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Correspondence Address:
Editor, JBUMDC, Bahria University Medical & Dental College, Adjacent PNS SHIFA,
DHA Phase II, Karachi Pakistan
+92-21-35319491-9
https//jbumdc.bahria.edu.pk
editor.bumdc@bahria.edu.pk
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REVIEWER'S LIST

The editor of JBUMDC extends gratitude to the following scholars for reviewing the manuscripts for current issue, Volume - 9 No 3 of JBUMDC

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Water and Human Health

Nasim Karim

Water is an essential requirement of human body. It makes up about fifty to seventy five percent of the human body. We can live without food for many weeks but for water it is only days. Water is part and parcel of our body tissues such as fats, muscles, bones etc and is the basic component of fluids like blood, juices in the digestive tract, sweat and urine. It is required on daily basis as human body cannot store it. Water being lost from skin, lungs, feces and urine needs replenishment on daily basis. However the daily amount required depends upon the body size, food intake, rate of metabolism, environmental and weather conditions and life style of any individual. On an average daily loss of water in adults accounts for two and a half to three litres whereas in elderly it is two litres per day that necessarily needs replacement to maintain health.[1]

About 1.1 billion people in the world do not have access to safe drinking water and eighty percent of all illnesses in developing countries are due to drinking unsafe water that causes 2.2 million deaths every year.[2] Sea water accounts for ninety seven percent of water on earth while fresh water is only three percent. About sixty nine percent of fresh water is present in the form of ice and thirty percent as ground water. Out of this only 0.25 percent fresh water is easily available to us as surface water that is in the lakes and rivers.[3] Thus safe drinking water is mainly available from the ground water. It has dissolved in it many types of metals and several other substances which are useful for human body but in a specific limit.[4]

The detailed insight into the story of water is, it maintains the (a) integrity of each cell present in our body (b) moistening of mucus membranes in the oral cavity and respiratory tract (c) fluidity of blood that keeps it flowing in our blood vessels with provision of nutrition and oxygen supply (d) the elimination of metabolic end products that is the waste products (e) fluid and electrolyte balance (f) body temperature (g) smooth mobility of joints by lubricating them (h) functioning of bladder by flushing and clearing the bacteria (i) composition of fecal matter good enough to avoid constipation (j) beauty of individual by keeping the skin moisturized and making the skin texture healthy(k) proper functioning of eye, spinal cord and amniotic fluid through its shock absorbing activity and property.[1]

Besides drinking water there are other sources also that provide water to the body .[5]About twenty percent of body water requirement can be fulfilled from food that we eat even if it is dry and solid while ten percent body requirement is met by the water byproduct produced as a result of digestive process in the body. This is a total of thirty percent therefore the remaining seventy percent water requirement of body is to be completed by intake of fluids mainly the drinking water. The daily requirement of women is 2.7 liters equal to eleven and a half cups and that of men is 3.7 liters equal to fifteen and a half cups of fluids. Majority of this intake should be preferably in the form of drinking plain water. Less water intake is needed in case of sedentary life style, cold weather conditions, diet composed of high water content like vegetables and fruits conversely more water intake will be necessary in case of active physical activities, hot and humid climatic conditions and diet composed of low water content.[6] Moreover people on a high-protein diet, high-fibre diet, pregnant or breastfeeding mothers, having vomiting or diarrhea, active physically, living in hot climate areas require higher fluid intake in comparison to others. However drinks that contain artificial sweeteners and other sugary fluids such as soft drinks, vitamin added drinks, mineral water added with flavours, energy drinks should be avoided for use as they load the individual with large amount of additional energy that is kilojoules with no essential nutrient at all, leading to excessive weight gain and hence predisposing them to many diseases. Mineral water or commercially produced mineral bottle water should be avoided as it contains salt that predisposes to retention of fluid. This leads to swelling, increase in body fluid volume with resultant increase in blood pressure. Drinking simple/ plain water is the best choice as it has zero calories, easily available and above all is inexpensive.[7]

Water intake can be improved by the tips provided by Center of Disease Control and Prevention. These are: (1) At work place always carry water in a bottle to have easy and ready access (2) If ice cold water is the choice then use freezer safe bottles for cold water provision throughout the day (3) Avoid using water with added artificial sweeteners or soft drinks as they affect our body weight. 20 ounce of sweetened soft drinks/ soda contains 240 calories for which a healthy alternate with no calories is simple plain water (4) Save expenses by choosing water instead of beverages whenever eating out at lunch or dinner (5) Improve the taste of drinking water by adding a wedge of lime/ lemon. It also increases the desire to drink more water.[8]

The qualities that make drinking water safe and best for health are: (1) It should have an alkaline pH between 7.0 and 9.5(2) It should contain alkaline minerals such as magnesium and calcium (3) It should have anti-oxidant

Nasim Karim
Professor and Head, Pharmacology Department
Bahria University Medical & Dental College, Karachi.
Email: nasimkarim.bumdc@bahria.edu.pk

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properties so as to slow down the aging process in the body (4) It should have no contaminants or toxins such as synthetic chemicals, radioactive substances, toxic metals, bacteria, viruses etc (5) It should have all naturally occurring minerals (6) It should have good taste in order to drink sufficient quantity to avoid dehydration.[9]

The US Center for Disease Control has notified that *"Except for boiling, few of the water treatment methods are 100% effective in removing all pathogens." "Boiling can be used as a pathogen reduction method that should kill all pathogens. Water should be brought to a rolling boil for 1 minute. At altitudes greater than 6,562 feet (greater than 2000 meters), you should boil water for 3 minutes." "Water temperatures at 160° F (70° C) kill all pathogens within 30 minutes. Water temperatures above 185° F (85° C) kill all pathogens within a few minutes. In the time it takes for water to reach the boiling point (212° F or 100° C) all pathogens will be killed, even at high altitude. The moment your drinking water reaches a rolling boil, the water has already become safe to drink."*

In third world countries like Pakistan awareness regarding the importance of water for maintenance of health and use of safe drinking water must be disseminated to people by electronic and print media in the communities and at the level of schools, colleges and higher educational institutes with emphasis to use water only after boiling for a healthy living.

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Original Article

Evaluation Of Phenotypic Methods For Detection Of Carbapenem Resistance In Isolates Of *Pseudomonas Aeruginosa* In A Tertiary Care Hospital

Shaista Bakhat, Yasmeen Taj, Faisal Hanif, Muhammad Faisal Faheem

ABSTRACT

Objective: To assess the effectiveness of Modified Hodge test (MHT) and Modified carbapenemase inactivation method (mCIM) for detection of carbapenemase enzyme produced by *Pseudomonas aeruginosa* strains that code for resistance towards carbapenem.

Study Design and Setting: This observational cross sectional study was carried out from January 18 to January 19 in microbiology department of PNS SHIFA Karachi.

Methodology: 140 isolates of *Pseudomonas aeruginosa* were cultured from pus samples of hospitalized patients from different wards like ENT, Surgery, Burn Unit, Plastic Surgery, ICU, Medicine, Pediatrics and family ward. These isolates were tested carbapenem resistance by two phenotypic methods namely MHT and mCIM test. This data was analyzed by using SPSS Version 23.0.

Results: In our research study mCIM method showed 100% sensitivity, 99.1% specificity, positive predictive value 96.1% and negative predictive value 100% as compare to Modified Hodge Test which gave 77% sensitivity, 99.1% specificity, 95.2% PPV and 100% NPV.

Conclusion: mCIM test is simple, accurate and more reliable method for detection of carbapenemase production as compared with MHT. It is recommended, cabapenemase producing isolates should be tested as a routine practice by all clinical labs laboratory.

Keywords: *carbapenem* resistance, mCIM, MHT, *Pseudomonas aeruginosa,* PPV, NPV.

INTRODUCTION:

The micro-organism *Pseudomonas aeruginosa* is a pathogen appearing as a common source of hospital acquired infections especially sepsis.[1] Resistance of microorganisms towards antibiotics is an upcoming crucial challenge in treatment of infectious diseases. This resistance comes with undesirable outcomes and morbidity, prolonged hospitalization, expense and even mortality.[2] Risk of death with *Pseudomonas aeruginosa* infection can surpass over 58.8%.[3] After the superbug methicillin resistant *staphylococcus aureus* which causes infections both in hospital and community infections by *Pseudomonas aeruginosa* are occurring Worldwide with limited treatment choices as a multidrug resistance. Unfortunately these infections have limited treatment choices as they are multidrug resistant. Carbepenem is the last resort against strains of *Pseudomonas aeruginosa*,[4] However its clinical use is facing problems as a result of resistance towards known carbapenem antibiotics (such as imipenem and meropenem).[5] This resistance is multifactorial as over-expression of efflux system, production of enzymes, reduction of pore expression, reduction of external membrane proteins expressions and topoisomerase enzyme. Carbapenem resistance is also arbitrated by mutated genes that transcribed for enzymes carbapenemase. According to Ambler classification these genes are classified into four classes depending on the amino acid sequence. Class A (KPC) and D (OXA) act through a serine-based mechanism while class B (IMP, VIM) depends on zinc to work therefore are called metallo-beta-lactamase. KPC [*Klebsiella pneumonae* carbapenemase] and VIM [Verona integron-encoded metallo-beta-lactamase] were regarded as the numerous type of carbapenemase. They were reported in United States, Israel, Turkey, China, India, the United Kingdom, Nordic countries and Greece till 2007. After 2008, NDM-1(New Delhi metallo beta-lactamase) was identified from isolates of *Klebsiella pneumonae* and *E coli* from India and Pakistan. OXA-48 genes are other plasmid borne which transcribe resistance and have been detected in strains of *Pseudomonas aeruginosa* from Middle East, Turkey and India.

Antibiotic resistant bacteria must be detected because suitable treatment is essential in curtailing the spread of resistant strains. Several phenotypic screening methods are used such as Kirby-Bauer (KB) disk diffusion antibiotic sensitivity test[6] on Muller Hinton Agar (according to CLSI standards

Shaista Bakhat
Senior Lecturer, Pathology Department
Bahria University Medical and Dental College, Karachi
Email:shaistakhurram2@gmail.com

Yasmeen Taj
Professor, Pathology Department
Bahria University Medical and Dental College, Karachi

Faisal Hanif
Assistant Professor, Pathology Department
Bahria University Medical and Dental College, Karachi

Muhammad Faisal Fahim
Researcher and Consultant Statistician
Bahria University College of Physical Therapy, Karachi

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sensitive and resistant zone), Carba NP test and eCIM. Other phenotypic detection methods for carbapenemase production are Modified Hodge Test[7] and mCIM method (modified carbapenemase inactivation).[8] Regretfully, carbapenem resistance is hard to detect by KB disk diffusion method in different laboratories. Recent CLSI policies suggest carbapenemase screening as a standard constituent of routine laboratory work. Despite the availibility of molecular methods for detection of carbapenemases transcribing genes which are more accurate they cannot be used for routine laboratory work as the method cumbersome and expensive. Among number of phenotypic used methods easily available are MHT and mCIM methods. mCIM method has newly been introduced by CLSI [http://clsi.org/standards/micro/ microbiology files][9] for phenotypic detection of carbapenemase in Enterobacteriaceae[10] . The efficacy of this test was assessed in a multi-center test and found to have 97% mean sensitivity and 99% specificity.[11] Another study carbapenemase was detected in *Pseudomonas aeruginosa* by mCIM and PCR-detected genes (KPC, GES, IMP, VIM, NDM, OXA-48, and NMC/IMI).[8]

Detection of carbapenemase in *Pseudomonas aeruginosa* strain is of extreme significance to evade hospital acquired resistant infections. The accessibility of precise and inexpensive carbapenemase detection methods may be an inducement for laboratories to scrutinize this problem and help prevent a major threat of antibiotic resistance trend in bacteria.

METHODOLOGY:

The observational cross sectional study was done at PNS Shifa a tertiary care hospital, Karachi. 140 samples of *Pseudomonas aeruginosa* were collected from jan 2018-jan 2019. This study was approved by Ethical Review Committee of PNS Shifa. Informed consent was taken from hospitalized patients. The strains of *Pseudomonas aeruginosa* were isolated from pus samples of infection of different body parts. Out-door patients, repeat samples from same patients and patients already on antibiotics were excluded. Samples of *P. aeruginosa* were received from various wards (Burn unit, ENT ward, Plastic surgery ward, paedriatic ward, family ward and ICU). Strains of *Pseudomonas aeruginosa* were grown on blood agar[12], MacConkey agar[13]. *Pseudomonas aeruginosa* clinical isolates yield large, smooth, mucoid colonies with flat edges and green pigments (Guangzhou Ikeme technology co Ltd) after incubation at 35°C±2°C for 24 hours. They gave colourless colonies on MacConkey agar (Shanghai Hungsun chemical co Ltd) after incubation at 35°C±2°C for 24 hours. Gram staining was done for confirmation of Gram negative rods. Then biochemical test (oxidase test) (Scien Cell) was done for *Pseudomonas aeruginosa.* When the reagent was oxidized by cytochrome C, it changed from colorless to a dark blue or purple compound, indophenols blue.

According to standard guidelines, preliminary AST (antibiotic susceptibility test) screening was done with disc diffusion method. Antimicrobial susceptibility testing was checked by disc diffusion method on Mueller –Hinton (MH) agar plate (Oxoid CM0337) as per CLSI 2019 (Clinical laboratory standard international) guidelines. Two carbapenem antibiotics like Meropenem 10µg(oxoid company) and Imipenem 10µg(Oxoid) were used. When zone is equal or less than 15mm it is interpreted as resistance both for imipenem and meropenem. Lawning was prepared with a 1:10 dilution of a 0.5 McFarland suspension of Escherichia coli ATCC 25922 on Muller Hinton Agar. Diameter of zone is 16-18mm is considered as intermediate. Diameter is equal or more than 19 indicates sensitivity for imipenem and meropenem.

Modified Hodge test and mCIM test were performed in all cases. Mueller Hinton agar was used to perform modified Hodge test[14]. Lawning was done with a 1:10 dilution of a 0.5 McFarland suspension of Escherichia coli ATCC 25922(provided by microbiology department of PNS shifa) on Muller Hinton Agar. Meropenem 10µg was used. Then test organisms and control positive were streaked on the lawn in a straight line from the edge of disc to the edge of the plate. These Mueller Hinton agar plates were incubated at 35±2°C for 24 hours. After 16-24 hours of incubation, a clover-leaf-type indentation was examined at the intersection of the test organism and E coli 25922, within the zone of inhibition of the carbapenem susceptibility disk. MHT (modified Hodge test) positive test indicated the carbapenemase production.

mCIM[15] was also used for phenotypic detection of carbapenemase. With the help of sterile inoculating loop, 1µl of test organism was put into 2ml tube of tryptic soy broth (TSB, Hi Media Laboratories); suspension was vortexed for 10-15secs. Then 10µg MEM disk was placed into 2ml tube and incubated for 4 hours ± 15 minutes at 35°C±2°C. E coli ATCC 25922 with turbidity equivalent to a 0.5 McFarland was prepared. Lawning was done on Mueller Hinton Agar. The MEM (meropenem) disk was removed from the TSB suspension and placed it on MHA plate and incubated for 24 hours. Results are considered as positive with zone 6-10mm, 11-19mm zone an intermediate results and >20mm as negative (no carbapenemase detected).

Statistical analysis of the data was done using SPSS version 23.0. Results were reported as frequencies (percentages) for categorical variables i.e source of specimens. The sensitivity and specificity of MHT for detection of carbapenemase-producing *Pseudomonas aeruginosa* were calculated and compared with mCIM as the standard method by chi square method. P-value <0.05 is considered as statistically significant.

RESULTS:

140 isolates of *Psedomonas aeruginosa* were cultured from

pus samples of different infection sites. The most frequent isolates were from ENT infections (47.1%) followed by co surgical wound infections (13.6%), burns super-infections (12.1%), diabetic foot (8.6%), plastic post-operative infections (7.9%), pediatric wound infections (1.4%) and officer ward (0.7%) as shown in (Tab 1). According to KB Disc Diffusion method, out of 140 *Pseudomonas aeruginosa* isolates 17 had zone size of =15mm indicating resistance according to CLSI 2019 as per Table 2. The results of mCIM showed 25 cases out of 140 as resistant with 100% sensitivity, 99.1% specificity, 96.1% positive predictive value and 100% negative predictive value as per Table 3. The results of MHT showed 20 resistant cases with 77% sensitivity, 99.1% specificity, 95.2% positive predictive value and 100% negative predictive value as per Table 4.

DISCUSSION:

Pseudomonas aeruginosa is the causative microorganism of hospital acquired infections. Multiple factors are responsible to make *Pseudomonas aeruginosa* as a nosocomial super bug such as imprudent administration of antibiotics, instrumentation and intrinsic resistance. So it is imperative to initiate suitable therapy. Several phenotypic methods are available for detection of carbapenemase producing microorganisms. Some clinical procedures for screening carbapenemase include MHT, CNPt, mCIM and eCIM. In our study, initial screening was done by AST. It was followed by two phenotypic methods MHT (Modified Hodge Test) and mCIM (Modified Carbapenemase Inactivation Method).

Table 1: Frequency of infection sites

Ward	Frequency	Percent
ENT	66	47.1
Surgery	19	13.6
Burn Unit	17	12.1
10-ICU	12	8.6
Medicine	12	8.6
Plastic Surgery	11	7.9
Paedriatics	2	1.4
officer ward	1	0.7

Table 2: Antibiotic (Carbapenem) Susceptibility Test

Carbapenems	Resistant <=15 mm	Intermediate 16-18mm	Sensitive >=19 mm
IMP	17	0	123
	12%	0%	88%
MEM	17	0	123
	12%	0%	88%

Table 3: 2x2 contingency table for mCIM

	mCIM		
	Positive	Negative	Total
Positive	25	1	26
Negative	0	114	114
Total	25	115	140

Table 4: 2x2 contingency table for MHT

	MHT		
	Positive	Negative	Total
Positive	20	1	21
Negative	6	113	119
Total	26	114	140

The most frequent *Pseudomonas* isolates from ENT samples as shown in tab 1. Other microbiological studies showed *Pseudomonas aeruginosa* is the most common cause of otitis media since II World War. The reason may be the common cold and ear infections after water infections. According to KB Disk Diffusion method out of 140 *Pseudomonas aeruginosa* isolates 17 had a zone size of =15mm indicating resistance according to CLSI 2019. mCIM showed 25 cases with zone diameter =10mm. MHT showed 20 isolates having resistance towards meropenem and imipenem with clover leaf indentation. Our study showed that among the phenotypic methods mCIM had the highest sensitivity 100%, 99.1% specificity, 96.1% positive predictive value and 100% negative predictive value. While MHT showed low results with 77% sensitivity, 99.1% specificity, 95.2% positive predictive value and 100% negative predictive value. These findings indicate that resistant cases may be missed by KB Disk Diffusion method which is used routinely in laboratory.

According to CLSI, AST (Antibiotic susceptibility test) is used as screening for detection of carbapenem resistant *Pseudomonas aeruginosa*, but it is not a confirmatory test.[16,17] Our findings in accordance with other studies like Van der Zwaluw et al (2015) recommended mCIM as highly sensitive, specific and inexpensive method for detection of carbapenemase. Virginia M et al explained the effectiveness of mCIM (Modified Carbapenem Inactivation method) with 93% sensitivity and 100% specificity for phenotypic detection of carbapenemase production.[18] Another study, Biewei Yu et al explained the effectiveness of mCIM for suspected carbapenemases among Enterobacteriaceae.[19] These studies are in accordance with our studies and endorsed the findings of mCIM method.

In our study the finding of MHT with 77% sensitivity, 99.1% specificity, 95.2% positive predictive value and 100% negative predictive value is also in accordance with other studies in which Lee K, Lim YS and et al identified 67% cases of metallo-beta-lactamase producing organisms with MHT.[20] After that Modified Hodge Test was introduced a step ahead of simple hodge test. A study was done in Pakistan explained the effectiveness of Modified Hodge Test with 69% detection of carbapenemases.[21] But with passage of time MHT had lost its effectiveness especially in detecting

NDM (New Dehli metallo-beta-lactamase). So Fernando Pasteron et al used Triton X-100 in their study in order to enhance the effectiveness of MHT for detection of NDM.[22] NDM-1 is zinc dependent enzyme,they considered deficiency of zinc in MHT was responsible for poor detection of NDM-1. They added 100microg/ml zinc sulfate but still failed. NDM-1 is lipoprotein acchored to the outer membrane with presence of canonical lipidation sequence (LSGC), called the Lipodox. In Triton Hodge test,they added non ionic surfactant, which allowed the detection of membrane bound carbapenemase. This was followed by another study in 2018, PAE-MHT (*Pseudomonas aeruginosa*-Modified Hodge Test) and chrom ID carba agar for detection of carbapenemase. This study indicated that PAE-MHT and chrom ID carba are sensitive and specific.[23] Further studies showed reduced value of this test for carbapenemase detection[24] and endorced use of mCIM as a routine practice in laboratories.

In our study high sensitivity positive predictive value (PPV) of mCIM supports the use of this test as a reliable tool for screening of carbapenemase producing strains of *Pseudomonas aeruginosa.* Prompt detection of carbapenem resistance is vital for infection control measures and epidemiological records. Further, it is important to make appropriate choice of antibiotics. Detection of carbapenem resistant *Pseudomonas aeruginosa* with simple and cost effective methods is recommended in absence of molecular techniques.

CONCLUSION:

mCIM test is simple, accurate and more reliable method for detection of carbapenemase production as compared with MHT. It is recommended, cabapenemase producing isolates should be tested as a routine practice by all clinical labs laboratory.

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Original Article

Role of Vitamin E as a Preventive measure Against Platelet Aggregation In Pregnancy Induced Hypertension

Kausar Aamir, Fatima Abid, Arfa Azhar

ABSTRACT

Objective: To correlate the preventive role of vitamin E levels and platelet count in patients with different grades of pregnancy induced hypertension. The secondary objective was to compare these grades with normal pregnant patients.

Study Design and Setting: This study was conducted in Obstetric OPD of Jinnah Postgraduate Medical Centre (JPMC), Karachi, from April 2002 through April 2004.

Methodology: The study group included 110 patients divided in three groups as Group A: n=40 Normotensive patients, Group B: n=40 Mild hypertensive (test group I), Group C: n=30 Severe hypertensive (test group II). All women were advised not to take any multivitamin supplements.

Result: Serum alpha tocopherol (vitamin E) was significantly low in severe and mild cases (0.32±0.00 mg/dl, 0.74±0.03 mg/dl respectively), when compared with normal pregnant women levels (0.78±0.040). The decreased platelet count (246820±1493.51) in mild cases and (135460±387.2) in severe cases was significant (P<0.01) as compared to the normal pregnant women (348000±574.35). The decrease platelet count values for severe cases were again significant (P<0.01) when compared with mild cases of PIH.

Conclusion: In patients with risk of preeclampsia adequate antioxidant nutrients may have a role in cessation of free radical-mediated cell disturbances, and thereby protecting against endothelial cell damage, which is the key factor in preeclampsia development.

Key words: Oxidative stress, Preeclampsia**,** Vitamin E

INTRODUCTION:

Pre-eclampsia is a distressing condition of pregnancy which presents with elevated maternal blood pressure, high protein in urine and body fluid retention, affecting around 2-5% of all pregnancies. Regarding the cause for the condition, various theories have been documented, however most prevalent factors which seem to play role are genetic and the placental dysfunction[1].

Pre-eclampsia has a large spectrum of effects and potentially involves all maternal organ systems[2]. Many theories have proposed diverse pathological changes including, abnormal trophoblast invasion in placental bed, coagulation abnormalities, immunologic phenomena, genetic predisposition and vascular endothelial damage. Defective placentation creates hypoxic condition which in turn increases oxidative stress in pre-eclampsia[3]. Increased production of oxygen radicals damage endothelial cells by enhancing the expression of adhesion molecules and causing imbalance of arachidonic acid metabolites[4].

The hydroxyl radical (OH^-) can initiate lipid peroxidation of cell membrane lipids, causes intermediate metabolites which results in an autocatalytic chain reaction of lipid peroxidation (Lipid-OOH) ultimately causes membrane damage and eventually, cell death. In addition, lipid peroxides impair endothelial prostacyclin synthesis[5]. In the light of these evidences many researchers have documented elevated lipid peroxidase reaction products in the preeclamptic subjects[6].

The increased lipid peroxide component is found to favor production of platelet derived thromboxane (TXA_2) above vascular prostacyclin ($PG1_2$) production[4].

Pre-eclampsia has been associated with alterations in the prostacyclin ($PG1_2$)/thromboxane (TXA_2) ratio thus increasing vasoconstrictor activity and platelet aggregation. Hence, alteration in $PG1_2/TCA_2$ ratio precedes the onset of clinical symptoms. Since endothelial cell injury also, decreases prostacyclin synthesis, an increase in peripheral vascular resistance and platelet aggregation occurs. All of these changes may contribute to the pathogenesis of PE[7].As it is known that the genesis of free radicals is the main factor in advent of extensive pathogenic events of pre-eclampsia, hence, free radicals scavengers (antioxidants) might be tried for therapy or prophylaxis. Antioxidant nutrients counter act the activity of free radicals in the body hence protecting peroxidation of lipids caused by free radicals[8]. It has been

Kausar Aamir
Department of Pharmacology
JPMC, Karachi

Fatima Abid,
Department of Physiology
JSMU, Karachi

Arfa Azhar
Senior Instructor, Biological and Biomedical Sciences
Department, Aga Khan University Hospital, Karachi
Email: arfa.amjee@gmail.com

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observed that antioxidant utilization is enhanced with increased free radical levels of antioxidants due to compensatory mechanism against oxidative stress[9]. Among several antioxidants Vitamin E has gained attention due to its activity against oxidative stress, lipid peroxidation and platelet aggregation[10], which are the key factors of pre-eclamptic development.

Alpha tocopherol represents the principal form of the tocopherols in animal tissue. However, recent evidence shows that gamma tocopherols and tocotrienols exhibit much enhanced activity against oxygen radicals in comparison to other forms[11]. Research experiments prove that vitamin E, working as an antioxidant acts as a chain breaking agent which withhold the membrane damage owing to oxidation more effectively than antioxidants which are water soluble like vitamin C, which deals with only liquid radicals, having no effect on membrane related radicals which carry chains[6].Vitamin E has also been found to amend adherence and aggregation of platelets hereby preventing the fatty streak progression and cell proliferation in a lesion to advance stage. Other important functions of Vitamin E include its ability to increase the activity of phospholipase A_2 and cyclooxygenase-1, which causes the release of prostacyclin. Investigations also show the inhibitory effect of vitamin E on platelet aggregation through protein kinase C inhibition and nitric oxide synthase activation[10]. Vitamin E usage was associated with better endothelial function and less placental dysfunction[12].

Based upon this hypothesis our study was designed to investigate serum levels of vitamin E in patients with different grades of pregnancy induced hypertension i.e. mild and severe and to compare them with normal pregnancy i.e. control.

METHODOLOGY:

Nearly 200 pregnant women visiting the Obstetric OPD of Jinnah Postgraduate Medical Centre (JPMC), Karachi, for perinatal care, were recruited for this study from April 2002 to April 2004. Written consent was taken from each participant. The study was approved by Institutional Review board. The diagnosis of pre-eclampsia was established according to predefined criteria of "The American College of Obstetricians and Gynecologists (ACOG)". Pre-eclampsia was classified as mild unless one or more of the following signs or symptoms were present, which changed the mild form of pre-eclampsia to severe form. In this: Systolic blood pressure =160 mmHg or 110 mmHg diastolic on two occasion 6 hours apart, Oliguria 24 hours (urinary output < 400 to 500 ml): Cerebral or visual disturbances: Pulmonary edema or cyanosis: epigastric or right upper quadrant pain and impaired liver function of unclear cause or thrombocytopenia. Out of 200 patients 90 patients did not follow up till the end of study period due to unexplained reasons. Finally 110 patients were followed and divided into three groups as:

Group A: (n=40) Normotensive patients (normal cases) i.e. pregnant women > 20 weeks gestation.

Grpup B: (n=40) Mild hypertensive > 140/90 mmHg (test group I) i.e. pregnant women > 20 weeks gestation.

Group C: (n=40) Severe hypertensive > 160/110 mmHg (test group II) i.e. pregnant women > 20 weeks gestation.

The pregnant females with maternal age of 15-38 years, gestational age 20-42 weeks and singleton pregnancy were included in this study. A predesigned proforma was used to record all important information related to personal history, maternal age, weight, height, systolic and diastolic blood pressure, parity, gestational age, any underlying illness, drug abuse history, family history of PIH or any complications occurred in previous pregnancies etc. Recent dietary intake was also recorded.Women having a history of vitamin supplementation before pregnancy, those with history of essential hypertension or high blood pressure due to kidney disease, endocrine disorder, any type of anemia, or any other chronic disease), multiple pregnancies and abnormal levels of serum creatinine (i.e. 1.5 mg/dl) were excluded from the study.For sampling, fasting venous samples of blood were taken and stored in tubes coated with heparin. Plasma separation was done by centrifuge method and initially stored at -80ºC to be analyzed later but within 1 week. á-tocopherol level was assayed by means of HPLC (high pressure liquid chromatography). Platelet count was done by fractional centrifugation after citric acid blood coagulation. A 24 hour urine sample was collected for proteinuria estimation by urine dipstick method.All the categorical parameters were analyzed with the help of by Chi-square test on SPSS version 22.

RESULTS:

Table 1 shows the mean maternal age, weight, height, gestational age and birth weight of normal pregnant and pregnancy induced hypertensive women. The mean maternal age of the severe cases of pregnancy induced hypertensive was 20.33±0.77 years which was significantly ($P<0.01$) low as compared to mild cases i.e. 23.37±0.75 years and highly significant ($P<0.001$) when compared to the control cases i.e. 25.0±0.6 years. The weight of normal pregnant women were 60.4±0.5 Kg while mean weight of the mild and severe cases of pregnancy induced hypertensive women were 58.05±0.4 Kg and 56.6±0.36 Kg respectively. There was no increase in the mean weight of the cases of PIH as compared to the normal cases, because of their comparative lower gestational ages which were 33.63±0.23 and 31.16±0.5 weeks in mild and severe cases of pregnancy induced hypertension. The mean gestational age of the controls were 36.6±0.37 weeks. The mean height of all respective groups were non-significant. The mean birth weight of mild cases was 2.924±0.019 Kg and severe group was 2.391±0.067 Kg, cases were highly significantly decreased ($P<0.001$) as compared to birth weight of normal pregnant controls i.e. 3.100±0.024.

Table 2 compares the blood pressure and proteinuria among three groups. The increase in systolic (144.5±1.11 mmHg) and diastolic (93.0±0.8 mmHg) blood pressure of mild cases and systolic (172.6±3.31 mmHg) and diastolic (127.5±2.07 mmHg) of severe cases were highly significant (P<0.001) when compared to controls: systolic (121±1.69 mmHg) and (77.7±1.11 mmHg). The increase in the systolic and diastolic blood pressure values for severe cases (group C) were again highly significant (P<0.001) when compared with the mild cases of PIH. Proteinuria was detected in 3 (7.5%) cases of normal pregnant women, 21 (52.5%) cases of mild PIH and 30 (100%) cases of severe PIH women.

Table 3 compares the antioxidant nutrient profile and platelet count values among the three groups. Serum alpha tocopherol (vitamin E) was significantly low in severe and mild cases (0.32±0.00 mg/dl, 0.74±0.03 mg/dl respectively), when compared with normal pregnant women levels (0.78±0.040).The decreased platelet count (246820±1493.51) in mild PIH cases and (135460±387.2) in severe cases were significant (P<0.01) as compared to the normal pregnant women (348000±574.35). The decrease in the platelet count values for severe cases were again significant (P<0.01) when compared with mild cases of PIH.

Table-1: Maternal Age, Weight, Height, Gestational Age And Birth Weight Of Normal Pregnant And Pregnancy Induced Hypertensive Women

Parameters	Normal cases (n=40)	Mild cases (n=40)	Severe cases (n=30)
Maternal age (yrs)	25.00±0.60	23.37±0.78	20.30±0.5036***##
Weight (kg)	60.40±0.50	58.05±0.50	56.60±0.36
Height (cm)	154.00±0.90	154.00±0.60	151.70±0.80
Gestational age	36.60±0.37	33.63±0.23	31.16±0.50
Birth weight (kg)	3.10±0.024	2.924±0.019***	2.391±0.067***

The values are expressed as mean and standard error of mean at "P" level of significance.

Table-2: Blood Pressure Values And Proteinuria Of Normal Pregnant And Pregnancy Induced Hypertensive Women

Parameters	Normal Cases (n=40)	Mild cases (n=40)	Severe cases (n=30)
Systolic blood pressure	121.00±1.69	144.50±1.11***	172.60±3.31***##
Diastolic blood pressure	77.70±1.11	93.00±0.80***	127.83±2.07***###
Proteinuria	7.5 (3)	52.50 (21)	100.0 (30)

The values are expressed as mean and standard error of mean at "P" level of significance.

*** (P<0.001) Highly significant as compared to normal pregnant women (normal cases)

(P<0.001) Highly significant as compared to mild cases of pregnancy induced hypertensive women.

** (P<0.01) Significant as compared to normal pregnant women.

(P<0.01) Significant as compared to mild cases of pregnancy induced hypertensive women

Table-3: Detection Of Alpha Tocopherol Vitamin E (Mg/Dl) In Normal Pregnant And Pregnancy Induced Hypertensive Women

Parameters	Normal cases (n=40)	Mild cases (n=40)	Severe cases (n=30)
Alpha tocopherol Vitamin E (mg/dl)	0.78±0.040	0.74±0.03	0.32±0.001***###
Platelet count	348000±574.35	246820±193.51**	135460±387.20**##

*** (P<0.001) Highly significant as compared to normal pregnant women.

(P<0.001) Highly significant as compared to mild cases of pregnancy induced hypertensive women.

DISCUSSION:

Pre-eclampsia is a major contributor to maternal and fetal mortality and morbidity. Its incidence and related maternal mortality is high in third world countries due to lack of antenatal care, poor socio-economic conditions and female illiteracy levels.[13] Oxidative stress has been implicated in the pathophysiology of pre-eclampsia. Also, the early stages of preeclamptic development are marked by enhanced activity of maternal clotting mechanism along with raised endothelial sensitivity to vasopressive agents. Physiologic irregularities of pre-eclampsia has been attributed to abnormalities in endothelial cells of maternal vessels due to emergence of free radicals from defective placenta. As a result of ongoing pathology in the vessels, the release of vaso-relaxing agents decreases, the process of vasoconstriction rise up, local anticoagulant levels goes down and pro-coagulant activity and production increases. Hence, the pathophysiology of preeclampsia revolves around these defective endothelial cells of maternal circulatory system.[14]

Under normal conditions healthy endothelium withstand platelet aggregation and coagulation on its surface[15]. This ability of resistance is due to endothelial cell dependent activation of potent circulating anticoagulant.[16]

Recently, much research is underway among preeclamptic women regarding the increased concentration thromboxane A2, which is a strong platelet aggregating agent and a dynamic vasoconstrictor, in comparison to decrease levels of prostacyclin, a vasodilator and suppresser of platelet activity.[4] Preventing PIH is one of the major goals of treating pre-eclampsia. Recent notion regarding increased usage of vitamin E (á-tocopherols) in PIH women point towards the probable defensive role of antioxidant nutrients in platelet aggregation and pregnancy induced hypertension.[10] Among other antioxidants of human body, Vitamin E is certainly the only lipid soluble antioxidant with chain breaking ability.[17]

Previously declared research material specify the involvement of free radical reactions in pregnancy induced hypertension as well as in other disorders like cardiovascular diseases and neoplasia[18].

The á-tocopherol component of Vitamin E out of four tocopherols is the only class suitable for human body. It has been stated to be a phenolic antioxidant, which acts as a free peroxyl radical hunter by donating its hydrogen atom to free oxygen radicals thus rendering them inactive and non-violent for human cells. Hence, Vitamin E has a crucial role in protecting polyunsaturated fatty acids (PUFA), cell membrane components and free radical related oxidation of low density lipoprotein (LDL).[19]

Much documentation has been done on the effects of nutritional supplements on maternal body during different stages and conditions of pregnancy. The centre of interest in this study was the serum concentration of vitamin E in PIH and the protective role which Vitamin E played against platelet aggregation mechanism. Our findings demonstrated the decreased plasma levels of vitamin E in severe cases of pregnancy induced hypertension. Also decreased platelet levels were recorded in severe cases of PIH indicating the enhanced aggregating activity of platelets thus decreased detection in plasma.The role of vitamin E as inhibitor of platelet aggregation has been investigated thoroughly. Hence, this can be hypothesized that decreased plasma concentration of Vitamin E due to its consumption in oxidative stress condition in pre-eclampsia, predisposes to increased platelet aggregation, thus leading to decreased serum levels in pre-eclampsia. Several previous studies have also identified an association between low levels of Vitamin E along with some other antioxidants with higher chances of pre-eclamptic occurrence. A meta- analysis showed relation between low Vitamin E levels and occurrence of pre-eclampsia, especially severe type of pre-eclampsia[20]. These trials provide more evidence regarding the activity of natural Vitamin E and other antioxidants in pregnancy. A case control study showed decreased incidence of pre-eclampsia in pregnant women on Vitamin supplements as compared to control group. Hence, there was 46% reduced risk of developing pre-eclampsia in supplement taking pregnant women.[21]A prospective study done on Vitamin E and C supplementation during the early weeks of pregnancy showed decreased incident of preeclamptic development in pregnant women by improving placental function and reducing oxidative insult. Natural Vitamin E thought to be more effective because of their antioxidant properties and their role in fighting free radicals which may lead to development of pre-eclampsia[22].However, some researchers have found increased levels of Vitamin E in PIH, which could be due to the compensatory mechanism taking place against increased oxidative stress[23].

Decreased vitamin E levels have already been documented in malnourished population of Asian countries as compared to western population[24] Also, vitamin E deficiency was found to be prevalent in South Asian pregnant women with healthy status. Bangladeshi researchers found á-tocopherol deficiency in 43.5% of the pregnant women[25]. A study done in India reported alarmingly high percentage of approximately 98% pregnant women deficient for vitamin E [26]. No direct study regarding vitamin E levels and its deficiency in Pakistani women was found except for a limited sized study with different objective of investigating suitable detecting method for vitamin E, which showed low levels of vitamin E in 4.9% of seemingly healthy adults [27]. Documented statistics regarding vitamin E deficiency in Pakistani population have not been found significantly, rendering it as an unexplored issue, which needs further research. However, a small sample sized study including diagnosed 25 PIH women was done in Karachi, which showed decreased blood pressure levels when alpha-tocopherol 400mg/day was administered to them from 24 weeks of gestation [28]. Hence, supporting the assumption of antioxidant role in decreasing the oxidative stress component in preeclampsia. Multiple antioxidant enzymes in the human body and exogenous nutrients provide defense against increasing oxidative stress and free radical damage. Several enzymes which acts as antioxidants are produced within the body, hence their production and levels cannot be manipulated easily. However, nutrients with antioxidant properties can be administered through diet and supplements to the patients.

It can be proposed that sufficient levels of antioxidants in mother can restrict the process of free radical production and lipid peroxidation, thus protecting the maternal endothelial cells[29]. It is recommended that antioxidant utilization in PIH should further be justified by large scale studies. Furthermore, to clearly identify the preventive role of antioxidant nutrients in averting the preeclamptic development and its related disorders, researchers should opt for nutritional intervention studies in pregnant women having history of preeclampsia.

CONCLUSION:

In patients with risk of preeclampsia adequate antioxidant nutrients may have a role in cessation of free radical-mediated cell disturbances, and thereby protecting against endothelial cell damage, which is the key factor in preeclampsia development.

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Original Article

Comparison of Calcium Hydroxide, Chlorhexidine and Triple Antibiotic Paste As Intracanal Medicaments In Patients With Acute Periapical Infections

Syed Adeel Ahmed, Shama Asghar, Safia Anwar

ABSTRACT

Objective: To compare the effects of calcium hydroxide, triple antibiotic paste (TAP) and chlorhexidine (CHX) as the intra-canal medicaments in post-operative pain reduction.

Study Design and Setting: This was a Quasi experimental study conducted in Bahria University Medical and Dental College, Department of Operative Dentistry for the period of six months.

Methodology: Patients with acute periapical infections in single rooted teeth were divided into 3 groups. Group 1 received Calcium hydroxide, group 2 received Chlorhexidine and group 3 received Triple antibiotic paste as intracanal medicament. Each group comprised of 30 patients therefore the total participants of the study were 90. Patients were recalled on 2nd, 7th and 15th day postoperatively and the pain was recorded by using Visual Analogue Scale.

Results: Among the study participants; two patients receiving calcium hydroxide were pain free after 2 days and this number increased to 11patients after 7 days. From the CHX group; nine patients were pain free after two days and 23 patients reported no pain after 7 days. In TAP paste group 3 patients reported no pain after 2 days and 22 after 7 days. No patient reported pain after 15 days in any group. Data was statistically analyzed by using SPSS version 23 and Chi-square test was used for descriptive analysis.

Conclusion: Intra-canal medicaments significantly reduced inter-appointment pain. The chlorhexidine and triple antibiotic paste were more effective as compared to calcium hydroxide.

KEY WORDS: Intra-canal Medicaments, Periapical Infection, Post-operative Pain

INTRODUCTION:

The reason behind the process of root canal treatment is to remove the infected pulp and eliminate the pain. This is achieved by chemo-mechanical debridement and cleaning of the root canal system followed by filling of the canals known as obturation. Microorganisms have a critical role in the pathogenesis of periapical and periodontal disease; hence their complete elimination is the key for success of root canal procedure.[1] The long-term success of an endodontic treatment can be affected by immediate post-operative pain in a tooth. The incidence of its occurrence is significantly more in teeth with necrotic pulps due to a larger amount of microorganisms present.[2] Total elimination of these microorganisms is, however, difficult to accomplish by chemo-mechanical preparation alone.[3] Placing intra-canal medicaments between appointments helps in the eradication of these microorganisms and promotes successful outcome of endodontic treatment.[4]

Syed Adeel Ahmed
Senior Lecturer, Department of Operative Dentistry
Bahria University Medical and Dental College
E-mail: dr.syedadeelahmed@gmail.com

Shama Asghar
Associate Professor & Head of Department
Operative Dentistry
Bahria University Medical and Dental College

Safia Anwar
Lecturer, Department of Orthodontics
Fatima Jinnah Dental College

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Intra-canal medicaments have been in use since the early 1900s to augment the chemo-mechanical debridement of the root canal system.[5] Calcium hydroxide has been in use since 1920 as an intracanal medicament in root canal treatment. Its antibacterial action is attributed to its ability to release hydroxyl ions (OH-).[6] However, it is not effective against E. faecalis which resides in the deeper parts of dentinal tubules where the pH tends to be stable because of the buffering action of dentin.[7] The search for a better alternative has led to the discovery of better antimicrobial agents like Chlorhexidine, metronidazole and a mixture of antibiotics known as triple antibiotic paste.

Chlorhexidine (CHX) has gained wide use in endodontics as an irrigant and intra-canal medicament owing to its superior anti-microbial activity.[8] The increased efficacy of CHX is attributed to its positively charged molecule which adheres to the negatively charged microbial cell wall, increasing the permeability of the cell wall resulting in cell death.[9] It is superior to iodine, potassium iodide and calcium hydroxide in removing actinomyces israelii from infected dentinal tubules.[10]

Recently a mixture of ciprofloxacin, metronidazole and minocycline, known collectively as triple antibiotic paste, has been used to disinfect the root canal system.[11,12,13,14] Triple antibiotic paste when used as an intracanal medicament aids in the development of dentin-pulp complex in immature teeth with pulp necrosis.[15] The rationale of the study was to find out the most effective intra-canal medicament for such cases in endodontics.

The purpose of this study was to evaluate the effects of calcium hydroxide, chlorhexidine and triple antibiotic paste as intra-canal medicaments on the inter-appointment pain in patients undergoing endodontic treatment with acute periapical infection.

MATERIALS AND METHODS:

This study was a quasi-experimental study design, conducted in the Department of Operative Dentistry, Bahria University Dental Hospital Karachi for a period of six months (April 2018 – September 2018). Total 90 patients with acute periapical infection in single rooted teeth were randomly divided into three groups of 30 each. Informed and written consent was obtained from all the participants. Patients between ages 17-55 and had acute pariapical infection in single rooted teeth with closed apices were included in the study. Immune-compromised patients with open apex, vertical or horizontal root fractures were excluded from the study. The patients in the first group (30) were given calcium hydroxide as intracanal medicament. The second group (30) received chlorhexidine, while the third group was given triple anti-biotic paste as intra-canal medicament. The root canals were performed by a single operator with significant experience in endodontics. In each group, pulpectomy was done using Hedstorm file no. 20 and the canals were prepared manually using a crown down technique. After preparation, canals were dried using paper points and intra-canal medicaments were placed using a lentulo spiral. Patients were recalled after 2nd, 7th and 15th day post operatively and pain was recorded using the visual analogue scale[16] on the following criteria: No pain=0; mild pain but no medication required=1-3; moderate pain that required a mild analgesic=4-7; severe pain not responding to mild analgesic=8-10. Patients who reported pain were prescribed flurbiprofen (Tablet Froben® 100 mg). The scores were recorded by one observer. The statistical analysis was done on SPSS version 23 and chi-square test was used to compare the results at a significance level of P – value < 0.05.

RESULTS:

A total of 90 patients participated in the study; aged between 17 and 54 with a mean age of 32.33 males and 57 females. In the calcium hydroxide group (Group 1) after 2 days, 9 patients showed VAS scores of 1-3 and 21 patients had scores of 4-7. No patients reported score 0. After 7 days, 11 patients reported no pain while 19 patients had scores 1-3. None of the patients complained of pain after 15 days. In the chlorhexidine group (Group 2), 9 patients reported score 0 and 21 had scores of 1-3 after 2 days. After 7 days, 23 patients had score 0 while 7 patients reported scores 1-3. None of the patients reported pain after 15 days. In group 3 (Triple antibiotic paste), 3 patients reported score 0 after 2 days while 27 patients had scores of 1-3. After 7 days, 22 patients reported no pain and 8 patients had scores of 1-3. None of the patients described pain after 15 days. Chi-square test was used to compare VAS scores of three intracanal medicaments, results depicted better effects for chlorhexidine and triple antibiotic paste than calcium hydroxide in controlling inter-appointment pain after 02 days (p-value =0.000) and 07 days (p-value =0.002). (Table 1) A comparison between gender and VAS scores of intracanal medicaments also revealed significant relationship after 2 days (p-value= 0.007), 7 male patients reported no pain and 24 reported scores of 1-3, while 33 female patients observed the scores of 1-3 and 19 reported the scores of 4-7. After 7 days, 31 male patients reported score 0 while 25 female patients reported score 0 and 32 reported scores of 1-3 with p-value= 0.000. (Table-2)

DISCUSSION: The success of endodontic treatment in teeth with pulpal necrosis or periapical lesions is based upon the effective removal of detrimental microorganisms from the root canal system. In addition to chemo-mechanical debridement, intra-canal medicaments have been proven to be valuable aides in root canal disinfection.[17] The results of our study reinforced this concept, as the pain caused by these remnant microorganisms was significantly decreased

Table-1: Comparison Of Intra-Canal Medicaments And Vas Scores On Day 2, 7, 15

Intracanal Medicament	VAS score 0	VAS score 1-3	VAS score 4-7	VAS score 8-10	P-Value
DAY 2					
Calcium Hydroxide	0	9	21	0	
Chlorhexidine	9	21	0	0	0.000
Triple Antibiotic Paste	3	27	0	0	
Day 7					
Calcium Hydroxide	11	19	0	0	
Chlorhexidine	23	7	0	0	0.002
Triple Antibiotic Paste	22	8	0	0	
Day 15					
Calcium Hydroxide	0	0	0	0	
Chlorhexidine	0	0	0	0	----
Triple Antibiotic Paste	0	0	0	0	

Table -2: Comparison Between Gender And Vas Scores Of Three Intercanal Medicaments

Gender	VAS 0	VAS 1-3	VAS 4-7	VAS 8-10	P-value
Day 2					
Male	7	24	2	0	0.007
Female	5	33	19	0	
Day 7					
Male	31	2	0	0	0.000
Female	25	32	0	0	
Day 15					
Male	33	0	0	0	------
Female	57	0	0	0	

in patients who earlier reported pain.

The results of our study showed that chlorhexidine and triple antibiotic paste were more effective in reducing inter-appointment pain than calcium hydroxide on days 2 and 7. The efficacy of all three medicaments was recorded equal on day 15. This result is in accordance with most studies comparing the three as intra-canal medicaments.[18,19] The anti-microbial activity of calcium hydroxide is due to its alkalinizing action in which ionization turns into hydroxyl ions. The hydroxyl ions deactivate bacterial lipopolysaccharides of gram negative bacteria, which are predominantly involved in root canal infections and the associated pain.[20] The present study shows effective pain relief from calcium hydroxide, with profound improvement in first 7 days and this was in harmony with the studies of Gome et al,[21] de Souza-Filho et al[22] and Gomes et al[23].

The antibacterial effect of chlorhexidine is attributed due to its ability to adsorbed in the anionic substrate and be subsequently released from these site over time (substantivity), thus providing long term antibacterial effect. The results of our study were in agreement with Barbosa et al, who found that the antibacterial effect of chlorhexidine was better than calcium hydroxide.[24] The present study showed that the efficacy of chlorhexidine in reducing the bacterial endotoxins and thus reducing interappointment pain was better than calcium hydroxide. Signoretti et al also confirms this finding in his *in vitro* study.[25] Studies have found that *E. faecalis* is resistant to calcium hydroxide, especially when a high pH is not maintained.[26] Dametto et al in his study showed that 2% chlorhexidine significantly reduced *E. faecalis* colonies.[27]

Triple antibiotic paste showed higher antibacterial activity than chlorhexidine.[28] This is in contrast with our study which shows that there was no significant difference between the activities of triple antibiotic paste and chlorhexidine, which was indicated by the fact that the number of patients with reduced pain was almost equal in both these groups. The effect of triple antibiotic paste however, was better than calcium hydroxide, which coincides with the study of Adl A et al.[29]

In regards to the limitations of the study, randomization of the patients was not done before placing them in one of the three groups. The sample size was also limited and a bigger sample size would have added the significance results. The long term follow-up following the treatment would be recommended in future studies.

CONCLUSION:

The addition of intra-canal medicaments significantly reduces the effects of microbial endotoxins and consequently inter-appointment pain. In patients with acute periapical infections, triple antibiotic paste and chlorhexidine were found to be significantly better in relieving inter-appointment pain as compared to calcium hydroxide.

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Original Article

Social And Health Related Effects of Smart Phone Usage Among University Students

Junaid Tariq, Ambreen Usmani, Maroosha Imran, Naveed Faraz

ABSTRACT:

Objective: To assess the social and health related effects of smart phone usage among the students of a public university in Karachi.

Study Design and Setting: Cross sectional study conducted on students of a public university of Karachi from July 2018 to October 2018

Methodology: A research questionnaire was distributed among students of a public university in Karachi. This anonymous questionnaire addressed the perceptions of the university students regarding usage of smart phones and its effects on health and social life. A total of 150 students were included in the study. The variable checked were effects on eyesight, whether the students feel relaxed or suffered from depression, experiences of headache, the effect on the students' studies and family issues. Data was entered in SPSS version 23 and frequencies were calculated. Chi-square was applied on each variable and p-value less than 0.05 was considered significant.

Result: One hundred and fifty students participated, of which 75 were females and 75 were males. It was observed those females were using WhatsApp more than their male counterparts. Males showed a slightly higher frequency of using Facebook and other internet Apps. From the total sample 66.6% noticed decrease in their eye sight, 17% are depressed, 38% had headache, 42% had bad effects on their studies and 43% had family related issues due to usage of smart phone

Conclusion: Use of smart phone has many adverse effects on university students like poor eye sight, depression, headaches, effects on studies and family issues.

Key words: Impact, depression, smart phone, university students.

INTRODUCTION:

Mobile phones are becoming increasingly ubiquitous. In the beginning it was used as a communication tool, however with time the innovation and growth of the mobile phones is astonishing and used for web browsing, social networking, watches, alarms clocks, games, camera, and calculator etc.[1] Smart phones are modern gadget and popular in all ages. The use of smart phones among young children and students has increased dramatically. Although it has some advantages however, concerns have been raised about the adverse health impacts associated with their use. One of the most widely expressed concerns is the radiofrequency (RF) waves emitted during use which may lead to an increase in brain cancer risk.[2] Excessive use of mobile phones may cause psychological illness such as dry eyes, computer vision syndrome, weakness of thumb and wrist, neck pain and rigidity, increased frequency of De Quervain's tenosynovitis, tactile hallucinations, nomophobia, insecurity, delusions, auditory sleep disturbances, insomnia, hallucinations, lower self-confidence, and mobile phone addiction disorders.[3]

According to the latest studies, increase dependence on mobile phones may lead to an increase internet addiction.[4] Research has proved that smart phone is a source of the eminence of electromagnetic waves. Several studies have been conducted in the last decades to identify the effect of electromagnetic waves emitted from the cell phones on human health. The impact of harmful radiation emitted from cell phones waves is still being studied.[5]According to literature; male users spend less time as compared to female like many other studies.[6,7,8] There are many ill effects on health due to the utility of smart phone as on the eye sight.[9] Some researchers have pointed out that these gadgets have effect on the studies excessively and results in academic decline due to more time spend on gadgets.[10] It is also observed that family relation were also affected due to lack of conversation with their family members. Studies revealed that children have started to feel emotionally unsatisfied as parents are becoming equally dependent and addicted to smart phones.[11] Studies have shown that how adolescents experience domestic violence especially with those who have a higher likelihood of smart phone addiction.

Junaid Tariq
Program Coordinator (HPE)
College of Physicians and Surgeons
Karachi

Ambreen Usmani
Professor, HOD - Anatomy,
DD-Medical Education
Vice Principal Medical College
Bahria University Medical and Dental College
Karachi

Maroosha Imran
MBBS student
Ziauddin University, Karachi

Naveed Faraz
Professor, Department of Pathology
Bahria University Medical and Dental College
Karachi

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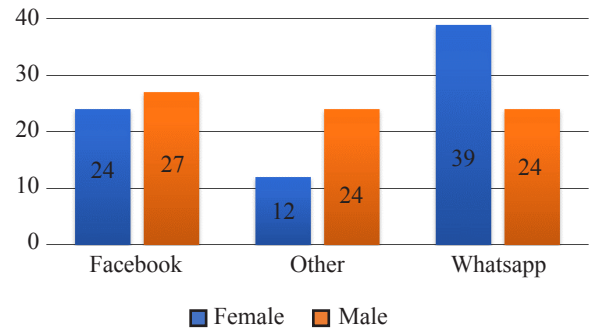
Furthermore, higher levels of self-control and peer relationship satisfaction has been shown when there is decrease utility of smart phone addiction.[12] There is the potential effect of smart phone addiction on family stress and increasing depression .[13, 14] Excessive usage can lead to depression and further suicide tendency, a study showed that 17% of the students claimed to feel depressed, whereas other studies predict that more than 60% of the teenage population by the end of 2020 would show symptoms of depression.[15, 16, 17]

The aim of this study was to assess the social and health effects of smart phone among the students of a public university of Karachi such as effects on eye sight, headache, depression, studies related and family related problems.

METHODOLOGY:

This study was performed by convenient sampling for a period of three months from July to October 2018. This anonymous questionnaire addressed the perceptions of the university students regarding usage of smart phones and their impact on health and social life. A total of 150 students were included in the study. Multiple questions were asked related to the eye sight, depression, headache, effect on studies and family related issues. The data was entered and analysed by SPSS version 23.Chi-square was applied on each categorical variable and p-value less than 0.05 was considered significant.

Graph 1: Gender differences in using social websites



RESULTS:

One hundred and fifty students participated, of which 75 were females and 75 were males. Overall perception was that female was using WhatsApp more than their male counterparts. Males showed a slightly higher frequency of using facebook and other internet Apps. (Graph-I).It was observed that eye sight was markedly affected as 66.6% showed negative impact on eye sight. 50% of people showed no effect on their psychological behavior after they were using smart phone. It was observed that 44% of sample expressed no headache after using smart phone while 38% were suffering from headache. 58% has no effect on their studies as compare to 42% who have effect on their studies if they were using smart phone. It was observed that people who were more involved in using smartphone their relation with their family members were less emotional as 57% of sample has unsatisfied family relation as compare to 43% who have good relation with family members. (Table- 1).

DISCUSSION:

Technological advancements in mobile phone industry have changed the way we interact with our peers. This study was done to observe the impact of using smart phone over health. It was observed in the study that male users spend less time as compared to female like many other studies.[6, 7, 8]We observed that the eye sight of those who were using smart phone was markedly affected with a decrease in eye sight, which was similar with another previous.[9] Headache is prevalent in smart phone user, this was also reflected in our study. Due to wastage of time some researchers have pointed out that these gadgets have effect on the studies who use

Table 1: Adverse effects of Smart Phone on Health

Variables		Male	Female	Total	P-value
Eye sight effect	Yes	51(34%)	49(32.6%)	100(66.6%)	0.017
	No	13(8.6%)	18(12%)	31 (20.6%)	
	Don't Know	11(7.3%)	8 (5.3%)	19 (12.6%)	
Feel like	Relaxed	23 (15%)	26 (18%)	49 (33%)	0.039
	Depressed	14 (9%)	12 (8%)	26 (17%)	
	No Effect	38 (25%)	37 (25%)	75 (50%)	
Headache	Yes	20 (13%)	37 (25%)	57 (38%)	0.015
	No	40 (27%)	26 (17%)	66 (44%)	
	Don't Know	15 (10%)	12 (8%)	27 (18%)	
Effect on Studies	Yes	26 (17%)	37 (25%)	63 (42%)	0.006
	No	49 (33%)	38 (25%)	87 (58%)	
Family Issues	Family satisfied	31(21%)	33 (22%)	64 (43%)	0.007
	Family unsatisfied	44 (29%)	42 (28%)	86 (57%)	

smart phones excessively which result in academic decline, this was highlighted in our study.[10] It was also observed that people involved in using smart phone their family relation tend to be affected due to lack of conversation with their family members. Studies show that children have started to feel emotionally unsatisfied as parents are becoming equally dependent and addicted to smart phones.[11]Studies have shown that adolescents experience domestic violence due to addiction of smart phone. Furthermore, higher levels of self-control and peer relationship satisfaction has been shown when there is less addiction of smart phone.[12]Although the results of this study need to be further clarified and validated by further studies, our study provides evidence regarding the potential health effects due to smart phone addiction like other studies.[13,14] Excessive usage can lead to depression and further suicide tendency, a study showed 17% of the students claimed to feel depressed, whereas another studies predict that more than 60% of the teenage population by the end of 2020 will show signs and symptoms of depression.[15,16,17]

With widespread use of the smart phone, clinical evidence for smart phone addiction remains unclear. Against this background, a study analysed the effect of smart phone use patterns on smartphone addiction in Korean adolescents. A total of 370 middle school students participated and severity of smartphone addiction was measured through clinical interviews and the Korean Smartphone Addiction Proneness Scale. As a result, 50 (13.5%) were in the smartphone addiction group and 320 (86.5%) were in the healthy group. For smartphone functions mostly used, the addiction group showed significantly higher scores in online chating.[18] For problematic use, the addiction group showed significantly higher scores on pre-occupation, tolerance, lack of control, withdrawal, mood modification, conflict, lies, excessive use and loss of interest.[19]In our study the effects of being addicted and resulting in headache was shown in 38%students which was comparable with is various literaturure. [11, 20]

Excessive use of smart phone causes adverse effects on studies as more time is spent on internet surfing. Making virtual friends has become more popular rather than real friends. In our study 63% said that their academic studies have been adversely affected as evidenced in ample literature.[2,9, 20 15 .] Total 57% students commented that they suffer from family issues including feeling of depression and being deprived of a lot of luxury when they see photos of others who pose artificial happy photos and selfies which itself has converted into a syndrome.[5]To keep up with the time changes smart classrooms are being used in affluent colleges, again leaving the less privileged deprived which results in family pressure and issues but it must be understood that social media is only an adjunct and not a replacement of classroom teaching.[21]

The use of mobile technologies is a promptly growing field which includes various specialities. Audio-visual communication via smartphones is a new introduction that has spread enormously throughout the world and gaining more popularity by including attractive apps. A nationwide survey performed in the United States in 2011 included 3306 medical providers and found that more than half used various apps in their clinical practice, some of which had not been specifically developed for medical purposes.[1,7 9]

WhatsApp Messenger is one of the most popular mobile apps, [22] its usage is becoming more popular as a social site as well as a forum for studies exchange of notes and knowledge sharing in the form of articles and e-books. The requirement of only a mobile internet connection explains the app's widespread success.[23, 24]

Increasing use of social media by our present generation of students has its own pros and cons. However, if used in the right way, social media might be deployed to complement medical education." There are certain peculiarities of social media which make it an ideal platform for teaching. It connects a large number of people at the same time. The participants have freedom of choosing a time when they want to access the information posted. "A single topic of discussion or a single case can be discussed over 1 or 2 days at leisure, which makes the exercise more interesting. The indiscriminate sharing of data on mobiles, particularly on group chats, raises further challenges. The usage of skype including other video sharingprocedures has allowed lectures by eminent scholars to be delivered to students of different countries which allows sharing of recent knowledge and keeping scholars up to date.[15, 19, 21]

CONCLUSION:

It was included in this study that use of smart phone has many social and health effects on university students like poor eye sight, depression, headaches, effects on their studies and family issues.

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Original Article

Assessment Of Depression Among The Dentists Of Karachi By Using AKUAD Scale

Kiran Fatima Mehboob Ali Bana, Zubair Ahmed Abbassi, Samina Saleem

ABSTRACT:

Objective: To assess the anxiety and depression among the dentists of Karachi by using AKUADS.

Study Design and Setting: It was a cross sectional study design conducted in Karachi.

Methodology: The calculated sample size was 293.The data was collected over a period of 3 months with the help of validated Questionnaire of Aga Khan University Anxiety and Depression Scale (AKUADS). Informed consent was taken and rationale was explained to all the participants before commencement of this study.

Results: Our study focused on sample of 234. The response rate was 79.8%. The anxiety and depression was prevalent in 67.9% of dentists from Karachi. Males and unmarried/single dentists were more depressed than females and married dentists. The 24-30 years of dentists having more than five years of professional experience and were working more than 40 hours per week were found to be more depressed n=82 (72.56%) than the dentists who worked less than forty hours per week; n=77 (63.6%) and calculated P value was 0.093. When analyzing the association between anxiety and depression and working sector; dentists who worked in private sector (n=81) 71.05% were found to be more depressed than the dentists worked in Public sector and the calculated P-value was 0.197.

Conclusion: The study rendered substantial data about unexpectedly high prevalence of anxiety and depression among the sample of dentists from Karachi. It was inferred from the study that experience in professional field, age of dentists, more than 40 hours working per week and working in private sector have been associated with anxiety and depression among the dentists of Karachi.

Keywords: AKUADS, Anxiety, Dentists, Depression

INTRODUCTION:

Worldwide, every individual is well known with the terms "Anxiety" and "Depression". There is not a single place left in this world which is devoid of depression and anxiety[1, 2] and it causes negative brunt on professional and personal life of an individual.[3] The condition of agony, panic or excessive worries results in unexpected and unpleasant physical and psychological symptoms is known as anxiety, which may lead to undesirable physical and psychological symptoms and unpleasant state.[4] The lack of interest in daily activities with low spirits is known as depression.[5] To address this problem, satisfactory mental health is the right of every individual on this earth. Mental health is an iceberg phenomenon which is under-diagnosed, under estimated and under treated in most part of the world.[1]Healthcare physician are facing more challenges towards their job and are at higher risk of having mental health issues which exacerbates anxiety, depression. There is ample literature available on mental health status in developing world stating that worldwide two third burden of mental health problems is in developing countries and will become more worsen if not addressed on a timely manner.[6]

Like Medicine, dentistry itself is a stressful profession and the stress commences from dental schools going way beyond their professional lives. [7] Upon taking step in professional life dentists bump into multiple stressors resulting in deterioration of physical and mental health. Occupational stress in dentistry was highlighted worldwide due to the competitive job market, demands of experienced, trained and qualified professionals, day to day technical innovations and competition to meet the benchmark of accreditations bodies in all the teaching and management Institutes[8]. Beside the pressure of occupational stress, there is a huge burden to improve the quality of life through handsome salary, sound mind and body, professional and personal development. All these stressors have a negative impact on personal and professional life of dentists.[9-12] In developing countries like Pakistan; there were some studies conducted which revealed the prevalence of anxiety and depression among the habitants of Karachi was 25% to 30% .[13,14] According to Khuwaja AK (2004); anxiety and depression in family practitioners was high as compare to general population.[3]From Rawalpindi and Islamabad 38.8% of dentists were severely stressed out.[15]Another study conducted at Islamic International Dental Hospital Islamabad to assess the stress and its associated factors among the dentists of only one Institute.[16] During 2005-2015, the prevalence of depression was augmented

Kiran Fatima Mehboob Ali Bana
Senior Lecturer Department of Community and Preventive Dentistry, Bahria University of Medical and Dental College
E-mail: kiranbana291@gmail.com

Zubair Ahmed Abbassi
Head of the Oral and Maxillofacial Surgery
Jinnah Sindh Medical University Karachi

Samina Saleem
In-dependent Researcher
Karachi University

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Accepted: 14-05-2019

and reached up to 18% according to World Health Organization.[17]

To accept the mental health problems in an individual and equipped for screening or treatment is not even welcomed by health care professionals and this is even not a routine practiced to assess the mental health problems including depression and anxiety. [1] Many a times; mental health problems of healthcare professionals are disregarded not only by general public but even from physician's themselves[1]. In developed countries like Canada, USA; significant work has been performed to assess the mental health status of healthcare personnel and more should be done in developing countries.[1, 18]

There is not such framework developed and practiced in developing countries to assess the mental health issues mainly depression and anxiety in general population. According to literature; there is not even a single study conducted in Karachi, Pakistan; which assessed the prevalence of anxiety and depression among dentists by utilizing Aga Khan University Anxiety and Depression Scale (AKUADS) and this was indeed the rationale of this study. It was hypothesized that there was an impact of age, gender, marital status, place of working and years of experience since graduation over anxiety and depression among dentist of Karachi.

METHODOLOGY:

It was a cross sectional study conducted in Karachi from April to June-2017.The dental Surgeons working in metropolitan city of Karachi, Pakistan were the study population. The sample size was 293 and was calculated by using the standard formula with the help of 20% prevalence.[19] By convenience sampling, self-administered questionnaire of AKUADS was distributed among all participants after informed consent was obtained. The general Dental practitioners having greater than one year of experience in any sub specialty of dentistry were included in this study. House surgeons and general dental practitioner who suffered from depressive symptoms for less than six weeks and had bereavement in the last six weeks were excluded from the study. (AKUADS) was formulated exclusively for screening in psychiatric setting of Pakistan. It is used in Primary Health Care Setting and integrates basic somatic metaphors of depressive disorder which are culturally apposite in the setting of our society.[5,20] AKUAD Scale consists of 25 items. The score > 20 indicates cut-off for the presence of anxiety and depression.[20,21] Other questions were also added in AKUADS questionnaire to assess socio-demographic and professional work load. Socio demographic variables included were age, gender, marital status, years of experience. Professional characteristics included were working hours per week and place of working such as public or private sector. The study was conducted after approval from ERB, BUMDC; reference number 209/116. Participants were assured of their confidentiality hence they were encouraged to give a complete honest response. The data was analyzed on Statistical Package for the Social Sciences (SPSS) version 23.[22]Association between different variables were assessed through application of chi square ($\div^2$).P value less than 0.05 was considered as statistically significant.

RESULTS:

The total number of inducted participants was 293 from which 234 dentists filled the questionnaire completely hence included for data collection and calculated response rate was 79.8%. The frequency of anxiety and depression among the sample of dentists from Karachi was found to be 67.9%. From the total number of participants there were n=113 (48.3%) male and n=121 (51.7%) female dentists. The age stratum was divided into 24-30 years, 31-40 years and more than 41 years of age. Majority of dentists were between 24-30 years of age; n=121 (51.7%), n=81(34.6%) were fall under the age bracket of 31-40 years and least number of dentists n=32 (13.7%) were of more than 41 years of age. There were n=127 (54.3%) unmarried dentists and n=107 (45.7%) married dentists from the entire sample. The experience period of dentistry profession was again divided into three groups. Most of the dentists; n=101(43.2%) had less than five years of experience; n=96(41.0%) had more than five years of experience and n=37(15.8%) had more than 10 years of professional experience. Depression was found to be highest in second group of more than five years of professional experience; n=69 (71.8%) and the calculated P value= 0.010. Majority of dentists; n=121(51.7%) worked less than forty hours per week and n=113(48.3%) were working more than forty hours per week. When analyzing the association between anxiety and depression and working sector; dentists who worked in private sector (private teaching Institutes, clinics) (n=81) 71.05% were found to be more depressed than the dentists worked in Public sector (Public teaching Institutes, hospitals) and the calculated P-value was 0.197. Therefore we accept the research hypothesis. (Table-1, Graph-1 and Graph-2).

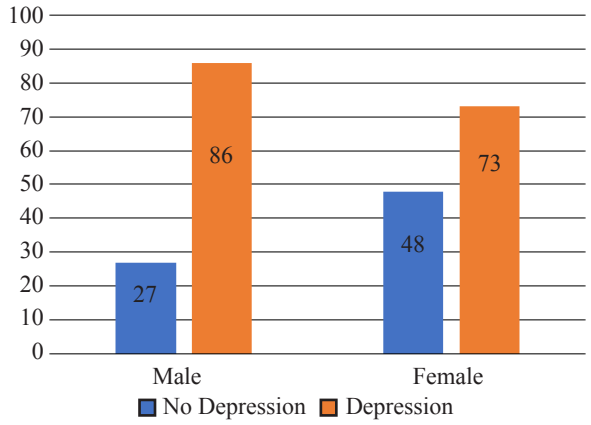
DISCUSSION:

In this study; the anxiety and depression was prevalent in 67.9% of dentists by using AKUADS; which was quite high as compare to the study conducted in Rawalpindi and Islamabad, in which 38.8% dentists were severely depressed.[15] According to the studies conducted in Lahore; on HADS Scale 1.0%and 7.2% doctors were suffering from severe depression and anxiety and 24.8% and 34% doctors were suffered from mild to moderate depression and anxiety respectively[1]. The prevalence was found to be 39% by using the same AKUADS study tool among family practitioners of Karachi[3] and these results were relatively elevated than the anxiety and depression score among the natives of Karachi by using similar AKUADS instrument in community based surveys[14,23];these results were analogous with the study conducted in UK 2014 which depicted that dentists in UK recorded a higher average anxiety score of (53%)

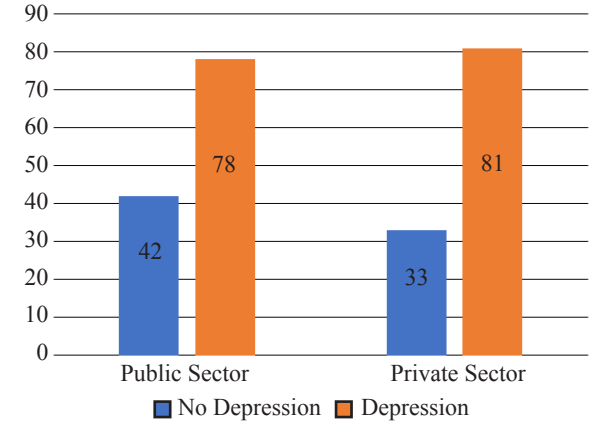
Table-1: Depression and Its Associated Factors

Independent Variable	Depression	No Depression	N=234
Age of dentists			
24-30 years	72	49	121
31-40 years	61	20	81
> 41 Years	26	6	32
Years Since Graduation			
<5years	59	42	101
>5 years	69	27	96
>10 years	31	6	37
Marital Status			
Single	85	42	127
Married	74	33	107
Average number of working hours per week			
<40 hours per week	77	44	121
>40 hours per week	82	31	113

Graph 1: Gender and Depressrion



Graph 2: Working Place and Depression



compared with the UK adult (39%) population.[23] According to the study conducted amongst Yemeni dentists; 22.2% dentists had depressive symptoms[19] and in nursing staff the [24]reported incidences of anxiety and depression were 25%; another study reported[25] 27.8% of dentists were anxious and depressed. The reported prevalence of stress among dentists in Kerman was 58.9%.[26]Similar results have been reported in several studies among general dentists in the UK (68.4%) [27], dentists in Denmark (59.7%) [18] and orthodontists in Morocco (44%).[18]

Although in our study; there were more females (51.7%) as compare to male (48.3%) but (76.1%) males were found to be more depressed than female dentists. These results were opposite to the study conducted among doctors in Lahore (Pakistan) which revealed that female doctors were more anxious then male doctors and the impact of gender on anxiety scores was significant *(p*-0.002) by using Hospital Anxiety Depression Score (HADS).[1]According to the study conducted in Yemen; gender of dentists have insignificant difference in occupational stress score which was due to similar stressors and working environment for male and female dentists in Yemen[19] and this finding mirrored a study in Kerman[28]. There were multiple studies; revealed that females were more depressed and anxious as compare to males.[29] Conversely female Irish dentists were observed having more stressed than males.[30] In 2004; one of the study conducted on family practitioners of Karachi revealed that mental and physical health of female doctors were significantly more affected by stress and community-based studies from Pakistan also divulged that depression and anxiety was widespread more among female practitioners.[14] Multiple studies also reported similar results among female dentists in Germany, Greece, United States, Spain, and Brazil.[8] These results indicate that women have a significantly higher prevalence of depression compared with men. This is due to the emotional differences between the two sexes and the aforementioned cultural responsibilities of Turkish women.[31] Several studies depicted that female doctors have six times higher risk of developing depression and anxiety[6] psychological distress and suicidal ideation[31]than male doctors according to the study conducted in Karachi.[3] BDA research report of 2014 expressed that high job stressed were reported by men and this difference was not significant in that report.[23] There were ample literature evidenced the similar results like our study that apparently males are more depressed then females.[31]

In this study, anxiety and depression score was more higher in 24-30 years of dentists and the P-value was 0.014 when comparing all three age stratum of dentists and these results were congruent with another study conducted in which less than 30 years of dentists were more depressed than older dentists[19]because of lack of experience, emotional exhaustion, new job hunting, competition and these results were also similar with study of Bourassa and Baylard[19]. According to the report regarding the levels of personal wellbeing among UK Dentists revealed that stress level related to work was noteworthy among middle aged dentists and there were not remarkable differences between job related stress with age,

gender or marital status.[23]

In this study, majority of unmarried/single dentists were found to be more depressed but statistically insignificant difference was found at P-value of 0.385 than married dentists. These results were in harmony with the study conducted in Yemni Dentists [19] in addition to the depersonalization and personal accomplishment score was higher among single dentists according to the study conducted among Turkish dentists[30]. According to the study conducted among doctors in Lahore; Pakistan, marital status has insignificant impact on anxiety and depression on Hospital anxiety depression score (HADS).[1]

The results of our study depicted that depression was highest among the dentists with more than five years of working experience as compare to other groups in this study; p value was 0.010 and these results were analogous with one of the study[25] in which P value was 0.001.According to the study in 2016; general dental practitioners who had less than 10 years of experience were more stressed then those dentists who were much experienced (20 years).[26]Earlier studies demonstrated the analogous results that experience is an important factor to control and manage the level of stress.[26] Clinical experience has an impact over reduction of stress as lack of experience is recognized as anxiety of making mistakes and lack of expertise to handle patients.[26,31] One of the study conducted in Lahore that doctors with lesser service years were more depressed, while total serving years had no significant impact on anxiety scores.[1]In United Kingdom, senior medical staff had higher levels of psychological stress and anxiety.[23] In another study, 50% of junior doctors suffered from emotional disturbance.[15]

Substantial numbers of dentists from Karachi were depressed than the dentists from Rawalpindi and Islamabad [15] possibly due to competitive job market, law and order conditions of the city and transportation (congested traffic routes due to construction of overhead bridges which covered the entire metropolitan city of Karachi). Job security has a strong association with depression and anxiety. In this ongoing study; the depression was higher among the dentists who worked in private sector (71.05%) as compare to the dentists who worked in public sector and these results were congruent with the study of NM Al Zubair et al. [19]There was an unmet need to educate the dentists with the coping strategies as to combat with this huge burden of mental disorders.

There were multiple strengths and limitations of this study. Utilization of AKUADS study tool was the strength of this study. Conversely this study is unique as no such study has been conducted in Karachi to assess the depression and anxiety among dentists. Sample technique was also the limitations of this study and the results from our sample cannot be deduced to the wider population of dentists in Karachi, Pakistan. It is recommended that different types of stressors should be incorporated in the questionnaire so that mental health promotion and mental disorders preventive strategies would be formulated by targeting the type of stresses. This is also recommended that stress management together with personal and professional awareness training should be included in the undergraduate curriculum so that threats to mental and social wellbeing, which might occur during the professional life, can be avoided or addressed. Further research and analysis may yield more prolific results, helping us to formulate guidelines to screen anxiety and depression in dentists, and deal with suffers more appropriately and at early stages. Healthy dentists can warranty explicit oral health care delivery.

CONCLUSION:

The study rendered substantial data about unexpectedly high frequency of anxiety and depression among the sample of dentists from Karachi. It was inferred from the study that experience in professional field, age of dentists, more than 40 hours working per week , marital status and working in private sector were the factors influencing anxiety and depression among the dentists of Karachi.

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Original Article

Evaluation Of Findings On Imaging Of Brain In Children With First Recognized Episode Of Fits-Experience At Tertiary Care Hospital Of Quetta

Pari Gul, Ameet Jesrani, Palwasha Gul, Nida Amin Khan

ABSTRACT

Objective: To evaluate various causes of fits in children on MRI presenting in Tertiary Care Hospital, Quetta.

Study Design and Setting: A Cross sectional study was conducted in the department of Radiology, Bolan Medical Complex Hospital Quetta from October 2017 to March 2018.

Methodology: A total of 100 children aged 06 months to 13 years were included in the study who presented with seizures to emergency department and neuro clinics. Information obtained from history, clinical examination and MRI brains were recorded. The data was analyzed in SPSS 20.

Results: Among the total 100 children, MRI examination was unremarkable in 45% (n=45). Neoplastic lesions were the second most common abnormal MRI finding and constituted 10% (n=10). Perinatal ischemia and Periventricular leucomalacia were recorded in 9% (n=9). Congenital aqueductal stenosis in 9% (n=9), along with Encephalitis/Meningitis also in 8% (n=8). Brain atrophy was noted in 6% (n=6). Three cases each of Vascular and Post traumatic changes/gliosis (n=6, 6%) and one case of each of Hydrocephalus/Aqueductal stenosis, Infarct, Malformation of cortical development, Leucodystrophy, Agenesis of corpus callosum, Arachnoid cyst and Hydatid cyst (n=7, 7%)

Conclusion: Brain magnetic resonance imaging was successful in detecting structural abnormalities and it can be trusted to detect seizure foci in pediatric patients.

Keywords: Brain. Children. Fits, MRI.

INTRODUCTION:

Epilepsy is one of the most frequently seen neurologic disorders within childhood. International League against Epilepsy defines epilepsy as; at least two unprovoked or reflex seizures >24 h apart. Epilepsy affects 50 million people around the world and half of them start in childhood period.[1-3]

The overall prevalence of epilepsy in Pakistan is 9.99 per 1000 population.[4] Highest prevalence is seen in people younger than 30 years of age. Higher prevalence is observed in rural population. Aetiology of epilepsy is more commonly identified in paediatric population.[4]

A seizure is a sudden, uncontrolled electrical disturbance in the brain. It is a symptom that points towards an underlying neurological disease or epilepsy. 1% of all emergency department visits are seizure related symptoms with a higher incidents being of infants and children. [5] Anatomic classifications define seizures of two types. One that has its focus of origin in temporal lobe and others that arise from a focus other than temporal lobe.[6] The most advance classification is based on the episode as described by the patient or the observer. There are focal seizures that affect a group of muscles or a body part. These may become generalized involving whole body also described as convulsions. Generalized seizures are the ones that involve whole body.[7, 8.] In general population, the mean prevalence of epilepsy is established to be 8%.[9] Epilepsy is a debilitating disorder that renders a person deprived of their psychosocial and physical standing. The psychosocial aspect of this disease is so enormous that it affects not only the patient but also his/her family. The stigma is so crude that it spans from mental well being to restriction in everyday activities and acceptance in society.

Although there is impressive advancement in the medical treatment of epilepsy, there are still cases that are refractory to treatment. It is worth noting that most of the refractory cases are due to underlying brain disorders that manifest as structural changes. Here, brain imaging plays an important role so as to guide the neurologist if any immediate surgical or medical intervention is needed for the treatment of the patient.

Computed Tomography of head in infants younger than six months presenting in emergency department with a first seizure, demonstrated a brain lesion in 50% of cases as concluded in a study by Harden et al. [10]

Pari Gul
Assistant Professor , Department of Radiology,
Bolan Medical Complex Hospital, Quetta

Ameet Jesrani
Assistant Professor, Department of Radiology,
Sindh Institute of Urology and Transplantation, Karachi
E-mail: ameet.jesrani@yahoo.com

Palwasha Gul
Senior Registrar, Department of Radiology,
Bolan Medical Complex Hospital, Quetta

Nida Amin Khan
Resident, Department of Radiology,
Sindh Institute of Urology and Transplantation, Karachi

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King et al. reported abnormal Magnetic Resonance Imaging (MRI) findings when all seizures evaluated as 35 in 263 patients (13.3%).4 With the increase of availability of high quality MRI; lesions that are not detected in Computed Tomography such as heterotopias and mesial temporal sclerosis that are both associated with childhood onset seizures can be visualised.[11-14]

Magnetic Resonance Imaging is a strong modality in neuroimaging and with its protocols and sequences, has the capability of demonstrating soft tissue and brain lesions with higher precision resulting in renaissance in evaluation and management of epilepsy. [15]

Sequences of MRI brain and their importance in detection of specific disease processes may aid in devising standard protocols for local community in near future.

The aim of our study is to highlight the strength of MRI brain as a diagnostic tool for detection and evaluation of structural abnormalities in pediatric population presenting with seizures and help preventing the possible episodes of seizures in future by treating the cause in affected childrens and let them to have brightness in their life.

METHODOLOGY:

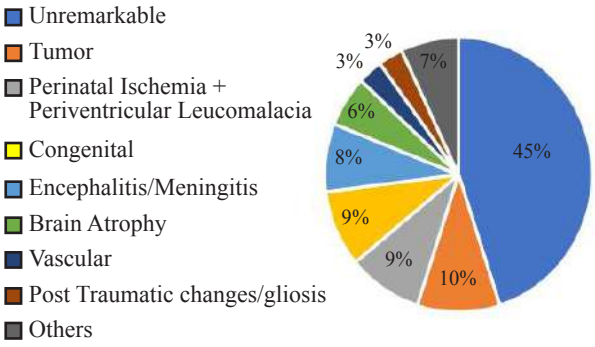
This cross-sectional study was conducted at the Department of Radiology, Bolan Medical Complex Hospital Quetta from October 2017 to March 2018. During this period, 100 patients aged 6 months to 13 years with a history of first episode of seizures were included and children with a known underlying genetic or metabolic disorder and children with a significant behavioral or psychiatric disorder were excluded. Children with a symptomatic seizure due to intoxication or drug ingestion or a transient electrolyte or metabolic derangement were also excluded from the study. The patients who were too young or irritable were sedated in MRI room by a qualified anesthetist to carry out MRI examination smoothly and optimally. The MRI examination was performed on 0.3 Tesla Hitachi Airis II%. The standard protocol used included T1, T2 and FLAIR sequences. MRI contrast gadolinium was administered when required as decided by radiologist. The MRI studies were viewed by consultant radiologists of our department. The reports and findings were recorded. The prescribed proforma was filled. The data was analyzed by SPSS-20.

RESULTS:

Among the total 100 children, MRI examination was unremarkable in 45% (n=45). Neoplastic lesions were the second most common abnormal MRI finding and constituted 10% (n=10). Perinatal ischemia and Periventricular leucomalacia were recorded in 9% (n=9). Congenital aqueductal stenosis in 9% (n=9), and Encephalitis/Meningitis in 8% (n=8).

Brain atrophy was noted in 6% (n=6). Three cases each of Vascular and Post traumatic changes/gliosis (n=6, 6%) and one case of each of Hydrocephalus/Aqueductal stenosis, Infarct, Malformation of cortical development, Leucodystrophy, Agenesis of corpus callosum, Arachnoid cyst and Hydatid cyst (n=7, 7%, 1 case each). Percentages and no of patients are shown in Pie Chart. Figure 1 is showing case of Tuberculous Meningitis as it is showing increased enhancement in basilar meninges along with significant enhancement of basal cisterns on postcontrast T1WI. Figure 2 is showing deficient white matter with indentation of lateral ventricles by gyri on T2WI. Figure 3 demonstrates large avidly enhancing mass arising from left lateral ventricle with hydrocephalous on postcontrast T1WI. Figure 4 showing symmetrical abnormal signals in the Periventricular occipitoparietal white matter with band of enhancement at the active edge of the demyelination on postcontrast T1WI.

Figure 1: Imaging In Peadiatric Population



DISCUSSION:

Epilepsy is a fairly prevalent neurological disorder with a long course , physical and psychological debilitation. There is inadequate literature available regarding epilepsy in pediatric population in Pakistani population .

Seven in every thousand children were found to have epilepsy in the district of Gujranwala of Punjab, according to a study done by Muhammad Akbar Malik and colleagues.[16]

There is shortage of detailed studies of neuroimaging in our population.

Clinicians can revolutionize the evaluation and management of patients in the light of imaging findings.

Our study concluded that 55% showed structural lesions in brain in accordance with a previous study that showed 51.3 % of cases having positive MRI finding (Resta *et al*).[16]

Another study done by Amirsalari *et al* reported abnormal MRI findings in 28.5% of cases including cysts, tumors, white matter changes and brain atrophy.[16]

Where other studies have reported brain tumors comprising of 4% of all brain abnormalities presenting with seizures, our study has demonstrated brain tumors as the commonest brain abnormality comprising 10% of the studied population as 10 out of 100 patients demonstrated a brain tumor.[17]

Second most common finding was Periventricular leucomalacia ;9% of study population. Brain atrophy is 6% was in accordance with a study done by Amirsalari *et al* which concluded it to be 10%.

Brain abnormalities in our study also comprised of some developmental diseases like leucodystrophy (1%), arachnoid cyst 1%, agenesis of corpus callosum (n=1, 1%). Similar study by Rachna Chaurasia and colleagues showed a different trend with leucodystrophy and cysts showing higher incidence 3.7% each.[18] In that study, the infective pathologies were also reported to be occurring with different frequencies as compared to ours. A study conducted in developed countries, concluded cerebral dysgenesis as the most frequent cause of epilepsy(Hsieh DT and colleagues).[19] Further studies by Guissard G and colleagues agreed with above findings and included, hypoxic-ischemic injury, non accidental injuries, infections, metabolic diseases and tumors as secondarily common cause for epilepsy. [20] On the contrary, our study demonstrated congenital dysgenesis as third most common cause and brain tumors as the most common cause. Since MRI is more sensitive than CT with soft tissue imaging it is a technique of choice to image the focus of seizure origin (3 in Ravi Kumar).[20]

MRI is superior to CT even on contrast examination as majority of seizure activity originates from temporal lobes which are difficult to evaluate on CT due to the beam hardening artifact from underlying temporal bone. [21] In literature, there are studies that support the relationship between abnormal brain MRI and continued seizure activity.[22]

MRI abnormality of brain was established to be prime independent modality to predict occurrence of convulsions in one epilepsy report. [23] In another report on partial seizures were seen to correlate with MRI detecting the underlying abnormality in 24% of cases.[24] MRI and CT findings correlated in 14.8% of cases in a study done by Gelisse and colleagues on children with benign epilepsy with centrotemporal spikes.[25] MRI findings correlated in 38.6% of patients in a study conducted with Labate and co-workers on benign temporal epilepsy.[26] Our data comprised of children presenting with first seizures referred to Bolan Medical Complex Quetta for MRI scan.

Our study was beneficial in evaluation of children presenting with epilepsy. Findings of MRI brain examination helped in fruitful decision making and better management of patients.

In the cases that were presented in our study, unremarkable MRI examinations were demarcated in 45% of cases may be due to inappropriate selection, stratification leading to erroneous referral to MRI of patients with pseudoseizures. This results in wastage of resources and malpractice as the already sick child is subjected to unnecessary anesthesia and turmoil of investigation.

CONCLUSION:

Brain magnetic resonance imaging was successful in detecting structural abnormalities and it can be trusted to detect seizure foci in pediatric patients.

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Original Article

Patterns Of Torus Mandibularis And Torus Palatinus Among Dental Patients Of A Public Hospital In Karachi

Ramsha Azhar, Salik Rasool, Bushra Jabeen, Umer Hasan, Hasan Baber, Bilal Hussain, Mansoor Akhtar

ABSTRACT

Objective: To evaluate the patterns of Torus mandibularis (TM) and Torus palatinus (TP) among the patients attending the dental department of a teaching hospital in Karachi focusing on the age and gender.

Study Design and Setting: A cross-sectional study conducted at dental OPD of Dow International Dental College/Hospital DUHS, conducted from November 2017 to October 2018.

Methodology: The calculated sample size of the study was 278. Written consent was taken from each participant prior to starting investigation. The questionnaire comprises of 17 variables, evaluating demographics, state of dentition and characteristics of presence of any suspected tori. Participants were examined via sterilized mouth mirror and probe. Impressions were then taken from the participants having positive findings to further evaluate the size and shape to tori.

Results: The prevalence of (TM) and (TP) were found to be 3.3% and 0.6% respectively. (TM) was predominantly found in males and (TP) was more frequent in females. Both (TM) and (TP) were most prevalent during fifth decade of life irrespective of gender. Bilateral unilobulated (TM) in the premolar region of the mandible were found to be most recurrent. Lobulated (TP) of large size was found to be prevalent in this study.

Conclusion: Study has shown very less prevalence of tori in population of Karachi, Pakistan. The prevalent patterns of tori were found to be bilateral unilobulated in the premolar region of the mandible and large, lobular in the palate. The relationship of tori with age and gender was not significant.

Keywords: Patterns, Prevalence, Torus mandibularis, Torus Palatinus,

INTRODUCTION:

Tori and exostoses are bony protuberances, composed of dense compact bone with minimal amount of bone marrow and are usually localized.[1] These benign, bony outgrowths are designated according to the anatomic location.[2, 3]When they develop at the midline of the palate, they are referred as torus palatinus and when found at the lingual aspect of the mandible, they are attributed as torus mandibularis[1, 2]. They continue to grow gradually during second and third decades of life and are usually unrecognized until middle age.[3]

Ramsha Azhar,
Lecturer, Department of Oral Pathology,
Dow International Dental College, DUHS
Email: Ramshaazhar92@hotmail.com

Salik Rasool
Associate Professor, Department of Oral Pathology,
Dow International Dental College, DUHS

Bushra Jabeen
Associate Professor, Department of Prosthodontics,
Dow International Dental College, DUHS

Umer Hasan
Associate Professor, Department of Oral Medicine,
Dow International Dental College, DUHS

Hasan Baber
Assistant Professor, Department of Oral Biology,
Dow International Dental College, DUHS

Bilal Hussain
Lecturer, Department of Oral Pathology,
Dow International Dental College, DUHS

Mansoor Akhtar
Lecturer, Department of Prosthodontics,
Dow International Dental College, DUHS

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According to the shape, Torus Palatinus (TP) is categorized as *flat, spindle-shaped, nodular and lobular* while Torus mandibularis (TM) is classified as *unilateral or bilateral solitary*, *unilateral or bilateral multiple* and *bilateral combined*.[1, 3]With respect to size,(TP) can be grouped as *small (less than 3mm), medium (3-6mm) and large (more than 6mm)*.[1](TM) may display modifications in size, but they are generally small.[1]Most commonly observed (TP) is flat shaped whereas most commonly found (TM) is bilateral solitary type.[7]They are diagnosed by clinical and radiographic examination.

The exact etiology of tori is unknown, but researches have shown that its occurrence is multifactorial; including genetic and environmental factors.[1, 2]The threshold theory by Gorsky et al is widely accepted. According to this theory, autosomnal dominant genetic trait is primarily required, but environmental factors must reach threshold levels for the development of tori.[2] Other predisposing factors include trauma, drugs, infection, discontinued growth, masticatory stress, dietary habits and nutritional imbalances.[1, 2]

Various studies have reported prevalence of tori to vary widely globally, ranging from 0.4 to 61.7% and 1 to 64% for (TP) and (TM) respectively.[2] Tori are predominantly observed in patients with more than 40 years of age.[2]

After a comprehensive search on Medline and Cochrane library, it was observed that there is lack of studies in Sindh, Pakistan regarding prevalence and pattern of tori, with one study in Karachi reporting 8.6% and 3.7% prevalence of (TM) and (TP) respectively among patients attending private dental hospital.

The Objective of current study was To evaluate the patterns of Torus mandibularis (TM) and Torus palatinus (TP) among the patients attending the dental department of a teaching hospital in Karachi focusing on the age and gender.

METHODOLOGY:

A cross-sectional study was conducted at Dow International Dental College/Hospital (*Chanesar and Ojha campus*) DUHS. The study was conducted from November 2017 to October 2018 (Duration of 1 year). Participants of the study included patients attending dental OPD of DIDC, DUHS for different dental problems.

Sample size was calculated by using online sample size calculator *Openepi* (proportion based), keeping 5% standard mean error and 95% confidence limit. The calculated sample size of the study was 278. This sample size was similar to the literature available of other studies that were conducted on tori.

Data was collected by trained dental surgeons and post graduates for this study. Initially, a pilot study comprising of 25 participants (which were not included in the main study) was conducted to determine internal reliability of the questionnaire via Cronbach's alpha internal reliability test using SPSS version 25. Three variables related to the occupation, number of working hours and working environment were removed from the questionnaire because these questions were irrelevant to the study and by removing these questions the Cronbach's alpha test value was found to be increased. Questionnaire was validated via face validity by experts in the subjects (*Oral pathologist and Research analyst*).

Limitations of the present study included males and females of all age groups ranging from 10 to 80 years and of all ethnic background.

Written consent was taken from each participant prior to starting investigation. The subjects who did not give consent were excluded from the research. Each participant was interviewed by a trained field investigator via aid of custom-made questionnaire. The questionnaire comprises of 17 variables, evaluating demographics, state of dentition and characteristics of presence of any suspected tori. The first five questions were related to sociodemographic details (age, gender, ethnic background) of the patient while the remaining questions are related to presence or absence of tori. The presence of any suspected (TM) and (TP) was done by visual inspection and palpation. Participants were examined via sterilized mouth mirror and probe. Impressions were then taken from the participants having positive findings to further evaluate the size and shape to tori. If presence of (TM) is observed, then its location (anterior, middle and posterior), shape (unilobulated, bilobulated and multilobulated) in the mandible are recorded and if (TP) is observed, then its size (small, medium and large) and shape (flat, spindle-shaped, nodular and lobular) are recorded in the questionnaire.

Total of two hundred and eighty (280) questionnaires were filled. Ten questionnaires were excluded from the research due to incomplete information.

For interpretation of data SPSS version 25 (Chicago, IL, USA) was used. To determine presence of tori with respect to age and gender, Chi Square test was applied. To determine any possible correlation between Independent Variable (*Gender and Age*) with Dependent Variable (*Tori*), Pearson correlation was utilized and to evaluate probability of tori occurring with change in age and gender logistic regression was used.

RESULTS:

A total of 270 subjects, including 135 males (50%) and 135 females (50%) were examined.10 participants had positive findings for tori. The overall prevalence of (TM) was found to be 3.3% (9 subjects) whereas (TP) was found to be 0.6% (1 subject).

Table 1 represents the occurrence of (TM) in relation to age. (TM) was reported in 9 (3.3%) out of 270 subjects. The highest frequency was found in the 40-49year age group where 3(1.1%) subjects had positive findings out of 104 subjects, while the lowest frequency was found in 10-19year age group where no subjects had positive findings out of the 10 subjects examined.(TP)was recorded in 1(0.4%) out of 270subjects. The only case of (TP) recorded was found in the 41-50year age group. No significant relationship was found between occurrence of (TM) and (TP) and age ($P>0.05$).

Table 1 also summarizes the occurrence of (TM) and (TP) in relation to gender. Out of the 9 subjects with (TM), 5(1.9%) cases reported were found in males while 4(1.5%) cases reported were found in females. The only case reported of (TP) was found in a female subject. No significant relation is seen between occurrence of tori and gender ($P>0.05$).

Table 2 summarizes the occurrence of (TM) and (TP) in relation to ethnic background. The highest frequency of (TM) was found in Urdu speaking subjects where 5(1.9%) out of 9(3.3%) cases were observed. Occurrence in (TM) in other ethnic backgrounds were found to be 3(1.1%) out of 9 in Punjabi subjects and 1(0.3%) out of 9 in Pathan subjects. The only case of (TP) was found in subjects with Punjabi ethnic background.

Table 3 summarizes the location of (TM) on the mandibular lingual aspect in 270 subjects. The highest incidence of

(TM) was found in the middle (premolar) area where 7(2.6%) out of 9(3.3%) cases were observed on the right side and 6(2.2%) out of 7(2.6%) cases were observed on the left side of the mandible. 2(0.6%) cases were observed in the anterior mandibular region on the right side whereas only 1(0.4%) case was observed on the left side of the mandible. The least incidence of (TM) was found in posterior mandibular region where no cases were observed in both left and right sides of the mandible.

Table 3 also summarizes the distribution of (TM) according to shape. The most common shape was bilateral unilobulated (TM). 7(2.6%) out of 9(3.3%) cases were detected of such type. In 2 (0.6%) out of 9 cases, unilateral unilobulated (TM) was found. No cases of unilateral or bilateral bilobulated and multilobulated (TM) were observed.

Table 4 presents the shape and size of (TP) on the hard

		AGE DISTRIBUTION						GENDER DISTRIBUTION		
		10yrs-20yrs	21yrs-30yrs	31yrs-40yrs	41yrs-50yrs	51yrs-80yrs	**Total**	Male	Female	**Total**
Torus	Present	0	0	0	1	0	1	0	1	1
Palatinus	Absent	10	23	60	103	73	269	135	134	269
Total		10	23	60	104	73	270	135	135	270
Torus	Present	0	2	2	3	2	9	5	4	9
Mandibularis	Absent	10	21	58	101	71	261	130	131	261
Total		10	23	60	104	73	270	135	135	270

TABLE 1: Presents the age and gender distribution of subjects in relation to presence of TM and TP. TM was more frequent in males (5 out of 9 subjects). TP was found in one female subject. TM and TP were most common in 40-49yrs of age (4 out of 10 subjects)

	Ethnic Background						
	Urdu speaking	Sindhi	Punjabi	Balochi	Pathan	Others	**Total**
Torus Mandibularis	5	0	3	0	1	0	**9**
Torus Palatinus	0	0	1	0	0	0	**1**

Table 2: Presents the ethnic background distribution of subjects in relation to presence of TM and TP. TM was found to be most common in Urdu speaking subjects (5 out of 9) whereas TP was found in Punjabi subjects.

		Anterior	Middle	Posterior	**Total**	Uni-Lobulated	Bi-Lobulated	Multi-Lobulated	**Total**
Torus mandibularis	RIGHT SIDE	2	7	0	**9**	9	0	0	**9**
	LEFT SIDE	1	6	0	**7**	7	0	0	**7**

TABLE 3: Summarizes the distribution of TM in relation to location and shape. Most common location of TM was found in middle [premolar region] (7 out of 9 at the right side of the mandible), anterior region (2 out of 9 at the right side of the mandible). Most frequent shape of TM was unilobulated (9 out of 9 at the right and 7 out of 7 at the left side of mandible).

	TP SIZE				TP SHAPE				
	Small (<3mm)	Medium (3-6mm)	Large (>6mm)	**Total**	Flat	Spindle-shaped	Nodular	Lobular	**Total**
Torus palatinus	0	0	1	**1**	0	0	0	1	**1**

TABLE 4: Summarizes the distribution of shape and size of TP. The only TP found was lobular in shape and large (>6mm) in size.

palate. The most frequent shape of (TP) was found to be lobular. No cases of flat, nodular or spindle-shaped (TP) were found. The most frequent size of (TP) was found to be large (>6mm). No cases of small or medium sized (TP) were found in this study.

DISCUSSION:

Prevalence rates of tori have been studied in various populations of the world. Epidemiological studies report that in Turkish population, the prevalence of (TP) is between 21- 45 %.[3] There is female predilection observed.[3] According to a study conducted in Northern Malaysia prevalence rates of (TP) and (TM) were found to be 12% and 2.8% respectively.[2]Epidemiological studies in India report that prevalence of (TP) and (TM) is 1.3% and 6.9% respectively.[7]Mirza et al from Karachi, showed prevalence rates of (TM) to be 8.6% and of (TP) to be 3.7%.[8, 11] In the present study, the prevalence rates of (TM) and (TP) were found to be 3.3% and 0.6% respectively. The results showed decreased prevalence as compared to other studies, but this may due to decreased sample size.

The current study also investigates the occurrence of (TM) and (TP) in relation to gender. (TP) is reported to be more frequent in females as compared to males, and this was accredited to the dominant X chromosome.[1, 12] The current study displayed similar results with high prevalence in female subjects which is in line with the studies conducted by Sathya et al in Northern Malaysia, Sisman et al in Turkey and Mirza et al in Karachi, Pakistan.[2, 3, 11] TM is found to be more common in males[1, 13, 14, 18] which is similar to the results of this study. However, contrasting results have been seen in study conducted by Sathya et al and Mirza et al, showing female predilection.[2, 11]

Tori tend to increase with age and become most prominent during the middle phase of life.[2, 15] In the present study, the prevalence of tori is seen to be most frequent in the fifth decade (40-49 years of age) which is similar to the previous researches conducted.[2, 8, 11, 15, 16, 17] The least incidence was found during the second (10-19 years of age). The increase in size of tori with age was suggested by Ludvig K. Haugen. According to his study, the masticatory stress is increased from adolescence to adulthood and decreased during senescence.[2, 18] Further research conducted by Sonnier et al suggested that the regression of tori after 60 years of age was due to decreased masticatory function as a result of edentulism.[2, 19]

The present study investigated the relationship of the various ethnic backgrounds with presence of (TM) and (TP).

The results showed that (TM) was most prevalent in Urdu speaking population and least prevalent in Balochi and Sindhi population which is similar to local literature reported by Mirza et al.[8] However, this result does not provide the true representation of all ethnicities due to limited sample size of the study.

The occurrence of (TM) was also investigated in relation to the location of tori. In our study, majority of (TM) were observed to be bilaterally symmetrical which are similar to previous studies conducted by Mirza et al in Karachi and Hiremath et al in Malay population.[2, 8, 20, 21] The most frequent location of (TM) was observed in premolar region. Unilateral (TM) was observed more commonly on right side of the mandible as compared to the left side. These findings are in congruence with past researches conducted.[8, 22]

The distribution of (TP) according to shape and size were also investigated. In the current study, the most common pattern of (TP) observed was large in size and lobular in shape. These results were found to be in contrast with Sathya et al and Gorsky et al where smooth variety of (TP) was found to be predominant.[2, 23] A local study in Karachi conducted by Mirza et al reported spindle shaped and medium sized (TP) to be most common.[11] The contrasting results found could be due to decreased sample size as compared to other studies conducted.

The exact etiology of tori is still unclear, but the role of environmental and genetic factors makes its etiology multifactorial. The environmental factors including dietary habits and occlusal stresses could play a major role in the development of tori.[2] The association of tori with medical conditions or syndromes, dental anomalies or excessive drug usage was not observed in the present study. A study conducted by Sasaki reported relationship between chronic phenytoin therapy with presence of tori. [27] Another study by Morrison et al reported significant association between tori and temporomandibular dysfunction and tooth attrition.[28]

Presence of tori necessitates the need to redesign denture prosthesis and may require surgical removal in rare cases. A new technique was introduced by Rocca and colleagues for surgical removal of tori.[8, 26] In order to facilitate easy removal of tori and to avoid damage to the surrounding tissues, Er: YAG laser was utilized by them. Healing process has also been seen to be enhanced by this technique.[8, 26] Furthermore, studies with larger sample size should be conducted to conclude the actual prevalence of tori in Pakistani population. Future studies can deduce the relation of drug usage, dental anomalies and systemic diseases with tori.

CONCLUSION:

Study has shown very less prevalence of tori in population of Karachi, Pakistan. The prevalent patterns of tori were found to be bilateral unilobulated in the premolar region of the mandible and large, lobular in the palate. The relationship of tori with age and gender was not significant.

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Original Article

Awareness Regarding Vitamin D Amongst The Medical And Non-medical Students Of Karachi

Asma Dahar, Tahira Assad, Hafiza Touseef Sayyar

ABSTRACT

Objective: To assess the awareness regarding Vitamin D amongst medical and non-medical students.

Study Design and Setting: A cross-sectional study was conducted during the period December 2016-June 2017 on a sample size of 388 subjects.

Methodology: Undergraduate medical and dental students that are in their 3rd or 4th year, house officers, post graduate trainees and graduate medical students were included in the study. Undergraduate and graduate students from non-medical institutes were also included. The participants were assessed on the basis of a questionnaire which contained 15 closed ended questions.

Results: The age of participants in this research varied from 21 to 35 years with the mean age of 24. Male subjects were 25 % but the females were predominant in this study, calculating 75%. Medical subjects were 70.4% (n= 273) and Non-medical subjects were 29.6% (n= 115). Undergraduates were 79.4% (n=308) and Graduates were 20.6% (n=80). An overall of 75% of the medical subjects have satisfactory knowledge as compared to 25% of the non-medical subjects.

Conclusion: There is a lack of awareness regarding vitamin D among non-medical students. Awareness of vitamin among medical students was also not up to the mark.

Keywords: Awareness, medical and non-medical students and Vitamin D,

INTRODUCTION:

Medical and allied health professionals are the first referrals to whom the patients present, when they have signs of vitamin D deficiency/insufficiency. Due to cosmopolitan life style, our local population is not exposed to sufficient amount of sunlight that is required for vitamin D activation. Latest literature shows that, Vitamin D which is also known as the sunshine vitamin, plays a vital role in fighting against cancer, heart diseases, bone fractures, type 2 diabetes, depression, influenza and autoimmune diseases.[1] This vitamin is not solely consumed through diet but it is produced endogenously by the action of sunlight on skin as well. [2] Vitamin D is classified into two types: Vitamin D2 and Vitamin D3. The Former is also known as Ergocalciferol while the latter is also known as Cholecalciferol. There are two sources of Vitamin D3. First, being the exogenous source that is obtained from diet and the second is the endogenous source, in which vitamin D3 is synthesized through sunlight. Regardless the source from which the Vitamin D3 comes, it has to undergo two hydroxylation processes. The first hydroxylation process occurs in the liver, where it forms 25-hydroxy vitamin D3 [25(OH) D], and then second hydroxylation process occurs in the kidney to form 1, 25 hydroxy vitamin D3 (activated form). Vitamin D2 has lower binding capacity to proteins and has a rapid clearance, whereas Vitamin D3 has a half-life of around 2-3 weeks, this is the reason behind more potency of Vitamin D3 than Vitamin D2.[3]

It is seen that deficiency of vitamin D affects over one billion people across the globe as it is the most under diagnosed and untreated of all the deficiencies. [4] Defects in mineralization of the skeletal components of our body are caused by Vitamin D deficiency. These mineralization deficits provide little anatomical support for the periosteal covering. Due to these deficits, patients suffering from osteomalacia complain of generalized arthralgia and myalgia. Patients with mineralization defects of bones are often misdiagnosed with fibromyalgia, dysthymia, degenerative joint disease, arthritis, chronic fatigue syndrome and other diseases.[5-6]

The prevalence of vitamin D deficiency has been found all over the world except for a few areas in South and Southeast Asia.[7] Studies have shown that rickets is common in all age groups in Pakistan, Bangladesh and India.[8] Mothers with deficiency of Vitamin D and low intake of calcium in their diet were found to be the cause of rickets in Pakistan, Bangladesh and India.[9] A survey conducted in 2007 by International Osteoporosis Foundation showed that people are familiar with the role that calcium plays as a bone constructing agent but are not apprehensive about the role

Asma Dahar
Dental Student
Fatima Jinnah Dental College
Azam town, Karachi.

Tahira Assad
Associate Professor
Karachi Institute of Medical sciences
Malir Cantt, Karachi.
Email:drtahiraassad@gmail.com

Hafiza Touseef Sayyar
Pharmacist
Bahria University Medical and Dental College,
Karachi.

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Accepted: 14-05-2019

of Vitamin D in preservation of a healthy body.[10] In a study done in 2007, Mc Gillivray and his colleagues realised that out of a total of 232 East African migrant children and adolescents aged 0-17 years who were residing in Melbourne, the prevalence of vitamin D deficiency (serum 25-OHD level < 25 nmol/l) was 44% and that of vitamin D insufficiency (serum 25-OHD level <50 nmol/l) was 87%. Risk factors for vitamin D deficiency in these subjects included children less than 5 years of age, female, prolonged stay in Australia, reduced sunlight exposure and sping or winter season.[11] According to a report, maximal risk of Vitamin D insufficiency and decreased calcium absorption is seen in young adults aged between 20-39 years.[12] In a study conducted in Karachi, it was observed that high prevalence of vitamin D deficiency was found in females. The prime predictors for the vitamin D deficiency were found to be Age, location of residence and housing structure. [13]

In Pakistan, basic needs of people are not fulfilled and the healthcare systems are not up to the mark. Health education and health care systems do not meet the criteria of public's health demand.[14] It is due to this breach in health education system that we are facing outcomes in which there are high prevalence of vitamin D deficiency.

The objective of this study was to assess the awareness of Vitamin D amongst medical and non-medical students. It is very influential to assess the awareness levels among medical and non-medical groups as this will predict the future health issues.

METHODOLOGY:

A descriptive cross-sectional study was conducted during the period December 2016-June 2017. Ethical review board of Fatima Jinnah Dental College and Hospital provided Ethical approval, with code DEC-2016-ORS-01 to conduct this study.

Undergraduate medical and dental students that are in their 3rd or 4th year, house officers, post graduate trainees and graduate medical professionals were included in the study. Undergraduate and graduate students from non-medical institutes were also included. A self-explanatory pre-tested questionnaire was given in various medical, dental and non-medical schools which contained 15 close ended questions.[15]

The sampling technique chosen was non probability convenient Sampling technique. The sample size was calculated using sample size calculator on www.openepi.com at 95% confidence level and prevalence of 50%. The sample size used for this study was 388 which excluded Non-practicing dental professionals; Post graduate non-medical students and Practising medical doctors.

Prior consent was obtained from every respondent before including in the study. A data entry sheet was formulated and filled by the participants that had questions regarding their age, gender, education and level of education. Data tabulation and analysis was completed using SPSS software version 22. A Chi -square test was used to determine awareness among them.

RESULTS:

Data was entered in IBM SPSS statistics version 22. Percentages, standard deviation, Odds ratio and Chi square tests were applied to all the Qualitative questions. The total subjects who participated in this research were 388.

General Characteristics

The age of participants in this research varied from 21 to 35 years with the mean age of 24. Male subjects were 25 % but the females were predominant in this study, calculating 75%. Medical subjects were 70.4% (n= 273) and Non-medical subjects were 29.6% (n= 115). Undergraduates were 79.4% (n=308) and Graduates were 20.6% (n=80). (Table 1), Table 2 shows the percentage of medical and non- medical students answered positively on various questions asked regarding vitamin D. (Table 2), Table 3 shows statistically the comparison between medical and non- medical professionals regarding their awareness of vitamin D. Although medical professionals were found to be more knowledgeable than non-medical professionals as expected, but their knowledge was also not upto the mark.

DISCUSSION:

Vitamin D deficiency is common all over the world but it is more prevalent in Pakistan [16]. The main function of vitamin D is to maintain the balance of calcium absorption and excretion in the body [17]. A study was conducted in Manchester, UK to check the awareness of vitamin D among people at risk of vitamin D. A total of 363 people were included in the study whose ages were above 18 years. In this study, one hundred and sixty people (72%) had heard about vitamin D and 61 of the respondents (28%) had never heard of vitamin D.[18] Another study was conducted in New Delhi, in which 599 students aged between 18 to 25 years were included. Amongst them, 99.7% females answered that they heard about vitamin D before and 99% of the male answered the same.[19]

In this study, 76.5% of the medical population answered correctly about the production of vitamin D. Moreover,

Table 1: Gender, Category and level of education wise distribution of the subjects

Group	Item	Percentage
Gender	Male	25.0
	Female	75.0
Category	Medical	70.4
	Non-medical	29.6
Level of Education	Under-graduate	79.4
	Graduate	20.6

Table 2: Percentage of medical and non-medical students answered positively on various questions asked

Questions	Medical (%)	Non-medical (%)	Total (%)
Have you ever heard of Vitamin D?	70.9%(271/382)	29.1%(111/382)	98.5%(382/388)
Is Vitamin D produced inside the body by itself?	76.5%(153/200)	23.5%(47/200)	51.5%(200/388)
Is Vitamin D good for bone health?	72.5% (272/375)	27.5%(103/375)	96.6%(375/388)
Do you think your Vitamin D status is sufficient?	70.1%(108/154)	29.9%(46/154)	39.7%(154/388)
Have you ever got your Vitamin D levels checked?	69.9%(100/143)	30.1%(43/143)	36.9%(143/388)
Is Vitamin D produced in the body with the help of sunlight?	70.9%(254/350)	27.4%(96/350)	90.2%(350/388)
Do you take sun protection while any outdoor activity?	70.6%(115/163)	29.4%(48/163)	42.0%(163/388)
What are the normal levels of vitamin D in serum	72.2%(39/54)	27.7%(15/54)	13.91%(54/388)
What should be the minimum daily intake of Vitamin D?	74.6%(44/59)	25.4%(15/59)	15.2%(59/388)
What is the average time needed to spend in sunlight to have enough vitamin D?	72.2%(172/238)	27.7%(66/238)	61.3%(238/388)

Table 3: Comparison between medical and non-medical students based on certain questions inquired regarding vitamin D

Question Asked	Yes	No	Don't know	Odds Ratio	95% CI.	P-Value
1. Have you heard of Vitamin D?						
Medical	271	2	0	4.883	0.882 - 27.043	0.066
Non-Medical	111	4	0			
2. Is Vitamin D produced in the body by itself?						
Medical	153	104	16	1.502	0.936 - 2.411	0.058
Non-Medical	47	48	20			
3. Is Vitamin D good for bone health?						
Medical	272	1	0	7.922	0.815 - 77.029	0.068
Non-Medical	103	3	9			
4. Do you think your Vitamin D status is sufficient?						
Medical	106	104	47	0.875	0.532-1.439	0.345
Non-Medical	39	36	20			
5. Have you ever got your Vitamin D checked?						
Medical	92	159	6	0.849	0.535-1.349	0.282
Non-Medical	40	46	9			
6. Is Vitamin D Produced in the body with the help of sunlight?						
Medical	241	11	5	2.165	0.870-5.387	0.079
Non-Medical	84	6	5			
7. Do you take sun protection while any outdoor activity?						
Medical	109	108	40	0.939	0.579-1.518	0.445
Non-Medical	41	39	15			

70.1% of the medical subjects and 29.9% of the non-medical subjects thought that their Vitamin D levels are sufficient.

Keeping the levels of all the minerals and vitamins adequate is crucial for a healthy body. Vitamin D being an essential vitamin needs to be within normal levels in our blood as prescribed (54-90ng/mL for sunny countries).[20] Vitamin D is needed for maintaining the levels of calcium and phosphate in our blood. It promotes absorption of Calcium and phosphorus in our blood. It also causes normal bone mineralization and prevents tetany caused by hypocalcaemia.[21] Additionally, vitamin D has some non-calcemic effects including its effects on cell growth, body's natural defence system, neuromuscular functions, carcinogenesis and its cardiovascular functions.[22]

In this study, a cumulative of 36.9% students answered "Yes" on inquiring about assessment of their vitamin D levels. Among them 69.9% were medical students and 30.1% were non-medical. Periodic assessment of vitamin D levels

is paramount in prevention of disorders of bone, nutritional problems, organ malfunction and many other medical conditions as well. Sufficient levels of Vitamin D prevent many diseases like rickets in children, osteomalacia and osteoporosis in adults.[21]

A cumulative of 90.2% answered (Yes) when asked about the role of sunlight in the production of vitamin D which is in accordance to other studies.[23-25] Vitamin D formation is dependent on a sufficient amount of sun exposure but according to a number of studies, sun exposure is a big problem in most of the countries as UV radiation is a carcinogen and can cause skin cancer.[22, 28]

Results from a study suggest that less enthusiasm to sun's exposure was linked to a person's Vitamin D knowledge, female gender and if she had higher education. In this study, 62.3% of the people did not prefer going into the sun and many others took sun protection to avoid their sun exposure. These people were mostly young Chinese women who had enough Vitamin D knowledge and awareness.[23]

72.2% of the medical respondents and 27.2% of the non-medical respondents replied 30 minutes per day as the average time needed to spend in sunlight, which is the correct answer. As it has been suggested by some vitamin D researchers, people should get 5 to 30 minutes of sun exposure between 10 Am to 3 AM.[29]

In another study done on athletes in New Zealand, 76% of Athletes had great information on the role of sun as a source of vitamin D. [24] Awareness on the topic of sun exposure and how much sunlight a person needs to obtain for activation of Vitamin D should be given. Brand et al. found in his study that the participants who were Australian women were highly aware of this.[25]

In this study, 72.2% medical subjects and 27.7% non-medical subjects answered correctly regarding normal levels of vitamin D, stating that greater than or equal to 50nmol/L is the normal level for vitamin D in serum. As recorded from a report by National Institute of health published in the year 2018, people with serum levels of vitamin D less than 30nmol/L are suffering from vitamin D deficiency; serum levels of 30-50 nmol/L are considered less for good bone and overall health but levels of greater than 50 nmol/L are regarded are adequate for bone and overall health in healthy people. Levels greater than 125nmol/L are accompanied with potential adverse effects.[26] In a study conducted in Karachi, it was seen that many people who were apparently healthy also faced vitamin D deficiency and insufficiency. These individuals were seen to be at risk for developing musculoskeletal and other chronic diseases. It was concluded in this study that serum parathyroid hormone levels and serum 25 OHD levels are considered better markers for vitamin D deficiency and insufficiency. [27]

In this study, 74.6% of medical subjects and 25.4% non-medical subjects said that 600IU per day is the average daily intake of vitamin D. According to the report, 600 IU per day is the adequate daily intake of vitamin D for a healthy individual aged 1 to 70 years. [28]

The sample size of medical and non-medical population was not same in this study. More researches and awareness on the topic of "Vitamin D" should be promoted.

CONCLUSION:

The results of this study interpret that there is a lack of awareness regarding vitamin D among non-medical students. Although Medical students were found to be more knowledgeable than non- medical students as expected, their knowledge was also not up-to the mark.

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Original Article

Factors Influencing The Choice Of Ophthalmology As A Career Amongst Students Of Dow University Of Health Sciences, Karachi

Hamidullah Ariff, Khowaja Faiz-ur-Rab, Shehlaa Dareshani, Tarique Saleem, Masood Hussain Rao

ABSTRACT:

Objective: To determine the factors influencing the choice of Ophthalmology as a career amongst Dow University of Health Sciences, Karachi.

Study design and Setting: A descriptive cross sectional study was conducted on fourth and final year students of Dow Medical College, DUHS, Karachi through non-probability consecutive sampling technique.

Methodology: Before conducting the study, permission from the Principal of Dow Medical College, Dow University of Health Sciences was taken. Overall 244 students were selected willing to participate in the study after having their written consent. A structured questionnaire with minor modification and after pretest was provided to them. All the information was filled by the student on their own reliability. The collected data was analyzed through SPSS version 21.0. The quantitative data was assessed through mean and standard deviation whereas frequencies and percentages were developed for qualitative data. Chi square test was applied to determine any significant correlation between different variables.

Result: According to analysis of the data, 77% female and 23% male medical students of fourth and final year participated in the study. Overall 8.65% students were given their first choice of Ophthalmology which is at 4th rank in all specialties after internal medicine, cardiology and paediatrics. The major factors which influence them to select Ophthalmology as their first choice were high income, less working hours and experience of medical and surgical field. The major factors, which restrict them not to choose Ophthalmology as a career, wereless opportunity of residency, long duration of residency and less opportunity at private sector.

Conclusion: Ophthalmology is at 4th rank in the choice of participated medical students. The factors attracted them to choose it were high income, less working hours and no night shift. However less opportunity of residency and less working opportunity at private sector restricted them not to choose the ophthalmology as their career.

Keywords: career choice, future career, Medical education, medical students, Ophthalmology and specialty choice.

INTRODUCTION:

The choice of any medical specialty taken as future career is the key worldwide which has to be decided normally by medical students at their graduation level. This is also decided on the basis of availability of seats for each category[1]. World Health Organization recommended Physician to population ratio as 23:10,000.[2] Many factors influence the medical students to select their particular speciality[3]. Generally there are two main groups, one which is related to the personal interest, gender and their priority and second one is related to the environment in which they are working along with load of patients in their circumstances, their life style, less on calls and night working days.[4,5,6] Even in United Kingdom, medical students while considering a choice of their career, the main important factors are short working days and job perception by the other people.[7]

In a study[8] conducted in Nepal, the main influencing factors in medical students for selecting a speciality as their career were gender, marital status, availability of jobs abroad, job security and future scope. Gynaecology and ophthalmology were the best choices of female Nepali medical students as compared to males whose choices were Orthopaedics, General Surgery and Internal Medicine. The other influencing factors were workload flexibility and illness of a family member or a friend. In another study[9] conducted in Jordan, competency of the individual and reputation of speciality were the main influencing factors to determine their choice of future planning. In this study, male's first choice was General Surgery whereas female's first choice was Gynaecology. Studies conducted in Saudi Arabia[10, 11, 12] on students and new graduates determined that General Surgery,

Hamidullah Ariff,
Senior Lecturer, Community Health Sciences
Bahria University Medical and Dental College, Karachi
Email: hamid_ariff@hotmail.com

Khowaja Faiz-ur-Rab,
Assistant Professor,
Dow University of Health Sciences, Karachi

Shehlaa Dareshani,
Associate Professor,
Dow University of Health Sciences, Karachi

Tarique Saleem,
Assistant Professor,
Dow University of Health Sciences, Karachi

Masood Hussain Rao
Ex Principal Research Officer and Visiting Faculty,
Dow University of Health Sciences, Karachi

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Paediatrics and ophthalmology were their best choices whereas main factors influencing for that were personal interest, flexibility of working hours, cultural values, speciality characters, prestige of the speciality and anticipated income. Similarly ophthalmology was the best choice due to shortage of Ophthalmologist in the country. In another study conducted in Nigeria[13, 14] the influencing factors in selecting ophthalmology as speciality were personal interest, life style and opportunity of surgery along with medicine. In a study conducted in Kenya[15], work environment and pressure of family and friends were the main factors in selecting the career choice.

A very scattered regional literature focusing on the career choice of medical students is available. In a study conducted in Kolkata, India[16], the main influencing factors were self-interest and passion. In another study[17]conducted in Iran, personal development, interest, motto of helping people, income and prestige, easiness and comfortable job were the most influencing factors in selecting the future career. Studies from Pakistan [18, 19, 20] were also showing different results. The main influencing factors were suited to personality, time commitment, prestige/respect and international opportunity having ophthalmology as only preference by 2.3% participants. However these studies were done from first to final year students. This study was designed to determine the factors influencing the choice of ophthalmology as a career among medical students of Dow Medical College, Karachi.

METHODOLOGY:

A cross sectional analytical study was conducted on students of Dow Medical College, Karachi through non-probability consecutive sampling technique. Overall 244 students of fourth and final year MBBS were selected for the study who gave the consent to participate. A self-administered semi-structured questionnaire comprising demographic data, questions regarding their future choice of specialities preferences and factors influencing them or restrict them to choose ophthalmology as a preference was distributed to them. All the information was filled by the student on their own reliability. The collected data was analyzed through SPSS version 21.0. The quantitative data was assessed through mean and standard deviation whereas frequencies and percentages were developed for qualitative data. Odd ratio at 95% confidence interval along with significance value at $P<0.05$ was calculated to determine the difference factor influencing them to choose ophthalmology or any other field.

RESULT:

Over all 244 students were equally selected from fourth and final year MBBS classes through non-probability consecutive sampling method. Mean age of the student was 22.72±0.48 years. Majority of the participants were females n=188 (77.0%) while males were n=56(23%). 89.3% were satisfied with their choice of medical field, and only 44.7% select this field as they wants to go abroad. Only 8.6% students have chosen ophthalmology as their first choice of career.

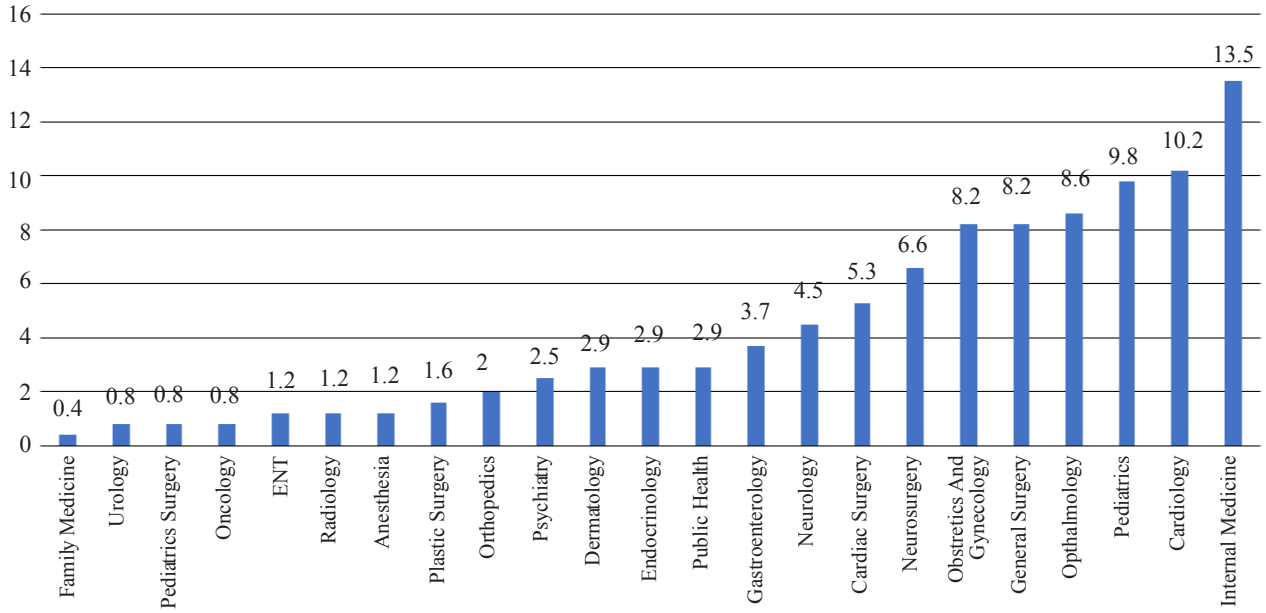
To determine the factors which either influences them to choose or not to choose ophthalmology as a career, different questions were asked. In response to first question whether part time work opportunities in ophthalmology are available or lacking, majority (62.3%) said no part time opportunities are there as compared to other fields. In reply to a question regarding whether you have seen any Ophthalmologist as a role model satisfying family life, replies of majority (70.9%) was no. 35.7% think that it is difficult to get a residency in ophthalmology. Majority of the respondents think that ophthalmology speciality has high income, personal experience in that field (56.1%), and portrayal of different specialties in the media (51.6%). However 57.8% respondent students were of the view that the length of residency is more and 73.0% said that opportunity in private sector for ophthalmology is less. (Table 1)

In comparing the choice of all fields of specialist, Ophthalmology came at no.4 after internal medicine, cardiology and pediatrics for the medical students as first choice of their career in future where they can experience for medicine and surgical procedures both. (Fig 1)

Table1. Factor influencing the choice of ophthalmology as a career

Factors	Yes	No
Opportunities for part time work in Ophthalmology	92	152
How ophthalmologist role model have a satisfying family life	71	173
The difficulty of getting into Ophthalmology Residency	87	157
The high income	205	39
Personal experience in that field (family member had a condition related to the specialty)	137	107
Private sector opportunities	66	178
Portrayal of different specialties in the media	126	118
The length of residency years	141	103

Fig 1. Choice of Speciality



DISCUSSION:

Medical students are a country's future physician reservoirs. Knowing how they choose their specialties is the key in enforcing a balance in distributing physicians in different medical specialties[4]. Students of medical colleges have to select their medical specialty during their study with concern to their like and dislike, job opportunities for professional, income dignity of the profession. Amongst them, Ophthalmology is a major one which has grown exponentially more competitive, especially with the low capacity of training centres.[21, 22]

According to a study[1] conducted in Saudi Arabia, majority of participated students were males (65.5%) and females on 34.55 with mean age of participants was 23.5±1.7. In another study[13]45.6% were males and 54.4% were females with mean age 23.7±1.54 years. In our study majority (77%) were females and only 23% were males with mean age 22.72±0.48. The reason for more females is admission ratio where it is around 80/20 for females and males.

In the same study[1], ophthalmology was the first choice for 10.2% students, while 44.7% wanted other medical specialities and 40.3% preferred surgical specialities. In another study[23]ophthalmology was on second preferred choice of medical student after dermatology i.e. (14.4%). In study of United Kingdom[7] ophthalmology was found the first choice of long term career for 2.3% of male and 1.5% of females one year after qualification. It was just 0.9% in 1974 which has now become 2.3%. In a study of Nigerian students[13], 32.5% opted for ophthalmology after their one year youth service. In our study ophthalmology was the first choice of 8.6% students whereas 56.5% wanted other medical specialty and 34.9 preferred surgical speciality. The difference is due to male female ration in our set up as compared to others. In different studies it was also found that females were less interested in ophthalmology.

Multiple factors influenced medical students' choice when choosing a future speciality. Knowing these factors can help in directing work-force to choose specialities that are currently limited. There are different factors which either influences the student to choose or not to choose ophthalmology as their specialty in future. According to a study[1], the factors which influence the student for choosing ophthalmology was high-income earning with as much as 54% of the participants giving it credit followed by private sector opportunities (40%), part-time opportunities (40%) and leisure (34%). In a study conducted in Iran[23] economic factors were deemed the most important factors in choosing ophthalmology as their specialties. In a study[23] the factors influencing them to choose ophthalmology as a specialty was their commitment with their work strengthened by the prospect of attractive hours and working conditions. In Nigerian study[13] the factors that influenced their choice of specialty as ophthalmology was mainly interest in the specialty (85%), opportunity to combine medicine and surgery (33.8%) as well as life style (42.5%). In our study, Majority of the respondents who choose ophthalmology as their specialty think that ophthalmology specialty has high income (84%), personal experience in that field (56.1%), and portrayal of different specialties in the media (51.6%).

There are some negative factors like difficulty of getting into the ophthalmology. According to a study[1]ophthalmology

Residency Program (53%) was the most important factor that pushed students away from choosing ophthalmology. In our study, 57.8% respondent students were of the view that the length of residency in more and 73.0% said that opportunity in private sector for ophthalmology is less and there is major difficulty of getting into ophthalmology Residency.

CONCLUSION:

Ophthalmology is at 4th rank in the choice of participated medical students. The factors attracted them to choose it were high income, less working hours and no night shift. However less opportunity of residency and less working opportunity at private sector restricted them not to choose the ophthalmology as their career.

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Original Article

Attitudes And Behavior Of Dentists Regarding Management Of Deep Carious Lesion

Umeed Javaid, Shama Asghar, Kulsoom Fatima Rizvi

ABSTRACT:

Objective: To assess the attitude and behavior of dentists for the management of deep carious lesions.

Study Design and Setting: It was a cross sectional based study conducted at six dental institutes of Karachi from both government and private sectors.

Methodology: The included participants were the dental graduates and post graduates working in different specialties of dentistry. Whereas graduates and post graduates not affiliated with any institution were excluded from the study. The Questionnaire comprises of two parts, first part was composed of participant's demographic details and academic qualification, while the second part comprised of clinical scenarios regarding management of deep carious lesions.

Results: From the 250 distributed questionnaires, 218 dentists returned the questionnaire giving a satisfactory response rate of 87.2%. There were 28% male and 72%% female dentists. The majority of dentists were aged between 25-35 years old. Complete caries removal was the management of choice by 72.5% of dentists for deep carious lesions.

Conclusion: Complete caries removal was the most preferred treatment modality when the risk of dental pulpal exposure associated with caries excavation is low. However when the risk is high, step-wise excavation was preferred procedure by half of the participants.

Keywords: Dental caries, Dental pulp exposure, Dentists, Stepwise excavation.

INTRODUCTION

A carious lesion is confined destruction of the dental hard tissues caused by acid production of oral bacteria due to fermentation of the dietary carbohydrates[1]. A deep carious lesion occurs when the demineralization extends into middle or inner third of dentin approaching the pulp[2]. Deep carious lesions can be symptomatic or asymptomatic and treating such lesions remains a challenge for dentists. It is very important that pulp status of a tooth must be determined before planning treatment for such lesions[3, 4].

Conventional approach to treat carious lesions is thorough removal of demineralized tissues followed by placement of a well-sealed restoration.[5] The rationale behind this approach is to remove all the pathological structure leaving sound aseptic dentin before restoration, as improper removal may result in further progression of caries and hence may lead to treatment failures [6]. The most common complication associated with complete caries removal is dental pulpal exposure which requires more complex procedures such as direct pulp capping or root canal treatment[7]. However, with the improvement in technology and materials available nowadays; there have been more conservative strategies introduced in operative field for treating deep carious lesions to avoid pulp exposure such as stepwise or selective removal of caries[5, 8].

Step-wise excavation involves two steps, in first step incomplete excavation is done leaving some carious dentin avoiding pulpal exposure, followed by sealing of residual dentin with the medicating material[9]. It is done to initiate remineralization through formation of tertiary dentin over the pulp. In the second step, once a tertiary dentin forms, operator re-enters the cavity after few months to remove residual dentin without endangering the pulp followed by restoration [2, 9]. Whereas in selective removal or one step removal, some carious dentin is left behind omitting the step of re-entry in the cavity[5]. The mechanism of stepwise or selective removal is that remaining bacteria are deprived from its nutrition hence the bacterial activity will be inert and the vital pulp is safe[10]. Multiple studies [11, 12, 13] reported that these conservative procedures are better than a conventional approach in maintaining the vitality and integrity of a dental pulp.

Most of the dental schools in the world still recommended complete elimination of bacteria in soft dentin ignoring newest conservative approaches. Studies conducted in various parts of the world like Saudia Arabia[14], Palestine[2] and France[15] showed that majority of their dentists followed conventional approach. However, study conducted among Norwegian dentists[13] found that most of them follow conservative approach. To the best of our knowledge there is no such study conducted at the national level regarding approaches

Umeed Javaid
Lecturer Operative Dentistry
Bahria University Medical and Dental College
E-mail: umeedjavaid@hotmail.com

Shama Asghar
Associate Professor Operative Dentistry
Bahria University Medical and Dental College

Kulsoom Fatima Rizvi
Associate Professor Community Dentistry
Bahria University Medical and Dental College

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employed by our dentists in cases of deep carious lesions and indeed it was the rationale of this study. Therefore the aim of the study was to assess the attitudes and behavior regarding the preferred method to manage the deep carious lesion with relation to qualification and clinical standing of different dentists in Karachi.

METHODOLOGY:

A cross-sectional, multi-centered study was conducted in six government and private dental institutes of Karachi from April to June 2018. Taking previous study as a reference[16] for sample size, keeping margin of error 5% and 95% confidence interval, the calculated sample size was 218 participants according to OpenEpi (Version 3). The expected dropout was 13% dropouts hence total 250 participants were required to obtain the desired outcome. The included participants were dental graduates and post graduates belonging to clinical and non-clinical of public and private sector. Whereas graduates and post graduates not affiliated with any institution were excluded from the study. A self-administered questionnaire was distributed among the subjects through convenience sample technique and they were asked for written consent before filling the forms. Ethical approval was obtained from Ethical Review Committee of Bahria University Medical and Dental College numbered (ERC 11/2018).

The questionnaire was a modified version of a previously used study of Falk Schwendicke *et al* and Taleb Hussain Alnahwiet al. [16, 17] The questionnaire was divided into two parts; first part was regarding demographic details and academic qualification (BDS level-I, MCPS/MSc level-II, FCPS/MDS level III) and in the second part cases regarding management of deep carious lesions were asked.

The questionnaire assessed the knowledge and behavior of dentists regarding management of deep caries in the following areas:(1) criteria to assess carious tissue removal in deep lesions, (2) methods for carious tissue removal, (3) procedures/techniques used to improve prognosis of procedure (4) management strategies for a deep lesion. (5) Attitudes towards leaving carious tissue beneath a restoration and (6) reasons of underlying the treatment decisions.

A statistical analysis was performed in SPSS Version 22.0. Descriptive analysis was carried out for qualitative variables, and means and standard deviations were determined for quantitative variables. Chi-square test was used to compare study responses between qualification and clinical standing at a significance level of = 0.05.

RESULTS:

Out of the 250 dentists, 218 returned the questionnaire giving a satisfactory response rate of (87.2%). Respondents include (28%) male and (72%) female dentists and the majority of them aged between 25-35 years old. (Figure 1)Most of the participants were graduates (Level 1) (84.9%) followed by post graduates (15.1%) (Level II and III).

Hardness of the dentine was the criteria most often used for assessing the carious tissue removal. Majority of respondents (73.3%) preferred removing the soft dentine. Almost (56.9%) considered wet dentin as main criteria while removing deep carious lesion. Color of the lesion was not significant for most of the respondents and was selected by (47.7%) only. When inquired about the preferred excavation method, majority preferred metal bur (slow and high) (56%) followed by hand excavation (41.7%) and few respondents selected chemo mechanical (2.3%) methods. The most selected method of cavity disinfection to improve prognosis was rubber dam (60.6%).Complete caries removal was chosen by (72.5%) dentists when there was no risk of pulp involvement. Whereas (48.6%) agreed on removing complete caries where risk of pulp exposure is involved and (47.7%) disagreed to it. (84.9%) participants selected that their interventions are based on evidences whereas only (6.4%) participants selected recommendations by peers. (Table 1)

When graduate and post graduates were compared regarding management of deep carious lesions we found no difference among them. (*p* value = .05) (Table 1)

DISCUSSION:

This study was done to assess attitudes and behavior regarding the preferred method to manage the deep carious lesion with relation to qualification and clinical standing of different dentists in Karachi. Deep carious lesions can cause pulp exposure in where complete caries is removed, in such cases dentists relies on minimal invasive procedures such as pulp capping, pulpotomy or pulpectomy[18, 19]. In our study (72.5%) of dentists preferred complete caries removal when there was no risk of pulp exposure which was comparable to (71.1%) of Southern Brazil[2] and lower than Saudi Arabia[16] which was (82.5%). According to our study (47.7%) of dentists were preferred step-wise excavation when pulp is in close proximity and these results were higher than 17.6% in Brazil[2] and lower (57.8%) than the findings of Saudi Arabia[16]and in France[17] which was (71%). Studies have shown that risk of pulp exposure was considerably reduced in selective carious removal technique in contrast to non-selective carious removal[20, 21, 22].

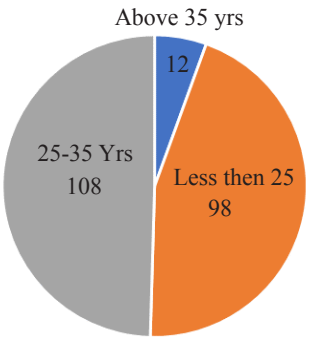

Fig- I Age distribution of the participants of the study

Table 1. Cross tabulation between Attitudes and behavior of dentists regarding deep carious lesion management among different qualifications.

Question	Criteria /method	BDS n(%)	MCPS/MSc n(%)	FCPS/MDS n(%)	Total n(%)	p-value
Hardness of dentin	Soft	136(73.5)	12(75)	12(70.5)	160(73.3)	**0.884**
	Leathery	38(20.5)	4(25)	4(25)	46(21.1)	
	Not Relevant	11(6)	0(0)	1(23.5)	12(5.5)	
Color of the lesion	Heavily stained	88(47.5)	8(50)	8(47)	104(47.7)	**0.999**
	Normal to yellow	62(33.5)	5(31.25)	6(35.2)	73(33.4)	
	Not Relevant	35(18.9)	3(18.7)	3(17.6)	41(18.8)	
Moisture content of the lesion	Wet	99(53.5)	11(68.7)	14(82.3)	124(56.8)	**0.123**
	Dry	47(25.4)	4(25)	2(11.7)	5324.3)	
	Not Relevant	39(21)	1(6.25)	1 (5.88)	41(18.8)	
Excavation methods	Metal bur (high and slow speed)	109(58.9)	7(43.75)	6(35.29)	122(55.9)	**0.223**
	Hand excavation	72(38.9)	9(56.25)	10(58.8)	91(41.7)	
	Chemo-mechanical	4(2.16)	0(0)	1(5.88)	5(2.29)	
Additional procedures/techniques	Rubber dam	112(60.5)	10(62.5)	10(58.8)	132(60.5)	**0.990**
	Cavity disinfection	55(29.7)	4(25)	5(29.4)	64(29.3)	
	Others	18(9.72)	2(12.5)	2(11.7)	22(10.0)	
Complete excavation	Agree	139(75.1)	11(68.7)	8(47.0)	158(72.4)	**0.055**
	Disagree	40(21.6)	5(31.25)	9(52.9)	54(24.7)	
	No opinion	6(3.24)	0(0)	0(0)	6(2.75)	
Incomplete excavation	Agree	82(44.3)	9(56.2)	13(76.4)	104(47.7)	**0.106**
	Disagree	95(51.35)	7(43.75)	4(23.5)	106(48.6)	
	No opinion	8(4.32)	0(0)	0(0)	8(3.66)	
Deep caries management	Evidence based	156(84.3)	13(81.2)	16(94.1)	185(84.8)	**0.639**
	Recommended by peers	12(6.48)	2(12.5)	0(0)	14(6.42)	
	Cost effective	17(9.18)	1(6.25)	1(5.88)	19(8.71)	
	Total n	**185**	**16**	**17**	**218**	

No statistically significant differences were found between simple graduates and post graduates respondents regarding the management of deep caries, ($P > 0.05$).

This study showed the higher preference for complete caries removal possibly due to unawareness about the advantages of minimal invasive techniques[23].The results clearly indicated that involvement of pulp alters the decision of treatment. Different studies[20, 23] showed that even if practitioners are aware of newer techniques, such as minimally invasive dentistry (MID) they are not completely following it and still prefers practicing an old methodology which is the removal of all the infected tissue.[20, 23, 24]

Our study revealed that hardness as the most chosen criteria to evaluate the extent of deep carious lesion which is in agreement to the studies done previously in Palestine[22], France[17], Germany[12] and Norway[15]. Hardness has been set as marker to evaluate the lesion's extent as no reliable diagnostic tool has been validated. However, it should be highlighted and considered that inactive slow progressing carious lesion can progress anytime.[25]

Dentine hardness is found to be the criterion endorsed by the International Caries Consensus Collaboration (ICCC) group in order to establish the clinical consequences of the disease[11].In our study no association between gender and levels of qualification was found on treatment decision. However, previous studies show that younger dentists tend to select more conservative approaches[2, 15]. In addition some literature revealed that experienced dentists conduct their treatment based on latest evidences for deep carious lesions.[15, 26, 27] In terms of limitations of this study these results were from the Institutes of Karachi only, hence results were unable to generalize to all dentists of the country. Another limitation was reporting bias as participants may answer what they actually did not practice. It is recommended that minimally invasive approaches for caries management should be added to the dental curriculum. Workshops should also be conducted to update practicing dentists to eradicate the fear of leaving affected dentin.

CONCLUSION

The results of this study revealed that complete caries removal was the treatment of choice when there was no

chance of pulp exposure and step-wise excavation was done by half of the participants when there was chance of pulp exposure. The result also highlights a contrasting response from the participants as they believe in evidence based dentistry but do not apply those concepts in their daily practice.

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Original Article

Assessment Of Premenstrual Syndrome In Medical Students And Its Association With Progression Of Academic Years

Sadia Suboohi, Saba Pario , Ghazala Nasim, Sughra Abbasi, Shahanaz Hassan Siddiqui

ABSTRACT

Objectives: The objective was to determine the frequency of Premenstrual Syndrome and its association with progression of academic years among the medical students.

Study Design and Setting: A cross sectional study was conducted at United Medical and Dental College Karachi from January to June 2018 among 150 female medical students.

Methodology: A structured questionnaire was designed to assess the demographic characteristics and symptoms of PMS if any experienced by the participants included in the study. The severity symptoms of PMS were marked by the participants on the behalf of their impact on their routine activity & performance, ranking from mild, moderate to severe. Data was analyzed using SPSS version 20.

Results: The frequency of PMS was reported as 39% in the study participants among them 79.31% showed mild form, 17.24% showed moderate and 3.44% were diagnosed with severe PMS. Increased frequency of PMS in female medical students was observed to be associated with progression of their academic years, with final year students having highest percentage. Academic year of MBBS, type of accommodation, and occupation of mother, menstrual cycle regularity and history of PMS in family were found to be statistically significant risk factors associated with PMS.

Conclusion: Premenstrual syndrome is a prevalent health issue in medical students, increasing year to year during their studies, which may unfavorably have affects on their quality of life and overall performance.

Keywords: Menstrual cycle, Medical students, Premenstrual syndrome,

INTRODUCTION:

Premenstrual syndrome (PMS) is a recurrent occurrence of cyclical somatic or psychological symptoms or both, that occur before onset of menstrual cycle that is in luteal phase and resolve in follicular phase, at least by end of menstruation. This disorder is not caused by any organic disease.[1] According to ACOG criteria, one of the following affective symptoms (depression, angry outbursts, irritability, anxiety, confusion, and social withdrawal) and any one of somatic symptoms (breast tenderness, abdominal bloating, headache, and swelling of extremities) with an adverse impact on daily life activities, markedly affecting interpersonal relationships are required for diagnosis of Premenstrual syndrome. These cluster of symptoms should be present five days before start of periods in three previous cycles and settled by four days after onset of menstrual bleeding.[2,3] Premenstrual dysphoric disorder or severe PMS is the extreme, predominantly psychological end of PMS.[4]

In literature spectrum of symptoms has been described but actually timing and severity are of most importance to any specific pattern of symptoms.[5] PMS occur in four in ten women of reproductive age and 5–8% of these experience were of severe form.[6] PMS can cause significant morbidity adversely affecting interpersonal relationships, impairment of normal day to day functioning, negative impact on work performance and general well being and health of women .[7,8] PMS is experienced by reproductive aged women , more prevalent in the younger age group leading to a significant public health problem in young girls.[9] There have been many theories of aetiology but current evidence suggest that PMS is caused by abnormality of neurotransmitter function mainly serotonergic dysfunction, reinforced by verification that selective serotonin reuptake inhibitors reduce PMS symptoms. Others suggest that women suffering from PMS are 'sensitive' to progesterone and progestogens.[10]

Premenstrual syndrome must be differentiated from Premenstrual magnification, that may be due to underlying psychiatric or medical disorder in which symptoms are present all the time but exacerbated in premenstrual

Sadia Suboohi
Associate Professor
Obstetrics & Gynaecology at Creek General Hospital
United Medical & Dental College, Karachi

Saba Pario
Assistant Professor, Obstetrics & Gynaecology at Creek General Hospital
United Medical & Dental College, Karachi
Email: drsabapario@gmail.com

Ghazala Nasim
Assistant Professor, Community Health Sciences
United Medical & Dental College, Karachi

Sughra Abbasi
Associate Professor, Obstetrics & Gynaecology
Karachi Institute of Medical Sciences CMH Malir Cantt Karachi

Shahnaz Hassan Siddiqui
Professor, Obstetrics & Gynaecology
United Medical & Dental College, Karachi

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phase.[11]According to research women diagnosed with PMS may have a devastating effect on herself, her family and colleagues around her.[12] Management of PMS should be individualized, suggested treatment options are life style modification, hormonal medications, SSRI, cognitive behavioral therapies and total abdominal hystrectomy and bilateral oophrectomy as last resort in most refractory and failed cases.[13] Majority of students in medical undergraduate studies are females in our country , high prevalence of PMS among them may affect their performance if left undiagnosed and untreated. Therefore the primary aim of this study was to assess the frequency of PMS, association of increase in frequency of PMS with progression of academic years and to study the factors associated with PMS among female medical students of United Medical and Dental College Karachi.

METHODOLOGY:

A cross sectional study was conducted to determine the frequency of PMS and factors associated with PMS among medical students of United Medical and Dental College, Karachi from January to June 2018 by convenient sampling on one hundred and fifty female medical students .Brief information about PMS was given to the participants, before conducting the study. Eligible criteria included those who consented to participate in the study. Students with history of medical illness including thyroid diseases, autoimmune disease, asthma , epilepsy and any psychiatric ailment were excluded. A structured questionnaire was designed to assess the demographic characteristics and symptoms of PMS if any experienced by the participants included in the study .Diagnosis of PMS in this study was made if the participant reported symptoms five days before menstrual cycle in last three menstrual cycles. At least one of the following affective symptoms including depression, irritability, angry outbursts, anxiety or social withdrawal and any one of somatic symptoms including headache , abdominal bloating, breast tenderness or extremities swelling. These symptoms must have relieved within 4 days of the onset of menses and did not reoccur till twelfth day of menses. (According to the diagnostic criteria of ACOG).[2]The severity symptoms of PMS were marked by the participants on the behalf of their impact on their routine activity & performance, ranking from mild, moderate to severe. Statistical analysis was carried out using SPSS software version 22. Percentage was calculated for descriptive variables. Chi-square test was applied to find the significant associations. Statistical significance was set at $P<0.05$.

RESULTS:

PMS was diagnosed in 58 medical students of the 150 participants in the study , while 92 did not had PMS. The prevalence of PMS among the study participants was (39 %), among them (79.31%) showed mild form, (17.24%) showed moderate degree and (3.44%) were diagnosed with severe PMS. (Figure II). N=31(20.66%) participants were less than 20 years of age, n=58 (38.66%) were between 20-22 years of age, and n=61(40.66%) were between 23 to 25 years of age . The data was analyzed using the Chi-square test (p-value 0.650) and no statistical significance was found between age and the incidence of PMS (Table-I). N=21(14%) were studying in first year of MBBS, n= 4 (19%) of whom were diagnosed to be suffering with PMS. N=29(19.3 %) were in the second year of MBBS, n=7 (24.1 %) of them had PMS. N=21(18 %) were in the third year of MBBS with n=9(33.3%) of them being diagnosed with PMS . N=29 (19.3 %) were fourth year students with n=14 (48.2%) of them had PMS. Lastly among final year MBBS students n=44(29.33 %) were enrolled in the study among them n=24 (54.54%) being eventually diagnosed with Premenstrual Syndrome. The data was analyzed using chi-square test (p-value=0.016) and significant association was seen between the year of MBBS and the incidence of Premenstrual syndrome. Increase in frequency of PMS in female medical students was observed to be associated with progression of their academic years, with final year students having highest percentage.

Majority of them (n=86, 57.33%) had age of menarche between 10 to 13 years.

Among 150 participants, 48.66% revealed irregularcycles, in whom 28.76% were having PMS. While menstrual cycle was regular in 51.33% of participants. Regarding residence status, n=78 (52%) participants were residing in hostel, n=38 (48.71%) of whom suffered from symptoms of PMS, compared to n=72 (48%) day scholars in whom only n=20 (27.77%) were diagnosed with PMS.

Figure I: Percentage Of PMS Among Medical Students

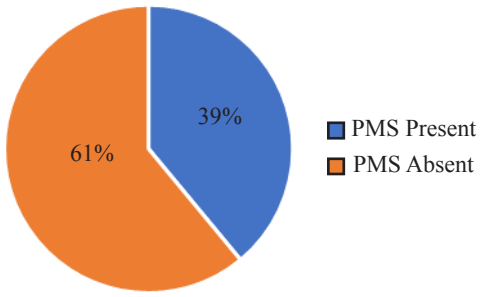

Figure II: Severity Of PMS Among Medical Students

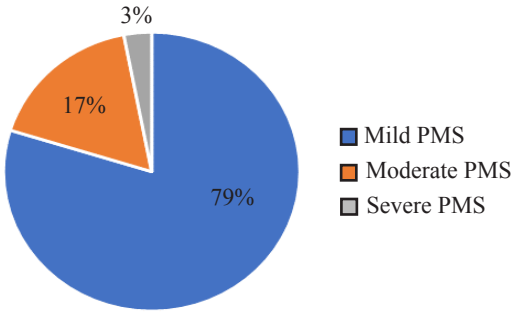

Table 1: Demographics And Characteristics Of Students Enrolled.

	With PMS n= 58	Without PMS n= 92	Total (100%)	P-value
<20	11 (35.5%)	20 (64.5%)	31	0.650
20-22	21 (36.2%)	37 (63.7%)	58	
23-25	26 (42.6%)	35 (57.3%)	61	
Total	58 (38.7%)	92 (61.3%)	150(100 %)	
1st year	4 (19%)	17(81%)	21	0.016
2nd year	7 (24.1%)	22(75.9%)	29	
3rd year	9 (33.3%)	18 (66.6%)	27	
4th year	14 (48.2%)	15 (51.8%)	29	
Final year	24 (54.5%)	20 (45.5%)	44	
Total	58 (38.7%)	92 (61.3%)	150(100 %)	
10-13 years	31 (36%)	55 (64%)	86	0.445
> 13 years	27 (42.2%)	37 (57.8%)	64	
Total	58 (38.7%)	92 (61.3%)	150(100%)	
Hostel	38 (48.7%)	40 (51.3%)	78	0.008
Day Scholar	20 (27.8%)	52 (72.2%)	72	
Total	58 (38.7%)	92 (61.3%)	150(100%)	
Nuclear	40 (43.5%)	52 (56.5%)	92	0.127
Joint	18 (31%)	40 (69%)	58	
Total	58 (38.7%)	92 (61.3%)	150(100%)	
Illiterate	12 (52.2%)	11 (47.8%)	23	0.148
Literate	46 (36.2%)	81 (63.8%)	127	
Total	58 (38.7%)	92 (61.3%)	150(100%)	
Housewife	33 (50.7%)	32 (49.2%)	65	0.007
Working women	25 (29.4%)	60 (70.6%)	85	
Total	58 (38.7%)	92 (61.3%)	150(100%)	
Regular	37 (48%)	40 (52%)	77	0.015
Irregular	21 (28.8%)	52 (71.2%)	73	
Total	58 (38.7%)	92 (61.3%)	150(100%)	
Present	33 (54%)	28 (46%)	61	0.001
Absent	25 (28%)	64 (72%)	89	
Total	58 (38.7%)	92 (61.3%)	150(100%)	

About 61.33 % of girls came from nuclear families. Majority of the mothers of participants were literate (84.66%), while only 15.33% of them were illiterates. Eighty five participants mothers were working women (56.66%) by occupation, while sixty five (43.33 %) were house wives.

PMS was significantly more frequent in girls with family history of PMS (p = 0.001).

PMS was not found to be statistically associated with age, age of menarche, type of family, and education of mother.

DISCUSSION:

In the present study, the prevalence of PMS among the female medical students of United Medical and Dental College was 39 %. Similarly an Indian study conducted by Rumana AM et al, found a prevalencerate of 31.1% among medical students of Basaveshwara medical college, Chitradurga.[14] Nearly similar prevalence of PMS was observed in Thai high school students, study conducted by Buddhabunyakan N et al. [15]

However a higher prevalence rate of 92.4% of PMS was present among female students of Army Medical College (NUST), Islamabad, in a study conducted by Rizwan hashim et al,.[16]Sarkar AP et al, and Pal et al, alsoreported high prevalent figures of 61.5% and 79.9%respectively. [17, 18] This difference could be due to the difference of prevalence in general community and the selective groups, age, bachelorhood, marital status, employment status, educational status etc.Among the study participants 79.31% showed mild form of PMS , 17.24% showed moderate degree and 3.44 % were diagnosed with severe PMS in current study. In a study conducted by Nusrat Nisar et al59.5% had mild PMS, 29.2% had moderate and 11.2% had severePMS. [9]

While the frequency distribution of the PMS cases reported by Magdy Hassan Balaha et al, were as 45% mild, 32.6% moderate and 22.4% severe cases. [19] Present study reports higher prevalence of PMS among 23-25 years old medical students compared to other age groups, but it was not statistically significant. Increase in frequency of PMS in female medical students was observed to be associated with progression of their academic years, with final year students having highest percentage then compared to other academic years. This might be due to higher level of stress due to tough and demanding final year medical studies. These findings were consistent with the study conducted previously by Rumana AM et al,.[14]Magdy Hassan Balaha et al reported that PMS had a significant association with older age groups in medical students. [19]

In the current study, no association was found between age of menarche and development of premenstrual syndrome. These finding were consistent with study conducted by El -Defrawi MH et al,[20]in contrast to it, Abu-Hashem H, et al did found association between PMS and age at menarche.[21]

PMS was found to be more frequent among students residing in hostels in present study, this is in agreement with study conducted by Rumana AM,et al.[14]

Regarding educational status of mother and occupation of mother, no association was reported for educational status of mother but occupation of mother was found to be statistically significant in present study. However no such association was found by Magdy Hassan Balaha et al.[19] In study conducted by Sarakar AP et al, PMS was not found to be statistically associated with education of mother, whereas occupation of mother was found to be statistically significant .[17]

History of regular menstrual cycle was found to be predisposing factor for development of premenstrual syndrome, in the current study. This was in agreement with some previous studies.[22]On the contrary, Sarkar AP etal, did not reported any association between PMS and regularity of menstrual cycle .[17]

Finally, the family history of PMS was found to be statistically significant associated risk factor in our study; this is in line with NFarahmand M et al. and Rasheed P et al. [23, 24]

In the light of this study, further large-scale studies would be recommended to evaluate the prevalence of PMS in community, impact of PMS on quality of life and effective interventions for alleviating PMS among general community and high-risk population like medical students. Counseling and health services should be made accessible and available. It is recommend that health education, counseling and medical services to be provided at medical college campuses for female students. Adequate means should be taken to promote a healthy and stress free environment in medical colleges, especially in hostels. Comfortable conditions should be provided with the availibity of counselors to avoid the symptoms of PMS and its consequences.

CONCLUSION:

Premenstrual syndrome is a prevalent health issue in medical students, increasing year to year during their studies, which may unfavorably have affects on their quality of life and overall performance.

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Original Article

Dentists Perspective Regarding Prophylactic Removal Of Asymptomatic And Impacted Third Molars

Wahab Buksh Kadri, Sameera Asif, Atif Zubairi, Sarah Jamil, Tooba Kamran, Zahra Hassan, Hania Idrees

ABSTRACT:

Objective: To determine dentist's perspective regarding NHS guidelines for prophylactic removal of Impacted Third molars among dentists of Karachi.

Study Design and Setting: It was a cross sectional study design based on the questionnaire. Questionnaire was filled by total 110 general dentists selected by random sampling and was practicing in various private and government setups of Karachi to know about their preference regarding prophylactic removal of asymptomatic third molar.

Methodology: The questionnaire comprised of total 13 questions to find out dentists view point about the prophylactic removal of impacted third molar. The results were then analyzed using SPSS version 23. Frequencies, percentages of different variables used in the study were calculated to identify the co-relation among different attributes. P-value of less than or equal to 0.05 was considered statistically significant.

Results: The study reflected that 71.8% dentists were aware with the NHS Guidelines for removal of asymptomatic & impacted third molars while 28.2% dentists preferred conventional approach. The study also revealed Mesioangular impaction as being the most commonly observed type of impaction in the dental practice.

Conclusion: It was concluded from this study that majority of dentists were aware of the guidelines provided by NHS and regarding the angulation of impacted teeth most of the impactions seen at the dental office were Mesioangular.

Key Words: Asymptomatic tooth, Impacted third molar NHS guidelines, Prophylactic tooth removal.

INTRODUCTION:

Mandibular third molars are the most frequently encountered teeth which are impacted in human dentition.[1] Prophylactic removal of asymptomatic tooth is defined as the removal of tooth without any sign and symptoms in order to prevent occurrence of disease or pathology.[2]Impacted lower third molars are commonly removed surgically in general dental practice as well as many teaching institutions. Even though there are well demarcated indications for the removal of impacted third molars, still their removal without a concurrent disease is being carried out universally.[3,4]In many studies, removal of asymptomatic impacted teeth have proven to reduce the pathologies associated with partially erupted or impacted third molars.[4,5] The indications behind removal of third molars have always been a matter of controversy among the dental practitioners. In the previous years, many dental practitioners have come to a conclusion that asymptomatic third molars should be extracted to counter the risks and complications that follow.[6,7]

Third molar removal is one of the most prevalent surgeries performed in Oral Surgery. The rationale being is the high trend of their impactions, often linked to various problems in the oral cavity, such as pericoronitis, periodontal deficiencies in the distal margins of second molar, numerous types of odontogenic cysts and tumours, and overlapping of the incisors of lower jaw.[8,9,10]

Current NHS Guidelines recommended that healthy wisdom teeth should not be removed as a preventive measure, unless there is an `evidence of repeated infection or disease associated with the tooth.[11]In order to devise a comprehensive treatment plan, dentist must take into account all the factors that may impact the outcome of their treatment.[9] Concurrently, risk vs. benefit analysis should also be done to justify these surgeries.[12,13]

Additionally, both the dentists and their patients must consider the drawbacks related to the surgical procedure. These

Wahab Buksh Kadri,
Head of Dept., Oral & Maxillofacial Surgery
Bahria University Medical and Dental College

Sameera Asif,
Senior Registrar, Oral & Maxillofacial Surgery,
Bahria University Medical and Dental College
Email:sameeraasif3@gmail.com

Atif Zubairi,
Senior Lecturer, Oral & Maxillofacial Surgery
Bahria University Medical and Dental College

Sarah Jamil,
House Officer
Bahria University Medical and Dental College

Tooba Kamran,
House Officer
Bahria University Medical and Dental College

Zahra Hassan,
House Officer
Bahria University Medical and Dental College

Hania Idrees
House Officer
Bahria University Medical and Dental College

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drawbacks range from pain to bleeding, dry socket to dehiscence, abscesses, paresthesia, hematoma and trismus. Severe trauma during surgery may lead to fractures of the jaw.[11] Therefore, decisions regarding removal and retention should be done wisely according to the available guidelines on prophylactic removal of Impacted Third Molars. The objective of the study was to determine dentist's perspective regarding NHS guidelines for prophylactic removal of Impacted Third molars among dentists of Karachi.

METHODOLOGY: This cross sectional study was conducted over a period of 3 months from the time of approval in Bahria University Medical & Dental College, Karachi.The instrument to record responses was formulated on the basis of 13 close-ended questions. The interrogated questions were rate of third molar extraction, the philosophy behind the third molar extraction, the type of impaction recommended for extraction, most common age group recommended for extraction, consequences of retaining 3rd molars, the conditions that justify your recommendation of extractions and awareness regarding the NHS guidelines for extraction of wisdom tooth along with the demographic questions which were type of clinical practice, professional experience and location of practice.. Participants were randomly selected via convenience sampling. Total 118 dentists included in the study but due to incomplete questionnaire 8 forms were excluded hence responses of 110 dentists were analyzed for this study. Ethical permission was obtained from the Ethical Review Committee of Bahria University Medical & Dental College before the data collection.Written consent was obtained from the participants before filling the form.Only practicing dentists were included in the study, with age range of 25-65 years. Fresh graduates and house officers were excluded from the study. Data was analyzed using SPSS ver.23. Frequencies, percentages of different variables used in the study were calculated to identify the co-relation via Fisher Exact test.

RESULTS:

From the total 110 dentists 71.8% showed awareness to NHS guidelines for third molar removal cases, while 28.2% of dentists preferred the conventional approach of third molar removal in asymptomatic and impacted third molar cases. It was observed that mesioangular impactions are the most commonly removed impaction in private and hospital settings. (Table 1) followed by distoangular, horizontal and vertical impactions respectively. Regarding consequences of retaining third molar, study revealed that chances of development of cyst and tumors associated with third molar are more prevalent, if the impacted tooth is not removed followed by tooth decay which can pose significant risk to patient's health and hygiene.(Table 1).

Regarding the correlation between awareness of dentists with NHS Guidelines and Justification of removal of impacted third molar, it was observed that pathologies associated with third molar were a major concern while planning for removal of impacted third molar followed by recurrent pericoronitis. (Table 2). However, results revealed that awareness of these guidelines did not impart any significant difference among the treatment planning. (P-value: 0.164)

Table-1: Awareness Of NHS Guidelines

	Frequency (%)
Yes	79 (71.8%)
No	31 (28.2%)
Type Of Impactions to which you recommend Extractions	
Mesioangular	57 (51.8%)
Distoangular	23(20.9%)
Vertical	14 (12.7%)
Horizontal	16 (14.5%)
Consequences of Retaining 3rd Molars	
Tooth decay	27 (24.5%)
Bone loss	15 (13.6%)
Interference with needed dental treatment	12 (10.9%)
Periodontal Disease	23 (20.9%)
Development of Associated cysts and tumors	33 (30.1%)

Table 2: Fisher exact test was applied to see the significance. P= 0.05 considered to be statistically significant

Condition that justify your recommendation of Extractions	**Awareness Of NHS Guidelines**		**Total**	**P-Value**
	Yes (%)	**No(%)**		
Recurrent Pericoronitis	25 (61%)	16 (39%)	41	0.164
Periodontal Defects in Second Molar	9(75%)	3(25%)	12	
Caries in 3rd or 2nd Molar	15 (68.2%)	7(31.8%)	22	
Associated Pathologies with 3rd Molars	28(87.5%)	4 (12.5%)	32	
Crowding of Incisors	2 (66.7%)	1 (33.3%)	3	
Total	79 (71.8%)	31 (28.2%)	110	

DISCUSSION:

The prophylactic surgery of 3rd molar removal is defined as the surgical extraction of third molar in the absence of a disease at its particular site.[2] During the course of this study, 71.8% of the dentist showed awareness to NHS guideline. However, no significant association was seen between the awareness of guidelines and removal of impacted teeth. In this view, The National Institute for Health and Clinical Excellence (NICE) issued guidance on the management of third molars in 2000.[14] The stated guideline summarized that 40% of the wisdom teeth at NHS are removed without any clinical indication of extraction thus the practice of prophylactic extraction of wisdom teeth should be discontinued. Contrary to the guideline published, removal of impacted teeth is seen as commonly performed procedure in oral surgery.

During the study, 51.8% of the patient showed Mesioangular positioned teeth followed by Distoangular, Horizontal and vertical impactions respectively. This finding was in agreement with a study conducted by M Hatem et al[15] which stated that mesioangular impaction is the most prevalent angulation seen in mandibular impacted teeth. Regarding the consequence of retaining third molar, it was revealed that occurrence of pathological changes including development of cyst and tumor was seen in the retained impacted tooth (30.1%) followed by caries to second molar (24.5%). Various authors have assured that partially erupted molars are more prone to developing pericoronitis and are therefore best chosen for prophylactic removal.[9,10] Manganaro[16] demonstrated similar findings, with cystic changes reported in nearly 46% of pericoronal radiolucencies around impacted third molar teeth. Several recent studies have evaluated soft tissues retrieved from third molar sites without radiographic evidence of disease (follicular spaces 3 mm or less), and have reported pathologic change in high percentages[17,18], which was in accordance with the findings of our study.

Development of caries distal to second molar was also evident in patients presenting with partially impacted third molar according to this study. Allen et al[19] described that caries on distal margins of second molars is more prevalent in second molars that are adjacent to partially erupted third molars. Nunn et al[20] have proved in a clear set of words that retention of third molars is directly linked to increased risk of pathologies in middle aged population. The consequences of retaining third molar should be analyzed before formulating treatment plan.[21,22] Development of cysts, tumors, tooth decay and periodontal issues are the most commonly considered factors which necessitates the removal of impacted wisdom teeth.[23-27]Studies have also proven that with age, complications related to third molar surgeries increase significantly.[26,28-30] Hence, treatment should be planned accordingly taking into account patient's age and medical status.

Among the limitations of the study larger sample size should be conducted to rule out the problems associated with impacted teeth. Clinical and radiographic parameters can also be included for in-depth analysis of effects caused by impacted and asymptomatic third molar in future studies.

CONCLUSION: The study concludes that majority of dentists were aware of the guidelines provided by NHS and regarding the angulation, mesioangular impaction was the most commonly seen impaction at the dental office.

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Original Article

Assessment Of Perinatal Outcome Of Breech Presentation At A Tertiary Care Hospital, Quetta

Safia Bibi, Khanda Gul, Fozia Mohammad Bukhsh, Palwasha Gul

ABSTRACT:

Objective: To review the mode of delivery and perinatal outcome in breech presentation in a tertiary care hospital.

Study Design and Setting: Retrospective Analytical Study. Department of Obstetrics and Gynecology Unit-4, Bolan Medical Complex Hospital, Quetta, from 1st January 2012 to 31st December, 2016.

Methodology: This retrospective analytical study included review of clinical records of all patients who delivered either vaginally or via caesarean section with breech presentation.

Results: During the study period, 806 patients presented with breech (2.4%). Vaginal breech delivery was carried out in 71.8% patients and caesarean section was done in 28.2% patients. In vaginal breech group 30.7% patients were primigravida and 69.3% patients were multigravida. In caesarean section group 50.3% patients were primigravida and 49.7% were multigravida. Most common birth weight was between 2.5-3.5 kg in both group. Most common indication for cesarean section was breech with previous one LSCS.

Conclusion: Like all vaginal births, vaginal breech delivery is not only beneficial in the chance of having a vaginal birth in future but also prevents from the complications of caesarean delivery.

Key Words: Breech presentation, caesarean section, primigravida, vaginal breech delivery.

INTRODUCTION:

Breech presentation is defined as the fetal buttocks presenting in the birth canal. It is classified as frank breech (45-50%), complete breech (10-15%) and footling breech (35-45%). Prematurity is commonly associated with breech, 33% at 24 weeks. It drops to 3-5% at term (37-40 weeks.) Predisposing factors include high parity, uterine anomalies, pelvic tumors, polyhydramnios, oligohydramnios, fetal anomalies, macrosomia, multiple pregnancy, placenta previa, absolute cephalopelvic disproportion, and previous breech. Often no cause is found too.[1]

The optimal route of delivery for breech infants has been the subject of much controversy. There is a vast difference in the mode of delivery between private and public hospitals. In United States over 90% of primigravidas are delivered by caesarean section. Initially it was thought that caesarean in breech fetus improves maternal and fetal outcome but now it's evident that caesarean does not prevent all infant morbidity and mortality because it usually arises by the same problems that caused the breech presentation in the first place. Rather caesarean places mother at risk of anesthesia, short and long term complications of surgery and makes her a high risk pregnancy in future, especially in developing countries.[2]

Two considerations, not strictly medical, are made in decision making of mode of delivery. Firstly, the skill of vaginal breech birth is not universally available neither an effort is made to teach it, plus those having the skill are either aging or not part of delivery team due to seniority. Secondly, the medico-legal consequences prohibit many from attempting the vaginal breech birth.[3]

Though many factors are taken into account, including conclusions from medical literature, community and national standards, the specifics of each individual case, the patient's wishes and skill of the operator in delivering a breech fetus, but it should also be considered that as being in developing world the complications of anesthesia, surgery, lack of antenatal, home deliveries with a scar, morbidly adherent placenta and its consequences, lack of neonatal care and fear of limited family does not make it a first choice.[4]

METHODOLOGY:

This retrospective study was conducted in the department of Obstetrics & Gynaecology unit-IV, Bolan Medical Complex Hospital, Quetta from 1st Jan 2012 to 31st Dec 2016. The study group included all patients with breech presentation among the 33,396 patients who delivered in the department during the study period. Patients with singleton pregnancy with breech presentation and patients with twin pregnancy having first twin breech presentation were included

Safia Bibi
Assistant Professor, OBG Unit 4,
Bolan Medical Complex Hospital, Quetta

Khanda Gul
Assistant Professor, OBG Unit 4,
Bolan Medical Complex Hospital, Quetta
Email: khandagul76@yahoo.com

Fozia Mohammad Bukhsh
Assistant Professor, OBG Unit 4,
Bolan Medical Complex Hospital, Quetta

Palwasha Gul
Senior Registrar, Radiology,
Bolan Medical Complex Hospital, Quetta

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in the study. Patients with compound presentation and those delivered before 28 weeks were excluded from the study. Clinical records of patients were obtained from the labor ward and operation theater registers as well as from the case files. Data was collected, including the age, parity, gestational age, mode of delivery, perinatal outcome, birth weight, fetal anomalies, and indication of caesarean section. Results were calculated in terms of percentages and frequency.

RESULTS:

There were 33,396 deliveries during the study period. Out of these 806 were breech deliveries. The incidence of breech delivery was 2.4%. Vaginal breech delivery was carried out in 579 (71.8%) patients and caesarean section was carried out in 227(28.2%) patients, emergency 180 (22.3%) and elective 47 (5.8%) as shown in Fig 1. In vaginal breech delivery group, there were 178 (30.7%) primigravida and 401 (69.3%) multigravida while 94(52.2%) patients were primigravida and 86(47.8%) were multigravida in emergency caesarean section group and elective cesarean section was carried out in 20 (42.6%) primigravidas and 27(57.4%) multigravida patients. Indications of elective cesarean were macrosomia (12) previous 1LSCS (10), more than one LSCS (6), patients wish (8), postdate (4), bicornuate uterus (2) bad obstetrical history (4) and one preterm with musculoskeletal dystrophy.The main indications of emergency caesarean section were previous 1 LSCS (27.2%), PROM (12.8%), fetal distress (8.9%) and patient's wish(8.3%) as shown in table-2. 866 babies were delivered both vaginally and through cesarean section. There were 60 sets of twins, in which 57 delivered vaginally and 3 by caesarean section. The presentations of twins who delivered vaginally were as breech-breech 33(57.9%), breech-vertex 24 (42.1%). Two case of breech -vertex presentation had complications, one came home delivery with body delivered and stuck head.The second twin was vertex and delivered vaginally while other was locked twin undiagnosed in hospital and caesarean section done. Most of the patients were non booked. Thirty fetuses had congenital abnormality which included, hydrocephalous (13), spinabifida (6), maningocele (5), anencephaly (3), hydrops fetalis (2) and umbilical hernia (1).The rate of congenital anomaly of fetus in this study was 3.5%. There were 89 perinatal deaths, out of which 66 patients had intrauterine fetal demise at admission, in which 54 delivered vaginally and 12 babies delivered by caesarean section. There were 16 stillbirths and seven NNDs in vaginal breech delivery group. NNDs were due to prematurity and 12 stillbirths had congenital anomaly, two were trial taken and 2 were twin delivery with body delivered and stuck head of first twin (fig-2).There were total 27 preterm babies. In vaginal delivery, 354 babies were male and 280 were female, one had ambiguous genitalia. While 127 babies were male and 104 were female in caesarean section group. Most of babies were between 2.5-3.5 kg in both groups. 86.1% babies in vaginal breech delivery and 81.7% in caesarean section group. 8.1% babies delivered vaginally were more than 3.5kg in our study and most of them were intrauterine deaths as shown in table-3.

DISCUSSION:

Incidence of Breech presentation has remained constant at 3-5% over the years. There has always been a debate about the mode of delivery and it will remain so as long as there

Table 1 Parity of the patients

Parity	Vaginal delivery no=579	Emergency C/S no=180	Elective C/S no=47
Para 0	178(30.7%)	94(52.2%)	20(42.6%)
P1-P2	173(29.9%)	48(26.7%)	13(27.6%)
P3-P4	92(15.9%)	15(8.3%)	7(14.9%)
=P5	136(23.5%)	23(12.7%)	7(14.9%)

Table 2 Indications of emergency LSCS

Indications	Number	Percentage%
Previous 1 LSCS	49	27.2
PROM	23	12.8
Fetal distress	16	8.9
Patient demand	15	8.3
Obstructed Labor	13	7.2
Macrosomia	13	7.2
Secondary arrest	10	5.5
B.O.H	8	4.4
APH	7	3.9
Footling breech	5	2.8
Contracted Pelvis	5	2.8
Severe Preeclampsia	4	2.2
Post Date	4	2.2
Twin pregnancy	3	1.7
IUGR	3	1.7
Eclampsia	2	1.1

Table 3 Weight of baby

Weight of baby	Vaginal delivery. no (%)	Caesarean Section. no (%)
<2.5kg	36 (5.7%)	1(0.4%)
2.5-3kg	254(39.9%)	41(17.8%)
3.1-3.5kg	294 (46.2%)	147(63.9%)
3.6-4kg	13 (2%)	28(12.2%)
>4kg	39 (6.1%)	13(5.7%)
Total	636	230

Fig: 1 Mode of Delivery

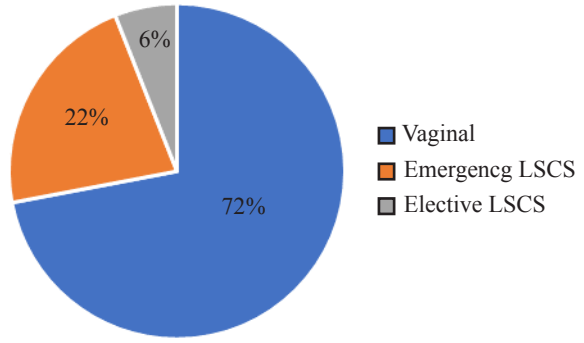
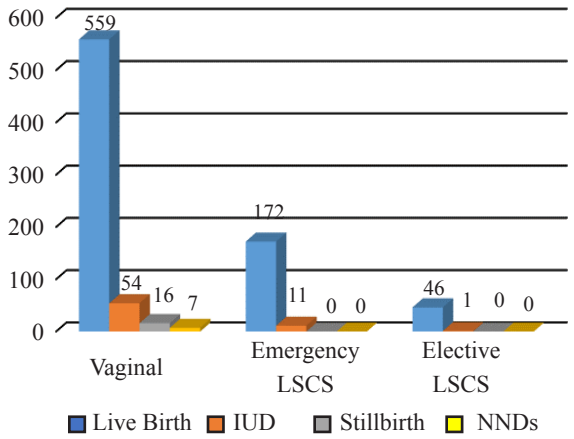


Fig: 2 Perinatal Outcome



are different approaches in developed and developing countries, private and public hospitals, due to lack of skills or fear of litigation. Incidence in our study is 2.4% comparable to the incidences found by Karning RK[5] et al and Moodley et al [6] which were 2.92% and 2.4 % respectively. While the incidence is 6.7% in Zahoor S[7] and 4.7% in Rauf B[8] studies which is quite higher than ours.Tanau K[9] had a prevalence of 1.7%.

Over the last few years cesarean rate has been on the rise and breech presentation has become one of the indications. Hogberg U et al[10] reported a cesarean rate for breech rise from 28% in 1999 to 78% in 2010. There was a threefold increase. Sullivan EA et al[11] observed that vaginal breech birth dropped from 23.1% in 1991 to 3.7% in 2005. In our study vaginal deliveries were 71.8% and cesarean 28.2% comparable to 69.1% vaginal breech delivery and 30.9% cesarean section in Tanau K[9] study. The success rate of vaginal breech delivery is 65% in Waseem T[12] study and 74% in Naheed F[13].Vaginal breech delivery is a preferable mode of delivery in our setup. 30.7% primigravida and 69. 3% multigravida were delivered vaginally in our study.

The main indications in elective caesarean section were macrosomia, previous caesarean section, patient wish and postdate pregnancies. The indications of emergency caesarean section were previous caesarean section (27.2%), PROM (12.8%), fetal distress (8.9%) and patient wish (8.3%). Majority of the babies were having birth weight of 2.5-3.5 kg in both groups.8.1% babies delivered vaginally were more than 3.5kg.The operators skill and will has a role in the mode of delivery.[14]

The cesarean delivery increased in breech presentation because at a point of time it was believed that mode of delivery was the cause of good or bad neonatal outcome but now it's somewhat obvious that it's the associated conditions that cause unfavorable fetal outcome and not solely the breech itself. The risk factors associated with adverse perinatal outcome were IUGR, diabetes, epidural, oligohydramnios, congenital anomalies, nulliparity, macrosomia, and induction of labour.[15,16,17] Congenital anomalies in our breech babies were 3.5% and karing rk 3.13%. Bjellmo S et al[2] reported that the neonatal death and cerebral palsy was similar in breech cesarean delivery and cephalic vaginal delivery. Adjaoud S et al observed that there was higher risk of severe acidosis in vaginal breech delivery but no increase in the risk of asphyxia, NICU transfer or death. Lorthe E et al[18] dealt with preterm breech almost totally with cesarean section (99.6%).

Schrage R[19] stated that girls presented a little more than boys as breech. We had a different observation both in vaginal breech delivery and cesarean section. The male gender presented more as breech presentation.

External cephalic version (ECV) is an effective intervention that decreases need for cesarean section. Vaginal delivery was more likely when breech diagnosed before 38 weeks and ECV offered[20]. Induction of labour in breech presentation was feasible with vaginal breech delivery[21]. Louwen F et al[22] suggested that an upright position was associated with less duration of second stage of labour, maneuvers required, injuries, cesarean section rate compared to dorsal position. Franz M et al[23] recommends MR pelvimetry as a useful tool for prenatal assessment of female pelvis for selection of trial of labour in nullipara. Wildschut HI et al[24] had more success with breech delivery on all fours. The aim of these efforts is to make vaginal breech delivery as an option for the patients.

There are significant regional disparities, lack of consensus and recommendations on the preferential mode of delivery for breech presentation[25,26]. Vaginal breech delivery training may be customized by practice and support from experienced clinicians[27]. Vaginal breech delivery skill need to be propagated in trainees. Clinical guidelines needs to be made and applied.

CONCLUSION:

Like all vaginal births, vaginal breech delivery is not only beneficial in the chance of having a vaginal birth in future but also prevents from the complications of caesarean delivery.

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Differences In Learning Preferences Among Medical, Dental And DPT Students

Amtul Anum, Tabassum Ahsan Qadeer

ABSTRACT:

Objective: To analyze the learning styles of undergraduate medical, dental and DPT (Department of physical therapy) students using the VARK questionnaire.

Study Design and Setting: This cross sectional questionnaire based clinical study was conducted on 278 undergraduate students at Bahria University of Medical and Dental College in Karachi.

Methodology: 150 medical, 100 dental and 28 DPT students were asked to complete VARK (Visual, Auditory, Read-write and Kinesthetic) questionnaire and their learning preferences were studied. Percentages were formulated and outcomes of each group were paralleled to conclude the result. The data was assessed using SPSS software, version 23. Statistical associations among MBBS, BDS and DPT students and gender preferences were made using chi square analysis and comparison between academic years was made with Fisher's exact test. $P<0.05$ was considered significant.

Results: Our result showed that 76.3% preferred unimodal style followed by bimodal (18.3%) and trimodal (5.4%). Kinesthetic (40%) was the most preferred method followed by aural (36%). There was no preferential shift with gender or academic year variation.

Conclusion: According to our study, most of the undergraduate medical, dental and DPT students prefer unimodal method of learning despite of educational, gender and academic variation in the sample. None of the students preferred the quadmodal learning style. Kinesthetic was the most preferred unimodal preference.

Keywords: Vark, Learning Preferences, Teaching Strategy, Dental Education, Kinesthetic, Aural, Multimodal.

INTRODUCTION:

Do all the individuals have the same preferred way of learning? Are there any differences in learning perceptions of students belonging to different academic years, background, culture or geographical distributions? Are these differences also gender based? All of these questions are termed very important while constituting a thorough academic course and syllabus.[1] Researchers over the period of time have proposed that each and every individual has a different sensory modality. Every student attains knowledge and learns new information according to one's distinctive learning style. Awareness of the learning perceptions of their students is of paramount importance for the teachers. [2,3] This may identify problems in their learning and may also improve overall academic performance of the students. Having a widespread attitude for teaching, also improves the communication between the student and the educator. In order to maximize the outcome, the learning styles of students need to be recognized so that the teaching style can also be tailored according to the preferred learning methods. If a person chooses one learning preference, they are classified as unimodal and if a person displays two or more equally predominant preferences, he has multimodal learning preference. [4,5] The multimodal group is further classified into bimodal, trimodal and quadmodal preferences. There are numerous ways of delivering knowledge and four major types are characterized by VARK questionnaire.

VARK is a questionnaire consisting of 16 multiple choice questions, established by Neil Fleming, an educator and a teacher in New Zealand, who brought forward a model for differential learning. The internet links for the VARK homepage and questionnaire have been given in the references.[2,6]

VARK is an acronym for Visual, Auditory or Aural, Reading and Kinesthetic respectively. Visual learning preference is a concept in which students prefer to learn with visual aids such as pictures, figures, diagrams and graphical representations. Those who prefer aural mode of learning, adapt best to lectures, discussions and small-group learning. R in the VARK stands for reading and it's a preference for those students who prefer to learn best from reading from books or written notes. Lastly, individuals who prefer kinesthetic sensory mode, learn well when they are taught with demonstrations, mockups, case-based learning, community trips and role plays.[7]

The VARK questionnaire is quite intricate, self-explanatory and easy to appraise, therefore it is used in studies to determine learning preferences of students belonging to diverse fields. Awareness about their own perceptiveness can enable students to amend their study methods and also

Amtul Anum,
Lecturer, Department of Orthodontics
Bahria University Medical and Dental College, Karachi
E-mail: aanum.s@hotmail.com

Tabassum Ahsan Qadeer
Associate Professor, Head of Orthodontics Deapartment
Bahria University Medical and Dental College, Karachi

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help lecturers to modify their teaching system according to the students' needs.[8] Many studies using the VARK questionnaire have indicated that students of health sciences prefer to use two or more sensory modalities rather than a single mode of learning. The learning style of students may be unimodal or multimodal.[9]

It is very important to determine the learning preferences of the students in order to create a learning environment suitable for all preferences and since there has not been enough studies conducted on Pakistani population, our study aimed to find the learning preferences of students at Bahria University of medical and dental college by using the VARK questionnaire. This questionnaire helps students and teachers understand their best approach to learning and also serves as a guideline for teaching and learning. The study also aimed to determine if there were any gender variations in learning styles of students.

METHODOLOGY:

This was a cross sectional clinical study, conducted at Bahria University of Medical and Dental College in Karachi, Pakistan from September 2018 to December 2018 using both clinical and non-clinical students as subjects. The study was approved by the ethical review committee, BUMDC No. 65/2018. Sample size was estimated using the method of sample size for "single proportion" by using formula of single proportion with known population with margin of error 5%, confidence interval for mean 95%. The required sample size was found to be 278 out of which 150 were MBBS (30 each year), 100 BDS (25 each year) and 28 DPT (20 from 1st year and 8 from 2nd year). All the enrolled ungraduated students in MBBS, BDS and DPT were included in the inclusion criteria and House officers, residents were excluded from the study along with the students who did not consent to being included in the study.

For data collection, a consent was taken after which first Candidate was selected randomly and then every third student was selected for the study. The selected students were asked to fill a validated VARK questionnaire. VARK questionnaire consisted of 16 multiple choice questions, each with four different options. The students were asked to select more than one option if required. The data was kept anonymous, only gender and educational year were recorded. Filled forms were collected by the investigator.

Data was reported as the percentages of the students in each category of their learning preference. The number of students with their respective preferences was divided by the total number of responses to determine the percentage.

The data was assessed using SPSS software, version 23. Statistical differences regarding learning preferences among MBBS, BDS and DPT students and gender preferences among the subjects were made using chi square analysis and comparison between academic years was made with Fisher's exact test. $P<0.05$ was considered significant.

RESULT:

Out of 278 students, 216 (78%) were female and 62 (22 %) were male. When learning preferences were compared between all students it was observed that the predominant preference was unimodal (76.3%) learning style followed by bimodal (18.3%) and trimodal (5.4%). No statistically significant difference was found between genders. The pattern of sensory mode preference is depicted in figure 1. *None of the students preferred the quadmodal learning preference. Kinesthetic (40%) was found to be the most preferred unimodal method by the students. This was followed by aural (37%) and reading (12%) styles which were found higher in preference than visual (11%). (Figure no.2). Amongst the bimodal learners, the combination Auditory-Kinesthetic (AK) was the most preferred combination. Visual-Auditory-Read (VAR) was the most preferred trimodal combination. Furthermore, when the four models were compared between the genders, the difference was insignificant. Both the genders preferred the unimodal method followed by bimodal and trimodal methods as depicted in table no. 1. Both genders showed preference for kinesthetic method, followed by the aural and read and visual styles. When groups were compared based on academic variations, MBBS, BDS and DPT all preferred unimodal style of learning (Bar chart 1). However MBBS showed a preference for kinesthetic style (33.3%) followed by Auditory (24.75%), Read (11.3%) and Visual (7.3%) while BDS and DPT both preferred auditory sensory modality. BDS had Auditory (31%) as the highest learning preference followed by Kinesthetic (30%), Visual (9%) and Read (8%) methods. While DPT preferred Auditory (35.7%), followed by kinesthetic (17.9%), Visual (10.7%) and the Read (3.6%) as the lowest learning preference.

DISCUSSION:

This study was conducted to analyze the difference in learning styles of students in Bahria University of Medical and Dental College, Karachi, Pakistan. An interesting point was raised by James et al that significantly more weightage is given to other fields of medicine by our educational system as compared to nursing students, regarding the way knowledge is imparted to them.[10] And this should be a point of research to check if it is true for our population as well.

VARK questionnaire is one of the thoroughly used methods to define and evaluate different sensory approaches of learning.[11] It is crucial that such studies are conducted to identify major contributors that cause excessive failure rates in advanced medical and dental institutions and result in a substandard academic end result of the students. [12] Recognition of these modalities meticulously aids the dental and medical teacher to adopt a differential teaching approach and select multiple teaching modalities in their educational curriculum.[13] Having a thorough insight of students' various learning preferences also aids the student to learn faster and

Figure No.1 – Percentages of Students With Preferred Mode of Learning

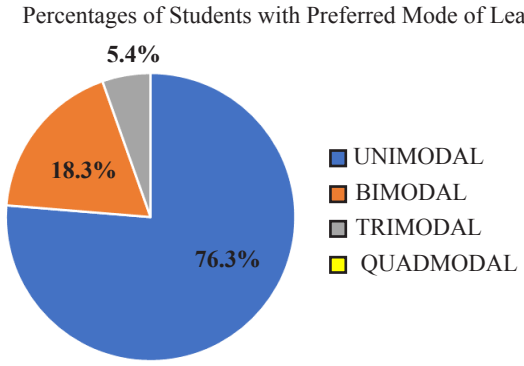


Figure No.2 – Percentages of Students Who Preferred Unimodal Mode of Learning

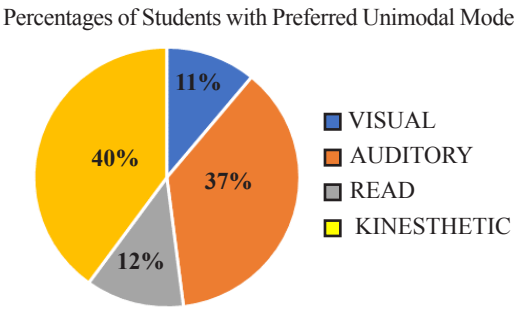
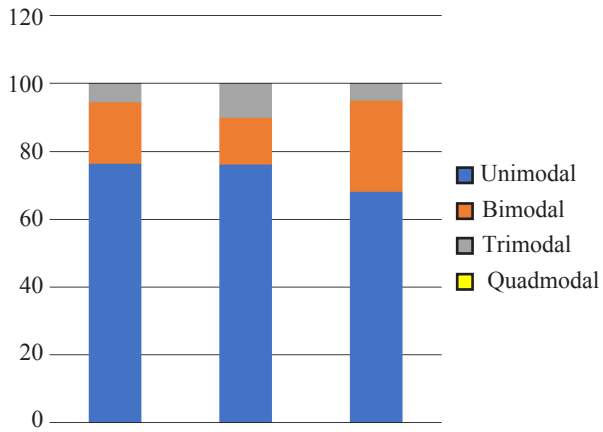


Table No.1 Vark Score And Gender Preferences

		SENSORY MODALITY			
Gender		Unimodal	Bimodal	Trimodal	Quadmoal
Female	Count	163	40	13	0
	%	75.0%	19.0%	6.0%	0.0%
Male	Count	49	11	2	0
	%	79.0%	18.0%	3.0%	0.0

Bar Chart No.1 Preferred Sensory Modality Amongst MBBS, BDS AND DPT



better and also motivates the teacher to move from their single mode of teaching to other methods.[14] Moreover, according to Panambur et al., administration of learning preferences in the early educational stage of a student, can ominously improve quality and standard of education.[15] Hence this research was conducted to analyze undergraduate students of all academic years and determine the influence of gender on learning styles. In the present study, the preferences of unimodal (76.3%) learning, was the most dominant among the the undergraduate medical, dental and DPT students followed by bimodal (18.3%) and trimodal (5.4%) method of learning. This was similar to a study conducted by Liew SC et al, in which 343 respondents (81.9%) had adopted unimodal learning style while the remaining 76 students (18.1%) embraced multimodal learning styles.[16] The chief sensory methodology of learning among unimodal learners was Kinesthetic (40%) followed by aural (36%) and read (12%) styles which were found higher in preference than visual (10%) learning method. These results were in contrast to a study conducted by Nandita et al in which auditory modality was the most preferred unimodal learning style amongst both male (45.8%) and female (50%) students followed by the kinesthetic mode (41.7% males and 38.64% females). Contrary to other studies conducted using VARK questionnaire, none of the students preferred the quadmodal learning preference. This could be as a result of the predominantly more unimodal method of learning being carried out in most pre-medical colleges.[17] As observed by Samarakoon et al, pre-university education is often augmented with private tuition classes to promote strategic learning in order to have a satisfactory performance at the university entrance examination. Pre-clinical students tend to have a prominent auditory learning preference, however these learning styles do seem to change as they move up the ladder of medical education. A shift is observed from a more preferred auditory to predominantly kinesthetic learning from first to final years. Unfortunately, despite there being a cohesive modular base curriculum and assessment methods such as problem-based learning, case-based learning, tutorials and assessments, the ultimate learning styles do not appear to have changed significantly over the five years of undergraduate medical education, as evidenced by minimal change in the proportion of multimodal learners (69.9% among first years to 68.5% among final years).[18] An increase in academic performance has been seen in a study among Jordanian nursing students, where Problem-Based-Learning (PBL) was introduced as an improvement to the conventional teaching methods. A significant progress in learning style and increase in the percentage of multimodal learners in pre and post-tests, was seen after introduction of PBLs in a Jordanian study. Thus, it is likely that teaching strategies which promote active learning such as group discussions, debates and role playing may enhance the learning experience of students.[19] When the mode of learning of MBBS, DPT

and BDS were compared, the end result was also insignificant. Other researchers who studied the learning preferences of first, second and third year medical and dental students found that a small minority of students (14.9% from medical and 30.7% from dental) preferred multimodal styles. Study by Haq HM et al, involving first year dental students in Turkey concluded that multimodal learning style was prevalent making up 64.12% of the total sample.[20] This highlights the convenience of VARK questionnaire. It lets the students ascertain their own learning style, which may also contrast from their own insight. Having a thorough knowledge about your own learning behavior helps in improvising the overall academic performance and encourages active learning in the student.

Course curriculum in our college meticulously consists of lectures using multimedia, whiteboard teaching, hands-on demonstrations and small-group learning as well. Unimodal learners who tend who have a kinesthetic mode of preference are specially catered in our practicing methods. More over the passive lecture method is highly disregarded and the substance in the presentation is organized in such a manner that the topic becomes more interactive, comprehensible and can be carried out during a restricted amount of time.[21] For students who prefer the aural method of learning, spoken sessions and lectures should be organized in such a manner that would enhance their ability to grasp the information. [22]

Our results showed no gender disparity and were similar to the study conducted by Urval et al. in 2015 who also did not find any significant differences between genders in any of the learning styles.[8] On the contrary Wehrwein et al.'s study on physiology students and Nuzhat et al.'s study on medical students found that females preferred kinesthetic styles in contrast to males.[23,24,25] This disparity between different studies could be because of any variance in educational year, age, society and the methods of education to these students were exposed to during their school and college years and gender of the research participants.

To sum up, if teaching methods are presented in such a way that the learning becomes pleasurable, the teacher will be able to understand the student more rather than expecting the students to become compliant to the passive teaching methods. Based on our study, it can be stated that it would be ideal for an institution to recognize VARK's four models and incorporate all in their teaching methodology to cater to the learning preferences of all the students.

Our study has a few limitations. It does not report whether changing the teaching system according to VARK learning style increases academic performance. The sample size was small and the students were selected from a single educational institution. Therefore research conducted in this department should further include a higher sample size, accommodate more educational institutions and also keep a track of the learning preferences among the students throughout their educational duration. However, our study upholds the concept of learning in multiple ways in accordance with the student's own acuities. It encourages learners and educators both to acknowledge the fact that the method of learning is as essential as the knowledge being conveyed.

The results of this study gives us a direction for constructing a more kinesthetic oriented learning system for the students. Every individual has his own insights and not all students are catered to by a single unreceptive lecture method.

CONCLUSION:

It was concluded that the undergraduate medical, dental and DPT students prefer unimodal method of learning despite of educational and academic differences. Amongst the unimodal learners, the most common method was kinesthetic followed by aural. Gender differences were also insignificant.

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Awareness Regarding Cervical Cancer And Pap Smear Test As A Screening Tool Among Married And Unmarried Females Of Karachi

Warda Zainab, Shareaa Naz, Summaiya Munim, Hafsa Farhat, Alishba Solangi, Nadia Khalid

ABSTRACT

Objective: To determine the knowledge of risk factors of cervical cancer and Pap smear as screening tool in the prevention of disease among married and unmarried females of Karachi

Study Design and Setting: It was a crossectional study conducted from April until September 2018, a total duration of six months. Data has been collected from three different areas of Karachi.

Methodology: Non-probability convenient sampling techniques have been used to collect the data. Data collection was carried out by an interviewer based structured questionnaire. Data was entered and analysed using SPSS V 24. Pearson's chi square used as statistical test.

Results: 400 respondents with a mean age of 32.1 +/- 1.1 years participated in the survey. 48.8% have heard about cervical cancer reflecting suboptimal knowledge. Major source of information amongst the females were health care providers. 21.8% (n =87) of females considered HPV infection as a major risk factor followed by multiple sexual partners (17.3%, n = 69) and early marriages (16.5%, n=66). Study showed 29.8% (n=119) of respondents have heard about Pap smear while only 5% (n=20) of them had gone through this screening test.

Conclusion: The study revealed that knowledge regarding cervical cancer and Pap smear test is low among married and unmarried females. Attitudes and practices were not promising as the cost of test procedure seen as the main constraint.

Key Words: Cervical Cancer, Pap smear, Prevention, Screening.

INTRODUCTION:

Cervical cancer is one of the leading cause of morbidity and mortality amongst gynaecological cancers in the developing countries; however, it is a preventable disease.[1] In the developed countries, pap smear screening is an easy clinical method for detection of cervical cancer and it is an essential part of woman's routine health care which is useful in detecting precancerous lesions as well as early cancers, being the major factor responsible for significant decline in mortality rates due to cervical cancer.[2] The main purpose is to detect abnormal cells that may develop into cancer if left untreated. According to medical recommendation, the first smear should be done at the age of 21 year or within 3 year of onset of sexual activity and thereafter every three years.[2]

Knowledge, attitude and practices of the community about cervical cancer and risk factors offer crucial opportunity for all embracing preventions and control techniques of the disease.[3] Women's knowledge about cervical cancer and its preventive measures are limited in many developing countries mainly due to lack of education and awareness programs.[4] Health care professionals are key persons to provide knowledge and facilities towards goals of cervical cancer prevention.[5] Detection of cervical cancer at the early stages is linked with excellent survival but mostly the females present with advanced and often untreated disease with quite poor prognosis,[6] this counts the significance of the detection of precancerous lesions with the aid of screening tool as pap smear.

Approximately, 500,000 women are diagnosed with invasive cancers of cervix per year across the world, killing 2,73,000 women however, number of cases are higher in developing countries where screening for cervical cancer is not widely practiced.[7] According to WHO, prevalence of cervical cancer in Pakistani women was 0.019%.[8] Despite of low incidence of cervical cancer in Pakistan its mortality is higher.[9] The

Warda Zainab
Final Year Student
Bahria University Medical and Dental College, Karachi

Shareaa Naz
Final Year Student
Bahria University Medical and Dental College, Karachi

Summaiya Munim
Final Year Student
Bahria University Medical and Dental College, Karachi

Hafsa Farhat
Final Year Student
Bahria University Medical and Dental College, Karachi

Alishba Solangi
Final Year Student
Bahria University Medical and Dental College, Karachi

Nadia Khalid
Research Supervisor - Student Project
Senior Lecturer, Community Health Sciences
Bahria University Medical and Dental College, Karachi

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reason of increased number of cervical cancer cases in Pakistan is the unawareness among women and lack of accessibility and availability of the screening test in rural areas of Pakistan. That results in progression of very advanced stage of malignancy and cause high rate of mortality in the country.[10] This study aims to assess the knowledge and awareness regarding cervical cancers and its preventive measures, to determine the routine practices of Pap smear amongst females of Karachi and to compare the knowledge regarding cervical cancer amongst married and unmarried females.

METHODOLOGY:

It was a crossectional study conducted from April until September 2018, a total duration of six months. Data has been collected from three different areas of Karachi. Non-probability convenient sampling technique has been used to collect the data. The sample size was calculated from openepi.com, the population size was kept 1 million, design effect being 1 with confidence limit= 5 and anticipated frequency=50%. With confidence level 95%, the sample size calculated was equal to 384. Both married and unmarried females of age group 19-49 years were included in this study irrespective of any specific educational status. Females who have been exposed to cervical cancer or gone through Pap smear test were excluded from the study. Data collection was carried out by an interviewer based structured questionnaire. Data was entered and analysed using spss V 24. Pearson's chi square used as statistical test. Ethical permission taken from ethical review committee of Bahria University Medical and Dental College.

RESULTS:

According to demographic analysis, 400 respondents with a mean age of 32.1 +/- 1.1 years participated in the survey, the majority of them being in the range of 18-33 years (n=287, 71.8%). The participants hailed from the different socio-economic backgrounds of Karachi, mostly being married females (n=209, 52.3%) and were having 4 children (n=136, 75.5%). Amongst the married females mostly were married since last 2 years (n=14, 3.5%). 13.8% of the respondents were working women (n=55). Significant history of abortions (n=56, 14%) was also present in the participants.

119 participants had heard about Pap smear test and only 20 had gone through it. 215 females were willing to participate in the Pap smear screening test, if provided free of cost. Out of 161 females unaware of Pap smear, 78 respondents were willing for the screening and 42 stated denial even after provision of complete knowledge regarding it. Reluctance to do the Pap smear screening was abundantly observed in women who were never informed by their physician (*p-value*=0.00) and due to family and religious restrictions (*p-value=0.00)*.

DISCUSSION:

Cervical cancer is one of the most common cancers among females. It is a slow growing cancer and its progression through precancerous changes provides opportunities for prevention, early diagnosis and treatment.

In our study, only 48.8% have heard about cervical cancer reflecting suboptimal knowledge. The level of knowledge

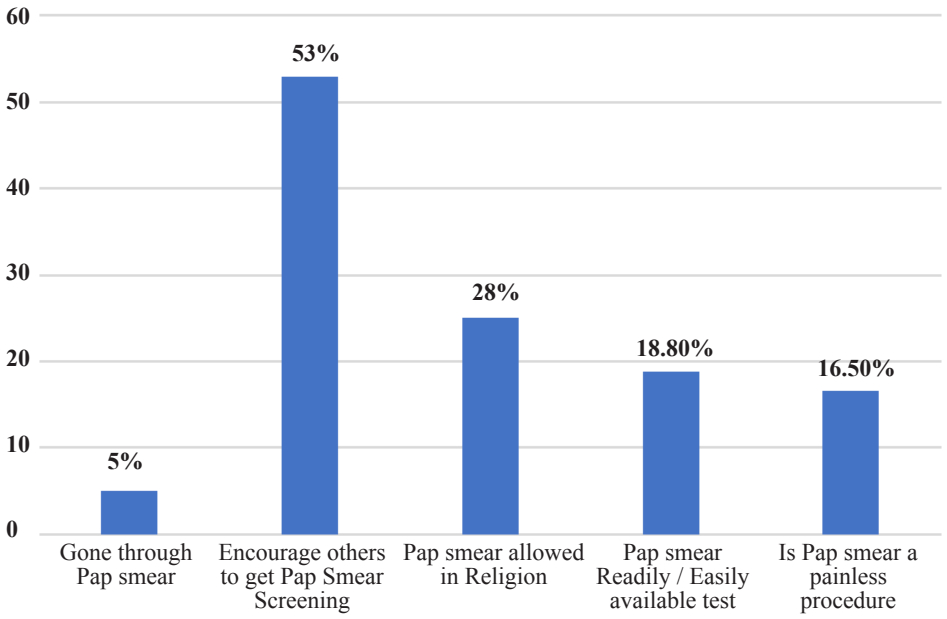
Table1: Knowledge Of Cervical Cancer And Papsmear

VARIABLES	FREQUENCIES	(%)	
	Yes	No	Don't know
Have you ever heard about cervical cancer?	195(48.8%)	204(51.0%)	1(3%)
If yes , then from where did you get this information?			
Family/Friends	54(13.5%)		
TV	35(8.8%)		
Doctors	96(24.0%)		
Never Heard	172(43.0%)		
Do you have family history of Cervical Cancer?	23(5.8%)	292(73.0%)	85(21.3%)
Is there a vaccine against cervical cancer?	57(14.2%)	82(20.5%)	261(65.3%)
What do you think are the signs and symptoms of Cervical Cancer?			
Abnormal vaginal discharge	77(19.3%)	322(80.5%)	
Persistent pain	76(19.0%)	324(81.0%)	
Abnormal vaginal bleeding	109(27.3%)	291(72.8%)	
Post-menopausal bleeding	39(9.8%)	361(90.3%)	
Have you ever heard about pap smear?	119(29.8%)	161(40.3%)	120(30.0%)

Table2: Knowledge Regarding Cervical Cancer Among Married And Unmarried Females

		Married	Unmarried	P-value
Have you ever heard about cervical cancer?	Yes	67(32.1%)	128(67%)	0.00
	No	142(68.0%)	63(33%)	
Is there a vaccine against cervical cancer?	Yes	15(7.2%)	42(22%)	0.00
	No	32(15.3%)	50(28.2%)	
	Don't Know	162(77.5%)	99(51.8%)	
By which methods can cervical cancer be prevented?	Vaccination	51(24.4%)	29(15.2%)	0.02
	Avoiding multiple sexual partners	15(7.2%)	37(19.4%)	0.00
	Not having sexual intercourse	7(3.3%)	16(8.4%)	0.03
	All of the above	11(5.3%)	28(4.7%)	0.04
	Don't know	127(60.8%)	82(42.9%)	0.00
Can cervical cancer cause infertility if left untreated?	Yes	123(58.9%)	106(55.5%)	0.00
	No	3(1.4%)	17(8.9%)	
What are signs and symptoms of cervical cancer?	Abnormal vaginal discharge	26 (12.4%)	51 (26.7%)	0.00
	Pain during sexual activity	10(4.8%)	36 (18.8%)	0.00
	Post-menopausal bleeding	9 (4.3%)	30 (15.7%)	0.00

Figure: 1 Attitude And Practices Of Pap Smear Amongst The Females Of Karachi



is far less than in developed countries as results similar to our study were reported in studies conducted in other developing countries such as Cameroon[11] and New Delhi.[12] In contrast, in developed countries, similar studies reported that 98.5% in Poland[13] and 95.9% in Hong Kong[14] had heard about cervical cancer. This difference can be explained because of better health education and availability of awareness programs in developed countries like Poland and Hong Kong.

Present study showed that the major source of information amongst the females who have heard about cervical cancer were doctors (24%, n=96). These findings are supported by

another study which was done among the women in Mangalore city.[15] It shows an inclining rate of doctors in educating the people and in preventing the disease. Our study reveals that few of the respondents got to know about cervical cancer via news (10.8%) and from TV (8.8%), in contrast other studies shows that major source of information about cervical cancer is media in Kerala (55%).[16] This signifies the important role of print and electronic media in awareness of cervical cancer that is lagging behind in our region.

According to the participants of our study, abnormal vaginal bleeding is the main sign and symptom for cervical cancer findings were similar to another study which showed bleeding between the periods as a major sign and symptom of cervical cancer.[17]

With contextual categorization of health related factors, in this study only 21.8% (n =87) of females considered HPV infection as a major risk factor followed by multiple sexual partners (17.3%, n = 69) and early marriages (16.5%, n=66). Another study reported that main risk factor for cervical cancer is infection with HPV.[18] This is reflecting suboptimal knowledge of cervical cancer amongst our study population.

Results in this study showed 29.8% (n=119) of respondents have heard about Pap smear while only 5% (n=20) of them had gone through this screening test. Majority responded that neither they have proper information about the test nor they have heard about it, hence signifying extreme lack of awareness in our society. Findings are similar to another study conducted in Karachi,[19] that showed although 75.1% of participants had heard about pap smear only 0.01% of females had undergone this test. Similarly another study conducted in Karachi[20] reported that only 13.7% of women had opted for Pap smear. Similar Findings were present in a study in India[21] that showed only 3 % had pap smear done in their life. In contrast, a study in London shared that 80.5% of women had undergone at least 1 pap smear and 71.5% of participants had regular smears every 3-5 years.[22] This reveals that the levels of knowledge and practice of pap smear in our region is less than developed countries. Most probably the cause is that our study mainly includes married females with lesser advanced knowledge. Due to lack of awareness, most of the women were unaware of the vaccination available for the prevention of cervical cancer with the value of 32% as compared to 30.1% obtained by another study.[23] Moreover majority of our respondents (64.65%,n=261) didn't have knowledge regarding HPV vaccine while only 14.6% (n= 57) knew about HPV vaccination. Findings are similar to the study conducted in Bahrain[24] that showed only 3.7% had ever heard of the vaccine.

This study revealed reluctance to do Pap smear was abundantly observed in women who were never informed by the physicians and secondly because of the religious or family restrictions. This is in close association with findings of a study conducted in Karachi[18] reporting that a common cause of decrease practices of pap smear is lack of urging by health care providers. Several other barriers were identified by the study conducted from a public hospital, amongst them lack of knowledge was the commonest followed by the privacy because of the male doctors during procedure.[25]

Majority of the women (53.8%) agreed for going through the Pap smear screening test if they are given proper information and if it's done for free. Studies in other developing countries such as India, Nigeria and Nepal also reported positive attitude towards cervical screening despite of low knowledge.[26]

An interesting finding of our study was that amongst the females who had heard about cervical cancer majority were unmarried (67%, n = 128) and they had more knowledge of cervical cancer and its screening. This may be because of the reason that majority of unmarried females were young population in our study, either employed or students and they may have greater opportunity for social interaction hence, they got to know more about the disease. Results of this study could not be generalized to entire population of Karachi because of the small sample size. Study conducted on a large scale with bigger sample size and more participants from different areas of Karachi can provide better results.

CONCLUSION:

The study revealed that knowledge regarding cervical cancer and Pap smear test was low among married and unmarried females. Attitudes and practices were not promising as the cost of test procedure seen as the main constraint.

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Review Article

Type 2 Diabetes Mellitus And Vitamin C

Shabzain Ishrat, Talea Hoor, Mohammed Sajid Abbas Jaffri

ABSTRACT:

Type 2 diabetes mellitus (DM) is a chronic disease which deteriorates the quality of life with time. Type 2 DM accounts for more than 90% cases of diabetes mellitus as compared to other types of this disease. There is significant oxidative stress in type 2 DM which plays an important role in the pathogenesis of disease. In order to combat this oxidative stress antioxidant supplements have to be added as add on therapy along with treatment of type 2 DM. Vitamin C is the safest antioxidant which plays significant role in diminishing the oxidative stress. The vitamin C supplementation have good control of FBS and HbA1c and therefore helps in achieving better glycemic control along with prevention of lipid abnormalities.

Keywords: fasting blood sugar, glycosylated hemoglobin, glycemic control, type 2 diabetes mellitus, vitamin C,

INTRODUCTION:

Diabetes mellitus (DM) is one of the chronic disease which is characterized by several metabolic abnormalities including hyperglycemia. The complicated type 2 diabetes mellitus has increased morbidity and mortality.[1] People who are genetically prone for disease will tend to have the disease early in life. Similarly lifestyle and environment also has an important role in disease causation.[2] This disease is continuously rising and will raise the figure in near future. The current prevalence of DM is 8.7% worldwide.[3] Approximately 366 million people will be affected by the end of year 2030.[4] According to the statistics of World health organization type 2 diabetes mellitus will be among the top ten leading causes of mortality by the year 2030.[5] In 2015 about 5 million deaths were caused by diabetes mellitus. This number shows that in every six seconds a person dies due to complicated diabetes mellitus. Half of the population remains un-diagnosed equivalent to one in two persons. In Pakistan the disease is also much prevalent about 11.7%. The disease has predilection for male and urban area population as compared to female and rural area population. They tend to consume more and advanced calorie food and have stressful daily routine.[6] Type 2 DM has increased levels of free radicals which are generated in response to increased oxidative stress. Among them reactive oxygen species have an important role in disease pathogenesis. This disease also affects different sites and organs across the body and the smaller and larger vessels are afflicted more which leads to micro-vascular and macro-vascular complications respectively. These complications are enhanced and occur rapidly in the presence of free radicals which affect the cellular organelles and functions by changing the lipid protein ratio of membranes through lipid peroxidation.[7] The oxidative stress in hyperglycemia is due to several pathways which include increased flow of glucose and other sugars by the polyol pathway activation which along with increased production of glycosylated products and their receptors for magnified actions to occur. Protein kinase isoforms are activated and hexosamine pathway also becomes overactive.[8] The other pathways include glycosylation through non-enzymatic mechanisms. The status of anti-defense mechanisms, inflammatory mediators, sorbitol pathway and metabolic abnormalities has also been implicated in the disease pathogenesis.[9] Despite the best available therapy of type 2 diabetes mellitus, it progresses ultimately and has poor outcome. Therefore researchers are continuously working to improve the disease outcome. Many antioxidants have been tested in type 2 diabetes mellitus. Vitamin C is one of the antioxidant which helps in controlling the oxidative damage and managing the hyperglycemia in a potent manner.[10] People with type 2 diabetes mellitus have decreased levels of plasma vitamin C which further aggravates the condition.[11] In order to control the oxidative damage the researchers preferred antioxidant in the form of supplements for type 2 diabetic patients. Vitamin C diminishes oxidative damage caused by free radicals called reactive oxygen species and is the most important role of vitamin C.[12] This can ultimately reduce the prevalence of diabetic complications and may help in achieving better outcome of the disease.[13] In type 2 diabetic patients the lipid abnormalities also exist as there is dyslipidemia due to lipid peroxidation as a result of oxidative damage. Vitamin C can help in lowering the oxidative damage and thus can achieve good glycemic control and prevent the derangement of lipids.[8]

METHODOLOGY:

Pubmed, Cochrane library and Google scholar search engines were used to find the relevant studies for writing this review.

Shabzain Ishrat
M.phil Student Pharmacology,
Bahria University Medical and Dental College, Karachi
Email: ishabzain@hotmail.com

Talea Hoor
Professor of Pharmacology,
Bahria University Medical and Dental College, Karachi

Mohammed Sajid Abbas Jaffri
Professor of Medicine,
Bahria University Medical and Dental College, Karachi

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The keywords used were vitamin C, type 2 diabetes mellitus, ascorbic acid, fasting blood sugar, HbA1c and glycemic control. The filter applied was of year duration between 2008 to 2018. The articles found were 123. From these 36 articles were not relevant, 5 articles were in non English language, 9 were animal studies,11 were done in children,10 showed only abstract,8 were for gestational diabetes and 3 were type 2 diabetes with foot amputation. Finally 41 were selected for writing this review.

REVIEW OF LITERATURE:

Diabetes mellitus is one of the major endocrinopathy worldwide. It causes significant mortality and morbidity.[14] The most prevalent type of diabetes mellitus is type 2 DM. Previously it was also known as non-insulin dependent diabetes mellitus. There is hyperglycemia along with abnormalities of insulin and relative insulin deficiency or insulin resistance.[15]

The most widely accepted classification is that of American Diabetes Association (ADA) according to which diabetes mellitus is classified into four types. These include type 1 DM, type 2 DM, gestational diabetes and some other types of diabetes mellitus. From these type 2 diabetes mellitus is the commonest and accounts for greater than 90% of cases.[16]

Type 2 diabetes mellitus patho-physiology:

The insulin abnormalities play an important role in the pathophysiology of diabetes mellitus. There are three main pathways which include insulin resistance, decreased synthesis of insulin and pancreatic beta cell failure. The catabolic pathways occur along with diminished uptake and transport of glucose. In previous studies it has also been implicated that the alpha cells not functioning properly also take part in the disease pathogenesis. As the time passes, the disease progresses to lifelong deteriorating complications and results in early morbidity and mortality.[15] Many diabetic individuals also suffers from lipid metabolic abnormalities. There is a triad of lipid abnormality found in these patients. It comprises of increased levels of triglycerides known as hypertriglyceridemia, low levels of high density lipoprotein cholesterol and increased levels of low density lipoprotein cholesterol.[17]

Oxidative stress in type 2 diabetes mellitus:

Type 2 DM is one of the chronic conditions in which body's antioxidant defense mechanisms does not function properly due to diminished levels of antioxidants. Free radicals are yielded in response to oxidative damage. These free radicals are called reactive oxygen species (ROS). Hyperglycemia induced glycation reaction leads to beta cell dysfunction and impairs the insulin production from beta cells hence causing hemoglobin glycosylation.[18] Complicated diabetes mellitus as a result of continuous oxidative stress causes six deaths in every minute.[19] In the coming years this disease will become the most prevalent cause of preventable deaths.[20] Mortality from CVS complications is also high in type 2 diabetic individuals. Lipid and lipoprotein abnormalities have been implicated in CVS complications. Hyperlipidemia in type 2 diabetes mellitus results from increased lipid peroxidation caused by free radicals generated in response to oxidative stress.[14]

Vitamin C and insulin sensitivity in skeletal muscles:

The greater portion of whole plasma glucose about 85-90% is distributed to skeletal muscles during hyperinsulinaemic and euglycemic states. The skeletal muscles are the main site of peripheral insulin resistance in type 2 diabetes mellitus. Skeletal muscles of type 2 diabetic patients are exposed to a greater deal of oxidative stress. Sodium dependent vitamin C transporters (SVCTs) help the vitamin C to be taken by most tissues. Of these SVCTs, only SVCT2 is found in skeletal muscles. This indicates that SVCT2 protein is required for uptake and storage of vitamin C in skeletal muscles. Vitamin C supplementation helps in diminishing the oxidative stress in skeletal muscles and promotes the insulin sensitivity that helps in glucose uptake.[21]

Complications of diabetes mellitus:

The complications of diabetes mellitus cause greater morbidity, mortality and disability. The complicated diabetes mellitus leads to significant damage and affects multiple organs and systems. They are classified into micro-vascular and macro-vascular.[22]

Smaller vessels are affected by these complications. Retina, kidney and nerves are the primary sites affected by these complications. Involvement of retinal vessels will lead to diabetic retinopathy while those of kidneys will lead to diabetic nephropathy and involvement of nerves will cause diabetic neuropathy. The risk factors that are proved to be predictive for micro-vascular complications include smoking, hypertension and duration of diabetes greater than 10 years.[22]

The complications which affect larger vessels involve the cardiovascular system and brain. Heart and peripheral vessels are most commonly involved and lead to coronary heart disease and peripheral arterial disease respectively while involvement of brain leads to stroke. Aging, male gender, smoking, sedentary lifestyle and high cholesterol are important risk factors for macro-vascular complications.[22]

Cardiovascular complications are more prevalent in type 2 diabetic individuals. There are about 80% chances of mortality due to CVS disease in diabetic patients.[23]

Miscellaneous complications:

Diabetic cardiomyopathy is a specific complication which develops independently of coronary artery disease or hypertension and leads to significant morbidity and mortality.[22]

Diagnostic criteria of Diabetes mellitus:

Certain parameters help in the diagnosis of diabetes mellitus.

These include fasting blood sugar, oral glucose tolerance test, glycosylated hemoglobin and random plasma glucose. When fasting blood sugar levels are = 126 mg/dl (7.0 mmol/L), plasma glucose after 2 hours of oral glucose tolerance test = 200 mg/dl (11.1 mmol/L), or random plasma glucose values = 200 mg/dl (11.1 mmol/L) with presence of symptoms of hyperglycemia will favor the diagnosis of diabetes mellitus. The glycosylated hemoglobin (HbA1c) also helps in diagnosing the disease if value is = 48 mmol/L (equivalent to 6.5%). This criteria has been accepted internationally by different organizations and also by World Health Organization.[24] HbA1c has been recommended for diagnostic purposes as well in addition monitoring treatment. This has been accepted by international committee of experts, ADA, the endocrine society, WHO, scientists and organizations all over the world.[16]

Treatment choices:

The treatment choices include oral and inject-able agents. The availability varies among different countries. Not all drugs are available in all countries.[25] The oral treatment option includes different classes of hypoglycemic drugs. The selection of treatment agent is dependent upon the various factors and clinician decides the best suitable agent for the patient. Some drugs of different classes are combined together to achieve better result. The classes of oral hypoglycemic drugs include sulfonylurea, biguanides, thiozolidinediones, alpha glucosidase inhibitors, glinides, dipeptidyl peptidase 4 inhibitors, sodium glucose transporter 2 inhibitors.[25] The injectable choices include amylin analogues, GLP1 receptor antagonist and insulin. Amylin analogues are also known as amyloid polypeptide analogues and includes pramlintide. The insulin has different types which includes short acting, intermediate acting and long acting insulin. Exenatide and liraglutide are GLP1 receptor blockers. Short acting insulin includes regular insulin, insulin aspart, insulin glusine and insulin lispro. Intermediate acting insulin includes isophane insulin and lente insulin while long acting insulin includes ultralente insulin, insulin detemir.[25]

Pharmacokinetics and pharmacodynamics of vitamin C:

The presence of vitamin C is an essential requirement for many enzymatic reactions to occur in all animals and plants and is made endogenously with the exception of humans. It is also known as ascorbate. Structurally it has six carbon lactone ring which is the building block for ascorbate. In humans it acts as a cofactor in many enzymatic reactions. It also empowers the defense mechanism by providing antioxidant activity. L-gluconolactone oxidase is an enzyme in the final step of the synthesis of ascorbic acid. Humans lack the ability to synthesize vitamin C as they are lacking this enzyme. So they depend on external sources of vitamin C. Diet is one of the important sources for intake of this vitamin. In diet fruits and vegetables are important sources while dairy products contain little amount of vitamin C and are the less important sources. The absorption of vitamin C is an important factor in favoring the antioxidant defense system. The absorption begins as soon as it enters the oral cavity and also gets absorbed as it passes through other parts of gastrointestinal system (GIT). Renal system is also involved in the metabolism of vitamin C. GIT is the major site for absorption of vitamin C with approximately 70% of vitamin C absorption. The recommended dietary allowance of vitamin C is 60mg per day. It has short half life and gets excreted from the body rapidly. The pharmacokinetic properties are enhanced by taking the vitamin C in higher doses greater than 1000 mg per day. This produces enhanced bioavailability. Plasma Vitamin C levels are decreased in type 2 diabetes mellitus patients.[26-28] Along with disease pathogenesis it also plays an important role in the lipid peroxidation. Decreased vitamin C levels will also increase the chances of CVS mortality and morbidity.[29] Dietary sources are not much helpful as they contain less quantity of vitamin C whereas repeated small doses of vitamin C in the form of supplement are helpful.[30] Due to the resemblance of vitamin C with glucose many reactions in the body are replaced and prevents glycosylation.[31] In another study vitamin C given in higher doses greater than 1000 mg/day for six weeks helped in lowering the plasma sugar thereby achieving better insulin sensitivity.[32] In a study by Harding et al. baseline vitamin C levels were inversely proportional to the fasting plasma glucose levels and lower plasma vitamin C levels were associated with increased risk of new onset type 2 diabetes mellitus.[33] Vitamin C deficiency might also lead to increased synthesis of triglycerides by impairing the transport of long chain fatty acids.[34] Researchers in the past have proposed that vitamin C given as supplement can reduce the cholesterol, triglycerides, lipid peroxidation and increase HDL-C and help in prevention of cardiovascular disease.[17,35] Vitamin C is an electron donor and in this process it forms ascorbyl radical or semidehydroascorbic acid. This newly formed compound is relatively stable as compared to other free radicals and this enhanced stability make it better and preferable antioxidant. It is documented that vitamin C is the only antioxidant in human plasma that helps in complete protection of endogenous lipids from oxidative damage caused by reactive oxygen species.[36]

Interactive system of antioxidants:

It has been advocated that vitamin C is involved in recycling of important antioxidant vitamins. Glutathione an important antioxidant is also recycled by vitamin C. Vitamin C functions along with glutathione as redox couple. Antioxidants interact with each other and may modulate the activity of many antioxidants and can help in diminishing oxidative stress.[37]

Vitamin C plays a role of leader among the anti oxidants. Vitamin C and other important antioxidant vitamins have been shown in several studies to be on the lower aspect in type 2 diabetes mellitus. Lower levels of other vitamins

along with vitamin C are also implicated in the oxidative stress.[38] Vitamin C efficacy on glycemic control has also been studied along with certain polyunsaturated fatty acids and has been advocated that vitamin C given in combination with these fatty acids can achieve better glycemic control and diminish the fasting blood glucose, lower the HbA1c, low density lipoprotein cholesterol (LDL-C), triglycerides (TG) and increase the high density lipoprotein cholesterol (HDL-C).[39] Vitamin C given alone or in combination with other antioxidants can help in enzymatic transformation of superoxide anions into hydrogen peroxide in the mitochondria and hydrogen peroxide is removed by an enzyme glutathione peroxidase. When there is imbalance between production and breakdown of these superoxide radicals, the atherosclerosis and macro-vascular complications results.[40] A meta-analysis has documented that vitamin C alone or in combination with other vitamins can raise the antioxidant capacity by elevating glutathione peroxidase activity, superoxide dismutase activity and total antioxidant capacity.[41]

CONCLUSION:

Vitamin C is one of the important antioxidant taken exogenously in the form of diet and supplement. It helps in controlling blood glucose level and helps in achieving good glycemic control in doses greater than 1000 mg/day in divided doses as an adjunct to the treatment of type 2 diabetes mellitus. It also helps in reducing the levels of oxidative damage induced glycosylation of hemoglobin and lowers HbA1c. In addition vitamin C has potential to reduce CVS induced complications and mortality in type 2 DM. Vitamin C causes reduction of lipid peroxidation and hence lowers the LDL-C, TG levels and raises the HDL-C. Thus vitamin C is a scavenger of free radicals that minimizes the complications associated with type 2 diabetes and improves the quality of life in patients suffering from this disease.

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Review Article

Cervical Spondylosis; An Inevitable But Preventable Catastrophe

Syeda Bushra Ahmed, Aisha Qamar, Muhammad Imran, Ambreen Usmani, Yasmeen Mehar, Sama ul Haque

ABSTRACT:

Cervical spondylosis is a chronic degenerative disease which is prevalent in middle and aging population. Its cause is multifactorial attributing to stress, anxiety, trauma, sports, occupational factors or use of handheld devices. It is easily missed and neglected as it has an insidious onset, early subtle features, and resemblance with musculoskeletal problems. It is essential to investigate and intervene because it places a significant impact on health care of individuals and can adversely affect lifestyle by causing depression, dysphagia, and cervicogenic headache along with chronic neck pain, which is ranked as the disabling cause of adjustable life years (DALY). It is responsible for causing minor symptoms like chronic neck pain, numbness in hands as well as even quadriparesis or spastic gait. It needs to be diagnosed and treated earlier. The state of art strategy adopted by health practitioners can be a promising future for the next generation. The objective of this article is to discuss the anatomy, etiology, prevalence, pathogenesis, clinical manifestations and treatment options.

Key Words: Cervical Spondylosis, Cervicogenic headache, chronic neck pain, disabling cause of adjustable life years.

INTRODUCTION:

The human body is supported at the back by a bony flexible structure called as the vertebral column, which is made of 33 vertebrae, out of which regional distribution is 7 cervical, 12 thoracic, 5 lumbar, 5 sacral and 4 coccygeal vertebrae. The vertebral column aids in weight bearing and flexible movements. The flexion is most considerable at cervical region while the extension is more evident at the lumbar region. It also protects the spinal cord and acts as a passage for important vessels and nerves through its foramina. The vertebral column also displays four curvatures; the anterior concavity at the thoracic and sacral region is called as thoracic and sacral kyphosis while posterior concavity at the cervical and lumbar region is called as cervical and lumbar lordosis. Cervical and lumbar lordosis are secondary curvatures attained during extension from the flexed state during fetal development. Intervertebral discs in between vertebra cushions the vertebral column and act as a shock absorber. The intervertebral disc is made of an outer fibrous ring the annulus fibrosis and inner soft jelly-like material the nucleus puplosus[1].

Syeda Bushra Ahmed
M.Phil Student, Department of Anatomy
Bahria University Medical and Dental College
Email: sbushra.ahmed@hotmail.com

Aisha Qamar
Professor, Department of Anatomy
Bahria University Medical and Dental College

Muhammad Imran
Consultant Radiologist and Head of Radiology Department,
Patel Hospital

Ambreen Usmani
Professor, Vice Principal and Head of Anatomy Dept.
Bahria University Medical and Dental College

Yasmeen Mehar
Associate Professor, Anatomy
Bahria University Medical and Dental College

Sama ul Haque
Assistant Professor, Anatomy
Bahria University Medical and Dental College

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Figure 1: Illustration showing curvatures of vertebral column

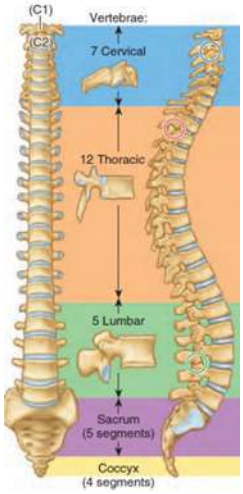
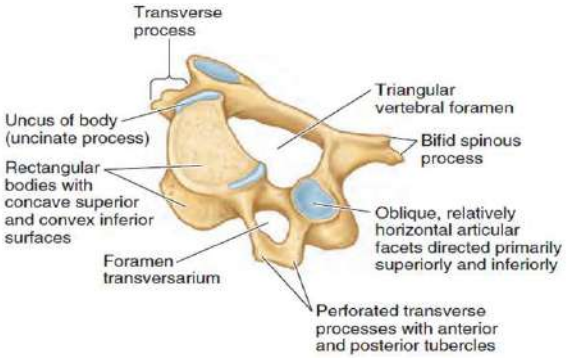


Figure 2: Cervical vertebra



Owing to the delicate structure and movements at cervical region, cervical vertebrae are prone to trauma, prolapse or degeneration which results in neck pain also called as cervicalgia. The cause of neck pain is multifactorial; it can be due to trauma, stress, anxiety, posture[2, 3], sports, occupational factors, usage of the computer or even mobile. A review done in Hong Kong showed that mobile phone usage is an essential cause of neck pain contributing around 17.3 to 67.8% as the prevalent musculoskeletal problem[4].

A term Text neck and turtle neck[5] have also been introduced by a U.S chiropractor Dr. Lean Fishman. It is due to the repetitive stress caused to the ligamentous or bony structures of the neck because of the forward head posture adopted during the use of electronic or handheld devices like computers, laptops and mobiles.

Neck pain is prevalent in the middle-aging population and primary cause of consultation worldwide[6]. It affects 30 to 50% of people. It causes a decreased range of motion and reduced muscle strength. 25% of patients attend physiotherapy clinics due to the complaint of neck pain[7]. Amid so many causes of neck pain and its aftermaths, cervical spondylosis is the most common cause in the middle-aged population over 40 to 50 years, prevalent as 3.3 cases per 1000 people[8].

Cervical spondylosis severity is classified on the basis of osteophytes formation, intervertebral disc height loss, and vertebral plate sclerosis. This classification is in accordance with Kellgren and Lawrence osteoarthritis severity grade[9]. It ranges from grade 0 to 4 as mentioned in table 1 below.

METHODOLOGY:

The methodology was undertaken by the following steps mentioned below;

1. Mapping exercise which includes identification of studies according to inclusion and exclusion criteria
2. Quality appraisal of studies
3. Data extraction
4. Analysis of findings
5. Conclusion

The steps were followed, and a comprehensive literature search was done using Google Scholar, Pubmed, Medline and Pakmedinet from the year 2009 onwards using keywords like cervical spondylosis, cervical spine, disc degeneration, and neck length. Grey literature in the form of books and clinical guidelines of international organizations was also searched for relevant references. The analysis of the data was done by thematic analysis technique, and narrative synthesis methodology was used to synthesize overall review findings.

DEFINITION

"Cervical spondylosis is a chronic degenerative process of the cervical spine that affects the vertebral bodies and intervertebral discs of the neck, and may progress into disc herniation, bone spur formation, compression of the spinal

Table 1: Scoring system based on Neutral Lateral Radiograph

1. Height loss Middle disc height compared to normal middle disc height at an adjacent level	0% ≤25% >25%–≤50% >50%–≤75% >75%	0 points 1 points 2 points 3 points 4 points
2. Anterior osteophytes with respect to the AP diameter of the corresponding VB	No osteophytes ≤1/8 AP diameter >1/8–≤1/4 AP diameter >1/4 AP diameter	0 points 1 point 2 points 3 points
3. Endplate sclerosis	No sclerosis Detectable Definite	0 points 1 point 2 points
Overall degree of disc degeneration = 1 + 2 + 3	0 points (no degeneration) 1–3 points (mild degeneration) 4–6 points (moderate degeneration) 7–9 points (severe degeneration)	

cord, or cervical spondylotic myelopathy"[10].

It is a broad spectrum of disease which causes syndromes as mentioned below. These are;

1. Cervical Radiculopathy: Compression of the cervical nerve roots due to osteophytes or vertebral plates clinically manifested as pain, paresthesia, motor deficits and diminished reflexes in the distribution of cervical nerve roots. The distinguishing feature between cervical radiculopathy and axial joint pain is the presence of pain on the unilateral side rather than bilateral as presented in axial joint pain[11]. It is the easiest syndrome to recognize[12].

Clinical findings: It is characterized by neck pain with radiation to the upper extremity. The upper extremity signs and symptoms correlate with the specific nerve root compression, its characteristic reflexes, and sensory and motor weakness. Most common nerve roots to be affected are C6 (C5-C6 disc space) and C7 (C6-C7 disc space). In case of the C6 nerve root, there will be weakened biceps muscle, decreased brachioradialis reflex and sensory loss over the arm to thumb and index finger. The C7 nerve root impingement will cause weakened triceps, decreased triceps reflex and sensory loss to the middle finger[13].

Signs characteristic for cervical radiculopathy are Spurling's sign; shoulder abduction test and manual traction to the neck[13]. These provocative tests are also mentioned in table 2.

2. Cervical Myelopathy: This is degeneration of spinal structures as a result of the narrow spinal canal causing neurological signs and symptoms. The narrow spinal canal can be congenital, or due to the aging process of cervical spondylosis. In the Asian population, ossification of posterior longitudinal ligament appears to be the cause. It is the common cause of non-traumatic quadriparesis. Vitamin B12 deficiency is the sole nutritional reversal cause and should be screened in elderly[14].

Table 2. Provocative tests

Test	Original Description
Spurling's/Neck Compression Test	Passive lateral flexion, & compression of head. Positive test is reproduction of radicular symptoms distant from neck.
Shoulder Abduction (Relief) Sign	Active abduction of symptomatic arm, placing patient's hand on head. Positive test is relief or reduction of ipsilateral cervical radicular symptoms.
Neck Distraction Test	Examiner grasps patient's head under occiput and chin and applies axial traction force. Positive test is relief or reduction of cervical radicular symptoms.
L'hermitte's Sign	Passive anterior cervical flexion. Positive test is presence of "electric-like sensations" down spine or extremities.
Hoffman's Sign	Passive snapping flexion of middle finger distal phalanx. Positive test is flexion-adduction of ipsilateral thumb and index finger.

Clinical findings:

It has insidious onset starting from lower extremity as a disturbance in gait, balance and progressing to upper extremity with the clumsiness of hands, loss of grip, weakness in fine movements, neck stiffness, pain in upper limbs, bowel and bladder changes and multi-segmental weakness.

Signs characteristic for cervical myelopathy are Lhermitte's sign and Hoffman's sign[15].

3. Axial joint pain: It is characterized by the pain in the joints and ligaments of the vertebral column. The pain is radiated to the shoulder, scapula, chest wall and head. There is no neurological involvement and pain in the joints is related to the activity. It is the most common clinical presentation, caused by improper posture and muscle fatigue due to ligamentous or muscular strain. Axial pain is nociceptive inflammation. Discography, steroid injection and radiography are important in its diagnosis[17].

FACTORS RESPONSIBLE FOR CERVICAL SPONDYLOSIS:

Several factors are responsible for causing cervical spondylosis. Among them, patient characteristics like race, ethnicity, age[6], height, and weight[18] play a role as they are attributed to cervical dimensions. These characteristics and occupational factors like carrying heavy loads[19] or using forward posture for an extended time like in computer workers or even mobile use is also presented as the cause[20].

ADVERSE EFFECTS OF CERVICAL SPONDYLOSIS:

Ischemic stroke:

Ischemic heart disease, ischemic stroke, diabetes, back pain, and neck pain are the main burden of illness in middle and low Socio-Demographic Index (SDI) countries due to obesity[21]. Ischemic stroke accounts for about 20 to 30% which is mainly caused by atherosclerotic changes and emboli. The transient ischemic stroke mostly involves posterior circulation. The vertebral arteries and their branches constitute the vertebrobasilar system, which is responsible for supplying blood to the upper spinal cord, brainstem, cerebellum and small part of posterior cerebral hemispheres. The vertebral arteries ascend through transverse foramina of upper six cervical vertebrae and enter cranial cavity through the foramen magnum. They converge medially and unite at the back of the pontomedullary junction to form the basilar artery. The vertebral artery can be compressed by the uncinate process in the degenerative process of cervical spondylosis and increases the risk of posterior circulation ischemic stroke. This degeneration at vertebral plates, osteophytes formation, and disc height loss causes compression of the vertebral artery leading to vertebrobasilar insufficiency and eventually causing an ischemic stroke. Cervical levels prone to vertebrobasilar insufficiency are fifth and sixth (56%), fourth and fifth (24%), and sixth and

seventh (20%). Cervical spondylosis must be carefully and strategically assessed by clinicians and anticoagulant drugs be advised to such patients[22].

Depression:

Depression is due to the poor health, lack of exercise, improper posture and is accelerated due to aging. People who suffer from depression are likely to have improper posture, disturbing the normal spine alignment and such individuals are more prone to develop spinal disorders like cervical spondylosis. A study revealed that there was a high risk of cervical spondylosis in severely depressed patients in comparison to the non-depressed group[23].

Cervicogenic Headache:

It is the chronic hemi- cranial pain[24] referred to the head from bony or soft tissues of the neck. It is caused by anatomical structures of the neck such as, the intervertebral disc between C1-C3 vertebrae, muscles, and ligaments supplied by upper three cervical nerves. The nociceptive afferents relay in the trigeminal nucleus and the pain is referred to trigeminal nerve territory, while the pain from the nociceptive afferents from the trigeminal system is also referred to cervico- occipital area. This pain must be differentiated from migraine and tension headache[25].

Dysphagia:

Dysphagia[26] can also be observed in patients suffering from cervical spine disorders such as scoliosis, kyphosis, lordosis[27] and in vertebral degeneration with the presence of osteophytes[28] and spinal cord injuries.

CERVICAL SPONDYLOSIS IN ASYMPTOMATIC PATIENTS:

95% of asymptomatic individuals over age 60 to 65 years show at least one degenerative change in lateral cervical spine X-rays. It is a slowly growing process which is detected mostly with imaging. The diagnosis of cervical spondylosis should be not entirely on imaging, but history and physical examination should also be taken into account. Clinical correlation is highly recommended for such cases[29].

SHORT NECK LENGTH & IT'S CORRELATION WITH CERVICAL SPONDYLOSIS:

In a group of patients with cervical spondylosis, the neck length and cervical curvature were measured with the help of self-leveling plumb, level and square beam laser pointer, angle finder and level and laser level tape measure pro and were compared with healthy controls. It was found that patients with cervical spondylosis had decreased neck length and increased cervical curvature[30].

The neck length and its association with cervical spondylosis need to be studied in our population as well, a majority of the Asian population is of short stature and as the disease is prevalent in middle-aged population so the condition should be intervened and screened in short height individuals. There are currently no national or international standards for neck length[31].

PATHOGENESIS OF CERVICAL SPONDYLOSIS:

Because of the degeneration at the intervertebral disc, these discs lose the water content, become soft and unable to bear the axial load at the cervical spine. Osteophytes form at dorsal and ventral margins and inside the vertebral canal to compensate for the load-bearing effect and cause compression of nearby neural and vascular elements. The disc loses its height, and as a result, the cervical spine loses its anterior concavity, that is, lordosis. Thus the cervical spine becomes kyphotic. The kyphosis can be removed surgically, either through ventral surgical fixation or combined ventral and dorsal approach of stabilizing fixation[32].

TREATMENT OF CERVICAL SPONDYLOSIS:

Many treatment options are available for treating cervical spondylosis. They include conservative and operative management.

Conservative management:

Conservative management includes neck exercises, kinesiotaping, trans-cutaneous electrical nerve stimulation (TENS), medicines, acupuncture and percutaneous neuromuscular electrical stimulation.

Neck exercises:

According to a study, a 3-month isometric neck extension home exercise program along with NSAIDs restores physiological lordosis of the cervical spine and has proved to be beneficial in alleviating neck pain and its intensity. Asymptomatic individuals can even adopt the exercise program as cervical kyphosis can worsen with time and cause future complications. The exercise program can also be a better initiative to restore physiological curve rather than opting for surgery[33].

Mulligan's mobilization and Kinesiotaping:

Mulligan's mobilization movement is a manual technique at gliding joints practiced by physiotherapist at the cervical region to ease the movements and make them pain-free. It involves natural apophyseal glides, reverse natural apophyseal glides, sustained natural apophyseal glides and mobilization with movements. Another method called as Kinesio taping, consist of a Kinesio tape which is a porous adhesive tape applied on the trapezius and paravertebral muscles under 5 % tension following the Kenzo Kase's KT muscle technique. Two strips in the form of I and Y are applied to ease pain and muscle movements. Copurgensli et al. used the concept of Mulligan's mobilization and Kinesio taping along with TENS and isometric exercises together for the treatment of neck pain caused by cervical spondylosis, and it proved to be beneficial as combination therapy rather than exercises alone[34].

Prayers:

Islamic prayers, i.e. Namaz is obligatory for every Muslim. It involves the act of kneeling, bending, and prostration. They are beneficial for strengthening the neck muscles and protecting cervical vertebrae. The act of salam and sajdah proved to be beneficial in supporting and strengthening neck muscles. It has a significant role in the prevention of cervical spondylosis[35].

Percutaneous Neuromuscular Electrical Stimulation (PNMES):

This involves use of PNMES device which gives electric current at a frequency of 2 to 100Hz at acupoints of Jing-jiagi on the back. It reduced the pain in the patients of cervical spondylosis. It has proved to be beneficial for acute and chronic cases as well[36].

HILT:

Laser therapy has been widely practiced in musculoskeletal disorders like knee arthritis, shoulder pain, epicondylitis, and chronic ankle pain[37]. High Intensity Laser therapy and traction therapy were compared in short term, medium and long term follow up in patients with cervical spondylosis. HILT proved to improve range of motion and ameliorating pain. It could be the best therapeutic measure for long term management[38].

Pillows:

Cervical pillows are recommended by physiotherapist as a part of the therapeutic strategy. It has been supported by a number of studies that the ergonomic latex pillow can effectively reduce neck pain in the long term follow up patients along with physical therapy[39].

Surgical management:

Surgery is indicated for those who develop myelopathy or fail to respond to conservative treatment. Surgical management improves disease more promptly with less adverse effects. There are several surgical techniques including anterior, posterior, and combined approaches as well as Cervical disc arthroplasty, also known as total disc replacement. The Anterior approach yielded better results without exploiting the posterior neural elements. Variations of anterior approach also include Bailey-Badgley approach and Cloward approach[40].

Most commonly anterior approach[41] which includes anterior cervical discectomy and fusion (ACDF) has been practised due to its less invasive nature, as compared to the posterior approach which included laminectomy or laminoplasty with or without fusion[42].

Cervical disc arthroplasty (CDA) has also emerged as a better option for cervical level 1 and 2 herniation and spondylosis. It preserved mobility at the segmental level and protected adjacent segment disease. The current study demonstrates it as the best strategy for preservation of a range of motion with less re-operation and adverse events[43].

CONCLUSION:

Cervical spondylosis is one of the most common causes of DALY. It is prevalent in middle-aged as well as the aged population. The middle-aged population is an active group of society, and cervical spondylosis can deteriorate lifestyle and impact on the health of this major population. Considering the risk factors, adverse effects, pathogenesis, syndromes and treatment options, this disease needs to be further studied and correlated with the demographic, occupational and even neck length.

The neck length and its association with age, sex and the total height of the individual needs to be assessed and tested as a factor for cervical spondylosis in our population, because no study has so far been done in Pakistan correlating neck length with the incidence of cervical spondylosis. The neck length should be standardized in our population so that it can aid health caregivers and physiotherapist to obtain a standardized measure for evaluation and prevention of cervical spondylosis. Masses should be educated about the prevention of the disease by adopting healthy lifestyles, offering regular prayers, and maintaining good posture at the workplace. It is though a degenerative process which progresses with age, but its progression can be slowed down by focusing on prevention.

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Review Article

Nocturnal Enuresis In Children

Asiya Kazi, Syed Ijaz Hussain Zaidi, Khemchand, Faisal Faheem

ABSTRACT:

Nocturnal enuresis is one of the commonest developmental problem specially in our country. It can cause emotional family stress and social isolation of child. According to WHO if condition persist after six years of age, it should be consider as pathological. Exact cause of this condition is not known but is common in lower socio economic people due to lack of awareness about the impact of this disease on the psychology of the children. Different modalities of treatment comprising of non-Pharmacotherapy as well as pharmacotherapy are being tried but relapse rate still persist. In non-pharmacotherapy: Psychotherapy, toilet training and alarm therapy has been tried but in pharmacotherapy, monotherapy that is desmopressin and imipramine and combination of therapy that is desmopressin + oxybutynin and desmopressin + imipramine has been tried. Multiple studies are available but relapse rate till exist. Combination therapy (desmopressin + oxybutynin) is being tried in various Tertiary care Hospital of Pakistan and results are encouraging.

Keywords: children, combination therapy, desmopressin, imipramine, Nocturnal enuresis, oxybutynin.

INTRODUCTION:

Nocturnal enuresis is commonest problem in children all over the world.[1] The child failed to control over automatic passage of urine at any time of a day during sleep beyond the age of 5yrs. It is more in boys but diurnal enuresis is common in girls.[2] If this condition persists after 6yrs then it should be considered as pathological (according to WHO). International children continence society (ICCS) has defined nocturnal enuresis as intermittent involuntary voiding at night which is not having any physical ailments. In minimum of 1 episode a month for at least 3 months is required for diagnosis of this disease. This disease is mainly divided as primary and secondary. In primary, mono-symptomatic nocturnal enuresis (MNE), the child has never attained nocturnal enuresis continuous. It is not associated with other lower urinary tract symptoms (LUTS) or dysfunction of urinary bladders[3,4].

In Non-symptomatic enuresis (NMNE), it is caused by lower urinary tract infection, increased or decreased frequency of urine, urgency, hesitancy, straining and feeling of incomplete emptying of bladders. In this condition the child have achieved 6months of nocturnal dryness. There is just a 15% chance that kids to be suffering by NE if the parents were having the history of enuresis. However this increases to 44% and 77% if one or the two parents had this problem.[5] Besides its association with the urinary tract infection, but more important cause is deficiency of antidiuretic hormone.

The correct neuro-physiological process is not known. However, kids accomplish control of bladder at various stages of life. The majority of children usually accomplish by 5 years of age. In the early years, the frequency of urine is because of micturition reflex due to stimulation of para sympathetic system, up to 2yrs due to expansion of bladder this reflex is decreased and involuntary control of bladder is achieved. At the age of 3yrs control if the internal sphincter of the bladder is attained and urination can be started as well as finished voluntarily. At the age of 5yrs 85% of children manage to fully control the urine. The exact etiology of NE is unknown. However there are various factors which affect NE include genetic heritage, delay in maturation of CNS , lack of regulation of ADH, urinary tract abnormality, bacterial infection, and psychological problems.[6,7]

AsiyaKazi
M.Phil Student Pharmacology
Bahria University Medical & Dental College, Karachi

Syed Ijaz Hussain Zaidi
Associate Professor, Pharmacology
Bahria University Medical & Dental College, Karachi
Email: col_zaidi@yahoo.com

Khemchand
Professor of Paedriatric Nephrology
National Institute of Child Health, Karachi

Faisal Faheem
Researcher
Bahria University Medical & Dental College, Karachi

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METHODOLOGY:

Nocturnal enuresis is socially cumbersome problem which lowers the self-esteem as well as quality of life of both parents and child. A total of 10 articles have been selected from google and search engine i.e. Pub Med/ midline google scholar for the year 2010-2017. Basic concept of nocturnal enuresis has introduced using various keywords like NE, desmopressin, oxybutynin, etiology, pathophysiology and treatment.

LITERATAURE REVIEW

CLASSIFICATION

PRIMARY CAUSES:

90% cases are primary nocturnal enuresis, these are bases on genetic, biological and developmental factors. If one parent is having NE than there is 44%chances that child is

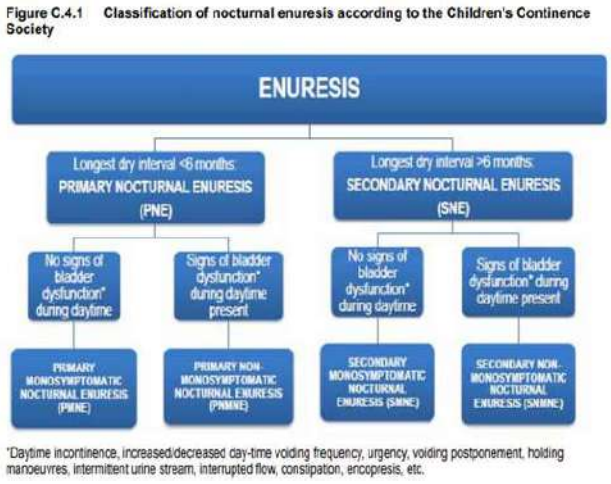


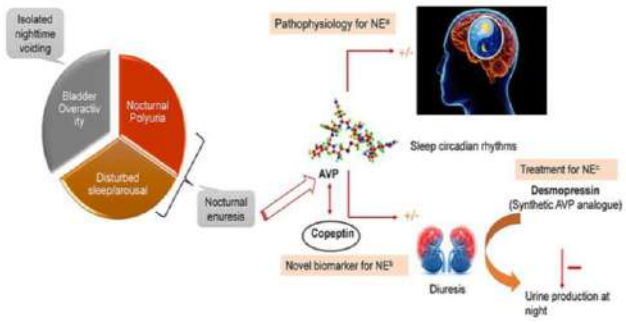
Figure C.4.1 Classification of nocturnal enuresis according to the Children's Continence Society

*Daytime incontinence, increased/decreased day-time voiding frequency, urgency, voiding postponement, holding manoeuvres, intermittent urine stream, interrupted flow, constipation, encopresis, etc.

having this disease. If both parents are involved then there are 77% chances of this disease. It is more common in obese kids.[8] In USA obesity has significant impact to increase incidence of this disease (16.9%).[9] It is mainly associated with sleep disorders, psychological and attention deficit hyperactive disorder which might be related to the morbidity and later on life threatening condition as well.[10,11]

In accordance with ICCS [12], the bladder dysfunction causes lower urinary tract symptoms (LUTS) with or without constipation. However, there is obvious relation between incontinency and constipation, And there is increased incidence (30%) of this disease.[13] Numerous studies presented positive effects while managing constipation in LUTS/NE of functional constipation on LUTS/enuresis.[14,15] However, there is obvious relationship between these two symptoms which causes increase incontinency

SECONDARY CAUSES: it mainly included neurological dysfunctions, inherited problem and malformations of urogenital system, infections and psychological disorders. The important secondary cause of NE is constipation which may increase the pressure in the bladder and predisposing to the act of urination.[16] These subjects need through psychological investigation to identify a treatable cause of the condition.[17,18] One of the study predicted that history of child abuse was one of the cause of urinary incontinence. [19], however this condition has also observed in few cases in middle aged individuals as reported by Madhu et al .[20]



PREVALENCE

Multiple studies are available which showed that nocturnal enuresis is more prevalent in 5yrs of age (8-20%), in 10yrs of age 5-10% and for adults 2-6%.[5,21] It is more prevalent in boys than in girls. The high incidence of this disease is more in people having low socio economics status. Frequency of this disease is varied in various countries of the world. The variation may be due to the cultural, ethnic, ecological and social factors.

EPIDEMOLOGY

It is still debatable to know about the exact cause of this disease. Its epidemiology is complex. It is 2 to 3 times more common than the day time urinary in continuous. It is more prevalent in boys than in girls. Primary is more common than secondary enuresis. Mono symptomatic enuresis is 2 times (69%) more common than non-mono symptomatic enuresis (32%). The prevalence of this disease decreases with the advancement of age and children, however the incidence is decreased every year by 14% (. If one family member is having this disease the child is most likely to have 48.5% and if both parents are involved then the chances of this disease is 77% .[22]

PATHOPHYSICOLOGY

Exact cause is not known but research has been done and evaluated that the following mechanism are interrelated for its pathophysiology i.e. 1) defective arousal response during sleep when volume of urine exceeds bladder capacity, it causes NE. 2)Due to decrease diurnal rhythm of vasopressin secretion resulting production of excessive urine and caused nocturnal polyuria.3) Bladder over activity resulting in involuntary voiding.4) Acetylcholine act on M3 receptors and relax inter sphincter of bladder and promotes increase passage of urine.[23]

MANAGEMENT:

In past, the cruel management like beating and punishment was awarded due to lack of knowledge about the adverse impact on child psychology. It is mandatory requirement to create awareness among parents, teachers and treating doctors. Subsequent increase of publications over the last 20 years provided up to date knowledge of this disease in order to improve the understanding of this condition and importance regarding the treatment.

After proper diagnosis of this disorder, habit should be made to evacuate the bladder before sleep and less ingestion of fluids 3-4hrs are suggested as prior measures.[24] additionally the medical treatment of constipation is also recommended.

The initial step in managing of NE is recording of history and performing physical examination. While taking history, patients voiding pattern, together with regularity of passing of urine around the clock, morning enuresis and incidence of NE in one week is evaluated. Amount of fluid intake throughout the day time, in evening and additionally prior

to sleep been evaluated. The step of physical examination includes correct neurological assessment, spinal dysraphism and anomalies of urogenital system.[25] Urine analysis is done for evaluation of glycosuria which is essential for all patients having night time urinary incontinence. Ultrasonography and other relevant investigations are advised for assessment of any abnormality in urogenital system or to delineate the exact cause of disease [26]

DISCUSSION:

NE is very notorious condition affecting the kids and their families. Various options have been formulated for the management of this condition, comprising of non-pharmaco therapy and pharmaco-therapy.

Non-pharmaco therapy includes alarmed therapy that requires training of child and parents.[27] In this when the bladder is full and due to this technique the child will awake at night and passes urine.[28] Training of the bladder exercise is to retain the urine for longer time. A research done by Maxwell on 250 patients, He compared the treatment modalities that are drug imipramine with conventional therapy NE is common issue with the age 6-12yrs. Many surveys have been conducted at different educational institutions but definite treatment of NE is still a matter of debate due to unknown pathology, lack of knowledge and awareness among the people. The cumulative incidence rate of enuresis is 25% in children (6-12yrs)in our study which is very high as compared to other study of various countries.[29] In Pakistan few studies are available.

NE is claimed to be related with the excessive production of urine at night when the child is sleeping with signs of bladder fullness. The increase urine formation at night is because of decreased production ADH at night. Therefore existing management of this condition involves utilization of drugs (desmopressin) that increase ADH secretion and help to reduce the over production of urine at night. Another therapy is given by using anticholinergic drug oxybutynin. It acts on the hyperactive bladders and decrease muscle spasm bladder by relaxing internal sphincters of bladder and decrease urgency and frequency of urine. The success rate is 70%, desmopressin (63%) and imipramine (61%)[30]

CONCLUSION:

The substantial variation in the monotherapy treatment of enuresis is with desmopressin, imipramine and oxybutynin. In comparison among these drugs oxybutynin's response rate is high while the relapse rate is low. These ambiguities can be cleared by clinical trials with a larger sample size.

Furthermore, there was lack of knowledge and awareness in parents and necessary measures should be taken to formulate awareness programs in order to reduce the burden of the disease.

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Case Report

Bernard Soulier Syndrome: Presenting As High-grade Fever In A Young Male

Syed Parvez Asghar, Rida Ali, Syed Sajid Abbas Jaffari, Zehra Akhtar, Naveed Siddique

ABSTRACT:

Bernard-Soulier syndrome (BSS) is a rare inherited disorder of blood clotting (coagulation). They may be life-threatening and demand immediate attention. Congenital bleeding disorders especially pose a diagnostic challenge to the clinician because of their rarity and the need to be differentiated from the other common causes of bleeding in children. We present a case of young male presenting with generalized weakness, high grade fever with chills, dry cough and black tarry stools (2-3 stools/day). No response to steroids and further evaluation by platelet, ADP, collegen, epinephrine and defective response to ristocetin led to the correct diagnosis – Bernard soulier syndrome (BSS). However, it is imperative to have arrived at correct diagnosis in order to save unnecessary therapy and to take due precautions for prevention of bleeding.

Key Words: Bernard Soulier Syndrome, Bleeding Disorder, Decrease expression of glycoprotein.

INTRODUCTION:

It is congenital bleeding disorder, named after two physicians Dr. Jean Pierre Soulier in 1948. It was recognized to be familial and inherited in autosomal recessive manner. It is characterized by prolonged bleeding time, a low platelet count and giant platelet membrane glycoprotein GPIb. Patient usually present in neonate, infancy, early childhood with bruises, nose bleed (epistaxis) or gingival bleeding. Later in adolescence it may present as menorrhagia in females, stomach ulcer, trauma and surgery.

CASE REPORT:

An 18 year young male student of class X, presented on 19 DEC, 2009 with generalized weakness, high grade fever with chills, dry cough and black tarry stools (2-3 stools/day).His past medical history revealed prolonged bleeding after circumcision, sports injury, epistaxis and malena .He had various hospital admissions and blood transfusion history. Bleeding usually provoked by aspirin and panadol intake.

Upon clinical examination, he was pale and rest of examination is unremarkable. The patient was thoroughly investigated by blood tests, radiological studies, flow cytometry, and platelet aggregation studies. His BCP shows Hb:6.9g/dl, TLC:12.8×/L,LFTs: bilirubin:18µ/L,ALT:49µ/L, ALK.PHOSPHATASE:108µ/L, PT/APTT are normal. Bleeding time : more than 7.00min/sec, retic count:05% to11%, combs test direct/indirect: -ve,HbsAg: -ve ,Anti HCV : -ve, ferritin:83.5ng/ml, ANA: -ve , D-DIMER: normal , stool for occult blood : +ve, DENGUE VIRUS IgM: -ve. Peripheral blood film shows: Dimorphic picture, anisocytosis, poikilocytosis. Polychromasia, few lymphoctes, microcytes, target cells,right shift neutrophills, spherocytes, large platelet seen.

Oesogastoduodenoscopy shows multiple bleeding points at 1st and 2nd part of duodenum with multiple polyposis, which was found to be benign polyp. Ultrasound and CT-SCAN abdomen is normal.

Platelet aggregation studies shows: normal response to ADP, Collagen, Epinephrine and Defective response to Ristocetin. Von-willebrand AG-factor=119%. Risticetin co-factor=115%

All above findings are suggestive of BERBARD SOULIER SNDROME.(BSS)

This patient was treated symptomatically with proton pump inhibitors, folic acids, iron supplements, antibiotics, electrolyte replacement and blood transfusion. Injection NOVASEVEN (1.2mg) vials 2.4mg IV at interval of 3 hrs, started after platelet aggregation study which did not responded by our patient.

Desmopressin nasal spray was started twice a day and results were poitive. His BCP shows Hb:11.2g/dl, TLC:10.6×10^9/L, LFTs: serum biirubin:35, ALT:29, serum ALK.PHS:189µ/L, PT:16, APTT:34, stool for occult blood : -ve. Follow up at 6 monthly was advised that reveals good results.

DISCUSSION:

Bernard-Soulier syndrome is a bleeding disorder associated with abnormal platelets, which are blood cell fragments involved in blood clotting. In affected individuals, platelets are unusually large and fewer in number than usual (a combination known as macrothrombo-cytopenia). People

Syed Parvez Asghar,
Professor, Medicine Department
Bahria University Medical and Dental College, Karachi

Rida Ali,
Registrar, Medicine Department
Bahria University Medical and Dental College, Karachi

Syed Sajid Abbas Jaffari,
Professor, Head of Medicine Department
Bahria University Medical and Dental College, Karachi

Zehra Akhtar,
Lecturer, Medicine Department
Bahria University Medical and Dental College, Karachi

Naveed Siddique
Lecturer, Medicine Department
Bahria University Medical and Dental College, Karachi

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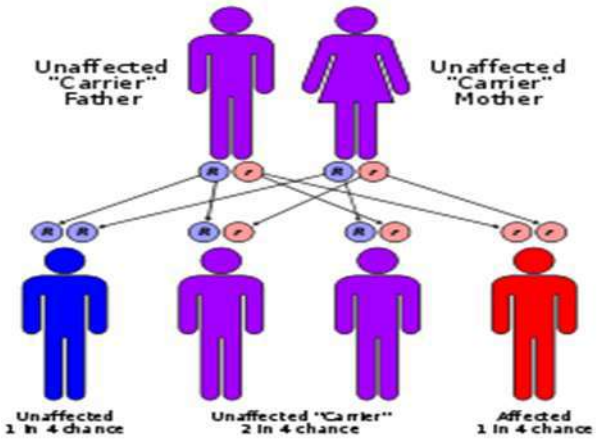
with Bernard-Soulier syndrome tend to bruise easily and have an increased risk of nosebleeds (epistaxis). They may



also experience abnormally heavy or prolonged bleeding following minor injury or surgery or even without trauma (spontaneous bleeding). In some affected individuals, bleeding under the skin causes tiny red or purple spots on the skin called petechiae. Women with Bernard-Soulier syndrome often have heavy or prolonged menstrual periods (menorrhagia).

Bernard soulier syndrome (BSS) is a qualitative and quantitative bleeding disorder that is characterized by the absence or decrease expression of glycoprotien GPIX/V complexs on the surface of platelet that is the binding receptor of vWF for platelet at the site of vascular injury. This absence of platelet plug formation results in increase bleeding tendency. It has three genetic variants which are: i: Type A-GP1BA, ii: Type B-GP1BB and iii: type C-GP9. Bernard-Soulier syndrome has an autosomal recessive pattern of inheritance.

The GPIb-IX-V complexes are four proteins GPIb alpha, GPIb beta and GPV, present on the surface of platelet. The subunit GPIb alpha binds to a protein vWF to initiate clotting mechanism. If vWF protein also deficient, it would result in other bleeding disorder such as hemophilia A or B. The other conditions of bleeding disorders are as follows.

The disease is found in whites of European ancestry, Japanese other ethnic group is uncommon, with occurrence rate less than 1 case/million population among both gender. Patient with BSS, gives history of prolonged bleeding after any tooth extraction, trauma, surgery, bleeding after circumcision in neonate, bruise and mucosal bleeding on physical examination. Family history of any bleeding disorder should be asked in detail by the patient, as homozygote presents with prolonged bleeding episode, while heterozygote do not usually manifest bleeding.

Laboratory investigation include CBC (thrombocytopenia), peripheral blood smear shows gaint platelet that is often mistaken for RBCs on automatic counters as platelet exceeds the size of RBCs.Bleeding time is prolonged analyzed by automatic platelet function analyzer (PFA)PFA-100.Platelet aggregation studies show normal response to ADP, epinephrine, collagen but do not aggregate in response to Ristocetin, this is not corrected by the addition of normal plasma that differentiate it from vWD. Flow cytometry shows abnormalities of platelet membrane glycoprotein.

There is no cure for BSS, although supportive and medical care is available. Educate the patient about the disease and need to avoid trauma, in contact with sports, surgery, emphasize on good oral hygiene. Avoid anti-platelet drugs such as aspirin, NSAIDs, ibruphen, naproxen, iron supplements can be started in women with menorrahgia as

Conditions	Prothrombin Time	Partial thromb-oplastin time	Bleeding Time	Platelet Count
Vitamin K deficiency or Warfarin	Prolonged	Prolonged	Unaffected	Unaffected
Disseminated intravascular coagulation	Prolonged	Prolonged	Prolonged	Decreased
Von Willebrand disease	Unaffected	Prolonged	Prolonged	Unaffected
Hemophilia	Unaffected	Prolonged	Unaffected	Unaffected
Aspirin	Unaffected	Unaffected	Prolonged	Unaffected
Thrombocytopenia	Unaffected	Unaffected	Prolonged	Decreased
Early liver failure	Prolonged	Unaffected	Unaffected	Unaffected
End Stage Liver failure	Prolonged	Prolonged	Prolonged	Decreased
Uremia	Unaffected	Unaffected	Prolonged	Unaffected
Congenital a fibrinogenemia	Prolonged	Prolonged	Prolonged	Unaffected
Factor V deficiency	Prolonged	Prolonged	Unaffected	Unaffected
Factor X deficiency as seen in amyloid purpura	Prolonged	Prolonged	Unaffected	Unaffected
Glanzmann's thrombasthenia	Unaffected	Unaffected	Prolonged	Unaffected
Bernard Soulier syndrome	Unaffected	Unaffected	Prolonged	Decreased

to cover low iron stores that results due to prolonged bleeding tendency in BSS. Medical treatment of bleeding episode includes anti-fibrinolytic agents such as aminocaproic acid, or traxemic acid useful for mucosal bleeding. Platelet transfusion is the only available therapy for surgery or life threatening hemorrhage. Although the patient may develop antiplatelet antibodies due to GPIb/IX/V against transfused platelet.

DDAVP, have been shown to shorten the B.T. in some but not in all patients. It shorten the bleeding episodes by increasing level of vWF binding to some residual GPIb in patients without an absolute deficiency. Its dose is same in adults and pediatric 0.3mcg/kg IV, intranasal<50kg:150 mcg,>50kg:300mcg (one spray in each nostril).In our case , patient is also well responded to DDAVP(NASAL SPRAY) rather than recombinant factor VII.

CONCLUSION:

Recombinant activated factor VII(NOVOSEVEN) is avitamin-k dependent GP indicated for bleeding episodes such as Hemophilia A/B and inhibitors. It works by activating the extrinsic pathway of the coagulation cascade, forming complexes with tissue factor and promoting factor X to Xa, factor IX to IXa and factor II to IIa. Although it is limited in patients with congenital platelet disorders. As in our patient its use does not manifest good results, besides this DDAVP works well. However researches are studying the efficacy of bone marrow transplantations and have shown some success in treating the patients with BSS.

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Improving Learning: Underlying Factors And Suggestions To Improve Learning In Health Profession

Farhat Fatima, Shafaq Sultana

INTRODUCTION:

Learners in health professions education may struggle with learning and educationist can help them to explore what can be followed to optimize it.

A multitude of factors influence the storage and retrieval of information stored in memory. These include, but are not limited to the implications and understanding gained out of that piece of information, how it is learned, the contextual conditions during its learning and if relevant practices are employed during its retrieval.[1]

Rationale:

To organize processed information; building blocks of cognition are linked in large networks. This idea of network is very useful for thinking about how information is stored in and retrieved from memory. Cognitive units in these networks act as nodes and there are links between them that represent their relationship. During recall, activation of the stimulated node (nodal activation) spreads along the links to the nodes directly connected with the concept and to nodes linked with these nodes and so on (spreading activation). Students can have problems in comprehending information and using it effectively in cognitive operations if they are unable to create quality networks for building blocks of cognition.[2] Thus efficient recall depends on our understanding of what information means and being able to find it.[2]

Underlying factors:

Students can have problems with recall if:

- They do not actively condense and organize material into meaningful chunks to overcome the constraints of limited processing capacity posed by working memory. The human mind can become cognitively overloaded if more than seven pieces of information are simultaneously presented to working memory for processing. This may lead to inefficient attempts at thinking and problem solving leading to limited learning.[1,3-7]
- Students cannot achieve meaningful learning and therefore may have problems with recall later if they are not actively involved in selecting, organizing and integrating the currently presented information with prior relevant knowledge activated from long-term memory and brought into working memory for processing.[1,2,4,7]
- How a student encodes to-be-remembered information makes a huge difference in how well she recollects it.[1,8] Student can have problems with recall if they do not take active participation in the encoding process by constructing meaning and using variety of approaches to organize, enrich and add new information. This means they are not employing elaborative rehearsal.[1,2,6,8] Research suggests that elaborative rehearsal (Referring to deeper and diverse activities while encoding) is superior to maintenance rehearsal (refers to surface encoding) for long term recall.[8]
- Problems with learning can also occur if the educational strategies are not focused at enhancing meaning, reducing contextual reliance, and providing recurrent, relevant practices at recovering information. At the time of retrieval memory could be efficiently searched when conditions and cues at retrieval match those present at encoding, a phenomenon known as encoding specificity.[1,9]
- Retaining knowledge and skills seems to be in direct relationship to the frequency with which they are used. Thus, engaging in massed practice rather than distributed practice can lead to problems in long-term knowledge retention. Massed practice exhausts the cognitive resources, thereby increasing cognitive load and eventually ensuing minimal learning.[5,9,10]
- Lack of a broad knowledge base, automaticity, sufficient strategies for learning, and metacognitive knowledge about when, where and why to use them combined with an inability to ignore distractions can all lead to inefficient encoding and problems with learning.[1,8]

In 2013, the monograph was published by DunloskyJ, et al, on improving students learning with effective learning techniques. Following were the techniques discussed in the monograph followed by suggestion based on their utility. Elaborative interrogation, Self-explanation, Summarization, Highlighting/underlining, Keyword mnemonic, Images, Rereading, Practice testing, Distributed practice and interleaved practice. To explore the best technique, the utility of each techniques were evaluated based on four parameters:

Farhat Fatima
Clinical Tutor, Clinical Academic Sciences
College of Medicine, Qatar University

Shafaq Sultana
Senior Lecturer, Department of Medical Education
Bahria University Medical and Dental College
Email: dr.shafaqsultana@gmail.com

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learning conditions, student characteristics material used and criterion task. The highest utility in terms of improvement in student learning was found in practice testing and distributed practice and exhibit improved performance of learners in many criterion tasks followed by elaborative interrogation and self-explanation.[13]

Recommendations for improvement:

- Students can be suggested to use practice testing. During practice testing the learner searches long-term memory in order to redeem the targeted information area. This searching process activates other relevant bits of information as well. All this information can then be encoded collectively in the form of an elaborated trace, facilitating future access to information through assorted routes.[13,21]
- Distributed practice can also help them improve learning by increasing contextual variability .[9-11,13]
- Students can improve their learning by employing elaborative interrogation. Deep learning is enforced by raising questions, focusing on knowing how, looking for interrelations and origins, generating hypothesis, constructing multifaceted mechanisms, providing explanations and validations and engaging in evidence based decision making.[8,11,13]
- Learners should try to acquaint themselves with a wide array of encoding strategies along with the metacognitive knowledge to rightly employ them. A premeditated yet flexible approach wherein the employed strategy is best matched with the to be learned content, learning outcomes and assessment type goes a long way. Sometimes it might mean using maintenance rehearsal, but mostly it means deep processing i.e. elaborative rehearsal.[8]
- Constructing knowledge learnt from various sources using own sentences and writing structures and presenting their knowledge in a meaningful way by constructing mechanisms and concept maps can also serve as a valuable tool in improving learning.[11,12] The same holds true for summarization technique which augments learning by digging out the advanced meaning and essence of the to be learned material.[13]
- Using analogies can help learners by identifying relationships between the familiar model and the new information they are trying to learning. A well-established relationship will help them comprehend the function and structure of the new system they are studying. This allows learners to better understand the different components of a difficult concept, apply it to different real life situations and problem solve with confidence.[11,14,15]
- Joining a peer-tutoring group can be of benefit in multiple ways like: discovering gaps/inadequacies in knowledge, identifying misconcepts and correct them, enhancing motivation to learning, using time effectively, learning new skills, enhancing collaborative learning and communication and interpersonal skills.[11,16,17]
- Instilling critical thinking skills can help students improve learning by developing self-regulation, analysis and interpretation skills and can also enhance their skills in cognitive and affective dispositions.[11,18]
- They can use rereading as a technique, which improves learning by simply augmenting the bulk of information that gets encrypted .[13] Reflection and self-directed learning have been emphasized as important in the process of learning. By assessing their own progress and critically analyzing achievements, students can become a life-long, self-regulated learner.[11,19,21]
- Using a wide range of learning resources and suiting them to the stage and purpose, can help students get the best out of each learning resource and build links between resources and learning needs.[11]
- Application of learnt knowledge to new problems can help students assimilate knowledge from varied topics/areas of study, explore associations between concepts, practice a number of cognitive skills as ell as determine any shortfalls or breaches in their comprehension.[11]
- Interleaved practice (learning by mixing up topics or subjects) has been shown to improve learning by providing learners with an opportunity for comparison between varying concepts and problems. It also helps because of the distributed retrieval from long term memory.[13]
- Students should ask for regular feedback to improve learning and accept it because unless feedback is accepted by the recipient it cannot be effective.[11,22]

CONCLUSION:

The comprehensive overview and an awareness of the possible underlying factors associated with effortful learning, along with a repertoire of strategies to improve can be of help to both faculty, and students in health professions, as this provides them with a handy resource to refer to when experiencing learning issues.

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Searching Literature: A Challenge For Novice Researchers

Syed Muhammad Zulfiqar Hyder Naqvi

Sir/Madam, the significance of a meticulous literature search can never be emphasized enough. It is rightly said that new knowledge is often generated in the process of interpreting and incorporating existing knowledge.[1] For most scientific conducts and writings therefore, an in-depth literature search is a must. It is defined as 'the methodical investigation of all published sources for information bearing on a usually scientific or technological subject'.[2] It is a dynamic process that is regarded as the prime step in any research.[3] Its fundamental aims are familiarization with the current body of pertinent literature and identification of any gaps that may exist within it. The major challenge in understanding the literature review process is to unlock a researcher's commitment with the literature.[4] Apart from persistence, patience, and a strong and consistent desire to explore, a comprehensive literature search also requires familiarity with various literature search techniques as interpretation and comprehension are immanent in the literature review process.[4] Though majority of healthcare practitioners do not have the skills to conduct a research themselves, the knowledge to understand and use available evidence is nevertheless needed.[5] But unfortunately, it is often observed that many novice researchers get overwhelmed by, or underestimate the importance of, an exhaustive research process as this skill is often taught on an as-needed basis. Therefore, such researchers often lack enough relevant knowledge or comprehension to cope with its various challenges. In any case, such an approach may bear the untoward consequence of a search that is conducted without thoroughness and as a result, pertinent literature may be partially overlooked or completely missed making the whole exercise pointless to a great extent. In order to do justice to any such endeavor, newcomers in the field of scientific research must equip themselves with the required understanding and expertise before attempting to undertake such an arduous task on their own. Making comprehensive use of available learning resources such as instead of depending entirely on abstracts accessing complete articles whenever possible, instead of relying solely on electronic websites searching manually in the libraries and trying to discern the references given at the end of pertinent articles in order to get good ideas about other sources of relevant literature[6]; exploring the avenues of self-learning and education; and associating with experienced peers are suggested as the solutions of meeting with the demands of an exemplary literature search process.

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Syed Muhammad Zulfiqar Hyder Naqvi
Assistant Professor,
Baqai Medical University, Karachi

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Education Of Females And Impact On Fertility

Rabiya Ali, Rehana Rehman

Dear Editor,

Infertility; an inability to conceive after unprotected intercourse for a period of at least one year, is associated with several medical conditions in both men and women which may end up in depression and a number of medical, psycho- social disorders[1]. It has been observed that female partners are usually blamed for this condition, especially when they are living in joint families[2]. Since we are aware of the fact that females in many settings are put into early marriage for the sake of royalty or for carrying forward the genetic legacy which prevents them from seeking higher or sometimes even basic education and thus ending up believing in misconceptions and myths. This renders them with lack of awareness and therefore a positive approach for diagnosis and management of infertility.

There is an increased number of studies done on Fertility and its relation to ethnicity and education but this are not much is done in Pakistan since the late 90's[3]. Infertility is not just related to illiteracy or less education but many well-educated women also suffer from infertility. As they focus on pursuing higher education and becoming career oriented hence delay parenthood, resulting in detoriation in natural child bearing process with increase in their age[4]. While achieving their goals they refrain themselves from the fundamental knowledge related to their own mental and physical health. On later realization, they face depression and anxiety and their apprehension adds on to the causes of infertility.

We conducted a survey to compare the level of education in fertile and infertile female population and observed that 13% infertile females were uneducated as compared to 4% fertile females. The importance of level of education with awareness to opt for fertility treatments is described in a study done in Toronto in 2014[5]. According to our results 51% fertile females were graduates as compared to 33% infertile females, which raises the question to explore the impact of education on awareness of fertility options and treatment plans.

We realize that targeted educational interventions to expand knowledge about the ideal age of fertility, different elements affecting fertility potential and fertility options can only be dispersed once the female is literate. We therefore advocate on emphasis of provision of basic and essential education to females from rural as well as urban population followed by motivational research programs to encourage women of all ethnic backgrounds to acquire education.

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Rabiya Ali
Senior Lecturer, Department of Physiology
Bahria University of Medical and Dental College Karachi

Rehana Rehman
Associate Professor, Department of Biological & Biomedical Sciences
Aga Khan University, Karachi
Email: drrehana7@gmail.com

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

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