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EDITORIAL

Lessons Learned by Teachers During COVID-19 Pandemic

Sadia Ahsin

The COVID-19 pandemic has globally brought significant transformation in educational activities worldwide.[1] Pakistan, although suffered comparatively less than rest of the neighboring countries was and still is, one of the affected regions. In March 2020, with strict restrictions on social gatherings, the conventional education methods were suspended temporarily with an urgent need to shift to online teaching methods.[2] Online education is electronically supported learning that relies on the Internet for teacher/learner interaction and the distribution of learning resources. It may include audiotaped lectures, videos, text, animations, virtual training environments, real-time online lectures and interactive sessions with teachers.[3]

Online learning methodology was adopted by the west, long before it was even introduced in Pakistan. Considering, that the first-ever completely online course was offered in 1984 by the University of Toronto,[4] it seems that we are lagging far behind. The West, with its already existing online learning technology, had the economic strength to survive the pandemic, yet such online practice and technological advancement was not available to the developing countries like Pakistan. The shift from traditional classroom teaching to online teaching was a huge change to adapt to for all stakeholders including institutional administration, faculty, students, and parents. High-quality online teaching is not only difficult to execute, but it is more demanding than traditional on campus teaching. It requires more upfront planning, groundwork, more individualized response and assistance for learner and teacher for which we were not ready. [3]Despite strenuous efforts there were many shortcomings and blunders on part of management, teachers and students due to poor technical skills, reluctance, time constraints, inadequate infrastructure and absence of institutional strategies and support. Just like any other educational institute of this region where online readiness was non-existent, medical colleges were no different in the face of this challenge. This urgent requirement to 'move online'[5] added to the stress and workload of university faculty and staff who were already struggling to balance existing teaching, research, and administrative duties, not to mention the stress related to their own health and safety concerns during pandemic. Power outages and connectivity issues at both learner and faculty end were also one of the recurring problems.

COVID-19 taught us quite a few lessons as far as education is concerned. During pandemic crisis, Higher Education Commission of Pakistan sprang into action and initiated faculty and management training workshops in the field of online modalities from undergraduate to doctoral level education by creating a collaborative environment.[6] Despite all impediments, educational institutes showed the will and desire to devise and follow practical solutions for implementation of emergency distant teaching strategies, with special focus on online lecture-based classes along with interactive learning sessions.[7] Transitioning to take lectures through screens, asking and replying to questions without face-to-face interaction, uploading relevant laboratory and clinical skills demonstration videos on campus/ learning management systems are some of the situations faculty and students acclimatized themselves to. Many senior teachers also had to adopt the new methods, and despite poor technical skills, gradually became accustomed to this new methodology. The struggle and commitment of institutional managements and faculty in providing students with quality education to the best of their abilities during these stressful circumstances has been commendable. It has taught us that, motivation and readiness to change practices with collaborative effort can help us adapt to any situation.

As faculty we learned that online teaching expanded our reach regardless of geographical location and time scale. Out-stationed and overseas students

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could listen to lectures along with their class fellows while maintaining social distance. In addition, if allowed by institutes, outside participants could join the educational activity at a specified allotted time. In this way, students got opportunity to interact with subject experts, from other institutions too. During virtual teaching it was also learned that a certain degree of student anonymity, may actually be preferred by a number of students over the traditional face-to-face setup, and hence may enhance their performance. Faculty using online technology could archive lecture content, syllabus, feedback and attendance and set up databases to add relevant supplemental learning resources.[3] Having to adapt themselves to virtual learning, faculty members also made best use of this technology for their own professional growth and development. Several open online courses from renowned universities were offered free of cost during the pandemic where teachers actively participated to deepen their content knowledge and teaching skills at their own pace.

One of the challenges faced was, and still is the constant doubt about students' academic honesty pertaining to their attendance, assignments, supervision of exams (impersonation or cheating during examinations), etc.[1]However, we are not alone in this ethical dilemma, it is an endemic problem in distance learning since it became popular, and it is because there is no guarantee that students are being honest.[8] Fear of academic dishonesty compromising merit in high stake exams compounded the teething problems of newly adapted environment and caused disruptions in conduction of exams and assessments throughout the country.[9] Thus, another lesson learned by educational institutes and faculty is to upgrade their online assessment methods and technical skills to use them for formative type of feedback. For high stake summative assessments, on-campus modalities may be employed by dividing students into small groups, should the need arise again.

COVID -19 pandemic is a global calamity that has transformed the approach to education throughout the world. Few of the lessons that teachers learned about online education are, that they can adapt and overcome their limitations if they are willing, they can expand their audience, they can set up their own databases, they can join online courses at their convenience, and last but not the least, they too can be fooled!

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ORIGINAL ARTICLE

Frequency of Chikungunya Virus Infection in the Tertiary Care Hospital of Karachi

Fouzia Zeeshan Khan, Fatima Fasih, Mohammad Sohaib Tauheed, Saba Hassan, Sambreen Zameer

ABSTRACT

Objective: To determine the frequency of Chikungunya virus (CHIKV) infection in the tertiary care hospital of Karachi during the time from 1st January 2017 till 31st December 2018.

Study Design: This was a retrospective cross-sectional study.

Place and Duration of Study: The study was conducted in the Department of Microbiology, Dow Diagnostic Reference and Research Laboratory, Karachi, Pakistan from 1st January 2017 till 31st December 2018.

Materials and Methods: Serum of suspected patients of Chikungunya virus infection was separated from venous blood samples and checked for immunoglobulin M (IgM) antibodies against Chikungunya virus infections by applying a micro titer plate enzyme-linked immunosorbent assay (ELISA). Data was collected after the approval of ethical committee of Dow University of Health Sciences by Pacslink software and analysis was accomplished by using Statistical Package for Social Science SPSS version 17.0 for frequencies of age group, gender, and IgM positive Chikungunya virus infection.

Results: Out of 4329 venous blood samples collected from suspected patients of Chikungunya virus infection. 1181(27%) showed the presence of IgM of Chikungunya virus (CHKV) infection. Majority of the patients were in the third decade of their lives with median age of 38.74 years. The proportion of males was slightly more 605 (51%) than females 575 (48%) (Table I). Age group 16-44 years showed high prevalence 627 (53%) as compared to other age groups (2017-2018) (Figure: 1). Incidence of CHIKV was higher in October and November 2017(37.8%), than 2018 (Figure: 2).

Conclusion: This study concluded that the frequency of Chikungunya virus Infection was higher during the period from 1st October till 31st November 2017.

Key Words: *Chikungunya Virus, Infection Control, Serology Markers, Tertiary Care Hospital, Viral Diseases.*

Introduction

The name Chikungunya derives from Makonde, which means to become contorted. Chikungunya virus (CHIKV) is an enveloped, single-stranded, positive sense flavivirus that is sustained in nature between humans and Aedes mosquito.[1] These vectors are found all over the globe and are responsible for many outbreaks. Female mosquitoes are responsible for the transfer of virus because blood meal is special ingredient for the development of egg. The virus used to divide in the salivary gland of mosquitoes.[2] The CHIKV symptoms can be observed 4-7 days after the bite of a mosquito. Arthralgia is the main symptom involving the ankle joint, knee joint, lower back, wrist, and phalanges. Fever comes with rigors and chills and has a distinctive biphasic trend. Other symptoms including nausea, fatigue, headaches, muscle pains and rashes.[3] The disease is self-limiting, but it may take a prolonged course before it abates.[4] High-risk population includes newborns infected around the time of birth, older adults (>65 years), patients with medical condition such as increased blood pressure, diabetes, or heart disease.[5] Aedes albopictus and Aedes aegypti are responsible for the spread of the virus. These mosquitoes are mostly found in tropical and subtropical locations and frequently bite during daylight. The proximity of mosquito breeding to human habitation is a significant risk factor for Chikungunya. Complications include the involvement of urinary, cardiovascular, cerebral, and digestive systems. If the virus is transferred via the vertical route of transmission, it may lead to neuro-

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disability due to severe encephalopathy. Currently, CHIKV fever has affected more than 50 countries. The global distribution of A. aegypti is expanding due to global travel and trade, including the virus. It has become a public health problem in Asia, Africa, Europe, and America. In late 2004, there was a massive outbreak in Eastern Africa that extended to India and East Asia in a span of 2 years, which affected approximately 2 million people.[6] A study conducted by Muhammad et al proposed detection of CHIKV during Dengue outbreak in 2011 in Lahore .[7] In September 2016, National Institute of Health (NIH) had issued a warning concerning the risk factors involved in Chikungunya disease after its outbreak in India. So, after the NIH warning due to lack of appropriate measures Pakistan had its first Chikungunya outbreak in the populated area of Karachi, including Malir, Shah Faisal, Saudabad and neighborhoods, where over 3000 people have been infected in Nov 2016. In addition, Pakistan had a burden of other viral infections including Crimean-Congo hemorrhagic fever, dengue in 2016. World Health Organization and health authorities had a serious concern about these viral emergencies.[8] CHIKV infection suspicion is based on clinical and epidemiological criterion, but disease confirmation required laboratory testing. Laboratory diagnosis involves detection of viral RNA and serological testing. Serological tests are the most used for the diagnosis of CHIKV. A combination of molecular and IgM antibody detection assays is suggested for diagnosis of CHIKV infection. Chikungunya IgM antibodies are appeared and detectable after 3-5 days of Chikungunya viral infection and elevated for 3 -6 months. In addition, CHIKV IgG antibodies appear after two weeks of infection and remain elevated for years.[9] After CHIKV emerged in Karachi during 2016, and an outbreak eventually was declared when evidence of local transmission was confirmed.[10] Babar et al reported higher rate of CHIKV infection in the duration of December 2016 till May, 2017.[11] The current outbreak of 2016-17 in Pakistan was termed as a mysterious disease related to warm climate and substandard sanitary state of the town.[12] Due to the higher number of cases observed in the duration of 2016-2017, we planned this study with the objective to assess the incidence of CHKV Infection in our setup during the period of 1st January 2017 till 31st December 2018.

Materials and Methods

It was a retrospective cross-sectional study, conducted with convenience sampling technique in the Department of Microbiology, Dow Diagnostic Reference and Research Laboratory, Karachi, Pakistan, during the time from 1st January 2017 till 31st December 2018. The patients were suspected cases of Chikungunya virus infection. They were advised for the detection of IgM antibody of Chikungunya virus by their physician. The permission for conducting this study was taken from the Institutional Review Board of Dow University of Health Sciences. The retrospective, non-parametric data was retrieved from Pacslink (laboratory data software) then it was shifted to SPSS software for final evaluation. Venous blood samples were collected from suspected patients of Chikungunya virus infection. 5 ml venous blood received in yellow cap gel tubes, after centrifugation for 10 minutes, serum was separated for further testing. 10 microliter serum was checked for Immunoglobulin M (IgM) antibodies against CHKV infections by applying a micro titer plate ELISA assay. The test was done according to the kit manufacturer's protocol (EUROIMMUN, ELISA reader Statfax) and inferred either positive or negative based on absorbance with respect to cutoff values. Data analysis was accomplished by using Statistical Package for Social Science (SPSS version 17.0) for frequencies of age group, gender, and IgM positive Chikungunya virus infection. We included only those blood samples of patients who were registered for detection of IgM of Chikungunya virus infection irrespective of age and gender. Exclusion criteria included clinical samples of patients registered for detection of IgM of Chikungunya virus with inadequate serum volume, improper labeling, and absence of demographic information.

Results

A total of 4329 blood samples of suspected patients were registered for the testing of the occurrence of IgM of CHIKV Infection during the period from 1st January 2017 till 31st December 2018. Out of total (4329) blood sample 1181 (27%) were showed the presence of IgM antibodies of CHIKV. Majority of them were in the third decade of their lives with median age of 38.74 years. Males were slightly more

605(51%) than female 575(48%) (Table:1). Age group 16-44 showed high prevalence of IgM 627(53%) as compared with other age groups (Figure: 1). Incidence of CHKV was higher in October and November 2017(37.8%), than 2018 (Figure: 2).

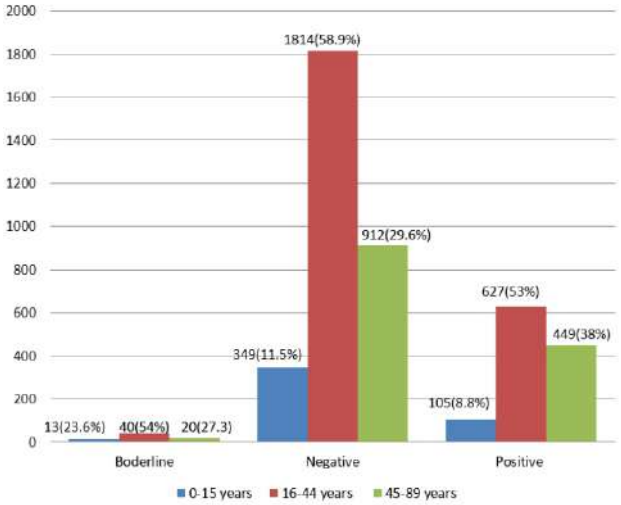

Fig 1: Frequency of Chikungunya Virus Infection in Different Age Groups from 2017-2018 (N=4329)

Table I: Gender Wise Distribution of Chikungunya Virus Infection from 2017-2018 N=4329

Gender	Borderline n (%)	Negative n (%)	Positive n (%)	Total n (%)
Female	34(46%)	1311(42%)	576(48%)	1921(44.3%)
Male	39(53%)	1764(57%)	605(51%)	2408(55.6%)
Total	73	3075	1181	4329

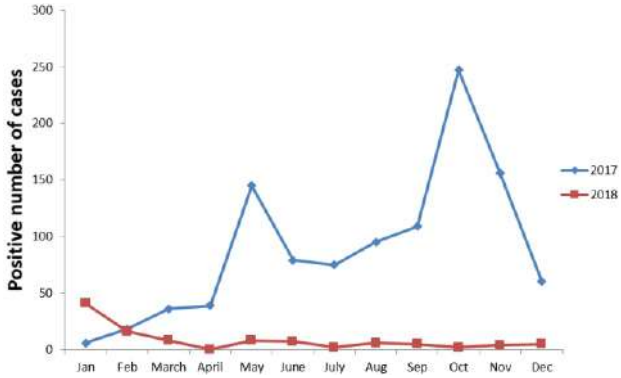

Fig 2: Month Wise Frequency of Chikungunya Virus Infection in Year 2017-2018

Discussion

Since its identification in 1953, there have been multiple epidemics of CHIKV infections throughout Africa and Asia.[2] The emerging CHKV infection in Pakistan has become a serious threat with a significant effect on public health because of its epidemics and devastating symptoms which results in economic burden on patients. Our study discovered a high incidence of CHKV during the period of October and November in 2017; however, the emergence of CHIKV was not highly reported during 2018. Naik et al also reported highest incidence in monsoon period starting from July till October.[13] Similarly one more study from India endorsed our finding.[14] Intense breeding of mosquitoes occurs from July till October, before and after monsoon rains. The stagnant water is converted into small ditches, which results in the growth of insects, thereby imposing a substantial burden on the control of mosquito-borne infections. The outbreak is linked with warm climate and inadequate sanitary conditions. The poor hygienic system of Karachi including open drains and feculent morasses are brilliant breeding habitats for mosquitoes. Vector control is the most significant strategy in controlling the transmission of CHKV infection.[15]Furthermore, a study found that besides abiotic factors (temperature & humidity), habitat also plays a major role in the growth of mosquitoes *A. aegypti* resides in water collected close to residential areas.[16]Current study reported high prevalence in age group 16-44 years with male predominance, endorsed by other studies.[17-19] However, Lubna et al contradicted the results of our study and showed higher prevalence in females.[20] Our study estimated IgM antibodies in the serum of 27% suspected cases of CHKV. Another study revealed 38.06% cases were positive by IgM antibodies.[21]A conclusive lab diagnosis can be made by evaluating acute-phase serum or plasma by PCR, IgM and neutralizing antibodies.[22]Development of IgM antibodies occurs at the end of the first week of infection. Therefore, samples should be obtained from a convalescent period of illness otherwise IgM antibodies will be replaced by IgG antibodies. Chikungunya is usually misdiagnosed as dengue that results in complications and further spread of disease.[23]

Since three decades, statistical analysis of diagnosed and undiagnosed viral infections showed no indication of the prevalence of CHIKV in Pakistan.[24]However, poor diagnostic tools could be one of the reasons or unlike other viral infections, which present with the same symptomatic manifestations. The eco-tourism and global travelling have brought about outstanding changes

in the epidemiology of CKHV in Pakistan. A study found phylogenetic close strains of CHKV in India and Pakistan.[25] Local health authorities should take serious action against the occurrence of a regional epidemic of arbo viral diseases during the monsoon season.[15] NIH had alerted and advised the government to be vigilant across border travelling. There is increasing spread of infectious diseases to other parts of the country due to lack of preventive measures and screening for viral diseases at airports, railway stations and at the Pakistan–India border.[26]

We have no prophylaxis measures like vaccines, to fight against CHIKV. Only supportive treatments are provided to symptomatic patients. The constant reporting of clinical cases of CHIKV in Pakistan is alarming. Moreover, continuous incidence in the last two years is justified that if proper precautions will not be taken, then devastating complications of CHIKV may occur in Pakistan.[27]We acknowledge number limitations of our study such as lack of history from suspected cases of Chikungunya virus infection and unavailability of confirmatory test (RT-PCR) to all IgM positive. Despite all these limitations, detection of IgM antibodies is cost effective initial tool for finding of acute phase Chikungunya virus infection. Our data also helped us in detecting seasonal variations in emergence of Chikungunya virus infection.

Conclusion

An emerging epidemic of CHKV infection in Pakistan is distressing issue. This study found that the frequency of Chikungunya virus infection was higher during the period of October and November 2017 with male predominance and age group 16-44years. The important measures for the control of CHKV infection including surveillance programs, proper disposal of waste, vector control, and public awareness programs through available resources, efficient diagnostic tools and development of good health care system should be established on an urgent basis.

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ORIGINAL ARTICLE

Foot Care Practices among Diabetic Patients Visiting Public Hospitals in Rawalpindi

Rameen Tariq[1], Sarah Rahman[2], Sidra Hamid[3]

ABSTRACT

Objective: To assess the practices of diabetic patients visiting public hospitals of Rawalpindi with regards to diabetic foot complications and its prevention**.**

Study Design: Descriptive cross-sectional survey.

Place and Duration of Study: The study was conducted in public hospitals of Rawalpindi within a duration of one and a half year. (November 2018-March 2020)

Materials and Methods: A descriptive cross-sectional survey was conducted on diabetic patients in the diabetic clinic situated in public hospitals of Rawalpindi. By using convenient sampling technique 200 patients were interviewed. Sample size was calculated using WHO calculator, with error of 5%, confidence level of 95%. Walk in (unscheduled) diabetes mellitus patients were approached and asked for willingness to participate in study after being given a brief introduction about the study. Foot care practices were compared with the examination findings.

Results: The mean age of respondents was 50 ±12.44 years. Only 21.5% of patients were practicing good foot care 43%had satisfactory practices and 35.5% had poor practices. Education of the patients had significant statistical association with good foot care practices (*p*-value <0.0001). Gender also showed significant association with good foot care practices (*p*-value <0.013) while age and socioeconomic status had no significant statistical association with good foot care practices.

Conclusion: Foot care practices adopted by the patients are highly inadequate and proper guidelines need to be provided to patients in addition to the insurance of proper foot care practices if diabetic foot associated complication is to be prevented.

Key Words: *Diabetic Foot, Diabetes Mellitus, Foot Self Care, Practices, Shoes.*

Introduction

Diabetes mellitus is characterized by a collection of metabolic disorders which commonly includes hyperglycemia, the underlying cause of which is either impaired production or action of insulin or both.[1] The number of people afflicted with diabetes has been increasing over the past thirty-five years.[2]

World Health Organization defines diabetic foot as neuropathy and vasculopathy associated infection and destruction of the deep tissues of lower limbs.[3]

Diabetes is associated with numerous complications, however, in the last ten years, problems regarding diabetic foot have been consistently rising.[4]

Within the diabetic population, foot problems are known to be an important factor leading to general ill health and mortality.[5] The major underlying reason for why diabetic patients require hospital admissions is complications associated with diabetic foot syndrome.[6] It was found that at least two or more risk factors that could potentially lead to diabetic foot were present in 10% of patients at the time of initial presentation with diabetes mellitus.[7] Amputations performed due to diabetes associated complications makes up 60% of the total number. of lower limb amputations carried out in the United States.[8] Diabetic foot has serious financial implications for the patients and adversely affects their lifestyle.[9]

There have been studies that state prevalence of diabetes in Pakistan is 13.9%.[10] However, with proper guidance and adequate measures the amputation rate of diabetic foot associated complications can be decreased by 49-85%.[11] Proper daily foot inspection was only performed by 17% of diabetic patients.[12]

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Considering all the variables that contribute in the development of diabetic foot it is apparent that the severity of this condition is dependent upon patient cooperation regarding foot care practices dictated by medical practitioners. Hence further research to assess the implementation of these practices may assist in gaining control over this complication. The rationale of this study was to assess the practices of diabetic patients visiting Puetic foot complications and its prevenblic hospitals of Rawalpindi with regards to diabtion.

Materials and Methods

A descriptive cross sectional survey was conducted on diabetic patients in the diabetic clinic situated in public hospitals of Rawalpindi. The study was conducted within a duration of one and a half year. (November 2018-March 2020). Based on WHO calculator, the estimated sample size was found to be 200, with error of 5%, confidence level of 95%. Previous study used for calculation.[13]Convenient systematic sampling technique was used. Formal permission was obtained from ethical review board of the college to conduct the study. The inclusion criteria consisted of patients with diabetes mellitus who had consented to the study, both males and females above 18 years of age. The exclusion criteria consisted of Patients who had undergone amputation, patients with gangrenous foot, foot ulcers, foot infections, and patients not willing to participate in the study. Walk in (unscheduled) diabetes mellitus patients visiting public a hospital of Rawalpindi were approached and asked for willingness to participate in study after being given a brief introduction about the study. The participants were interviewed by the researchers. The questionnaire was in the form of a pre-tested structured interview sheet with questions adopted from various studies conducted in Pakistan.[10, 12, 13] The questionnaire was translated into the Urdu language by a bilingual translator. The first part of the questionnaire consisted of questions regarding age, gender, education and duration of diabetes. The second part of the questionnaire included, questions to determine practice regarding foot care.

The dependent variable was foot care practices in diabetics and the independent variables included education, gender, and duration of diabetes.

Data was analyzed using SPSS version 25. Mean with standard deviation was calculated for quantitative data like age and practice scores with relation to education. Frequencies and percentages were estimated for qualitative variables like gender, age groups, education level, occupation and various foot care practices and examination findings. The chi+square test was used to associate the following non-parametric variables; results of foot care practices with educational background and gender. Seventeen questions were asked regarding foot care practices. Each correct answer was given one mark.

Poor practices: score is less than 50% ($\leq$9)

Satisfactory practices: score is 50%-70% (>9<12)

Good practices: score is greater than 70% ($\geq$12)

Results

A total of 200 respondents were selected. The mean age of respondents was 50 ±12.44 years. Out of 200 respondents190 (95%) of the total respondents were married. 130(65%) of the total 200 respondents had no previous knowledge about diabetes before contracting the disease. Demographic data in (Table I)

Table I: Demographic Profile of Patients Interviewed

Age (years)	Frequency (%)
18-40yrs	54(27.0%)
41-60yrs	105(52.5%)
>60yrs	41(20.5%)
Gender	
Females	104(52.0%)
Males	96(48.0%)
Education	
Illiterate	71(35.5%)
Under Matric	43(21.5%)
Matric	41(20.5%)
Intermediate	24(12.0%)
Postgraduate	21(10.5%)
Occupation	
Unemployed	106(53.0%)
Employed	75(37.5%)
Retired	19(9.5%)

From a total of 200 respondents 43 (21.5%) scored >70%(Good) ,86 (43%) scored between 5070%(Satisfactory) and 71 (35.5%) scored <50% (Poor).

Different types of footwear were preferred by the patients. Most of the patients,90 (45%) preferred

sandals whereas 44 (22%) of the patients preferred open toes, 38(19%) preferred boots and 24 (12%) preferred house slippers. Athletic shoes and orthofeet shoes were preferred by 2 patients (1%) each. Majority of patients, 169 (84.5%) stated they wear shoes most of the day.

With respect to exercise 110 (55%) of the patients were involved in some sort of physical activity like walking, jogging, bicycling etc. while 90(45 %) patients did not practice any routine exercise. When asked about blood sugar control, 59(29.5%) reported that they check their blood sugar levels daily and 130(65%) of patients checked their last blood sugar levels a month ago while 11(5.5%) of patients did not remember when they last checked their blood sugar levels.

Table II: Questions Asked to Determine Practice Regarding Foot Care

Structured Questionnaire n=200 Yes or No	Frequency(%)
Q1. Regular control of blood sugar levels?	189(94.5%)
Q2. Ownership of a personal glucometer?	135(67.5%)
Q3. Know How to properly use a glucometer?	128(64%)
Q4. Any Pain in your entire leg or part of your leg while walking?	175(88%)
Q5. Tingling or numbness in your leg or feet?	173(86.5%)
Q6. Podiatrists visit in past half yearduration.	85(42.5%)
Q7. Reach the sole of your feet without help?	179(89.5%)
Q8. Daily inspection of your feet for problems?	166(83%)
Q9. Immediately tell your doctor about any injury to your foot.	158(79%)
Q10. Wash your feet thoroughly every day?	192(96%)
Q11. Dry your feet between toes after washing?	155(77.5%)
Q12. Application of lotion on your feet daily?	121(60.5%)
Q13.Is there another person to cut your toenails in your house?	190(95%)
Q14. Wear shoes all the time?	169(84.5%)
Q15.Test water temperature before applying the water to your feet?	57(28.5%)
Q16.Inspection of the inside of your shoes before wearing them?	171(85.5%)
Q17.Wear diabetic shoots or shoes with protective inserts?	17(8.5%)

The gender has shown an effect on foot care practices (p=0.013), similarly the contribution of education was also significant with respect to foot care practices (p<0.0001). Age however has shown no association with foot care practices (p=0.35). The role of education is further strengthened by the fact that the mean score of the Illiterate population was 9±1.87 and mean score for the postgraduates was 12.2 ±1.82. (Table III) (Table IV).

Table III: Relationship of Practices Regarding Foot Care with Gender

Gender	Practice scoring about foot care		
Female	Good 15(14.4)	Satisfactory 44(42.3%)	Poor 45(43.3%)
Male	28(29.2%)	42(43.8%)	26(27.1%)
p-value= 0.013			

Table IV: Relationship of Practices Regarding Foot Care with Education

Education	Practice scoring categories		
Illiterate	Good 4(5.6%)	Satisfactory 24(33.8%)	Poor 43(60.6%)
Under Matric	8(18.8%)	21(48.8%)	14(32.6%)
Matric	12(29.3%)	20(48.8%)	9(22.0%)
Intermediate	4(16.7%)	17(70.8%)	3(12.6%)
Post Graduate	15(71.5%)	4(19.0%)	2(9.5%)
p value< 0.0001			

Discussion

The findings of this study indicated that a significant percentage of the diabetic population had poor foot care practices. Furthermore, gender and education had shown to be significant with respect to the quality of foot care practices. Only 21.5% of respondents in this study had good practices. This value is lower than that of a study conducted in Ethiopia (39%) and this dissimilarity may be attributed to differences in level of education of patients and amount of direct guidance provided by the healthcare professionals in the respective countries.[14] However a recent study conducted in India stated that only four out of every ten individuals had good practice of foot care.[15] A study in Iran also reported that only 8.8% of respondents had good scores of foot care practices.[16]

The individual frequencies showed that only 42.5%

of patients had been taught how to properly care for their feet but even so 96% of washed their feet daily. This difference can be due to the performance of Ablution as an Islamic perquisite for daily prayers and a study from Shifa hospital Islamabad confirmed the role of ablution with respect to the quality of foot care.[12]

According to our study education impacted the quality of foot care practices as majority of the patients with post graduate level education also had good practices. This is consistent with another study conducted in Jinnah hospital Lahore.[13] A possible reason for this can be that there is a greater chance of the patient's comprehension of any foot care guidance material if the patient has a greater education level.[17] Secondly, since most of the respondents in this study were categorized as illiterate, hence adopting educational interventions regarding better foot care practices in a visual or auditory manner may prove more effective.[18]

This study showed the percentage of males (29.2%) with good foot care practices were nearly double that of the females (14.4%). Another study in Saudi Arabia also reported poor KAP scores in diabetic females.[19] A contributing factor could be that females have less awareness and education about proper foot care practices.[17] However another study reported that females had 2.07 times better foot self-care than males.[14] These differences across multiple studies can be due to varying levels of literacy of the respondents or sociocultural differences.[16,18]

Age was not shown to be a significant factor as is supported by the following study conducted in a tertiary care hospital in Pakistan.[20]

This study also showed that most of the respondents wore sandals (45%) and only 8.5% wore special protective shoes. A study in India also confirmed that majority of patients wore chappals (open footwear).[21] This may be due to hot weather conditions throughout most of the year, so naturally many people may choose open footwear.[18] Another potential explanation for this may be that majority of the patients attending public hospitals were unemployed and thus less capable of affording appropriate therapeutic footwear. Effective and affordable footwear is recommended especially for high-risk patients with foot deformities and neuropathy.[22]

Limitations of our study are that the current study sample did not represent the entire population of Pakistan with several different ethnicities. In addition, relevant measures of blood glucose, urine glucose, cholesterol and blood pressure were not taken which could have further elaborated new findings.

It is recommended that further studies with a wider sampling frame and larger sampling size be conducted to accurately assess the factors responsible for inadequate foot care practices. Furthermore, the effectiveness of current educational interventions regarding foot care practices needs to be re-evaluated and tailored to the literacy levels of the population.

Conclusion

This study indicates that foot care practices currently adopted are inadequate. It is necessary to provide patients information about the disease (Diabetes Mellitus) itself and its complications one of which is diabetic foot. This goal could only be achieved with the combined efforts of our healthcare centers and patients.

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ORIGINAL ARTICLE

Comparison of the Effect of Ledermix Paste and No Intracanal Medicament on Interappointment Pain During Root Canal Therapy

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ABSTRACT

Objective: To compare the mean interappointment pain using Ledermix paste and no intracanal medicament in patients with acute apical periodontitis.

Study Design: Randomized controlled trial.

Place and Duration of Study: Operative Dentistry Department, Watim Dental College, Rawalpindi, from 1st March to 31st August 2018.

Materials and Methods: Sixty patients who were fulfilling the inclusion criteria were selected. Two groups were made Group 1 and Group 2. The patients were divided into these groups based on table of random numbers. Single blind technique was followed while dividing the patients. Group 1 patients had ledermix placed into the tooth and Group 2 patients had no intracanal medicament placed into the tooth. Patient pain score was recorded after 48 hrs using Visual Analogue Scale. SPSS version 23 was used to analyze the data.

Results: Mean inter-appointment pain was 3.23±1.43 for Ledermix (Group-1) and for no intracanal medicament (Group 2); the mean inter-appointment pain was 5.87±1.30. A statistically significant difference was recorded with a *p*-value of 0.005.

Conclusion: Patients in which Ledermix was placed as an intracanal medicament experienced significantly less inter-appointment pain as compared to patients having no intracanal medicament (p=0.005) at 48 hours. Hence, ledermix can be effectively used as an intracanal medicament to reduce inter-appointment pain for patients seeking endodontic treatment for acute periapical periodontitis in routine clinical settings.

Key Words: *Acute Apical Periodontitis, Intracanal Medicament, Inter-Appointment Pain, Ledermix, Root Canal Therapy.*

Introduction

Infection of the root canal can result in apical periodontitis.[1]The objective of root canal treatment is to reduce the bacterial load from the root canal. The prevalence of inter-appointment pain was reported to be 2.3%.[2] The occurrence of interappointment pain is influenced by various factors. These include age of patient, gender, type of tooth, condition of periapical tissues and preoperative severity of disease.[3] Microbial injury is the most common cause of inter-appointment pain.[4] Frequency of interappointment pain is greater in teeth with necrotic pulp having periapical lesionsas compared to teeth with vital pulps. Cleaning and shaping holds greater importance in comparison to the placement of intracanal medicaments in disinfecting the root canal system.[6] Obturation effectively entombs and seals the microorganisms remaining within the root canal system. Thus, placement of an intracanal medicament may not be required.[7,8]

Infection of root canal and surrounding tissues may occur from the microorganisms remaining in dentinal tubules after shaping and cleaning.[9] The placement of intracanal medicaments would enhance the disinfection of root canal.[10,11]Anti-inflammatory agents have been incorporated in these intracanal medicaments. The antibiotics have been shown to be effective in necrotic teeth and for the periradicular tissues. The local administration of

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antibiotics is a more effective method for reduction of pain during endondontic treatment.[12] The combination of antibiotics and corticosteroids in medicaments such as Ledermix are highly effective in acute apical periodontitis.

The objective of our study was to compare the mean inter-appointment pain using Ledermix paste and no intracanal medicament in patients with acute apical periodontitis.

Materials and Methods

Study was conducted after approval of Institutional ethic review committee. The study design was randomized controlled trial. Sampling technique was non-probability consecutive sampling. Inclusion criteria consisted of both male and female patients with age ranging from 18-50 years, with symptomatic mandibular posterior teeth with a diagnosis of acute apical periodontitis and those willing to undergo endodontic treatment. Exclusion criteria included patients with teeth that were malposed, with a fluctuant facial swelling, immature root apices, root fractures, mentally handicapped patients, terminally ill patients and non-cooperative patients. Study was conducted from March to August 2018 at operative department, Watim Dental College, Rawalpindi. Sixty patients who were fulfilling the inclusion criteria were invited by the principal investigator to participate in the study. Informed consent was taken from all the patients. The patients were divided into two groups based on table of random numbers. Single blind technique was followed while dividing the patients. The principal investigator performed all endodontic treatment. Local anaesthetic was used to anesthetize the tooth. Rubber dam was used to achieve the isolation. Access cavity was prepared with a round bur. Pulpectomy was done and working length confirmed by taking a periapical radiograph. Step back technique was used to prepare the canals till 35K file. During the treatment, the irrigation of the canals was done using Miton's technique in which 1% NaOCl was used alternating with 15% EDTA. Paper points were used to dry the canals. Lentulo-spiral was used to place the following medicaments into canals in the groups.

Group 1: Ledermix paste

Group 2: No intracanal medicament

Access cavity was sealed with sterile cotton and Cavit. Patient was recalled after 48 hours. Visual Analogue Scale was used to record the degree of pain on a scale of 0 to 10 with 0 indicating no pain and 10 indicating worst pain. Followup was ensured by keeping contact number and address of the patients.

SPSS version 23 was used to analyze the data. For both qualitative and quantitative variables, descriptive statistics were calculated. For age and pain scores (quantitative variables) mean±SD was calculated. For gender (qualitative variable) frequency and percentage was calculated. Comparison of the mean pain score in the two groups was done using Paired sample t-test. *p*-value< 0.05 was considered significant.

Results

A total of 60 patients with acute apical periodontitis were included in this study for root canal treatment. The patients were equally divided into two groups. In-group 1, patients were treated with ledermix as intracanal medicament and group 2 served as control (no intracanal medicament). Average age of the patients was 28.32±8.95 years. Similarly, overall average inter-appointment pain score was 4.55±1.89 as shown in Table I. Out of 60 patients, 35(58.3%) were females and 25(41.7%) were males.

Mean inter-appointment pain was 3.23±1.43 for Ledermix and for no intracanal medicament; the mean inter-appointment pain was 5.87±1.30 as presented in Table II. Mean difference was 2.64±1.93.

Average score for intracanal medicament i.e ledermix on visual analog scale for pain was 3 as shown in Table III whereas average score was 6 or 7 for patients in which no intracanal medicament was placed as shown in Table III.

According to Independent Sample *t*-Test- the null hypothesis is rejected implicating that ledermix is effective in reducing pain in patients with acute apical periodontitis.

Comparison of mean difference of inter-appointment pain between groups with respect to male and female was also calculated as shown in Table IV. For males in whom ledermix intracanal medicament was used, the mean inter-appointment pain was 3.00±1.55 and in whom no intracanal medicament was used, the mean pain score was 5.67±1.44. In males, significant difference was not observed between groups (difference 2.67±1.85).

For females, the mean inter-appointment pain for ledermix and no intracanal medicament was 3.35±1.56 and 6.07±1.16 respectively. In females' significant difference was not observed between groups (difference 2.72±1.95).

Independent Sample *t*-test for gender for both no intracanal medicament as well as for medication (i.e., Ledermix) are insignificant as p>0.05. For no intracanal medicament p=0.242 and for medication p=0.141. Both the p values are greater> than 0.05 showing that the variable tested here i.e., gender is not significant.

Table I: Descriptive Statistics of Age and Pain

Whole sample (n=60)	Mean ± (SD)
Age in years	28.32 ± 8.975
Pain on visual analogue score	4.55 ± 1.899

Table II: Inter-Appointment Pain according to Use of Intracanal Medicament

Intracanal medicament	Sample size (n)	Mean	Standard Deviation (SD)	P Value
No intracanal medicament	30	5.87	1.306	.001
Ledermix	30	3.23	1.431	

Table III: Average Score on VAS

	Average score on VAS
No intracanal medicament	6 or 7
Ledermix	3

Table IV: Pain on Visual Analogue Score for Patients Grouped on the Basis of Gender

Gender	Group	Mean Pain on VAS	Sample (n)	P value
Male	Group 1 Group 2	3.00±1.155 5.67±1.447	10 15	0.242
Female	Group 1 Group 2	3.35±1.565 6.07±1.163	15 15	0.141

Discussion

Placement of intracanal medicaments results in the reduction of microbial factors. It was concluded from the present study that pain associated with necrotic teeth having acute apical periodontitis in which Ledermix dressing was placed experienced less pain as compared to those patients in which no intracanal medicament was placed after first 48hrs.

Contrary to our findings on the use of intracanal medicaments, in which mean pain score for ledermix (3.23±1.43) on VAS was less in contrast to no intracanal medicament (5.87±1.30), number of clinical researchers have shown that inter-appointment pain is not relieved nor it can be prevented by the use of intracanal medicaments.[13] Patil et al, concluded in his study that inter-appointment dressing with calcium hydroxide does not relieve pain in all cases and therefore use of intracanal medicament is not always recommended.[14] The results of study conducted by Ehrmann et al., were similar to those with our study. In this study, patients in which Ledermix dressing was used as intracanal medicament experienced significantly less 9.5±14.6 post operative pain than those patients in which no intracanal medicament 16.3±20.8 was placed at 48 hours.[15] The frequency of interappointment pain was studied by same group of researchers. In this study three treatment modalities were used that included use of no intracanal medicament, calcium Hydroxide and Ledermix medicament. Pain incidence was found to be 6.9% with Ledermix while it was 12.3% with Calcium Hydroxide and it was 16.7% with no intracanal medicament at 4 hours.[16.17] Negm reported in his study that in 85% of the cases pain was completely relieved after 1 hour whereas more than 93% of the cases were pain free after 24 hours. [18] In majority of patients when Ledermix is placed in the root canal system reduction of pain occurs within an hour. The study conducted by Schneider supports this results in which it is stated that when a steroid antibiotic combination such as Ledermix is placed in the root canals, pain of the patient subsides before he even leaves the dental office. Many studies have confirmed that Ledermix is an effective intracanal medicament. It is perfect for use between the appointments and in root canal therapy. The intra canal use is not associated with any systemic side effects. It can be removed easily removed from the canal as it is water soluble.[19] In the current study no adverse effects were found with the use of Ledermix paste as well. Smith et al, has demonstrated that the periapical inflammation is significantly reduced by the preparation that contain corticosteroid following the canal preparation.[20] In contrast to this, Seltzer strongly criticized the use of corticosteroids. In his study he has stated that the major drawback of using corticosteroids is their effect on inflammatory cells. He also stated that repair process is adversely affected by the use corticosteroids.[21]Steroids are not

widely used due to their immunosuppressive effects in endodontics. To prevent the potential invasion of bacteria, antibiotics should be added to the steroids in topical formulations.[22]

Both the components used in Ledermix paste have the ability to diffuse through the cementum and dentinal tubules. In this way they reach the periapical tissue as well as the periodontium.[11] The demeclocycline component of the Ledermix paste has the ability to diffuses through the dentine over a period of time. During the first few days, the concentration of demeclocycline is very high. It is high enough to inhibit most of the known bacteria causing endodontic infection in the dentine. However its concentration decreases over time.[23]The diffusion of corticosteroid component of Ledermix paste (triamcinolone) is found to be much higher than the antibiotic component (demeclocycline). During the first 3-8 hours, the rate of diffusion of triamcinolone is highest with 30% of the triamcinolone released during the first 24 hrs.[6] It can be inferred from this that triamcinolone component of Ledermix is effective in initial acute phase whereas the antibiotic component of Ledermix i.e. demeclocycline provides antimicrobial substantivity.

We observed that there is no significant difference between groups for gender. Our results match with the findings of Absi et al. They also observed that there was no association between patient's gender and inter-appointment pain.[24] Contrary to our findings, study by Nair et al., observed that there is greater incidence of inter-appointment pain in females as compared to males. Levels of nor adrenaline and serotonin can be altered in females due to changes in female hormone levels during menstruation, use of oral contraceptives and hormone replacement therapy, therefore leading to decreased pain threshold in females.[25]

Limitations of the Study

Our study was not multi-centered and was not double blinded. Therefore, exceptional level of accuracy could not be achieved. More longitudinal studies need to be carried out or planned in order to evaluate the demerits and side effects of local application of the antibiotic as well as corticosteroid that might include development of bacterial resistant strains and suppression of immune cells.

Conclusion

Less inter-appointment pain was experienced by the patients in with ledermix was used as an intracanal medicament as compared to patients having no intracanal medicament (p=0.005) at 48 hours. Hence, ledermix can be effectively used as an intracanal medicament to reduce inter-appointment pain for patients seeking endodontic treatment for acute periapical periodontitis in routine clinical settings.

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ORIGINAL ARTICLE

Ischemia Modified Albumin Levels in Diabetes Mellitus Patients with and without Diabetic Retinopathy

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ABSTRACT

Objective: To determine and compare the levels of ischemia modified albumin (IMA) in healthy individuals, diabetes without retinopathy, and diabetic having no proliferative and proliferative retinopathy.

Study Design: Cross sectional comparative study.

Place and Duration of study: Diabetic Clinic, Lahore General Hospital from September 2104 to May 2015.

Materials and Methods: Sixty subjects were divided into three groups with 20 subjects in each. Group I was control group, included healthy subject, Group II included diabetics without retinopathy and group III included diabetics with retinopathy which comprised of both diabetics with proliferative and non-proliferative diabetic retinopathy. Indirect method using a 90 % D lens was used to diagnose diabetic retinopathy by a consultant ophthalmologist. The levels of IMA were measured by a colorimetric albumin cobalt binding assay and the values were presented as absorbance units. Data was analyzed using IBM SPSS version 23.

Results: Out of 66 % of diabetics individuals 33% were diabetics without retinopathy and 33 % were diabetics with retinopathy out of which 55% had proliferative diabetic retinopathy (PDR) and 45% had non proliferative diabetic retinopathy (NPDR). Low levels of IMA were seen in 33% of diabetics without retinopathy and significantly higher levels of IMA were seen in 27 % of diabetics with proliferative diabetic retinopathy.

Conclusion: We conclude from our study that the levels of IMA raise with the progression of the disease, higher levels of IMA are seen in diabetics with proliferative as compared to non proliferative diabetic retinopathy and as compared to diabetic without retinopathy.

Key Words: *Albumin, Diabetes Mellitus, Diabetic Retinopathy, Ischemia, Oxidative Stress*.

Introduction

Diabetes mellitus is globally a major public health priority.[1] The complications of the disease are broadly classified as acute and late complications. which are further classified as microvascular and macrovascular complications.[2] Among the commonest microvascular complications is diabetic retinopathy, which eventually leads to blindness in most cases.[3]

The diabetic retinopathy is classified according to Early Treatment Diabetic Retinopathy Study (ETDRS-the modified Airlie House Classification). Diabetic retinopathy advances from very mild retinopathy, to Non proliferative diabetic retinopathy (NPDR) to Proliferative Diabetic Retinopathy (PDR) in which proliferation of the new blood vessels, in the retina and vitreous gel occurs, thus filling the eye .[4,5,6,]

Human serum albumin has N –terminal which has a tendency to cohere metal ions such as nickel, iron and cobalt. Exposure of human serum albumin to ischemia or oxidative stress leads to biochemical degradation of N terminal thus decreasing its affinity for the metal ions. This human serum albumin having reduced ability to cohere to metal ions is called as ischemia modified albumin. [7]

Initially serum IMA was well thought-out as a valuable indicator for acute coronary syndrome and cardiac ischemia.[8] However, now IMA is also known as an indicator of oxidative stress.[9] Study in the patients of diabetes have shown higher levels of IMA as compared to controls , which result due to uninhibited oxidative stress, on the endothelial cell because of hyperglycemia and subsequently

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released reactive oxygen species modifies the albumin.[10] Increased levels of IMA have been seen in patients with diabetic retinopathy as compared to diabetics without retinopathy however very limited literature is available for the levels of IMA in different stages of diabetic retinopathy. A study done by Reddy et al, showed increased levels of IMA in diabetics suffering from PDR when compared with diabetics with NPDR. The succession of the disease from NPDR to PDR results in increased production of reactive oxygen species thereby increasing the levels of serum IMA in diabetics with PDR.[11]

A study done by Gulpamuk et al, suggested that levels of IMA can be used as a biomarker to determine the damage due to tissue ischemia in DM and to classify the different stages of DR, in the future.[12]

Diabetes and its complications considerably influence the life of the patient. Till now no economical marker is available for the early detection of the progression of diabetic retinopathy to proliferative diabetic retinopathy. So, the aim of the study was to determine and compare levels of IMA in healthy individuals, diabetics without retinopathy and diabetics with NPDR and PDR.

Materials and Methods

This comparative and cross-sectional study was carried in diabetic clinic of Lahore General Hospital on 60 subjects including both males and females from September 2014 to May 2015. Sample size came out to be 20 in each group with the power of study=90. Subjects were selected by Nonprobability, purposive sampling. The protocol of this research was accepted by the members of ethical review committee of the Post Graduate Medical Institute of Lahore. The subjects of the study were split into three groups. The control Group 1 consisted of 20 normal healthy adults, group 2 was of 20 diabetic patients without retinopathy and group 3 had 20 diabetic patients with retinopathy out of which 11 had proliferative diabetic retinopathy and 9 had no proliferative diabetic retinopathy. Presence or absence of diabetic retinopathy was diagnosed by an ophthalmologist on slit lamp through an indirect method using a 90D lens. Subjects with history of smoking, hypertension, end stage renal disease, diabetic foot, autonomic neuropathy, liver cirrhosis, acute coronary syndrome, and cerebrovascular occlusion were excluded from the study based on history and clinical examination. Each participant was briefed about the study and then written informed consent was taken.

4 ml of blood sample was collected from antecubital vein under aseptic conditions and was put in gel vial (yellow top) for measurement of IMA. Sample was then routinely centrifuged within 1 hour of collection for 15 minutes at 3000 revolutions per minutes and aliquots of serum samples were stored at -20 °C for a maximum of one week before IMA measurement. Serum levels of IMA were measured by colorimetric method explained by Bar-Or et al and results were reported in absorbanse units,

Data was analyzed using SPSS version 23 and was explored for normality by ShapiroWilk's statistics test of normality. Data came out to be non-parametric. Kruskal wallis test and Mann Whitney U test was applied to compare the parameters among the groups and two groups respectively, and the value of p< 0 .05 was taken as statistically significant

Results

Comparison of the levels of IMA in the three groups showed a significant difference of P<0.00 respectively. Fifty five percent of the population of diabetic retinopathy group had PDR and 45 percent had NPDR (Table I). Comparison of serum IMA levels in group I and diabetics with proliferative retinopathy and no proliferative diabetic retinopathy revealed a significant difference as shown in table II. Comparison of serum IMA between the diabetics without retinopathy and diabetics with PDR revealed a significant difference. However, when IMA of diabetics without retinopathy was compared with NPDR a nonsignificant difference was seen as shown in Table III. When the levels of IMA were compared between diabetics with no proliferative and proliferative diabetic retinopathy a significant difference was revealed as shown in Table IV.

Table I: Frequency Distribution of Study Population

Type of diabetic retinopathy	Frequency	Percentage %
Healthy individuals	20	33%
Diabetics without retinopathy	20	33%
PDR	11	18%
NPDR	9	15%
TOTAL	60	100%

Table II: Comparison of IMA Levels between Healthy Controls, Diabetic with PDR And NPDR

Parameter	Group I n=20	Group III	P value
Ischemia modified Albumin (Absorbance units)	0.51(0.43-0.54)	PDR n=11 0.65(0.61-0.72)	0.00
		NPDR n=9 0.60(0.56-0.72)	0.03

Table III: Comparison of IMA Levels between Diabetics without Retinopathy and Diabetic with PDR and NPDR

Parameter	Group II n=20	Group III	P value
Ischemia modified Albumin (Absorbance units)	**0.59(0.53-0.61)**	PDR n=11 0.65(0.61-0.72)	0.00
		NPDR n=9 0.60(0.56-0.72)	0.44

Table IV: Comparison of Ischemia Modified Albumin Levels in Diabetics with PDR and NPDR

Parameter	PDR n=11	NPDR n=9	P value
Ischemia Modified Albumin Absorbance Units (ABSU)	0.65(0.61-0.72)	0.60(0.56-0.72)	0.03

Discussion

Oxidative stress induced by high blood glucose level in diabetic patients is a leading cause of many ocular degenerative changes, to reduce the hazardous effects of diabetes mellitus on vision an effective screening marker should be introduced to assess the progression of diseases to the proliferative diabetic retinopathy which is a leading cause of blindness. Our study shows high levels of IMA in diabetics with NPDR, and PDR are seen as compared to controls group. Reddy VS et al, 2016 in one of his study concluded that the levels of ischemia modified albumin were higher in patients with NPDR as compared to control group, this supports the idea that there is a role of oxidative stress in the development of diabetic retinopathy.[11] Gaonkar B et. al 2020 in his study concluded that the concentration of oxidative stress markers are higher in patients with proliferative diabetic retinopathy as compared to controls, the results of his study support our study as there is high level of IMA in diabetic with PDR as compared to controls.[13] Retina has a large amount of polyunsaturated fatty acid, and also has maximum capacity of oxygen uptake and glucose utilization as compared to any other tissue in the body, which renders retina susceptible to oxidative stress.[14]

In our study there was non-significant difference in the level of IMA in patients without diabetic retinopathy with Non proliferative diabetic retinopathy. Our result is in correlation with the result shown by Bozkurl et al in 2019 on a group of diabetics without retinopathy and diabetics with non-proliferative diabetic retinopathy in which that the concentration of an oxidative stress marker rises in proportion to the severity of the DR, but the comparison did not show the significant difference.[15] Gulpamuk et al, 2018 in one of his research concluded that increase in oxidative stress in diabetics leads to increase levels of oxidative stress markers such as IMA in diabetics having proliferative retinopathy when compared to diabetics without retinopathy.[12]

The progression of the disease from NPDR to PDR causes a noteworthy rise in the levels of oxidative stress which is reflected by high levels of IMA in our study in diabetics with proliferative diabetic retinopathy as compared to diabetics with non-proliferative diabetic retinopathy. This result is similar to the results seen by Gulpamuk et al in 2018 in which increase in levels of serum IMA were seen in PDR patients as compared to those having NPDR thus indicating underlying ischemia and subclinical inflammation.[12]

Thus, we can say as there is progression of disease from non-proliferative to proliferative diabetic retinopathy there is more oxidative stress leading to underlying ischemia and subclinical inflammation. So, increased level of ischemia modified albumin can be taken as a marker of Proliferative diabetic retinopathy patients as compared to those with Non proliferative diabetic retinopathy

Limitations and Recommendations

Follow-up of the patients with NPDR should have been done in order to see the alteration in the levels of IMA so that the disease may not progress to PDR. In further studies Antioxidants levels and lipid profile should be estimated to evaluate the oxidative status of the body.

Conclusion

We conclude from our study that the levels of IMA raise with the progression of the disease, higher levels of IMA are seen in diabetics with proliferative

as compared to non proliferative diabetic retinopathy and as compared to diabetic without retinopathy.

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ORIGINAL ARTICLE

Radiographic Evaluation and Comparison of Chondroprotective Effects of Hyaluronic Acid and Triamcinolone in a Rat Model of Osteoarthritis

Noaman Ishaq[1], Muhammad Bilal Shahid[2], Samia Yasin[3], Nausheen Ata[4], Muhammad Waqar Aslam Khan[5], Malik Sikandar Mehmood[6]

ABSTRACT

Objective: To evaluate and compare the chondroprotective effects of Hyaluronic acid and triamcinolone at radiographic level in rat model of osteoarthritis.

Study Design: Laboratory based Randomized control trial.

Place and Duration of Study: This study was conducted in Pharmacology Department, Army Medical College, Rawalpindi, from May to July 2019.

Materials and Methods: Osteoarthritis was induced by medial meniscus and anterior cruciate ligament resection in right knee joints of twenty-four rats. They were divided in three groups with eight rats in each. Group I, II and III were treated with intra articular saline, hyaluronic acid, and triamcinolone once weekly for four weeks respectively. After one week, radiographs of corresponding knee joint of anesthetized rats were taken.

Results: Collective comparison of radiographs of control, hyaluronic acid and triamcinolone groups exhibited a *p* value of 0.001 While intergroup comparison of group I and II, group I and III and group II and III depicted *p* value of 0.05, 0.01 and 0.01 respectively.

Conclusion: Intra articular administration of hyaluronic acid and triamcinolone exhibited chondroprotective effects at radiological level in a rat model of osteoarthritis. On comparison of treatment groups, it was concluded that hyaluronic acid has better chondroprotective effects as compared to triamcinolone.

Key Words: *Chondroprotective Effects, Hyaluronic Acid, Osteoarthritis, Rat Model, Triamcinolone.*

Introduction

Osteoarthritis (OA) is the most common joint disease of old age, heterogeneous in character, affecting commonly joints of the hand, knee, hip and spine.[1] It is one of the leading causes of long term pain and disabilities. Overall old age population is increasing with improvement in health service in modern era. So with increase in old age people, Incidence and prevalence of OA is progressively increasing. It affects around 240 million people all around the world. Approximately 10% males and 18% females aged over 60 years are suffering from OA all around the globe. Basis of OA is degradation and chronic inflammation of the connective tissue of the joint, including the cartilage. Due to long term damage to chondroblasts, chondrocytes and extra cellular matrix caused by oxidative stress, as well as inflammatory factors and mitochondrial dysfunction that cause DNA damage are the leading factors of initiation and progression of OA. Currently few options are available for treatment and prevention of OA and many drugs are in the phase of investigation.[2,3,4] Drug treatment of OA in modern era is still limited to viscosupplement substances, non-steroidal anti-inflammatory drugs (NSAIDs) and corticosteroids.[5]

Hyaluronic acid (HA), a macro molecule of repeating unit of D glucuronic acid and D acetyl glucosamine, is major constituent of synovial fluid which helps to facilitate lubrication and shock absorption in joints. It is used in OA for viscosupplementation. It is a naturally occurring substance present in synovial fluid. It restores the viscoelasticity of the synovial

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fluid, may have anti-inflammatory and anti-nociceptive properties. It also stimulates denovo HA synthesis.[6,7] Triamcinolone, an intermediate acting synthetic corticosteroid, is quite effective and is one of the most common drugs used to relieve symptoms in OA. It shows anti-inflammatory activity via inhibition of gene expression of prostaglandins and other inflammatory substances. So, it not only relieves pain but shows functional improvement and chondroprotective effects. It also influences macrophage activation and eventually decreases osteophytosis and cartilage degeneration.[8,9]

Definite cure of OA is not currently available. HA, triamcinolone, and many other drugs are investigational and are used to reduce symptoms and delay the progression of disease. Aim of this study is to evaluate and compare the chondroprotective effects of HA and triamcinolone at radiographic level in a rat model of OA.

Material and Methods

It was a Laboratory based randomized control trial that was carried out in department of Pharmacology and Therapeutics, Army Medical College (AMC), Rawalpindi in collaboration with National Institute of Health (NIH), Islamabad. Ethical approval certificate was endeavored from ethical review committee of "Centre for Research in Experimental and Applied Medicine (CREAM)", AMC. Tenure of rat's intervention was two months from May 2019 to July 2019. They were kept and nurtured in animal house of NIH during the complete study period. Preliminary twenty-four (24) adult male or non-pregnant female rats of Sprague Dawley breed, approximately 10 weeks old and weighing about 500 grams were selected through nonprobability convenient sampling. They were randomly assigned in three (03) groups with eight (08) rats in each group. Group I, II and III were labelled as Control, HA and triamcinolone groups respectively. Rats were kept in standard environment with temperature ranged 25±5˚C, adequate humidity, and 12 hours day night cycle. Free excess to clean drinking water and standard rodent diet *ad libitum* was ensured during the whole study period. Surgical procedure was performed to induce OA in right knee joint of all rats. Before surgery rats were anesthetized with intraperitoneal injection of 5% xylazine and 1% ketamine.[10] Skin of the joint was shaved in a sterilized environment. Then a para patellar incision was made on medial side for complete exposure of the joint. Anterior cruciate ligament and medial meniscus were identified and transected. Aseptic closure of wound with surgical stapler was done after the completion of the surgery. Animals were allowed to move freely in the cage for two weeks thereafter.[11] Then intra articular drugs were administered in the corresponding joint of the rats. Rats of control, HA and triamcinolone groups were injected with 0.2 ml of Normal saline, 0.2 ml HA, and 70 µl (1.4 mg/ml) triamcinolone respectively once weekly for 04 weeks. [12,13,14] Thereafter Animals were anesthetized with intraperitoneal injection of xylazine 10% and ketamine 1%, transported to Radiology department of a private institute of Rawalpindi where their knee joints were radiographed. 500mA digital X ray machine China operated at 220 V with a 0.3 sec exposure time was used for radiography. Kellgren and Lawrence system was considered to grade the severity of the OA. According to Kellgren and Lawrence grading system grade 0 characterizes no radiographic features of OA, grade 1 represents doubtful joint space narrowing (JSN) and possible osteophyte lipping, grade 2 portrays definite osteophytes and possible JSN on anteroposterior weight-bearing radiograph, grade 3 depicts multiple osteophytes, definite JSN, sclerosis, possible bony deformity while grade 4 describes large osteophytes, marked JSN, severe sclerosis and definite bony deformity. [15,16] After radiographic grading with Kellgren and Lawrence system, animals were euthanized with toxic dosage of chloroform. Obtained data was analyzed using IBM SPSS version 23. Groups were analyzed through *kruskul wallis test* followed by *Post Hoc Tukey HSD test*. The differences between two interpretations were considered statistically significant if the *p* value was equal to or less than 0.05 ($p \leq 0.05$)

Results

Two radiographs (25%) of group I (control group) depicted severe changes of OA and graded as grade 04, while four (50%) radiographs depicted moderate, and two (25%) radiographs depicted minimal changes of OA and they were graded as grade 03 and grade 02 respectively. Figure 01 is an X-ray of a rat of control group that has characteristic features of sclerosis and possible joint deformity. Grade of this

X-ray is 03. Most of the radiographs of group I feature osteophytes, JSN and bone deformity.

Radiographic changes of group II (HA group) that received IA injection of HA described no radiographic changes of OA in two radiographs (25%), doubtful changes in four (50%) and minimal changes in two (25%) radiographs and they were graded as grade 0, grade 01, and grade 02 respectively. Figure 02 is an X-ray of a rat of HA group that depicts the feature of minimal changes of OA. Grade of this X-ray is 02. No or doubtful changes of OA were the feature of radiographs of this group. Radiographic changes of group III (triamcinolone group) that received IA injection of triamcinolone depicted as moderate radiographic changes of OA in four (50%), minimal changes in three (37.5%) and doubtful changes in one (12.5%) radiograph and were graded as grade 03, grade 02 and grade 01 respectively. Figure 04 is an X-ray of rat of triamcinolone group that depicts moderate changes of OA. Grade of this X-ray is 03. Most of the radiographs showed features of osteophytes and JSN in this group. When *Kruskul wallis test* was applied between all the three groups, *p* value was 0.001 that was statistically significant thus claiming the chondroprotective effects of hyaluronic acid and triamcinolone at radiographic levels. Intergroup comparison of groups via *post hoc tukey HSD test* depicted *p* values as showed in Table 01. Comparison of HA group and triamcinolone group exhibited *p* value of 0.01 that confirmed HA has superior chondroprotective effects as compared to triamcinolone.

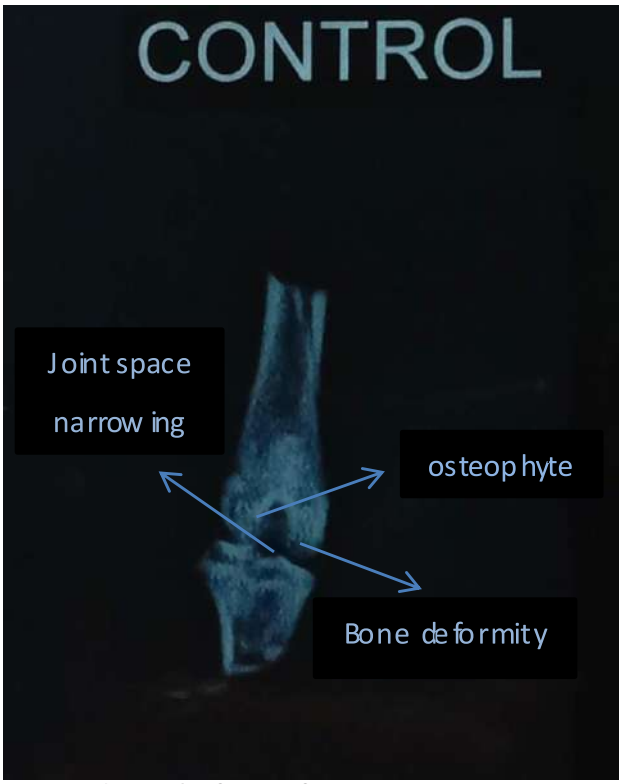


Fig 1: Radiograph of a rat of group I (Control group)

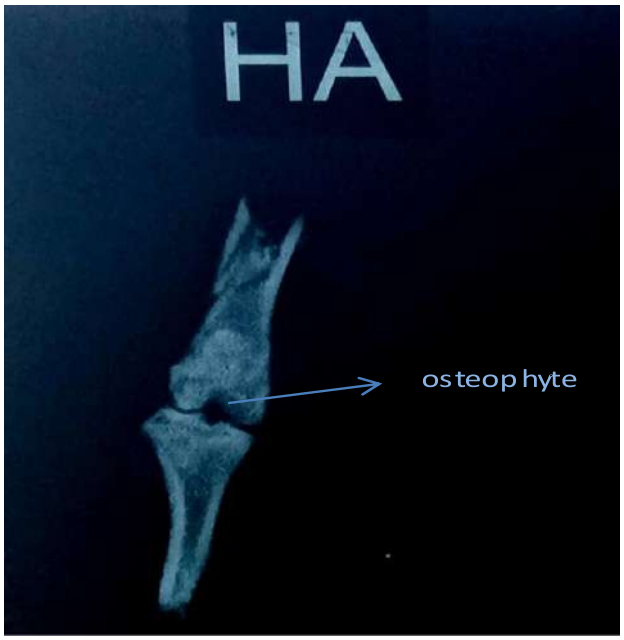


Fig 2: Radiograph of a rat of group II (Hyaluronic Acid group)

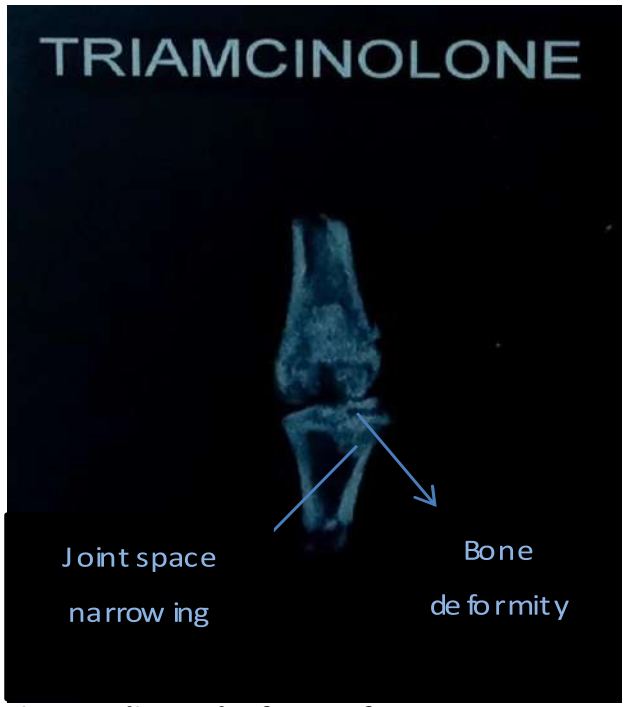
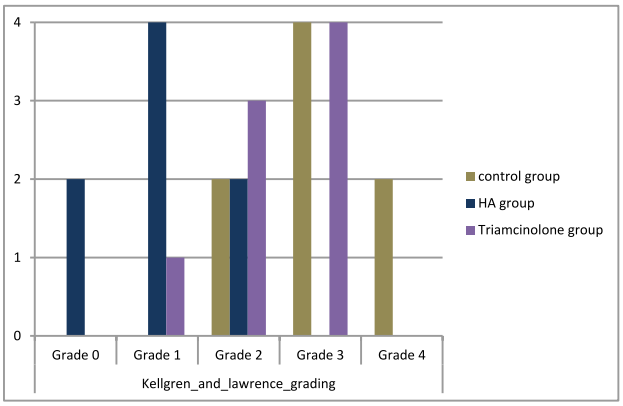


Fig 3: Radiograph of a rat of group III (Triamcinolone group)

Table I: Intergroup Comparison of Radiographs When Post Hoc Tukey Test HSD is Applied

Groups	P value
Group I and II	<0.05
Group I and III	<0.01
Group II and III	<0.01



Graph 1: Kellegren and Lawrence Grading of OA Knee Joints of Rats of all Groups

Discussion

Viscosupplement substances, nonsteroidal anti-inflammatory drugs (NSAIDs) and corticosteroids are group of drugs that are investigational but frequently used in the management of *osteoarthritis*.[17] HA, a viscosupplements, is a natural component of synovial fluid that helps to facilitate lubrication and shock absorption in joints. It is one of the many investigational molecules in the treatment of OA. Viscosupplementation with intra articular HA has positive outcome in pain alleviation and joint function improvement in OA.[18] Triamcinolone, a synthetic corticosteroid is being used in the management of OA for decades. Triamcinolone binds to intracellular glucocorticoid receptors and down regulates the expression of genes in prostaglandins synthesis and leukotrienes release. Moreover, it also enhances lipocortin expression that modulates anti-inflammatory effects. These factors ultimately lessen the inflammation of synovium and other articular structures in OA.[19,20]

This animal study is planned to evaluate and compare the chondroprotective effects of HA and Triamcinolone. Human admissible dosage of these drugs that was proficiently effective in rat model was selected by substantial search and literature review. OA was induced by medial meniscus and anterior cruciate ligament resection in the rats. After that they were randomly divided in control group, HA group and triamcinolone group with eight rats in each group. Control group was intra articularly treated with saline water while HA and triamcinolone groups were treated with intra articularly HA and triamcinolone respectively. Later, when intervention protocol was completed, chondroprotective effects of these drugs were analyzed by radiographs. When radiographic grades of treatment group were statistically compared with control group, we found a significant *p* value of 0.001 that confirmed the chondroprotective effects of HA and triamcinolone.

Our research work is supported by 2016 research work of Zhiwei Zhang who found that HA reduces radiographic osteophytosis grading ($p<0.05$) as compared to saline treated rats' model of osteoarthritis.[21] Likewise Ai Tong worked to evaluate the chondroprotective effects of cocktail of mesenchymal cells and HA in chemical induced rat model of OA. He assessed rats through Magnetic resonance imaging and found significant (p <0.05) chondroprotective effects of this mixture.[22] Their results also favor our outcome regarding HA. Similarly, research work of Yunus Emre proved that HA exhibit chondroprotective effects at histological level (P =0.04) in rat model of OA.[23]

In 2017 Yashashri C. Shetty did research work on chemical induced models of rats. His results confirmed that triamcinolone reduces the histopathological severity of disease ($p<0.01$) as compared to disease control group.[24] Likewise research of Jeffrey S. Kroin declares that triamcinolone lessens allodynia as compared to mice of control group (p value <0.01). Their work at tissue level expressed that triamcinolone has potent anti-inflammatory effects (p value <0.01) via inhibiting expression of IL- 1β and TNFα.[25] Furthermore in vitro research of E. Frank also confirmed that triamcinolone has some chondroprotective effects on damaged and swollen cartilage (p value <0.05) via inhibiting sulfate assimilation and glycosaminoglycan loss. Results of these studies strengthening our outcome regarding chondroprotective effects of triamcinolone.[26] Consequently chondroprotective effects of HA and triamcinolone that is confirmed by current research and supported by previous research favor the use of these investigational drugs in patients of OA and

provides a template for future studies.

When Radiographs of HA group was statistically compared with triamcinolone group, it was found that HA is more efficacious than triamcinolone. These results are according to the research work of Yashashri C. Shetty who found that HA has better chondroprotective effects than triamcinolone in chemically induced murine model of OA (p <0.001).[27] Likewise, human study by Soad A Elsawy portrayed better chondroprotection offered by HA as compared to triamcinolone (p=0.01).[28] Similarly, meta-analysis by Egemen Ayhan and colleagues also verified that HA has superior chondroprotective efficacy as compared to triamcinolone.[29]

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Conclusion

Intra-articular administration of 0.2 ml (10mg/ml) hyaluronic acid and 70 µl (1.4 mg/ml) triamcinolone once weekly for 04 successive weeks reduced severity of osteoarthritis in rat model at radiographic level. Upon Comparison of hyaluronic acid and triamcinolone, it was concluded that former has better chondroprotective effects as compared to triamcinolone in rat model of osteoarthritis.

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ORIGINAL ARTICLE

Effect of COVID-19 Related Infodemic on Health of General Public of Pakistan

Azeema Noor[1], Tahira Sadiq[2]

ABSTRACT

Objective: To know the public opinion about the role of infodemic in spreading fear & panic among the public of Pakistan and to assess the effect of fear created by infodemic on their health.

Study Design: This was a cross sectional survey.

Place and Duration of Study: The study was conducted from 14th July 2020 to 25th August 2020 in Rawalpindi, Pakistan.

Materials and Methods: An online cross-sectional survey was conducted using a pre-validated questionnaire from 14th July 2020 till 25th August 2020. People of age >12 years were invited to participate in an online survey through Google forms. A written consent was obtained from all the participants before filling the questionnaire. Data was analyzed using statistical package for social sciences SPSS version 24.

Results: Total 541 participants took part in this survey. 320 (59%) of which females and 221 (41%) were males. Majority 224(41%) reported that category of misinformation and fake news about COVID-19 had the most impact in creating fear and panic among people. 80% (432) reported that infodemic played a role in creating fear and panic among people, 310(57.4%) participants reported that infodemic created fear on them, 304(56.2%) reported their health was affected, 182(33.6%) had effects on psychological health, 17(3%) had effect on physical health while 105(19.4%) had effects on both psychological and physical health.

Conclusion: Infodemic caused by media played a major role in creating fear and panic among people. Fear created by infodemic during the Covid-19 outbreak is associated with negative psychological outcome in our population.

Key Words: *COVID-19, Fear, Pandemic, Public Health.*

Introduction

Corona virus (COVID-19) is an infectious disease caused by a newly found Corona virus in China in December 2019.[1] COVID-19 outbreak was declared as a "PANDEMIC" by W.H.O on 11 March 2020.[2] This caused a wave of fear, anxiety and panic among people throughout the world. In addition to the fear of disease, it's contagious and deadly nature; there was an information overload which created even more fear and panic among people.

"We're not just fighting an epidemic; we're fighting an infodemic"[3]

These were the words of WHO director general while addressing a conference on 15th February 2020. Infodemic is the term coined from the words "information" and "epidemic" which means the overwhelming amount of information regarding a problem which makes it difficult to find the accurate information and its solution.[4] This was a real challenge during the times of global health crisis. Due to media, the phenomenon of spread of information, misinformation and rumours has been dramatically increased[5] which posed a serious problem for public health both psychologically and physically.[6] "We're in the midst of the social media misinformation age and these rumours and conspiracy theories have real consequences."[7]

Electronic media is the most used source of information in Pakistan. But the role of media concerning COVID-19 is kind of disappointing. On one hand, media played its role in creating awareness regarding the disease, but on the other hand provision of unfiltered information affected health of public both psychologically and physically. Media covered the news about COVID-19 however, often the media coverage was without opinion of medical experts, doctors and even without scientifically proven evidence.[8] Media disseminated more information about rising death toll, rate of

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infectivity, some fake news about[9] herbal cures of disease, COVID-19 being a "conspiracy" and not actually a natural disease and other such news. In other words, there was an avalanche of such information which created fear and panic among people.

Fear is an emotional response of human beings which can have positive as well as negative effects. In context of health crisis, fear effected people psychologically causing negative symptoms like anxiety, depression, poor brain function as well as physically by weakening the immune system.[10] When fear is out of proportion, it becomes the source of various psychiatric disorders having long term effects.[11]

Humanitarian crisis is a public health issue and the goal of public health is physical, psychological and social wellbeing of[12] entire population which was greatly threatened in the above mentioned circumstances. There was no study to assess the effects of infodemic during the time of health crisis on the health of public of Pakistan. The purpose of this study was:

- To know public opinion about the role of infodemic in spreading fear and panic among the public of Pakistan during COVID-19.
- To assess the effect of fear created by infodemic on their health.

Materials and Methods

This was a cross-sectional survey conducted from 14th July 2020 till 25th August 2020 in Rawalpindi/ Islamabad. Sample size was calculated using "Raosoft", with total population of Pakistan 220.8 million, confidence interval of 95% and the margin of error of 5%, the recommended sample size was 385. And the additional sample of 156 was collected. Total 541 participants took part in study. Sampling technique used was non-probability convenience sampling. Instrument used for data collection was pre-validated questionnaire[13] used with permission from author. The inventory was modified with respect to local context. Only adolescent and adult citizens were included in the study. Children and people with clinical mental illness were excluded. Responses were collected after written informed consent at the start of questionnaire from respondents and their anonymity was assured. Data was collected from participants from different cities of Pakistan. Questionnaire was self-administered online via Google forms due to COVID-19 restrictions. Forms with incomplete information were rejected. Questionnaire consisted of 4 sections; first section addressed the demographic variables of gender, age and qualification. Second section addressed the category of information that had the most impact in creating fear and panic among people. Third section addressed the opinion about the role of infodemic in spreading fear and panic among public of Pakistan and the impact of fear caused by infodemic on their health. Final section addressed the opinion regarding need of information filtering by media. The data was analysed using SPSS version 20. Tables and figures were drawn using Microsoft Excel. Chi square test was employed to establish the association between qualitative variables. Confidence interval of 95% was used. P values of less than 0.05 were considered statistically significant. Tables and figures were drawn in terms of frequencies and proportions.

Results

The research revealed some interesting figures about the effects of infodemic on public health. Data is presented in the form of tables, figures, and bar charts. The participants comprised of 41% males and 59% females. Majority of participants aged 18-60 years (92%). Approximately 70% had received the university degree (table I)

Section 2: Figure 1 shows the response of participants about the category of information that

Table I: Demographic Information of Respondents

Variables	N (%)
Gender	
Female	320(59%)
Male	221(41%)
Age Group	
12-17 years(adolescents)	45(8.36%)
18-24 years	357(65.99%)
25-34 years	79(14.68%)
35-60 years	58(10.6%)
more than 60 years (older adults)	2(0.37%)
Qualification	
Just read and write	8(1.48%)
Matriculation	20(3.7%)
Intermediate	134(24.77%)
Bachelors	272(50.28%)
Masters	100(18.48%)
PhD	7(1.29%)

mostly caused fear. It shows that majority responded that the category of "misinformation and fake news" had the most impact in creating fear and panic among people.

Age Group Based Response About Category of Information That Mostly Caused Fear Is Shown In

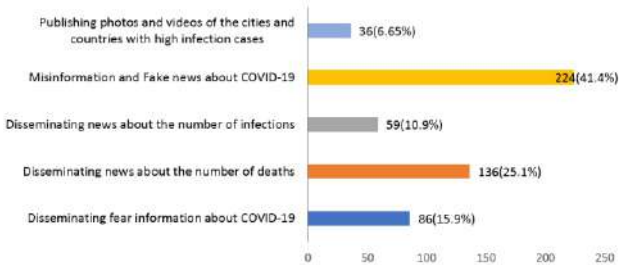

Fig 1: Category of Information That Mostly Caused Fear

Figure 2 Which Shows That In All The Age Groups The Category Of "Misinformation & Fake News About Covid-19" Was The Response Of Majority Of Participants.

Section 3 comprised of the opinion about spread of fear and panic among people by infodemic to which

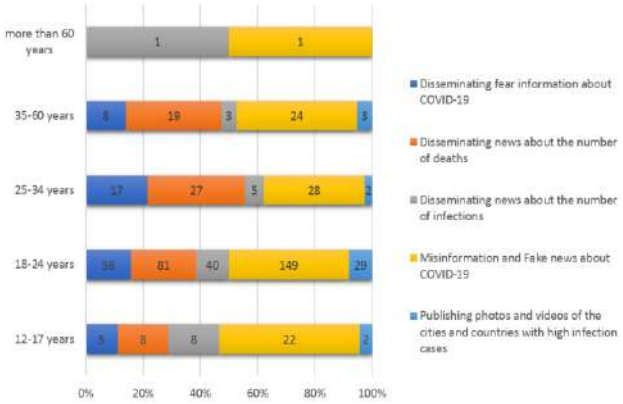

Fig 2: Age Group-Based Response About Category of Information That Mostly Caused Fear

majority 432(80%) had a positive response shown in figure 3.

Majority of participants 310(57.4%) reported that publishing more news related to covid-19 i.e., Covid-19 related infodemic created fear on them.

Figure 4 shows 304(56.2%) participants reported that their health was affected either in terms of physical, psychological or both i.e., physical and psychological health by the fear created by infodemic while 237(43.8%) reported they were not afraid.

Gender based response is shown in figure 5. In females, 61% reported that their health was

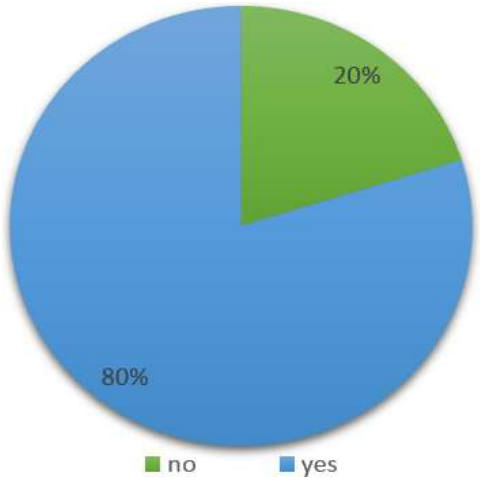

Fig 3: Opinion About Fear and Panic Among People by Infodemic

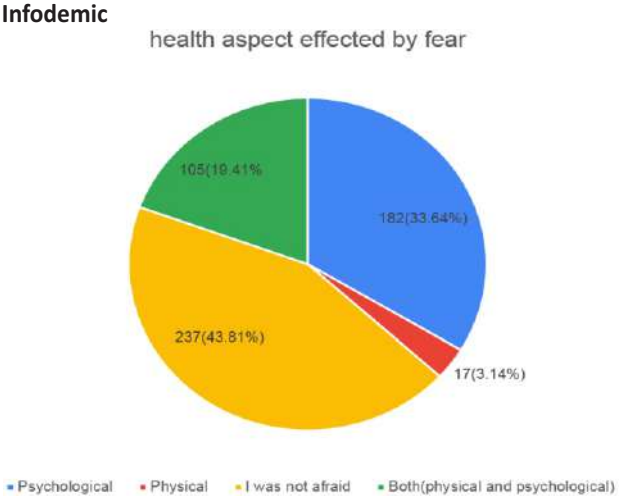

Fig 4: Health Aspect Affected by Fear

affected. While 50% males reported the effects on their health.

Section 4 comprised of opinion regarding need of information filtering by media. Majority of

Fig 5: Health Aspect Effected by Fear (Gender-Based Response)

participants 496(91.7%) reported that there is need of information filtering by media.

Opinion of participants that Covid-19 related infodemic has caused fear and panic among people has significant association with age group P=0.017, category of information that had most impact in creating fear and panic *p*=0.04, health aspect

effected by fear p<0.001 and the need of information filtering p=0.02.

The category of information that had most impact in creating fear & panic has significant association with the opinion of participants that Covid-19 related infodemic created fear on them *p*=<0.001, health aspect effected by fear *p*=<0.001 and the need of filtering of information p=0.03

The opinion of participants that Covid-19 related infodemic created fear on them has significant association with the health aspect effected by fear i.e p<0.001.However there was no significant association of any variable with gender and qualification of participants.

Discussion

This study was conducted to explore the effects of infodemic on the health of public of Pakistan. We found that majority had the opinion that there is more spread of fear and panic among people due the infodemic which had negative health outcomes. Our finding that majority (41%) reported "misinformation and fake news" played the main role in creating fear and panic among people is consistent with the study conducted in Italy that there were almost 46000 new posts[14] on twitter daily during March 2020 which was related to misinformation about covid19. A survey conducted in UK indicated that 46% of adults in UK were exposed to misinformation about covid19 and 40% of UK adults are 'finding it hard to know what is true or false about the virus'[15]. Another study conducted in US reported that due to misinformation/fake news 64% of the adults had confusion about basic information related to current events[16]. It was stated by WHO director General that the most contagious thing about COVID-19 might be the misinformation and stated that "social media panic travelled faster than the COVID-19 spread"[17]

There is negative health outcome associated with infodemic with health of 35% respondents affected psychologically. Psychological health of people is affected more as there is more spread of fear by the infodemic (p<0.001). Similar results are reported by a study conducted in China during March 2020 concluded that there is high prevalence of mental health problems associated with social media exposure during covid-19.[18] The study conducted in Iraq[13] also reported that the majority of participants had effects on psychological health due to fear which might have played a role in decreasing the immunity of people. A Chinese survey found that 53.8% of respondents rated the psychological impact of the outbreak as moderate or severe; 16.5% reported moderate to severe depressive symptoms; 28.8% reported moderate to severe anxiety symptoms, and 8.1% reported moderate to severe stress levels[19]. Another survey conducted in China in which 52370 people participated concluded that 35% people had psychological distress.[20] A study conducted in China with 17865 participants concluded that negative emotions Increased after the declaration of Covid-19 pandemic.[21] A study conducted in USA reported that COVID-19 pandemic has profound psychological and social effects which will persist for a long time in future.[22]

The problem is the filter failure due to which there is a need to have filters for information provided by media as expressed by 91% of participants but there is very little evidence to support this result.

This study has various limitations. This was a cross sectional study which cannot fully establish the cause and effect relationship of unfiltered media exposure and psychological health. The methodological choices were constrained due to lockdown and quarantine situation. We were not able to compare the mental health of participants before, during and after Covid-19. The research sample consisted of Pakistani public of mainly Rawalpindi and Islamabad so it's difficult to establish the generalization of results.[23]

Further studies should investigate the long-term health effect and psychological outcome of COVID-19 outbreak on health of public of Pakistan once the pandemic is over.

Conclusion

This study concludes that infodemic caused by media played a significant role in creating fear and panic among people. Fear created by infodemic is associated with negative health outcome during the Covid-19 outbreak in Pakistan.

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ORIGINAL ARTICLE

Operative Morbidities among Patients with Previous Caesarean Sections

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ABSTRACT

Objective: To determine the frequency of different operative morbidities among patients with previous one and previous two caesarean sections.

Study Design: Cross sectional study.

Place and Duration of Study: Study was carried out in department of Obstetrics and Gynecology of Nishtar Hospital Multan, from 13th January 2016 to 12th June 2016.

Materials and Methods: Three hundred and thirty-six women of reproductive age group having previous one or two cesarean sections undergoing emergency or elective cesarean section with gestational amenorrhea of >30 weeks were included. Women with medical illness e.g. cardiac, hypertension, renal, diabetes, uterine anomalies e.g. sub septate or bicornuate uterus were excluded. In all these women, type of maternal morbidities was noted in term of presence or absence of thick intraoperative adhesions, extremely weakened lower uterine segment and wound dehiscence.

Results: Age of women ranged between 18 to 45 years with 33.279± 5.33 years mean age. Mainstream of the women were between 26 to 35 years. Parity range of this study was from 1 - 4. Mean gestational age was 37.122 ±1.48 weeks, while mean number of previous C section was 1.610±0.48. Dense intraoperative adhesions found in 56.5%, extremely thinned out lower uterine part found in 23.5% and scar dehiscence was found in 13.7% of the total patients. When comparing outcomes in ladies with previous one and previous two cesarean sections, dense intraoperative adhesions was 23.7% versus 77.6% (p=0.000), extremely thinned out lower uterine segment was 31.3% versus 18.5% and scar dehiscence was 29% versus 3.9% respectively.

Conclusion: Females with history of recurrent cesarean section have possibility of having several intraoperative morbidities, which could escalate the frequency of maternal illness and deaths.

Key Words: *Cesarean Section, Dense Intraoperative Adhesions, Scar Dehiscence.*

Introduction

Caesarean section is the delivery of baby done by an operative incision made through the abdomen and the uterus, in order to save maternal and fetal life.[1] Initially cesarean sections were executed to deliver the fetus from mother in an effort to protect the fetus of a moribund woman but now a days it has become another mode of delivery.[2]

Since 1980s, worldwide rate of Caesarean section has risen extensively in all developing and developed countries.[3] Rendering to the World Health Organization (WHO) recommendations, Nationwide rates of c-sections should not surpass 5 to 15 per 100 live births.[1,4] The rate of cesarean deliveries recommended by the WHO has exceeded by various countries like India, Brazil, USA , Australia, China etc., similarly it has also increased in Pakistan.[1]

There are numerous indications of cesarean deliveries, but cesarean delivery due to previous cesarean sections is a main indication. The parallel rise in rate of cesarean section has caused scarred uterus in a number of patients and resulted in a gradual increase of maternal mortality and morbidity. Though, the procedure is now more protected because of advancements in antibiotics, anesthesia technology and blood transfusion facilities but as compared to normal vaginal

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deliveries, cesarean section still have substantial risks to the women.[5] As compared to vaginal deliveries, a mother delivered by caesarean is at greater risk of injury and that risk rises with increased rate of surgical deliveries. Though, several problems are linked to emergency abdominal deliveries.[6]

There are numerous maternal health issues occurring due to repeated cesarean sections such as thinned out lower uterine segment , dense intraoperative adhesions, injury to neighboring structures, scar dehiscence, hemorrhage and infections etc.[7,8] To control life threatening hemorrhages, Obstetrical hysterectomy has to be done as a last option which is usually caused by morbid adherence of placenta, placenta previa, , uterine atony or rupture of uterus.[9,10]

The objective of this study was to determine the frequency of different operative morbidities among patients with previous one and previous two cesarean sections.

Materials and Methods

It was cross sectional study, carried out in the department of Obstetrics and Gynecology of Nishtar hospital, Multan conducted from 13th January 2016 to 12th June 2016. Permission from Ethical review board of CPSP was taken for the study. Sample size n=336 calculated by WHO calculator. Sample collection was done by non-probability consecutive sampling technique keeping 95% Confidence level. All women of reproductive age group (18-45yrs) having previous one or two cesarean sections, women undergoing emergency or elective cesarean section and Women with gestational amenorrhea of >30 weeks were included in the study. While women with medical illness e.g., Cardiac, HTN, Renal, Diabetes, Women having uterine anomalies e.g., sub septate or bicornuate uterus, women having uterine scar other than cesarean section e.g., myomectomy and women having previous classical cesarean sections were not included in the study.

History was taken from women involved in study using to structured questionnaire. Conversant permission was taken from all the women. Confidentiality of data maintained and was strictly used for research purpose. In all these women, types of maternal morbidities were noted in term of presence or absence of thick intraoperative adhesions, extremely thinned out lower uterine part, injury to neighboring structures, excessive hemorrhage, scar dehiscence or rupture and obstetrical hysterectomy and were noted in the Performa.

Statistics analysis done by SPSS software version 20. Frequencies and percentages were commuted for categorical statistics such as age groups, parity, dense intraoperative adhesions, enormously thinned out lower uterine segment, scar dehiscence. Mean ±Standard deviation dispensed for quantitative variables like Age, gestational age, and no. of previous cesarean sections. Effect modifiers like Age, no of previous cesareans and parity were controlled by stratification and effects of these were seen on outcome through Chi-Square test. *P* value ≤0.05 was deliberated significant.

Results

The participant's age of the study ranged from 18 to 45 years with mean age 33.279± 5.33 years. Majority of the women were in the age group of 26 to 35 years. While parity ranged from 1-4. Mean gestational age was 37.122 ±1.48 weeks, while mean Number of previous C section was 1.610±0.48. Dense intraoperative adhesions were found in 56.5% of the patients. Extremely thinned out lower uterine segment seen in 23.5% of the patients. Scar Dehiscence was found in 13.7% of the patients. Association of Dense intraoperative adhesions, lower uterine segments and scar dehiscence with age, parity and number of previous c/sections is shown in Table I, II and III, respectively.

Table I: Association of Dense Intraoperative Adhesions with age, Parity and Previous Sections

Dense Intraoperative Adhesions		N (%)	p-value
Age groups	18-25	12(29.3%)	<0.001
	26-35	106(57.3%)	
	36-45	72(65.5%)	
Parity	1-2	57(44.5%)	<0.001
	3-4	133(63.9%)	
Previous C sections	1	31(23.7%)	<0.001
	2	159(77.6%)	

Table II: Association of Scar Dehiscence with Age, Parity and Previous Sections

Scar Dehiscence			p-value
Age groups	18-25	12(29.3%)	0.007
	26-35	23(12.4%)	
	36-45	11(10%)	
Parity	1-2	27(21.1%)	0.002
	3-4	19(9.1%)	
Number of previous C sections	1	38(29%)	<0.001
	2	8(3.9%)	

Table III: Association of Extremely Thinned Out Lower Uterine Segment with Age, Parity and Previous Sections.

Extremely Thinned out Lower Uterine Segment			p-value
Age groups	18-25	11(26.8%)	0.805
	26-35	44(23.8%)	
	36-45	24(21.8%)	
Parity	1-2	33(25.8%)	0.442
	3-4	46(22.1%)	
Number of previous C sections	1	41(31.3%)	0.007
	2	38(18.5%)	

Discussion

Our study shows that dense intraoperative adhesions and scar dehiscence is highly associated with age, parity, and previous c-sections. While the extremely thinned out lower uterine segment was found to be non- significant with age and parity but highly significant with multiple c sections. Literature also shows strong association of the operative morbidities with age parity and increased number of caesarian sections.

Maternal morbidity escalates with increased number of abdominal deliveries. Spontaneous vaginal deliveries have progressively decreased due to increased rate of cesarean deliveries especially in industrial countries throughout the world.[6]

There are many maternal morbidities of repeat caesarean sections such as dense intraoperative adhesions, weakened out lower uterine segment, scar dehiscence and injury to neighboring structures.[7, 8] Obstetrical hysterectomy is done as a last option to control critical hemorrhages that is generally caused by Placenta previa, morbidly adherent placenta, uterine atony or uterine rupture.[9,10] However some studies found no significant variance in the risk of uterine rupture or dehiscence between those with more than one caesarean and the other group of previous one caesarean.[11,12]

In our study dense intraoperative adhesions were seen in 56.5%, extremely thinned out lower uterine segment was found in 23.5% and scar dehiscence was found in 13.7% of the patients. Frequency of dense adhesions were 23.7% in women with previous one cesarean while thinned out lower uterine segment were 15.6% in women with previous two cesarean. Results of our study are also well-matched with a study conducted at Liaqat University of Medical & Health Sciences, Sindh which showed 22.8% frequency of dense adhesions with previous one caesarean sections versus 35.5% in females with previous two caesareans, whereas frequency of thinned out lower uterus was 8.7% among women with previous one caesarean versus 15.6% women with previous two caesareans.[7,13]

In our study we observed increased frequency of scar dehiscence in cases having previous 2 cesarean sections while in other studies, frequency of scar dehiscence and rupture of previous uterine scar increased with the increased no. of caesarean sections.[14,15] Our study showed more dense adhesions in women with previous two cesareans in contrast to previous one caesarean. That was because record of prior surgeries was not available in majority of cases which also has a link with formation of adhesions.

Our study showed increase in risk of dense adhesion with subsequent cesarean sections. Considerably more adhesions were observed in ladies having two surgical deliveries as compared to patients with one surgical delivery. Various studies show different tolls of adhesions and their consequences. They are reported to be 12%[14], 48%[16] and 73%.[17].

As compared to primary cesarean section, second cesarean takes more time duration and urinary bladder damages are considerably common in the existence of adhesions and at repeated cesareans.[6,18,19] Mothers with several abdominal deliveries are significantly liable to to have ruptured uterus, scar dehiscence, placental adherence and Placenta previa.[6,20]

It is also found compatible with studies which suggested that a single c/section is sufficient in restricting the physiological stretching of lower uterus in succeeding gestations, so averting movement of placenta away to the upper uterine segment with consequences of enlarged numbers of

placenta previa with uterus having scars.[21,22]

It was a single centered study with small sample size within a limited time frame. So, it may not be applied on whole population. Also record of previous surgeries related or unrelated to Gynae/Obs was not available in majority of cases which also has a link with formation of adhesions. This study shows increased frequency of operative morbidities with increasing caesarean sections in our regions, so it is necessary to keep our number of cesarean sections to a reasonable limit and vaginal birth should be preferred approach of delivery. However, a study with large sample size involving different ethnic backgrounds should be done.

Conclusion

Concluded that women with successive caesareans, age advancement and increasing parity are at danger of having numerous intraoperative morbidities. There are increased chances of development of abdominal adhesions, scar dehiscence and uterine rupture which may enhance the rate of maternal indisposition and death.

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ORIGINAL ARTICLE

Curcumin's Neuroprotective Efficacy Against Tartrazine-Induced Nissl Rim Alterations in Adult Male Rats' Motor Cortex

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ABSTRACT

Objective: To evaluate the neuroprotective potential of curcumin against tartrazine made Nissl rim changes in neurons of the motor cortex in cerebrum of rats.

Study Design. Laboratory based experimental research.

Place and Duration of Study: Department of Anatomy, Islamic International Medical College, Rawalpindi from 30th Sep 2019 to 30th July 2020.

Materials and Methods: Forty-five adult male albino rats (250-300gm) were divided randomly into three groups. (n=15). Group A, rats were given standard rat diet. Group B, rats were given tartrazine orally by dissolving in tap water with dose of 7.5 mg/kg body weight. Group C, rats were given 200mg/kg of curcumin along with tartrazine orally by dissolving in tap water, daily for 28 consecutive days. At the end, animals were euthanized and dissected to remove the brain. Coronal section of 5mm thickness of rat motor (frontal) cortices in the precentral areas were taken for further processing. After embedding,5µm thick coronal sections were obtained and stained with Toluidine blue to visualize the Nissl substance. Results were analyzed using SPSS version 21.

Results: The curcumin administration significantly improved the Nissl rim thickness (p-value < 0.001 on intergroup comparison). Nissl's rim thickness was found to be 1.77 ±0.284µm, 1.01±0.974 µm and 1.92±0.193 µm in groups A, B and C respectively.

Conclusion: The curcumin significantly restores the Nissl rim thickness and alleviate the tartrazine induced neurotoxic changes in gray matter of motor cortex.

Key Words: *Curcumin, Food Azo Compounds, Nissl Bodies, Oxidative Stress, Tartrazine.*

Introduction

Food dyes are commonly used to enhance the food fascination among the consumers around the globe. With the rapid industrialization and color revolution a large variety of artificial food colors have been added into our diet. Tartrazine is one of most widely used food dye amongst all. It is extensively used in various daily edible food items as well as in non-food products. For human utilization, worthy every day (ADI) of this color is 0-7.5 mg/ kg.bw/day.[1] Orally ingested tartrazine undergoes azoreduction in gut and liver lead to production of aromatic amine sulfanilic acid which act as precursor of reactive oxygen species (ROS). This metabolite can cross the blood brain barrier (BBB) and results in oxidative stress mediated nervous tissue injury.[2,3] It is reported that its consumption even at ADI level can result in antagonistic health effects like genotoxicity, embryo toxicity and carcinogenicity.[4] Tartrazine induced neurotoxicity has been reported in various brain sub regions including frontal cortex, hippocampus and cerebellum[5].An immunohistochemical recoloring with the anti-ssDNA counteracting agent (apoptotic cell marker) detailed plenteous apoptotic cells in the brain cortex.[6] Tartrazine could be source of behavioral alterations in human children similar to rat progeny.[7,8]The brain is exceedingly helpless to the harm caused by free radicals since of its quick oxidative metabolic action, high polyunsaturated fatty acids content, quite low antioxidant levels. Various tartrazine induced histopathological changes in nervous tissue have been reported including neuronal degeneration, vacuolation in gray and in white matter.[9] Increasing research suggests that nutritional antioxidant supplementation can

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reduce oxidative stress, minimize brain damage, and improve behavioral functioning.[10]

Curcumin a compelling antioxidant and a naturally available food color. It is the main constituent of turmeric. It has anti-tumor, anti-inflammatory, and antioxidant properties, as well as other pharmacological characteristics.[11] It has the ability to pass the blood-brain barrier and has neuromodulatory effects.[12] It has a neuroprotective effect against heavy metals and chemical-induced neurotoxicity.[13,14]

Given curcumin's therapeutic properties, the current study looked into its neuroprotective potential against tartrazine-induced Nissl rim alterations in the gray matter of adult male rats' motor cortex neurons.

Materials and Methods

It was a laboratory-based experiment and was carried out in the department of Anatomy, Islamic International Medical College Rawalpindi in collaboration with the National Institute of Health (NIH), after seeking approval from the Ethics Review Committee [Riphah/IRC/19/0373], Islamic International Medical College, from 30th September 2019 to 30th July 2020.

The sample was drawn using a non-probability convenient sampling technique in a laboratory setting. The study was performed on 45 Albino Sprague Dawley adult male rats as a mammalian model. Two months old adult male rat weighing 300gm were included and rats weighing less than 300gm and female rats were excluded from the study. The ethical review committee of the Islamic International Medical College, Rawalpindi, defined the criteria for animal care and handling.

Tartrazine and curcumin in powdered form was weighed first on electronic weighing scale according to a dose of 7.5 mg/kg/day and 200mg/kg /day respectively. Then dissolved in tap water to make 20ml solution for each rat which was given daily to 30 rats of experimental group B & C via oral route[5].

The rats were housed in cages at the National Institute of Health's Animal House in Chak Shehzad, Islamabad. Forty-five rats weighing (250-300gm) were kept under standard temperature at 22 ± 0.5˚C in air-conditioned room and were shifted into clean stainless-steel cages under 12-hour light and dark cycle with 50% humidity. They were given food and water ad libitum for 7-days to acclimatize. Rat pellets and water were used as food during the whole experiment. Each group comprised of 15 male rats. Group A (control group) was kept on standard diet orally throughout the experiment. Experimental group B was given tartrazine at dose 0.031gm/day and those of group C same dose of tartrazine along with 0.9 gm/day curcumin by dissolving in tap water via oral route for four weeks. Following 24 hours of last dose administration, the rats were anaesthetized with chloroform-soaked cotton balls till they lost consciousness (euthanasia). The brains were removed and washed in with cold saline. The brain tissues were fixed in 10% formaldehyde solution which were processed to obtain paraffin blocks, from which 5-µm-thick coronal sections were prepared and conserved for histopathological analysis. Tissue was stained by using Toluidine blue staining. The Nissl's granules form a circular rim at the neuronal periphery. Its thickness was measured at 11, 12, 4, and 6 o'clock positions in the neurons of motor cortex, by the line tool of image J under 40x power in toluidine blue stained sections to indicate the Nissl's granules density in neurons. Four images of each slide were taken by using eye piece camera YW-100 2.0 MP and then all images taken, were transferred to image J software. SPSS version 21 was used to enter and analyze the data, and the findings were expressed as mean standard deviation. The mean comparison of quantitative variables between control and experimental groups was done using one way analysis of variance (ANOVA). The intergroup comparisons among groups was done using the post hoc tukey's test. Significant was defined as a *p*-value less than 0.05.

Results

The average standard deviation of Nissl's rim thickness was found to be 1.77 ±0.284µm, 1.01±0.974 µm and 1.92±0.193 µm in groups A, B and C respectively (Table I, Figure 1A-1C). Difference between the groups was analyzed by ANOVA, which yielded highly significant result (p-value < 0.001). On comparing the mean Nissl's rim thickness measurements of group B with the group C and A, the difference in mean between the groups was determined to be statistically significant (p-values of 0.001). While between A and C the mean difference was found to be insignificant (p-value of 0.126) (Table I).

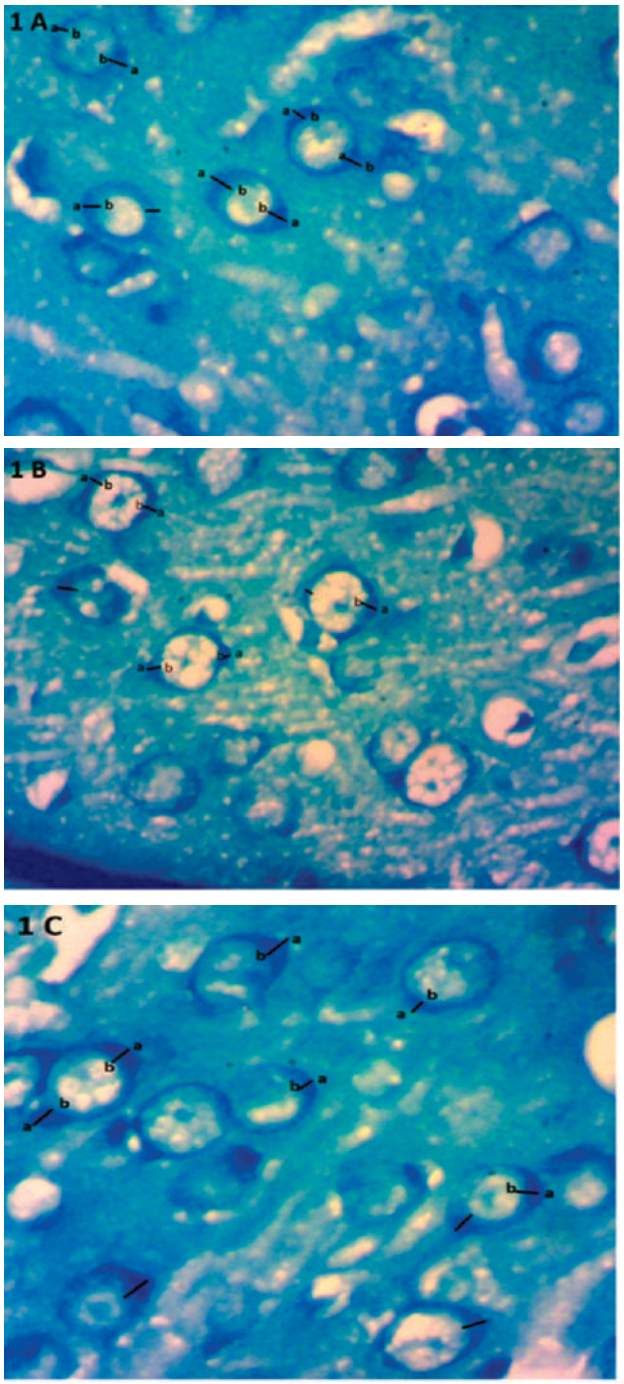

Fig 1: 1A-1C: Histopathological analysis of gray matter of motor cortex of rat brain in control group A and experimental groups B& C. Fig 1A from control group showing normal Nissl rim thickness represented as (a-b, a-outer margin to b-inner margin of rim) in the cortical neurons of motor cortex. While figure 1B showing significant decline in Nissl rim thickness represented as a-b. Fig 1 C showing the curcumin mediated amelioration in histological findings in the motor cortex. (Toluidine blue stains. Approximately 1600 X)

Table I: Mean Measurement of Nissl Rim Thickness in Micrometer among Control (A) Tartrazine Treated Group (B) Versus the Tartrazine + Curcumin Group (C).

Parameter	Group A n=15	Group B n=15	Group C n=15	p-value (ANOVA)
Nissl rim thickness µm	1.77 ±0.284	1.01±0.974	1.92±0.193	
Post-Hoc Analysis				
Parameter	B vs. A	B vs. C	C vs. A	
Nissl rim thickness µm	<0.001	<0.001	0.126	

Discussion

The inadvertent use of food colors in daily edible food items and other non-food products has augmented the need of determining the adverse effects on vital organs of the body including brain. Tartrazine has gained wide utilization in many foods such as canned juices, bakery items, jams and jellies, ice-cream and candies. The deleterious effects of tartrazine on the brain should be dealt with considerable attention because these can further lead to various behavioral and cognitive disorders during both childhood and adulthood [7].

In the present study, addition of the natural antioxidant, curcumin to diets containing tartrazine has improved cellular metabolism by increasing capacities of cellular antioxidants[15]. These ameliorating effects of curcumin on nervous tissue histology were in consonance with the previous reports[14,16].

Coadministration of curcumin in group C markedly improved the Nissl rim thickness highlighting its neuroprotective potential. Following the neuronal cell injury there is dispersion of rough endoplasmic reticulum in order to repair the cell. Central chromatolysis is the typical phenomenon involved, which is marked by a decrease in the number of Nissl bodies and eosinophilic cytoplasm. This is a reactionary alteration in injured neurons' perikarya[17]. Although the histological parameter of Nissl rim thickness on rat brain has not been studied with tartrazine but a study conducted by Heba R. Hashem in 2018 studied this parameter in rat cerebral cortex with complications of diabetes and it showed significant reduction in Nissl rim density[18].

Another study found that nutmeg's toxic effects on the primary visual occipital cortex in rats resulted in changes in Nissl rim density in rats[19]. Tartrazine causes neurotoxicity by triggering oxidative damage and peroxidation of lipids in cell membranes, affecting cellular activities by altering the physicochemical characteristics, fluidity, and integrity of cell membranes, making cells more vulnerable to lipid peroxidation and cell death[20]. In current study, a significant ameliorative effect of curcumin on Nissl rim thickness was detected in cortical neurons. This showed that antioxidants like curcumin improves the viability of neuronal cells by exerting its strong endogenous role of ROS scavenger[21]. Because of its antioxidant properties, it has been demonstrated that curcumin has proven to be useful in lowering neuronal death in the substantia nigra thus improving the functional outcomes in a variety of brain illnesses[22].

Thus, curcumin administration to tartrazine treated rats was found to significantly re-equilibrate antioxidant parameters back to normal values and restored the alteration in neuronal architecture[23].The limitation of study was lack of availability of special axonal staining procedures and settings at low cost. The current work highlights the need of future exploration of neurotoxicity induced by azo food dyes. It is recommended that the advanced investigation tools should be chosen to access toxic brain injury like immunohistochemistry, genetic polymorphism, gene expression analysis, portable EEG and diffusion MRI.

Conclusion

Curcumin administration markedly prevented the tartrazine induced oxidative stress and neuroinflammation which was appreciated in the form of restoration of Nissl rim thickness in the neurons of the gray matter of motor cortex. Therefore, it is concluded that curcumin administration improves the tartrazine induced Nissl rim changes in the gray matter of motor cortex of rat cerebrum.

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ORIGINAL ARTICLE

Perceptions of Community about the Characteristics of a Good Physician: A Mixed Method Research

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ABSTRACT

Objective: To explore the perceptions of local communities of Rawalpindi and Islamabad about the characteristics of a good physician and their expectations regarding attributes of a good physician.

Study Design: Exploratory sequential a mixed method research.

Place and Duration of Study: Different localities of Rawalpindi and Islamabad from September 2017 to February 2018.

Materials and Methods: Data for this research was collected using three focus group discussions followed by a cross-sectional survey. For quantitative data, a pre-tested structured questionnaire was administered to 804 respondents between the age group of 25-65 years, selected through non-probability convenience sampling technique. All the data was gathered after taking informed consent and confidentiality was ensured. A qualitative content analysis was carried out using inductive approach and the quantitative data was analyzed using SPSS version 22.

Results: Out of the 804 study participants, 57% were females and 43% were males with a mean age of 35.1 $\pm$11.8 years. Amongst highlighted qualities, 77.1%, ranked honest and trustworthy as a first priority, 73.4%, marked second priority to being a good communicator, third and fourth priorities were kind and respectful (82.5%) and good care provider (69.4%). There was no difference in prioritizing the characteristics among both genders and this finding was statistically significant (p=0.004), however education had a very significant role in prioritizing these characteristics (p=0.000) i.e., for uneducated participants priority was respect while for educated community honesty appeared as a priority.

Conclusion: The current study concluded that honesty, trust, politeness, respect and care are the main characteristics of a good doctor desired by the community. These non-cognitive attributes can be used as the basis for curriculum development in medical education. The evaluation of such instructional programs should be the focus of future research.

Key Words: *Case- Attributes, Characteristics, Community, Good physician, Perceptions.*

Introduction

Patient centered care has become the mainstay of patient-doctor relationship that caters for all the aspects of patient care including physical, psychological, emotional, and social issues.[1] Hence, the quality of patient-doctor relationship determines the accomplishment of treatment and outcome as a whole.[1]The responsibility to appreciate the characteristics of a good doctor has been shifted over to the patients with highlighting the shared decision-making concept between doctor and the patient.[2] Therefore now it is the patient who characterizes the basis of patient-doctor relationship, rather than doctors themselves.[3] Most of the patients are well aware of the qualities that they desire their doctors to possess.[4] The patients and their relatives associate goodness with integrity, safety, honesty, kindness, care and competency. All of these characteristics are important since they are aware of that the decisions of their doctors can affect the outcome of their illness, even the declaration of life and death, or between having the benefit of speedy recovery and suffering serious disability.[5]

A good doctor is the combination of all the traits, being integrated, composed, understanding and caring. Nevertheless also must be knowledgeable, skilled, and prepared enough to deliver best for

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saving lives of his patients.[6] Good physicians must put an effort to improve the quality of patients' lives by continuous and enduring hard work with a complete range of resources that will contribute to their patients' healing.[7]

There has been a lot of effort done to redefine the relationship between the patients and their physicians.[8]The medical professionalism has been defined to be based on a set of values, attributes and relationships that can serve as a yardstick by which patients can measure their expectations and make the decisions regarding their treatment by shared understanding.[9] The investigations of patient-doctor relationship were focused on different aspects of patient interaction including communication and honesty between doctors [6-9] There is evidence that suggests the importance of the participation of patients in the decision making throughout their treatment process.[10]For doctors to effectively take on these challenges and demands of their professional lives, they must have a certain degree of character strength.[11]

This research has been carried out to explore the perceptions of community about the characteristics of a good physician. It highlights a very crucial issue of how these strengths could be endorsed in practice. The research is also in accordance with the PMDC seven-star competencies for a good doctor. The main objective of this research is to explore the perception of the local community about the qualities they want to observe in their doctors.

Materials and Methods

The research approach used in current study was Exploratory Sequential, a mixed method research. The survey was conducted in twin cities of Rawalpindi and Islamabad from September 2017 to February 2018. Sample size was calculated by WHO sample size calculator, keeping confidence interval at 95%, and knowledge of characteristics of a good physician to be 50%, sample size turned out 385. However, total of 804 participants belonging to different socioeconomic strata and educational status were selected through non-probability convenience sampling technique from different localities of Rawalpindi and Islamabad. Ethical approval was taken from ethical review committee of Yusra Medical and Dental College. Informed consent was taken from the respondents explaining them the purpose of this study and confidentiality of data was ensured.

The qualitative data was collected through Focus Group Discussions (FGDs) followed by a structured questionnaire for quantitative data. Initially three FGDs were conducted. These FGDs were held in local community centers. Participants were invited without any monetary incentive. Informed consent was taken by the research team with surety of data confidentiality. There were 10-12 participants in each FGD, for male and female participants separate FGDs were held. Majority of the participants were married, minimally educated and were in the age group of 25-45 years. One separate FGD was held for youngsters between the age group of 18-24, all students and unmarried. All FGDs were audio-taped with the permission of each group. Field notes were also taken during the sessions. Transcripts were developed in English. Information gathered through notes was cross-checked before and during the data processing by the research team members for quality assurance and validation. A qualitative content analysis was carried out using inductive approach in which identified themes emerge from a group of categories with common meanings, followed by coding. Themes and sub-themes were identified through consensus of the research team.

For cross-sectional survey, a structured questionnaire was developed and pilot testing was done. The main themes that emerged in FGDs were used to design the questionnaire. The rationale for this approach lies in first exploring a topic before deciding what variables (qualities of a good physician) need to be measured and the community was asked to rank those (themes) qualities according to their priorities. Cronbach's alpha was 0.87. The response rate was 95%. Data on demographics, source of income, housing, literacy status was collected from each participant. Along with these, questions related to community's preferred choices for the characteristics of a good physician were asked. SPSS version 22 was used to analyze the data. Frequency distributions were calculated. For inferential statistics, Chi square test was performed, with a p-Value of less than 0.05 being significant.

Results

For qualitative data main themes identified through various focus group discussions about the

characteristics of a good physician were honest, trustworthy, good communicator, respectful and good care provider.

Table I shows details of themes and sub-themes

Table I: Themes and Sub-Themes Emerged from FGDs about Characteristics of A Good Physician

S. No	Themes	Sub-themes
1	Honest and trustworthy	• Correct diagnosis of a disease • Prescribed only required medicines and lab-tests (not because of having share from companies) • Telling truth about the prognosis of disease or complications • Be honest aboutthe effectiveness of treatment or any procedure • After Allah rely on doctor • It's a matter of life, death & disability
2	Good Communicator	• Courteous • Active listener • Humble • Polite • 'open and frank' in explaining the condition/disease/prognosis • Keep Confidentiality
3	Kind and Respectful	• Treat with dignity • Act humanely • Respect the social/cultural/religious beliefs • No discrimination because of social class, education, gender, age, etc • No humiliation
4	Good care provider	• Minimum waiting time • Punctual • Easily available and approachable • Provide best treatment in limited resources • Knowledgeable • Cost-effective

In a cross-sectional survey, out of 804 participants, 57% (462) were females and 43% (342) were males with a mean age of 35.1 ±11.8 years, 67% (541) of the individuals belonged to lower and middle socioeconomic status and 33% (263) were from high social class.

The first and foremost characteristic of a good physician reported by 80% (n=644) participants was honesty and trust, 77% (n=620) ranked good communication skills as second quality. With 73.4% (n=590) respect and being kind stood third, furthermore 81.2% (n=653) of participants expressed good care-provider as fourth quality necessary for a good physician. The details of these findings are depicted in Figure I.

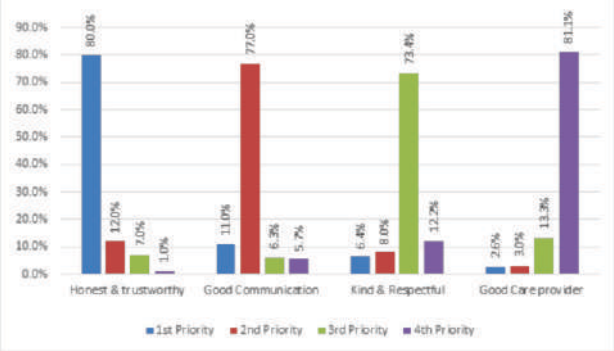

Fig 1: Characterictics of a good physiscian Priority wise

On application of chi-square, no difference in prioritizing the characteristics among both genders were found and this finding was statistically significant (p=0.004), however education had very significant role in prioritizing these characteristics (p=0.001) i.e., for uneducated participants first priority was respect while for educated community honesty appeared as first priority(Table II).

Table II: Comparison of Characteristics of A Good Physician (First Priority) Various Demographic Variables

Characteristics	Variable		Chi-square value	p-Value
	Gender			
	Male n(%)	Female n(%)		
Honesty	130(16.2)	104(12.9)	12.838	0.005*
Communication	84(10.4)	86(10.7)		
Respect	102(12.7)	98(12.2)		
Care provider	91(11.3)	109(13.6)		
	Socio-economic status			
	Low n(%)	High n(%)		
Honesty	61(7.5)	138(17.1)	16.266	0.001*
Communication	98(12.1)	110(13.6)		
Respect	126(15.7)	52(6.5)		
Care provider	97(12.1)	122(15.2)		
	Educational status			
	Uneducated n(%)	Educated n(%)		
Honesty	58(7.2)	141(17.5)	16.266	0.001*
Communication	97(12.1)	112(13.9)		
Respect	136(16.9)	52(6.5)		
Care provider	106(13.2)	102(12.7)		

* Significant p-value

Discussion

Patient's personal experiences and experiences of family and friends structure the perspectives about

what to look for in a physician,[2] opinion regarding the good doctor is considerably different from other professionals.[3,4] A good doctor can be defined as good only when he or she has certain combinations of attributes.[5] Even though it is difficult to find numerous qualities in a single person, yet the medical profession demands for such combinations.[6] The current research is novel in a sense that it focused on patients' perspective of qualities in a good physician and it holds a very significant place because limited work has been done in Pakistan. The doctors do not know exactly what their patients expect from them, they only try and do what they think is the best.[7] According to the findings of this study, with 80% vote honesty and trust turned out to be the most wanted quality the public wants in a doctor and endorsed by various other studies.[8,9] Patients must be able to trust doctors with their lives and health,' according to the GMC's Good Medical Practice – the main ethical advice document for doctors operating in the UK. It goes on to say that doctors *"Should be honest and open and act with integrity' and 'Never abuse your patients' trust in you or the public's trust in the profession"* [10]

Everyone deserves to be treated with respect and politeness. 73.4% of the local community wants their doctor to be respectful and kind. When a patient is in pain, and the first thing a doctor can do to ease his pain is to talk to him politely. Subsequently he feels at ease to share his problem in detail without any hesitation.[11,12] Patients should have a good understanding of their disease so that if they know the severity of the condition they would look after themselves with better care and visit the doctor again as scheduled to improve their health.[12] Our findings replicate the findings of research conducted in University of Birmingham. The research concluded that the top-quality patients wanted in a doctor were honesty and on third number highest voted quality was Politeness.[13]

Another quality as highlighted by 77% of the respondents was good communication skills. Patients are looking for doctors that are good communicators and have up-to-date clinical knowledge and skills.[14] They also expect practitioners to be concerned and sympathetic, to include them in the decision-making process, including an explanation of their symptoms, treatment, or investigation, to devote appropriate time and energy, and offer them guidance on health promotion and self-care.[15]

Out of total 81% of the participants voted good care provider as a 4th priority with involvement of the patient in their treatment. The conventional model of decision-making claimed that only the doctor was adequately educated and experienced to decide what should be done, and that patient engagement should be limited to granting or refusing treatment consent. However, this paternalistic approach appears to be outmoded presently.[16] Many patients now want to be informed about their disease and treatment alternatives, as well as to be actively involved in the decision-making process. [17,18] There is mounting evidence that people who actively participate in treatment decisions and healthcare management have better health outcomes. [18]

What's particularly intriguing about this study is that many of the characteristics, attributes, or virtues discovered were non-cognitive rather than cognitive skills, which are often overlooked in medical education programs. [18,19] If a number of non-cognitive activities are actually vital for a successful doctor, as this study implies, they should be given more attention in medical education.[19] However, there are fundamental issues regarding whether these virtues can be taught, and even if they can be, whether they can survive in today's culture, where self-interest, not altruism, is the guiding principle.[19,20]

It's been debated whether virtue can be taught. However, Aristotle stated that *"we learn by doing, and that the greatest way to do so is to emulate a virtuous person".* [20] To meet the community's ambitions, we need virtuous physicians as teachers in medicine. These values and attitudes must be inculcated into the personalities of future physicians.[21]

Conclusion

The current study concluded that honesty, politeness, respect and good care, are the main character strengths and attributes that the patients want to see in their physician. It is important to address that how these attributes could be inculcated in medical curriculum and endorsed in practice. The evaluation of such instructional programs should be the focus of future research.

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ORIGINAL ARTICLE

Team Based Learning: Pre-Clinical Students Perspective

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ABSTRACT

Objective: To determine the perspective of pre-clinical MBBS students about Team Based Learning (TBL) as a prime method of student-centered learning.

Study Design: Cross sectional observational.

Place and Duration of Study: Al-Tibri Medical College and Hospital from January 2019 to December 2019.

Materials and Methods: This study included pre-clinical MBBS students (1st, 2nd, and 3rd year) after an approval from Institutional ethical review committee of concerned institute. The students from the clinical and Allied medical sciences were excluded from the study. The students were included through non-probability convenient sampling, and their verbal consent was taken before the collection of data. Total of 25 questions with five-point Likert scale was included in the self-generated questionnaire. After data collection, the results were analyzed through SPSS version 21.0. Frequency and percentage were taken from the data, and Chi-square test was applied to evaluate the significant value, that was taken as $P<0.05$.

Results: The mean age of the participants was 22.34 years, and 54.6% were female and 46.4% were male participants in the present study. 86 % of the participants strongly agreed and agreed that TBL makes the students an autonomous learner, strong collaborator, and it enhances the communication skills and problem-solving ability of learners.

Conclusion: TBL is a competent method of learning for preclinical MBBS students in medical colleges. Preclinical medical students perceive that the learner-centered approach of TBL plays an important role to enhance their problem-solving ability and make them good collaborator and communicator.

Key Words: *Curriculum, Medical Education, Student Centered Learning, Self-Directed Learning, TBL.*

Introduction

Following the new era of medical education, the self-directed learning or learner-centered approach is a compulsory part of the curricula. From more than half of the decade, PBL takes advantage among other teaching methodologies. Now, as time passes, TBL takes the position of PBL in contemporary curriculum development, and the most highlighting reason is resource-challenged in maintaining a learning environment in health professional education.[1] TBL is an efficient method of learning with minimum resources and can cover the content effectively with few numbers of facilitator and maximum numbers of students at a time. TBL gained popularity graph among the medical students due to its active learner approach and helped to make a strong collaborator and provoke communication skills.[2] It facilitates the learner to become autonomous and nullifies the concept of a passive learner. Student built their new concepts based on their prior knowledge and make out their ways to solve their problems.[3] As the content was given earlier for the preparation, now as a part of self-directed learning the learners stimulates and find their resources to make up the pre-reading task.[4] Simultaneously TBL helps to make them critical thinker and problem solver. Per constructivist theory suggests that the achievement of learning goals can take place when a personal experience collaborates with new one and modification of old beliefs with time.[5]The surprising fact about the TBL, it evaluates the learner individually and along with their team at the same time. TBL helps the learner to find out their weakness of content individually, and simultaneously solve the problem with the help of team discussion. A blended learning approach that covers the significant content

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effectively within a limited time and efficiently fulfill the resource challenge. Feedback is the most robust feature of TBL, which can highlight the strength and weakness of individual work performance and a team based. In a single frame, the learner becomes a strong collaborator, efficient leader, problem solver, self-reflector, manager, communicator, and an autonomous learner with a wide range of experiences [1]. Time management is one of the critical parts of TBL, that learner can manage with their experiences and covers the relevant and substantial content within the given specified period. Facilitator's boosts up the spirit of team members and maintain discipline among the members and sharing of feedback play a final stimulating spark of motivation for the learner.[6] Since the new pattern of teaching and learning tends to evolve on newly designed teaching methodologies, therefore this study tends to uphold one for the most important aspect of student-centered learning viz TBL. The study aimed to determine the perspective of pre-clinical MBBS students about Team Based Learning as a prime method of student-centered learning.

Materials and Methods

A cross-sectional study was designed at Al-Tibri Medical College, Isra University Karachi Campus with duration of six months from January 2019 to June 2019. After taking an ethical approval from the Institutional Ethical Committee, from 200 students the verbal consent was taken by the students of 1st, 2nd and 3rd year MBBS. Study participants were asked to fill the self-generated questionnaire comprising of 25 valid questions with five-point Likert scale related to TBL. The questionnaire was evaluated by the faculty of community medicine, Director Research and Department of Medical Education. A pilot trial was conducted, including 30 students from different years of education randomly, and data were analyzed to evaluate the validity of the questionnaire. The students were included by applying non-probability convenient sampling technique, students form MBBS including both gender and those had attended minimum three TBL sessions. The students from basic sciences, allied medical sciences and those who had not attended minimum numbers of TBL were excluded from the study. After collecting the data results were analyzed through SPSS version 22.0. The data were evaluated in the form of frequency and percentage of each question response. Chi-square test was applied to find the level of significance. The level of significance was taken at P=<0.05.

Results

Figure 1: shows Percentage of Gender based distribution. Out of 200 pre-clinical MBBS students, 108(54.6%) were males and 92(46.4%) females with the mean age of 20.56±years. Table: I shows frequency of the participant questionnaire response was shown in Table I with the p-value. The level of significance was considered as *P*=<0.05. Students of each year agreed to majority of the questions asked regarding TBL, however there were some neutral to disagreement of students for instance, TBL approach was faster than the conventional teaching methods in covering the leaning objectives, TBL provided better platform to a learner for becoming autonomous. TBL helped in creating characteristic of critical thinking and TBL provided greater deal of experience with rich source of knowledge.

Table I: Frequency of Participant Response About TBL Based Questionnaire

		1st year			2nd year			3rd year			P value
	Questions	Agree	Neutral	Dis-agree	Agree	Neutral	Dis-agree	Agree	Neutral	Dis-agree	
1.	The session of TBL I felt interesting	30	14	15	38	12	19	32	10	30	0.024
2.	I found TBL session more stimulating	68	5	6	62	4	5	42	6	2	0.018
3.	It boosts up the teamwork skills	55	10	3	50	10	2	62	5	3	0.014
4.	It simultaneously helps in development of communication skills	44	11	8	39	18	10	50	14	6	0.390
5.	It helps in retaining the more knowledge of relevant subject through grouping material	37	18	11	32	12	9	44	24	13	0.001

6.	It helps in understanding the clinically relevant aspects of a subject more as compared to traditional methods	43	6	17	35	4	13	52	9	21	0.006
7.	It approaches faster than conventional teaching methods to cover the learning objectives	42	7	7	51	11	8	60	10	4	0.163
8.	It provides a healthy discussion environment, among the students and facilitator	60	6	1	70	8	2	48	4	1	0.025
9.	It provides a better platform to a learner to become autonomous	37	22	10	40	26	12	24	20	9	0.007
10.	It makes the learner active rather than passive	40	14	11	37	22	9	36	18	13	0.001
11.	It provides huge stage to cover the learning issues through discussion	29	25	9	35	19	12	32	33	6	0.081
12.	It gives better reflection of knowledge	60	4	2	57	6	1	65	4	1	0.012
13.	It helps to create a characteristic of critical thinker in learner	28	35	8	35	13	7	43	23	8	0.012
14.	It provides a way to learner for designing their own study plans	39	22	3	49	15	5	44	18	5	0.064
15.	Self-directed learning helps to cover the large scale of relevant topic and trigger the hidden aspects	44	20	6	53	12	7	47	8	3	0.069
16.	It stimulates the development of confidence with colleague	68	8	3	51	9	2	48	9	2	0.027
17.	It provides a great deal of experience with rich source of knowledge	42	20	2	47	27	1	36	23	2	0.164
18.	It helps in making a peer relationship	48	11	1	57	8	2	66	6	1	0.018
19.	It is remarkable way to establish self-motivation and communication	66	7	3	48	7	4	60	4	1	0.140
20.	It creates searching skills and teach how to use different resources to cover your learning objectives	55	7	2	52	11	3	59	9	2	0.049
21.	Facilitators have an impact to maintain the decorum of TBL	40	18	4	40	26	3	42	23	4	0.368
22.	Facilitators show his/her services as a strong collaborator	66	10	1	48	7	2	57	8	1	0.018
23.	Expertise of facilitator required to cover the un-resolved issues regarding session	53	9	3	43	12	2	63	13	2	0.180
24.	I found feedback is an important component of session	58	3	1	69	2	1	63	2	1	0.266
25.	Feedback plays significant role in highlighting the stronger and deficient aspects of topic and overall progress	68	4	1	57	3	1	62	3	1	0.711

Significant Value to be Considered P=<0.05 **Chi-Square Test Applied**

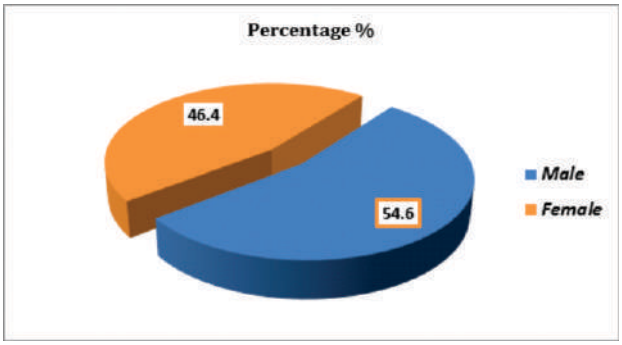

Fig 1: Percentage of Gender Distribution

Discussion

According to the students of Al-Tibri Medical College and Hospital, TBL is an effective method of self-directed learning. Following the conclusion of another study, TBL covers significant content in limited time framework, and a similar statement is accepted by maximum numbers of students about TBL in the present study. In the same study that was done on the analysis of TBL regarding gross anatomy and embryology-based topic concluded that TBL builds a higher level of cognition and critical thinking ability in students of health professionals, a similar statement was strongly agreed by the maximum numbers of participants.[7] Following the results of another study, regarding the comparison between TBL and traditional case-based discussion to teach pathology curriculum. It was found that both strategies found are useful, but those students who are slow learner got maximum benefits from TBL to achieve higher academic record.[8]

TBL has the ability to mastery the content; especially the students with low academic profile got more benefit to raise their scores as compared to high quartile achievers. One of the studies showed similar results about TBL based content, and the low quartile students mean higher score was 7.9% while on the other hand, high quartile got a mean score of 3.8%. In the present study, the students strongly agreed that TBL covers the course contents more effectively.[9] Results of another study revealed a pleasant feeling of the students that was reported during conduction of TBL to teach the ethics-based education. The students enjoy and feel more involved with the topic during TBL as compared to others. The medical students strongly agreed on a similar statement in the present study. [10]Majority of the nursing students preferred TBL as an efficient method of teaching for considerable group discussion with limited resources. The productive attitude of the students was reported regarding TBL, which is an excellent way of learner-centered approach with a higher level of engagement. [11] Most of the students agreed with the same statement in our study. TBL built a great potential in the students of second-year pharmacology, as they showed an outstanding performance in their summative assessment with the gradual improvement of scores in a group, except in that area that was traditionally taught. It gradually enhances the team-building skills and collaboration, the same as in our study majority agreed with the similar features of TBL.[12] According to the study results, a total of 180 participants responded to 19 different questions about TBL. Most of the respondent agreed that TBL promotes their professional growth, self-reflection attitude, communication skills with their co-team members and more critical component satisfied with the peer evaluation method. The higher level of cognition development with team manages skills. As in the present study, most of the respondent strongly agreed with the following beneficial aspects of TBL.[13] Following another study, the postgraduate students of pediatrics facing difficulties in learning bioethics, the expert decide to convey the content of bioethics through TBL obtaining Strategy, and that was showed remarkable engagement of the students with the topic and well satisfactory scores at the end of the term.[14] One of the conclusions of the study that was based on evidence-based practice and taught through an active learning strategy like TBL. The objective of the 3 semester-based courses was to develop the understanding and application of knowledge with practical engagement. Experts achieved the target and approached the learner with the desired attitude.[15,16] Peer evaluation is one of the prospective components of TBL, which motivate the students to work hard and try to use different resources and become better for the next task. Students in the present study respond more confidently and accept peer evaluation importance and team-based skills with a higher level of collaboration with the co-team and facilitator. [17-19] Further evaluation is required to compare the different teaching methodology, classify as a student-centered approach. In future, the comparison of TBL with PBL or CBL can provide a

better understanding to declare the TBL as an optimal model of learning.

Conclusion

Team Based Learning is a competent method of learning for preclinical MBBS students in medical colleges. Preclinical medical students perceive that the learner-centered approach of TBL plays an important role to enhance their problem-solving ability and make them good collaborator and communicator.

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ORIGINAL ARTICLE

Is Case Based Learning Better than Self Directed Learning? A Quantitative Analysis of Endocrine Physiology Exam Scores and Students' Feedback

Sadia Ahsin, Hira Ashraf, Madiha Imran, Gule Naghma Saeed

ABSTRACT

Objective: To compare the effectiveness of Case Based Learning and Self Directed Learning through end-of-module assessment scores of two groups of students studying endocrine physiology in the second year MBBS program and through student's experience about it.

Study Design: Quasi experimental study.

Place and Duration of Study: Foundation University, Islamabad, Department of Physiology, conducted in 4 months duration, starting from April till August 2020.

Materials and Methods: This study was conducted on second year MBBS students (group A) who were formally introduced to case-based learning sessions during endocrine module. The end-of-module physiology exam scores of this class were compared to endocrine module result scores of the previous class (group B), who had been taught through self-directed learning sessions during their endocrine module. Dividing same class into two groups would deprive one group from new learning strategy therefore scores of previous classes taught through SDLs were used. The number of sessions, learning objectives, facilitators, examiners, and assessment methods for both classes were ensured to be kept similar.

Results: Quantitative analysis of scores between the two groups using SPSS 23 was statistically significant (p-value = 0.001) through independent *t* test. Out of 143 students in group A, 96.5% passed while in group B 95% were declared pass. The above average scorers were 52% in group A and 29% in group B. Qualitative assessment of feedback questionnaire done by descriptive analysis, depicted positive impact of case-based learning sessions on students' self-perceived learning, communication skills and problem solving.

Conclusion: case-based learning sessions was found to be more effective learning strategy than self-directed-learning sessions.

Key Words: *Case-Based-Learning, Endocrine, Module, Self-Directed-Learning.*

Introduction

Teaching at Foundation University has been hybrid since 2009, employing both the conventional learning strategies as well as modern-day innovative methods like Problem-Based Learning Sessions (PBLs), tutorials and Self-Directed Learning Sessions (SDLs). Specifically, SDLs were included in the curriculum, keeping in mind the rapid advances in medical education and the importance of developing our future physicians into self-directed life-long learners, as SDL has been widely accepted as the most appropriate learning strategy to achieve this goal.[1]

In 1975, Malcolm Knowles defined SDL as "a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes.[2] It is however important to note that in the systematic review conducted by Murad et al., it was found that only 8% of published studies fulfilled the precise definition of SDL as defined by Knowles.[3] Likewise, the SDL time slots being offered in the curriculum of our medical students have also not been a true reflection of SDL as defined by Knowles. Students learn certain concepts on their own and any major queries would then be dealt with in classroom lectures. As such, our students often complained, about inadequate, and at times distracted learning during these SDL

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sessions, without guidance from facilitators. In the opinion of the study authors, while acknowledging the much-documented benefits of SDL learning strategy, its true effectiveness can be evaluated only when compared to other comparable methodologies, where students are guided towards focused learning while keeping the spirit of self-learning, e.g, through Case Based Learning (CBL). Case Based Learning is also an educational strategy where contextualized questions based upon real patient clinical scenarios are posed to students who are pre-informed about the content to be discussed. The case discussion is under supervision of a facilitator who is also well prepared. The implementation and assessment of CBL in various disciplines, including basic sciences, is also documented in literature.[4,5] Though the idea and implementation of SDLs in curriculum was whole heartedly embraced by the faculty, but due to student's dissatisfaction, it was considered prudent to change the learning methodology, but before introduction of new learning method i.e., CBL, into the curriculum of basic sciences at FUIC, some tangible rationale was needed in the form of better or comparable assessment results for at least one module. Towards this end, a study was planned where assessment results of one group of students taught through SDL and lectures was compared with the results of the second group of students who were taught through CBLs and same lectures. With this rationale current study aimed to compare the end-of-endocrine module assessment scores of two groups of students studying endocrine physiology either through SDL or CBL in addition to their lectures. It was also aimed to record the perception of these methods from those students who had experienced both methods through structured questionnaire. Therefore, the objective of this study was to compare the effectiveness of CBL and SDL through end-of-module assessment scores of two groups of students studying endocrine physiology in the second year MBBS program and through student's experience about it.

Materials and Methods

This Quasi-experimental study was conducted at department of physiology of Foundation University, in the students of second year MBBS, for the duration of 4 months, starting from April till August 2020. Ethical approval for the study was obtained from ethical review committee of university. The entire 2nd year MBBS class of session 2018 comprising of 143 students was included in group A through convenience sampling. The previous modules of the same class had been taught through lectures as well as SDL sessions. Since CBL was considered new method for students therefore they were formally introduced to Case Based Learning methodology. The endocrine module runs over a duration of 8 weeks. The CBL sessions were prepared according to recommended guidelines where pre reading material and case scenario was provided to the students and subject experts, a week prior to main discussion.[6] Physiology of pituitary, pancreas, thyroid, parathyroid, adrenal and gonadal hormones was covered, with one hormonal dysfunction scenario for one CBL session each week with a total of 8 CBLs. Students identified learning objectives, key concepts in the physiological functioning of hormones and consequences of their hypo or hyper functioning. The case summary was organized by facilitators. The end of module physiology scores of this class were compared to same exam result of class of 2017 (group B), who had been taught through lectures and one Physiology SDL per week in total 8 weeks of their endocrine module. Since the learning objectives devised for both SDLs and CBLs encompassed physiology of various hormones, therefore only physiology scores were extracted from the total module scores. Dividing same class into two groups would have deprived one group from new learning strategy therefore scores of previous classes taught through SDLs were used. However, the number of sessions, learning objectives, facilitators, examiners, and assessment methods for both classes were ensured to be kept similar, to avoid confounding factors. The subject pass percentage as per Pakistan Medical and Dental Council is 50% therefore, it was decided to compare percentage of pass and fail students, number of average scorers (50-70% scores) and number of above average scorers (above 70%) in both groups. The feedback about CBL from students was collected from group A because only they had exposure to both SDL and CBL in their academic year. It was collected through self-administered, structured questionnaires after their end of module exam. Questionnaire comprised of 8

questions with responses on Likert scale. Quantitative analysis of scores between the two groups was done using SPSS 23 where statistically significant difference with *p* value = < 0.05 was calculated through independent t test. Assessment of student's perceptions was done through feedback questionnaires by descriptive analysis using percentages and frequencies.

Results

There were 143 students who attended CBLs along with lectures (group A, n=143) and same number of students attended SDL sessions along with lectures (group B, n=143). Out of 143 students (group A) the pass percentage was 96.5% (138) while 3.4 % (5) failed to clear the modular exam. In group B, 95% (136) were declared pass while 4.8% (7) students couldn't score the pass percentage (50%).

The mean score in percentage of CBL+ Lecture group and SDL+ Lecture group along with standard deviation is shown in table I. The difference of scores between the two groups was significant at *p*-value of 0.003 applying t-test.

Table I: Comparison of Mean Score in Percentage of CBL (Group A) and SDL (Group B) (N= 143)

Group	Mean±SD	p-value
Group A	68.35±8.15	0.003*
Group B	65.55±8.83	

*p-value significant (less than and equal to 0.05%)

The number of students scoring above average scores (71-85 %) was 75 (52%) in group A while 42 (29%) students scored above average marks in group B. The number of students scoring average percentage (51-70%) was 67 (45%) in group A while 94 (65%) in group B.

Table II. Students' Feedback Questionnaire Scores Analysis (Figure in Parenthesis Indicates Score for That Choice) (N = 143)

Sr No.	Question	Strongly Agreed (5)	Agreed (4)	Not sure (Neither agree, nor disagree) (3)	Disagree (2)	Strongly Disagree (1)
1.	Case Based Learning (CBL) is a worthwhile progression from Self-Directed Learning	41 (27.5%)	43 (28.9%)	34 (22.8%)	14 (9.4%)	11 (7.4%)
2.	CBL improved my communication skills	34 (22.8%)	38 (25.5%)	29 (19.5%)	25 (16.8%)	17 (11.4%)
3.	CBL improved my ability to retain information	34 (22.8%)	50 (33.6%)	33 (22.1%)	14 (9.4%)	12 (8.1%)
4.	CBL helped me prepare for exams	30 (20.1%)	49 (32.9%)	40 (26.8%)	14 (9.4%)	10 (6.7%)
5.	This teaching method is a useful preparation in clinical problem solving	50 (33.6%)	51 (34.2%)	23 (15.4%)	8 (5.4%)	11 (7.4%)
6.	The discussion sessions facilitated interaction between staff and students	41 (27.5%)	37 (24.8%)	29 (19.5%)	21 (14.1%)	15 (10.1%)
7.	Time allowed for case discussion was sufficient	32 (21.5%)	32 (21.5%)	35 (23.5%)	20 (13.4%)	24 (16.1%)
8.	I enjoyed case-based learning	34 (22.8%)	40 (26.8%)	32 (21.5%)	20 (13.4%)	17 (11.4%)

Discussion

The current study was planned to evaluate the outcome of incorporation of CBL sessions, instead of SDL time slots, in the endocrine module timetable of second year MBBS class of 2018. There are multiple ways to evaluate a learning intervention in literature including knowledge assessment and surveys, therefore, both have been employed in the current study.[7] The module exam physiology results of group A, who were taught through CBL sessions in addition to lectures showed better overall scores compared to group B, who were taught through same lectures and dedicated 08 SDL time slots in timetable of endocrine module. Mean percentage score obtained by group A students was significantly higher 68.35±8.15 compared to 65.55±8.83 of group B with a *p* value of 0.003. Similar results were derived by Datta A et al., who found that post-test mean scores of CBL groups were significantly higher than that of didactic lecture groups when both were compared after teaching two clinical pathology topics.[8] The strength of our study is that a series of CBLs was conducted throughout the endocrine module, to evaluate their outcome in formal exam results. Another strong point of our study is that basic physiological aspects of each hormone were taught in lecture before the CBL session, as literature search suggests that true effectiveness of CBL can be achieved when students have already acquired

foundation knowledge of the topic.[7]

In our study, although the pass percentage of group A was higher than group B, their difference did not reach statistical significance. Although the number of 'average scorers (50-70%)' was more in group B i.e 95 (65%) compared to 67(45%) in group A, yet it was interesting to find that this difference was compensated by considerably more 'above average scorers (above 70%)' in group A, 75(52%) compared to group B, 42(29%). This suggests that students of group A had better in-depth understanding of the subject compared to group B. These findings are comparable to the results of Sahiba K et al., where authors found that incorporation of CBL method in biochemistry was superior in imparting knowledge to students. Their claim was supported by significant difference between pre and post CBL mcq test scores of students.[9] Questionnaire based inclination of students towards CBL sessions compared to SDLs also suggests its effectiveness as a student-preferred learning tool. Students considered it effective for knowledge retention and exam preparation which was reflected in their exam scores too. The clinical correlation with the acquired physiological concepts could be the reason of better perceived knowledge retention. As Bunmi S et al., concluded in their cohort study that perceived clinical relevance was a contributing factor to the retention of basic science knowledge in their students and they suggested that curriculum planners should make clinical relevance a more explicit component of medical teaching.[10]

The impact of CBL has been evaluated in various studies which concluded that students not only enjoyed the sessions but felt that CBL enhanced their understanding.[11-18] These conclusions are similar to the results of our study. Our students considered CBLs enjoyable, the reason could be the interactive and focused discussion with facilitators and the clinical application of their already acquired basic science theoretical knowledge.

An interesting finding in our study was the low number of students who were in favor of SDLs. This clearly shows the lack of readiness of our students towards self-directed learning, even at university level. Current study does not indicate why students were not in favor of SDL, however cultural factors have been shown to impede SDL assimilation in medical students across different cultural groups. For Asian students, the pressure of high achievement and traditional reliance on teachers has been documented as the main restraining factor in failure to adapt SDL strategies.[14]

Current study results motivate us to plan more CBLs for other modules that are being run during basic sciences years of medical students. However, the importance of making our future physicians' lifelong learners through self-directed learning cannot be overlooked. Therefore, it is recommended and planned, not to totally replace SDLs with CBLs, but to incorporate a few dedicated SDL time slots in every module in addition to CBLs.

True comparison of CBL and SDL by dividing the same class into two groups would have been gold standard but this was limitation of our study as authors did not want to deprive half of the class from new learning strategy.

Conclusion

CBL was found to be more effective learning strategy than SDL, as reflected in student's physiology scores of endocrine module exam. Student's perception about CBL was concluded as it being a helpful and enjoyable tool for learning.

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CASE REPORT

Uterine Torsion, Leading to Posterior Uterine Wall Incision at Cesarean Section

Ayman Khalil Othman Al-Tarifi, Nafees Akhtar, Aladin Alhadi Alamri

ABSTRACT

Any rotation of uterus along its long axis which is more than 45 degrees at the junction between corpus and cervix [Figure 1] is called uterine torsion.[1,2] Torsion of uterus is a rare phenomenon, and the true pathogenesis of the condition is still not clear.[3] Here we present a case of complete uterine torsion in a 37-year-old lady who underwent cesarean section at 39 weeks of gestation due to oblique lie. This patient had two small uterine fibroids and, in the past, she had right salpingectomy for right tubal pregnancy. Intra-operatively, due to complete torsion of uterus, inadvertently incision was given in the posterior wall of uterus considering it as anterior wall, but hemostasis was successfully secured and post operatively patient recovered well. This case illustrates that while doing cesarean section on gravid uterus especially in the background of previous pelvic surgery and in the presence of fibroids, obstetricians must exercise caution to identify torsion of uterus which is through a rare but significant uterine pathology that can cause incorrect posterior uterine wall incision.

Key Words: *Uterine Torsion, Fibroids, Posterior Wall Incision.*

Case

A pregnant lady in her fifth pregnancy presented in gynecology OPD at 39 weeks of gestation with oblique lie. Previously she had three vaginal births and also had right salpingectomy for tubal pregnancy. After laparotomy she had conceived after a significant period of infertility. Course of her index pregnancy had remained unremarkable till her last visit in OPD. Her obstetrical ultrasound revealed a single live fetus in oblique lie with adequate liquor and lower edge of placenta was away from cervical os. Ultrasound also revealed a small 4 ×4 cm fibroid in the anterior uterine wall. She was booked from OPD for elective cesarean section. After preoperative preparation, cesarean section was performed. Intra operatively, bowel was found adherent with both uterus and anterior abdominal wall especially on left side. Right adnexa appeared as a totted band of peritoneum that after crossing in front of the uterus became adherent with the left side of uterus. It was pushed aside, and uterine incision was made. A small fibroid about 3 ×4 cm in the course of uterine incision got separated. A female baby was delivered with good Apgar scores, placenta and membranes were removed completely and then uterus was exteriorized after adhesionolysis. Only on exteriorization of uterus it could be identified that uterus had complete torsion of 180 degrees along its long axis and seemingly anterior wall of uterus was in fact its posterior wall. Uterus was closed in layers and then interiorized. Hemostasis was successfully secured, and an intraperitoneal drain was left in situ in pouch of Douglas and abdomen was closed in layers. Estimated blood loss was about 1.0 liter and patient received two units of blood. Postoperatively she was kept under observation in high dependency area. Drain was removed after 24 hours of surgery. Postoperatively her hemoglobin was 8 g/dl while her pre-op hemoglobin was 10.1g/dl. Patient was discharged from hospital on third postoperative day along with her baby. She was also well on her postoperative follow-up in OPD.

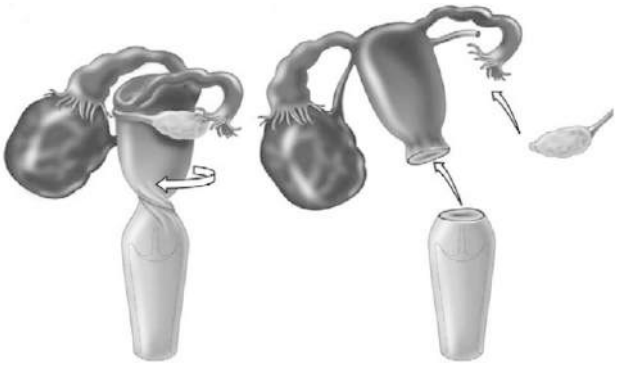

Fig. 1: Torsion of Uterus Caused by Rotation of Uterus along its long axis at the Junction between Corpus Uteri and Cervix

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Discussion

Though the true etiology of uterine torsion is still unknown, but a number of conditions have been proposed causing this pathology which include adhesions due to previous surgeries, fibroid uterus, ovarian tumors, uterine malformations and fetal malpresentation.[1-3] In our case patient has pelvic adhesions due to previous surgery for right salpingectomy, two uterine fibroids in the anterior uterine wall and fundal region, and also the lie of baby was oblique. In accordance with previous literature all these factors may have caused uterine torsion in our case. Uterine torsion can develop at any maternal age, parity, or gestational age. As presentation can be non-specific with or without any symptoms,[4,5] in our case due to the absence of any symptoms as well as due to the rarity of the condition, uterine torsion was diagnosed only at the time of cesarean section. The degree of uterine torsion may vary from 45 degrees to 180 degrees and in literature cases with even 720-degree torsion have been reported.[4-6] In our case as the right adnexal structures became adherent with adnexal structures on left side, apparently this may have caused a large torsion in uterus of about 180 degrees.[3]Theoretically, pelvic anatomical misalignment caused by uterine torsion may be one of the elements for secondary subfertility after laparotomy, in this case. Besides uterine torsion separation of small myoma across the uterine incision was managed without much trouble and also previously cases of unplanned but inevitable myomectomies at the time of cesarean sections have been reported without complications.[7] In our case despite the undiagnosed uterine torsion the good handling of cesarean section by the expert operator ensured good maternal and fetal outcome but in the literature a 12-15% perinatal mortality rate has been reported in such cases.[4,8] This case emphasizes that in the presence of risk factors of uterine torsion obstetricians should be cautious to recognize the pelvic anatomical alignment completely in order to avoid incorrect uterine incision and the resulting increased maternal and fetal morbidity.

Conflict of Interest: There is no conflict of interest among authors related to this manuscript.

Patient Consent: Informed consent for cesarean section was taken.

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b. Describe what is known (in the literature) and what is not clear about the subject with reference to relevant literature thus identifying the literature gap.
c. You write the rationale (justification) of your study.
d. Finally you mention the objective of your study

MATERIALS AND METHODS

Methodology is written in past tense.

Follow this sequence **without headings:**

- Study design
- Place and Duration of Study
- Sample size
- Sampling technique
- Mention about permission of ethical review board and other ethical issues addressed.
- Inclusion and Exclusion Criteria
- Data collection procedure-
- Type of data: parametric or nonparametric
- Data analysis; including Statistical Software used, and statistical test applied for the calculation of p value and to determine the statistical significance. Exact p-values and 95% confidence interval (CI) limits must be mentioned instead of only stating greater or less than level of significance. All percentages must be accompanied with actual numbers.

RESULTS

These should be presented in logical sequence in the text, tables and illustrations. All the data in the tables or illustrations should not be repeated in the text; only important observations should be emphasized or summarized. No opinion should be given in this portion of the text.

DISCUSSION

This section should include author's comment on the results. Write in present tense, active voice- except for results, which are written in past tense. It should be written in following sequence:

a. First of all very briefly summarize, Interpret and discuss main results and don't merely repeat the results.
b. Discuss key studies relevant to your study.
c. Compare your work with other`s work.
d. Describe limitations of your study.
e. Suggest future work if necessary.

CONCLUSION

Conclusion should be provided under separate heading. It should be in congruence with the objectives. No recommendations are needed under this heading.

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