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Editorial **Open Access**

Covid-19: A New Cause for Taste and Smell Dysfunction

Iqbal Hussain Udaipurwala

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Dysfunction of the sense of smell and taste may have severe impact on quality of life and overall health. Detection of bad smell in the local environment is a warning sign for a person and a good smell is pleasurable in life. Similarly sense of taste is also very important for pleasure and to avoid intake of hazardous meal or drink. Unfortunately, knowledge about the smell and taste dysfunction is very limited and little work has been conducted in this field. There is a long list of disorders and diseases that can affect and disturb olfactory and gustatory functions, ranging from the local to central neurological causes. Virtually any disease of the nose or paranasal sinuses can cause hyposmia or anosmia, the common being chronic rhino-sinusitis, atrophic rhinitis, nasal polypi, allergic rhinitis or neoplasia. The neurological causes may include any pathology that can affect olfactory nerves, olfactory bulb and their central connections or the primary olfactory cortex. A new cause in the list is COVID-19 infection for which medical fraternity is thriving hard to unveil the underlying mechanisms responsible for producing features.

With the recent pandemic of COVID-19, there is an explosion of patients in hospitals with varied symptoms from just fever to multiple organ failure.[1] A typical case of COVID-19 presents with fever and dry cough which may progress to pneumonia.[2] Majority of the symptoms are related with the upper or lower respiratory tract involvement by the virus. Various studies have been published emphasizing about new and atypical symptoms of COVID-19 related with taste and smell dysfunction.[3,4] The incidence of olfactory dysfunction have been reported in viral infections like rhinovirus, parainfluenza virus, Epstein-Barr virus and corona virus in the past as well.[5,6] Though in COVID-19 patients, this smell dysfunction is not related with nasal obstruction and nasal discharge. Cases have been recorded where isolated taste and smell loss is present with no other symptom of COVID-19 like fever, rhinorrhoea, body ache, breathlessness or cough etc.[7]

The objective assessment of olfactory and gustatory functions are not routinely performed in general health/medical checkup. The clinicians and physicians rely only on self-reporting of the symptom. Many of the patients are even unaware of any dysfunction present in these two special senses. According to one study from Europe, the olfactory and taste dysfunction occurrence in COVID-19 patients is around 85.6% and 88.8% respectively.[8] A local study from Pakistan showed association of anosmia in 43.75% and ageusia in 31.25%.[9] In addition, these smell and taste dysfunction may appear before, during or even after development of other typical symptoms of COVID-19. The present data depicts that the incidence of these two symptoms in European patients is much higher than the rest of the world. As taste and smell loss can be the only and early symptom of COVID-19, it should bear in mind when considering differential diagnosis in such situation. The time period for recovering from these two symptoms also varied from days to weeks to months even after improving all other symptoms.[8]

The fundamental pathophysiological mechanism for smell and taste dysfunction among COVID-19 patients is still unclear. It is not only related with nasal, oral and olfactory mucosa rather there is involvement of nerves and central nervous system. The viruses are known to effect nerves and central nervous system. The neurological involvement in COVID-19 patients, is broadly classified into symptoms related with the central nervous system and peripheral nervous system. The central nervous system manifestation may include, dizziness, headache, altered consciousness, epilepsy and acute cerebrovascular lesions. The peripheral nervous system manifestations are anosmia, hyposmia, ageusia, hypogeusia, muscular pain and muscle weakness.[10] In animal studies, it has been suggested that SARS-CoV (human angiotensin converting enzyme 2) may go into the central nervous tissues through the olfactory bulb.[11] Neurological involvement may occur in about 35% of all COVID-19 patients which may be much higher in patients with severe symptoms. The objective assessment of the smell and taste function through some objective tests are lacking, mainly because of the risk of disease transmission in current pandemic. With proper training and teaching, some of the objective tests like smell identification with UPSIT and chemical gustometry to differentiate taste can be done through telemedicine or through video consultation. Secondly with proper protective measures clinical examination, nasal endoscopy, electrophysiological tests for

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smell and taste and laboratory tests can be performed safely to further investigate about etiology, pathophysiology and outcome in these patients.

As far as treatment of smell and taste dysfunction is concerned, there is no specific therapy for it. Use of corticosteroid either systemic or intranasal is also of doubtful value. It may be used to reduce inflammation in the nervous tissue but in turn it can flare up the primary viral infection. Olfactory training is another approach to improve smell dysfunction after COVID-19 infection. A neuroprotective treatment and approaches that can check the invasion of SARS-CoV-2 to the central nervous system are next needed tactics in our fight against COVID-19.[12]

In conclusion, involvement of smell and taste function in COVID-19 may occur in many patients. There is a wide range in incidence from 5% to 98% depending upon the different methodology utilized in geographical region focused in the study. Considering all above facts and figures, following are the suggestions or possible solutions to physicians such as otorhinolaryngologists, pulmonologists who are dealing with COVID-19 patients baring taste and smell dysfunctions.

1. Advise for isolation and further investigations even if the patient presents with symptoms of taste and smell dysfunction only.
2. Reassure the patient as symptoms are likely to be resolved but recovery period varies greatly.
3. Brief the patient about association of COVID-19 virus with different mutations and clinical manifestations
4. Formulate a multidisciplinary team comprised of general physician, otolaryngologist, pulmonologist, pathologist, microbiologist etc for quality treatment and management of patients.
5. Conduct detailed studies with examination/endoscopic findings, psychophysiological tests and electro-physiological tests of olfactory and gustatory functions.

Authors Contribution:
Iqbal Hussain Udaipurwala: Substantial contributions to the conception criticaly evaluation of intellectual content, final approval of the version to be published

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Original Article **Open Access**

Clinical Effects of Amoxicillin-clavulanate and Calcium Hydroxide as Intracanal Medicament on Inter appointment Pain among Symptomatic Apical Periodontitis

Naresh Kumar, Rajesh Kumar, Priya Harjani, Sarang Suresh

ABSTRACT

Objective: To compare the clinical effects of Antibiotic amoxicillin-clavulanate and calcium hydroxide on inter appointment pain in cases of Symptomatic Apical Periodontitis.

Methodology: It was a single blind randomized controlled trial study performed in operative Dentistry Department of Liaquat University of Medical and Health Sciences Jamshoro. This study was conducted from 02-Jan-2017 to 27-June-2017. Total n=324 patients with symptomatic apical periodontitis were targeted. Patients were randomly allocated into two groups. Total n=162 patients in group1 treated with Antibiotic amoxicillin-clavulanate and n=162 patients in group 2 of calcium hydroxide. Procedure was performed by single operator. Clinical effect was assessed if pain present or absent after 24 hours and 7 days on recalled visit and was labeled as positive when there was no pain (0-3 on VAS) and as negative when there was pain (4-10 on VAS). Data of the study was analyzed by using the SPSS version 20. Mean and standard deviation was calculated for quantitative variables like age and pre and postoperative pain. Frequency and percentages were calculated for type of tooth. Both groups were compared by using Chi- square test for clinical effect.

Results: The average age of the patients was 39.807.36 years. There were 50% male and 50% female. Clinical effectiveness was significantly high in group 1 than group 2 [79.01% vs. 65.43% p=0.006].

Conclusion: The findings of this study are encouraging that patients in which Amoxicillin-clavulanate was used as intracanal medicament appeared to show a greater decrease in pain levels over the observation period when compared to the control group.

Keywords: Amoxicillin-clavulanate, Calcium Hydroxide, Flareup, Pain, Symptomatic Apical Periodontitis.

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INTRODUCTION:

Pain due to pulpal pathology has been a main primary objective for the clinician during and after treatment. Main cause of pulpal pathology is different type of microorganism that leads to clinical sign and symptom.[1] Infection spread from pulp to apical area through apical foramen leads to inflammation. Symptomatic apical periodontitis can be defined as inflammation of supporting structures of the tooth in area, surrounding the apex of tooth.[2] Literature suggests that healing is 10-15% less when symptomatic apical periodontitis is present compared to isolated pulpal pathology after root canal treatment.[3] Unable to decrease enough bacterial load that is required for perfect healing despite of good chemo mechanical preparation of root canals, due to presence of complex anatomy, canal ramification and cementum erosions.[4] Therefore, additional antimicrobial local intracanal medication is required to eliminate most of bacteria.[4-6] Most commonly used local intracanal medication is calcium hydroxide but it has limited effectiveness in eliminating all micro-organism. According to the study calcium hydroxide has been efficient in removing 81.8% of the intracanal bacteria after 7 days[8] and the inclusion of other antimicrobials promotes improved disinfection.

The semi-synthetic antibiotic amoxicillin is combined with the lactamase inhibitor clavulanate potassium to form Augmentin. Amoxicillin-clavulanate is a broad-spectrum antibacterial agent that is bactericidal to most Gram-positive and Gram-negative pathogens.[9] It was first used as a replacement for minocycline in triple antibiotic paste. Antibiotic amoxicillin-clavulanate is 100% effective against common endodontic infections.[10] As an intracanal

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medicament, amoxicillin-clavulanate paste is helpful in eliminating periapical lesions and encouraging apical closure of an immature tooth with necrotic pulp.[11] Antibiotics as an intracanal medicament are crucial in regenerative treatment. Antibiotic combinations such as triple and quadruple antibiotic pastes might raise the risk of bacterial resistance even when used for short periods. Amoxicillin-clavulanate is drug of choice for management of acute peri radicular infection. Although limited research is available on its local application as intracanal medicaments, according to studies, Amoxicillin-clavulanate can eliminate 100% primary and persisted bacteria from canal.[12] Another pilot study was performed in which Amoxicillin-clavulanate was 70% effective in relieving inter appointment pain.[13] Hence, this study was aimed to compare the clinical effects of Antibiotic amoxicillin-clavulanate and calcium hydroxide on inter appointment pain in cases of symptomatic apical periodontitis.

METHODOLOGY:

It was a single blind randomized controlled trial study performed in operative Dentistry Department of Liaquat University of Medical and Health Sciences Jamshoro. This study was conducted from 02-Jan-2017 to 27-June-2017. Study approval was obtained from institutional review board vide letter LUMHS/FD/0063/20. Total n=324 patients were selected for this study including 162 in each group. The expected population proportions for groups 1 and 2 were 70% and 81.8 percent, respectively, using the WHO sample size calculator with an alpha of 5% and a power of 80. They were divided in two groups 162 patient each with help of lottery method as group A (Amoxicillin-clavulanate 1g) and group B (Calcium Hydroxide). All permanent teeth diagnosed with symptomatic apical periodontitis of either gender, having age from 18 to 50 years were included in this study. Immature and previously endodontically treated or periodontally weakened teeth, allergy to Amoxicillin-clavulanate, patient having systematic medical disease or on any analgesic drug were excluded from study. Written informed consent was obtained from all the patients before start of treatment. Before start of treatment preoperative pain score was recorded by using visual analog scale after giving local anesthesia with lignocaine 2%, teeth were isolated with rubber dam. Access opening was done with round bur in high-speed hand piece. Working length was measured on periapical radiograph using ISO K file # 15 .Canal was prepared with rotary protaper file system along with sodium hypochlorite 2.5% . Canal was dried with paper points. . In group A (Amoxicillin-clavulanate paste was prepared by mixing 1g of antibiotic powder with normal saline until creamy mix obtained) and in group B (calcium hydroxide powder mixed with normal saline until creamy paste obtained), then paste was inserted with the help of lentulo spiral up to working length followed by cotton pledged and cavity was sealed with temporary filling (CAVIT). Clinical effect was assessed if pain present or absent after 24 hours and 7 days on recalled visit.

Clinical effect was labeled as positive when there was no pain (0-3 on VAS) and as negative when there were pains (4-10 on VAS). Data of the study was entered and analyzed by using the SPSS version 20. Mean and standard deviation was calculated for quantitative variables like age and pre and postoperative pain. Frequency and percentages were calculated for type of tooth. Both groups were compared by using Chi- square test for clinical effect.

RESULTS:

Total n=324 patients with symptomatic apical periodontitis were divided into two groups. The average age of the patients was 39.80±7.36 years. Similarly average age and pain score at specific time is shown in table 1. Comparison of the clinical effect of Amoxicillin-clavulanate and calcium hydroxide on inter appointment pain stratified for teeth in table 2. Comparison of the clinical effect of Amoxicillin-clavulanate 1g and calcium hydroxide on inter appointment pain in cases of symptomatic apical periodontitis is shown in table 3. Clinical effectiveness was significantly high in group 1 than group 2 [79.01% vs. 65.43% p=0.006].

Table 1: Descriptive Statistics of Age & Pain

Variables	Group1 n=162		Group 2 n=162	
	Mean	Std. Deviation	Mean	Std. Deviation
Age (Years)	39.49	7.405	40.12	7.323
Pre-operative pain score	6.85	.858	6.94	.889
Pain Score After Day 1	2.75	1.366	3.60	1.463
Pain Score After 7 days	1.55	1.549	2.14	1.746

Table 2: Comparison of the Clinical Effect of Amoxicillin-clavulanate and Calcium Hydroxide on Inter Appointment Pain Stratified for Teeth

Group		Effective	Not Effective	Total (n=324)
Group A	Molar	39 58.20%)	28 (41.80%)	67
	Premolar	43 87.75%)	06 (12.25%)	49
	Canine	46 (100%)	00	46
Group B	Molar	39 (52%)	36 (48%)	75
	Premolar	18 (72%)	7 (28%)	25
	Canine	49 79.03%)	13 (20.97%)	62

Table 3: Comparison of the Clinical Effect of Amoxicillin-clavulanate and Calcium Hydroxide on Inter Appointment Pain in Cases of Symptomatic Apical Periodontitis

Group of Study	Effective	Not Effective	Total	P Value
GROUP 01	128(79.01%)	34 (20.9%)	162	.006
GROUP 02	106(65.43%)	56(34.57%)	162	.006
TOTAL	234	90	324	.006

DISCUSSION:

Occurrence of interappointment pain is of very severe intensity during or after completion of procedure is called flareup. It occurs even following standard protocol of treatment[14,15] due to various factors like persistent microorganism, mechanical and chemical damage by extrusion of material from apical foramen into periapical area results in inflammation.[16] Other factor also modifies inter appointment pain like preoperative pain intensity, age, and gender.[17-19] The frequent leading cause of pain is remaining microorganism that cannot be removed by conventional protocol because these microorganisms reside in area where conventional protocol doesn't have access. But it is suggested that use of antimicrobial intracanal medicament can eliminate these bacteria so that pain can be effectively eliminated.[20]

The calcium hydroxide is the white odorless powder with pH 12.5-12.8. The high pH of this pure powder form is bacteriostatic. B.W. Herman developed it as a pulp capping agent in 1920. It was then used for intracanal medicaments, endodontic sealers, apexification, and pulpotomies.[21] The success rate of apical periodontitis patients varied from 67 to 88.97 percent. Trope et al[22] found an 80% healing rate with calcium hydroxide in two visits. Friedman et al[23] evaluated 4- to 6-year endodontic treatment results for teeth with apical periodontitis and found a 74% recovery rate. Paredes Vierya et al.[24] found that calcium hydroxide-treated teeth had an 88.97 percent success rate.

In present study Amoxicillin-clavulanate used as intracanal medicament to reduce these microorganism as it has broad spectrum anti-microbial effect and used as topical so that systematic effects are avoided. According to present study Amoxicillin-clavulanate found more effective compared to standard calcium hydroxide. Clinical effectiveness of Amoxicillin-clavulanate is 79.01% compared to calcium hydroxide 65.43 with P value .006. Another pilot study had also shown that Amoxicillin-clavulanate is more effective.[13]

Presence of preoperatively pain in experimental group is 6.85 is significantly of severe intensity but that is decreased with time after 24 hours and 1 week time. There was no significant difference found with in age and gender variable. But amoxicillin-clavulanate was found to be 100% effective in eliminate pain in canine teeth, while success in molar is not up to mark , was effective in 39 cases out of 67(58.2%). The reason for not getting promising results in molar teeth is presence of multiple canals, complex morphology, difficult to place intracanal medicament due to curved and narrowed canal. The results of present study are very promising to decrease interappointment pain used as intracanal medicament compared to control group. But effectiveness in molar was not appriciable so larger study is needed in future to evaluate effectiveness of Amoxicillin-clavulanate in molars as intracanal effectiveness.

CONCLUSION:

The findings of this study are encouraging that patients in which amoxicillin-clavulanate was used as intracanal medicament appeared to show a greater decrease in pain levels over the observation period when compared to the control group.

Authors Contribution:
Naresh Kumar: Conception or design of the work; or the acquisition, analysis, or interpretation of data for the work and Final approval of the version to be published
Rajesh Kumar: Acquisition & analysis of data and Final approval of the version to be published
Priya Harjani: Interpretation of data and Final approval of the version to be published
Sarang Suresh: Drafting of the work and Final approval of the version to be published

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Original Article **Open Access**

Post-operative Pain Outcomes of Laparoscopic Ventral Hernia Repair (LVHR): An eight-year experience

Shahid Rasul, Hassan Ahmed, Sanum Ali, Surrendar Dawani, Sarah Zahid, Sehrish Hussain, Salman Jafferi, Mansab Ali

ABSTRACT:

Objective: To evaluate post-operative pain, recovery time and standard of living in patients undergoing LVHR in detail.

Study design and Setting: This prospective cohort study was conducted at a tertiary care hospital of Karachi, Pakistan, after getting approval from the "National Medical Centre Ethical Review Board", from January 2011 to December 2019,

Methodology: Total n= 577 patients undergoing standard LVHR procedure (defect closed with non-absorbable monofilament suture, reinforced with intra-abdominal dual layer mesh, anchored with non-absorbable tacks & sutures). Patient demographics, perioperative & postoperative findings and post-operative pain analysis were investigated and presented as descriptive statistics. Follow-up was carried out at 1st week, 2nd week, 3rd monthly, 6 monthly and 12 monthly post-operative appointments.

Results: During the study period of nine years (January 2011 to December 2019), 577 patients (primary ventral hernia *n*=232, recurrent ventral hernia *n*=188 patients, incisional hernia *n*=157) underwent LVHR. Mean post-operative hospital stay was 1.53 ± 1.8 days. Mean post-operative pain assessment on visual analog scale (VAS) after surgery (0-3days) was reported to be 38.5±29 by 65 patients out of 577 (11.26%), which significantly decreased at the end of 1st week to 27.9 ± 25.6. Only 3 patients (0.51%) reported chronic pain during the span of 3-6 months.

Conclusion: LVHR was associated with considerably less post-operative pain, shorter hospital stay and reduced time of convalescence. It is demonstrated that LVHR to be a safe and superior approach for the repair ventral hernias.

Keywords: Chronic pain, Laparoscopic ventral hernia repair, Post-operative pain, Ventral hernia, Visual analog scale

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INTRODUCTION:

One of the most common pathologies presenting in the surgical clinic is Ventral hernia, appearing as a bulge through an opening in the anterior abdominal wall.[1] Ventral hernia is a broad term and can be categorized as; epigastric, umbilical, paraumbilical, subcostal and Spigelian hernias and others, while incisional hernia is acquired in nature and occur at the site of any previous surgery through abdominal wall musculature.[2]

Ventral hernias are associated with abdominal discomfort, pain and deformed body image, leading to impaired patient's standard of living by creating hindrance in carrying out routine activities.[3] More than 300,000 open ventral hernia repairs (OVHR) are performed in the United States each year for the repair of primary ventral hernia[4], 2–30 % of them result in the development of incisional hernia, requiring approximately 90,000 repair procedures annually for its correction.[5]

Laparoscopic ventral hernia repair (LVHR) was introduced by LeBlanc and Booth in early 1990s and now it is being considered as a well-established procedure for the treatment of ventral hernia.[6] The advantages it has over the conventional open repair include; minimal invasion, reduction in perioperative morbidity, less postoperative pain, reduced need of analgesics, shorter hospital stay and low recurrence

rates followed by quick recovery.[7] It also provides complete exploration of the abdominal cavity, making the parietal and visceral adhesiolysis easier, which is a basic step to maintain the stability of intestinal package and paramount factor in the reduction of the chronic abdominal pain, linked to the open repairs.[8]

In the recent years, attempts to evaluate the outcomes of different ventral hernia repair procedures have increased. LVHR has been extensively compared with OVHR for safety, morbidity and recurrence rates. [9,10] However, there are only few studies in the literature evaluating incidence of acute & chronic pain and general well-being of patients post LVHR. This study was aimed to evaluate post-operative pain, recovery time and standard of living in patients undergoing LVHR in detail.

METHODOLOGY:

This prospective study was conducted among patients undergoing LVHR to characterize the repair of primary, recurrent and incisional ventral hernias, post-operative pain, period of recovery and standard of living in detail. Operative time, post-operative hospital stay, use of analgesics were also investigated for their potential association with post-operative pain.

After getting approval from the "National Medical Centre Ethical Review Board", this prospective cohort study was conducted from 1st January 2011 to 31st December 2019, at a tertiary care hospital in Karachi, Pakistan. Total 577 patients, ranging from 20 to 60 years of age were included and divided on the basis of etiology and type of hernia into three groups; *Group A* (Primary Ventral Hernia *n*=232), *Group B* (Recurrent Ventral Hernia *n*=88) and *Group C* (Incisional Hernia *n*=157). Patients suffering from strangulated and obstructed hernias were not included.

After taking written and informed consent, all patients underwent detailed clinical history, examination, investigations. General anesthesia fitness evaluation was obtained and standard LVHR was performed on all patients. All surgeries were performed under general anesthesia with patients in a supine position, arms tucked at the sides, urinary and nasogastric catheters placed for decompression. Preoperative prophylactic antibiotics were administered. Pneumoperitoneum was established using Veress needle, followed by insertion of optical port for the exploration of abdominal cavity to visualize the location of hernia defect and distribution of adhesions. Additional two 5mm assisting trocars were inserted under direct vision for the lysis of adhesions and reduction of hernial sac (Figure: I). Defect size was measured and closed with non-absorbable monofilament suture. Appropriately sized intra-abdominal dual layer Mesh (ePTFE & Polypropylene) placed with an overlap of approximately 3-4cm, in all directions. Points of reference were marked on the mesh and corresponding site on abdominal wall, to aid in orientation. Mesh was anchored with four non-absorbable monofilament transabdominal sutures and was stapled with non-absorbable spiral tacks measuring 5mm. Ports were removed and skin incisions were closed. Postoperative analgesic protocol included Ketorolac (30mg) and Paracetamol (1g) I/V 8 hourly. Follow-up was carried out at 1st week, 2nd week, 3rd monthly, 6 monthly and 12 monthly post-operative appointments.

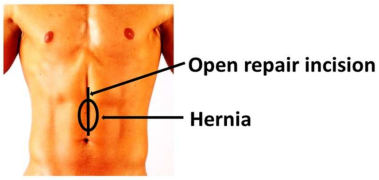
RESULTS:

During the study period of nine months, 577 patients underwent LVHR. A total of 232 patients (40.2%) for repair of primary ventral hernia, 188 repair of recurrent ventral hernia (15.25%) and 157 incisional hernia (27.20%). The mean age of patients in all groups was 42.07 ± 17.93 years and majority of patients were of female gender (55%), as shown in Table- I. Mean post-operative hospital stay was found to be 1.53 ± 1.8 days. Parameters like operating time, estimated blood loss, analgesia requirement, return to daily activities & work along with complications and recurrence rate can be observed in Table-1. Visual analog scale (VAS) was used on a 100 mm line, for the assessment of postoperative pain in patients after LVHR. Out of 577, 65 patients (11.26%) complained of pain having mean VAS score of 38.5±29.3, immediately after the surgery (0-3days). They were managed conservatively by I/M and oral doses of Ketorolac or NSAIDs. Out of those 65 patients, 20 (3.46%) reported pain with mean VAS score of 27.9 ± 25.6 by the end of 1st week, depicting a significant reduction in pain. Only 3 out of 65 patients (0.51%) reported chronic pain during the span of 3-6 months (Table: II). They were prescribed oral doses of Ketorolac or NSAIDs.

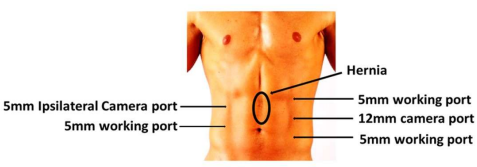
DISCUSSION:

In the past, surgeons tended to focus on the outcomes of LVHR in terms of recurrence and complications. From a patient's perspective, however, pain and discomfort from the abdominal wall may be more important than the risk for recurrence. The ultimate surgical goal should be to restore or increase the standard of living by limiting the incidence

Figure. 1: Schematic representation of OVHR incision (A) and LVHR ports (B)



A: Open repair incision



B:Laparoscopic Repair Port Placement

Table 1: Patient Demographics

Variables	Overall	Primary ventral hernia	Recurrent ventral hernia	Incisional hernia
Total no: of patients (%)	577 (100)	232 (40.2)	88 (15.25)	157 (27.20)
Females (%)	317 (55)	162 (69.82)	51 (57.95)	119 (75.79)
Males (%)	260 (45)	70 (30.17)	37 (42.04)	38 (24.20)
Age (mean ± std)	42.07 ± 17.93	46.77 ± 13.23	45.82 ± 14.18	49.46 ± 10.54
BMI (mean ± std)	29 ± 6.4	28 ± 6.2	31.92 ± 6.10	31.06 ± 6.53
PERIOPERATIVE FINDINGS				
Defect width (cm^2)	8 (3-15)	4.67 (3-8)	5 (4-8)	7.5 (5-15)
Operative time (min)	100 (80-120)	87 (75-100)	100 (80-120)	110 (90-130)
Estimated blood loss (ml)	30 (10-50)	25 (10-40)	28 (10-40)	34 (10-60)
Mesh size (cm^2)	25×20	15×10	20×15	25×20
POST-OPERATIVE OUTCOMES				
Post-operative hospital stay (days)	1.53 ± 1.8	1.49 ± 1.4	1.32 ± 1.5	2.1 ± 1.2
Use of analgesics (doses)	4 (2-6)	3 (2-4)	3 (2-4)	3 (2-5)
Return to daily activities (days)	3.61 (2-5)	2 (1-2)	2 (1-2)	3 (2-4)
Return to work (days)	7.13 (6-10)	5 (5-7)	5 (5-7)	6.5 (6-10)
Post-operative complications	15 (2.59%)	2 (0.34%)	4 (0.68%)	9 (1.53%)
Recurrence	7 (1.21%)	-	2 (0.34%)	5 (0.86%)

BMI: Body mass index, std: Standard deviation

Table 2: Post-Operative Pain Analysis on Visual scale (VAS)

Post-operative pain analysis	**0-3 days**	**At 1 week**	**At 2 weeks**	**3 months**	**6 months**	**12 months**
Mean VAS score	38.5 ± 29.3	27.9 ± 25.6	22.4 ± 24.3	8.8 ± 15.3	4.1 ± 6.4	2.7 ± 4.2
No of patients *(n*=**577)**	65 (11.26%)	20 (3.46%)	08 (1.38%)	03 (0.51%)	01 (0.17%)	00 (0%)

Interpretation of pain on 100mm Visual analogue scale (VAS): no pain (0-4), mild pain (5-44), moderate pain (45-74) and severe pain (75-100).

of post-operative pain and complications. Chronic abdominal pain (persisting for more than 3-4 months) [11] is a serious problem after ventral hernia repair. Nerve injury or entrapment due to extensive adhesiolysis, dissection of the abdominal wall for myofascial structures post OVHR could lead to increased incidence of chronic pain.[12]

With the advent of minimally invasive procedures, such complications can be reduced. The present prospective study demonstrated that LVHR had a significant positive influence on a broad spectrum of recovery parameters. Even though large incision is not used, LVHR may be associated with significant abdominal pain. The incidence of chronic pain after LVHR has been reported to be approximately 1–3 % in literature, affecting the quality of life badly.[13]

Gronnier *et al* reported that after a mean follow-up period of 24.6 ± 9.9 months, 31 patients (28.4%) complained of chronic pain post OVHR, which was predominantly neuropathic in nature.[14] Eker *et al* found association of greater number of patients with post-operative in OVHR group than LVHR group[15], however, our study witnessed an event free recovery by most of patients (table- II). During the span of 72 hours after LVHR, 11.26% of patients experienced post-operative pain which resolved in most of the patients by the end of 2 weeks. Only three patients (0.51%) complained of chronic pain during 3rd monthly appointment, no neuropathic involvement was seen and relief was attained by the administration of opioid analgesics, by the end of 6th month.

Post-operative chronic pain is largely related to fixation of mesh with tacks or sutures. Pain due to fixation is different from that at the port sites. The postoperative pain produced by the fixation techniques could play an important role in deciding between sutures and tacks for mesh fixation.[16] A randomized control trial from Sweden reported persistent post-operative pain in 7.4% of patients with only tacker fixation of mesh.[17] In this study, both tackers and sutures for the fixation of mesh were used and found no incidence of chronic pain with tacker fixation. The observations regarding association of chronic pain with tacker fixation are in alliance with Liot E, and her team who reported no change in the occurrence of chronic pain in group of patients with absorbable tackers, in comparison to non-absorbable

tackers' group.[18]

Operating time did not differ significantly between LVHR & OVHR as reported by Thota A, and his team that, laparoscopic repair took at an average of 94.35 minutes, while open mesh repair took 92.65 minutes.[19] The mean duration of surgery in the study subjects undergoing LVHR was 100 ± 20 minutes, however, it slightly increased in cases undergoing LVHR for incisional hernia (110 ± 20 minutes). An Egyptian prospective study reported shorter hospital stay in patients that underwent LVHR (1.94± 0.67 days)[20], this was in agreement with our study in which patients were discharged from hospital after 1.53 ± 1.8 days. This could be considered as a valuable outcome owing to the fact that shorter hospital stays are associated with reduced hospital expenditure.

This study witnessed few postoperative complications (2.59%), including seromas which were conservatively managed with antibiotics and no need for drain was required. No intestinal injury or obstruction was observed and no mortality took place, indicating that LVHR is a safe surgical procedure for primary and incisional ventral hernia repair. Moreover, no patients required reoperation for a port site hernia between the time of initial laparoscopic ventral hernia repair and assessment for the study.

An overall large number of patients, effective long-term follow-up, and the specific standardized operative methods are the main strengths of this study; however, our study lacks a comparison to an open surgery group. A substantial portion of patients were referred from other private set-ups and surgeons, which proves that minimally invasive surgical outcomes are much better then open repair.

CONCLUSION:

It is demonstrated from the experience that LVHR to be a safe and superior approach for the repair ventral hernias. It is better in terms of postoperative pain related complications and return to routine activities and work, yielding a good standard of living and patient's satisfaction, post-operatively. Although these results are encouraging, larger, long-term, multicenter studies comparing LVHR and open repair are needed.

Authors Contribution:
Shahid Rasul: Drafting of the work and Final approval of the version to be published
Hassan Ahmed: Drafting of the work and Final approval of the version to be published
Sanum Ali: conception or design of the work; or the acquisition, analysis, or interpretation of data for the work and Final approval of the version to be published
Surrendar Dawani: Acquisition & analysis of data and Final approval of the version to be published
Sarah Zahid: Acquisition & analysis of data and Final approval of the version to be published
Sehrish Hussain: Interpretation of data and Final approval of the version to be published
Salman Jafferi: Interpretation of data and Final approval of the version to be published
Mansab Ali: Drafting of the work and Final approval of the version to be published

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Original Article **Open Access**

An Audit of Maternal Mortality at a Tertiary Care Hospital

Shazia Naseeb, Piranka Kumari, Iqra Jam, Haleema Yasmin

ABSTRACT:

Objective: To find causes of maternal deaths and to calculate maternal mortality ratio at tertiary care hospital Karachi.

Study Design and setting: An observational study was conducted from1st January 2019 to 31st December 2020 at the Department of Obstetrics & Gynecology Unit 1, JPMC Karachi.

Methodology: Patients were selected according to inclusion criteria after ethical approval through non probability consecutive sampling technique. Details of patients were obtained from files and record registers. Their demographic feature like age, parity, gestational age, booking status and presence or absence of medical disorders, their status of delivery and direct and indirect reasons of maternal deaths were noted and their frequency and percentages were calculated. Brought dead patients and those who died accidently were excluded from the study.

Results: During the period of two years the total numbers of deaths certified in the department were 90. Total number of child birth and live births were 19084 and 17892 respectively. The maternal mortality ratio was estimated as 503.01 per 100,000 live births. Most of the patients 74(82.3%) were un booked. Direct Causes were about 67(74.5%). Haemorrhage was found to be most common reason of maternal deaths in about 21(23.3%). Eclampsia among18(20%) deaths. Anemia, cardiac disease, hepatic failure were the indirect causes of maternal deaths responsible for 23 (25.5%) of maternal deaths.

Conclusion: Maternal Death rate is persistently elevated in JPMC, being tertiary care hospital mostly due to serious and referred complicated cases. Haemorrhage and eclampsia are still major killers of mothers as before.

Keywords: Eclampsia, Haemorrhage, Maternal Mortality, Safe Motherhood.

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INTRODUCTION:

Maternal death is defined as death of women while pregnant or within 42 days of termination of pregnancy irrespective from any causes related to or aggravated by pregnancy or its management, but not from accidental causes.[1] Maternal deaths are divided into two categories: Direct obstetric deaths and indirect obstetric deaths. The latter are deaths for which there was a preexisting disease that was aggravated by the pregnancy. According to United Nations Population Fund (UNFPA) 2017 in every two minutes one women dies.[2] Maternal mortality is unacceptably high, about 295 000 women died during and following pregnancy and childbirth in 2017. The vast majority of these deaths (94%) occurred in low-resource settings, and most could have been prevented.[3] Having the population of approximately 204.6 million people, Pakistan is the sixth most populous country in the world. In Pakistan, the maternal mortality rate (MMR) was 140 per 100,000 live births in 2017.[4]Although there have been significant improvements in the country's healthcare system, Pakistan still faces many challenges in relation to its high population growth, infant and maternal mortality, and many infectious and non-infectious diseases.[5]

There is great variation in MMR of developing and developed countries worldwide. Many factors play a role in contribution of high MMR in developing countries like religious, social and cultural beliefs , poor socioeconomic condition, inappropriate diet, delay in seeking medical advice, delay in approaching medical facility and delay in management, presence of co- morbidities ,infections, high fertility rate and low literacy rate and virtually all are avoidable.

UNFPA estimated that 303,000 women died of pregnancy or childbirth related causes in 2015.[2] The causes range from to , [6] for which there are highly effective interventions. As women have gained access to and skilled with backup emergency obstetric care, the global maternal mortality ratio has fallen from 385 maternal deaths per 100,000 live births

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in 1990 to 2016 deaths per 100,000 live births in 2015, and many countries halved their maternal death rates in the last 10 years.[2]

According to a study which covered the period from 1990 to 2013, the most common causes are (15%), complications from unsafe (15%), (10%), (8%), and (6%).[6] Other causes include (3%) and pre-existing conditions (28%).[7] Maternal mortality caused by severe bleeding and infections are mostly after childbirth. Indirect causes are malaria, anemia,[8] HIV/AIDS and cardiovascular disease may complicate pregnancy or be aggravated by it.[9] Risk factors associated with increased maternal death include the age of the mother, obesity before becoming pregnant, other pre-existing chronic medical conditions, and cesarean delivery.[10,11]

Maternal mortality is an outcome measure of health and development system[1]. Repeated Audit on maternal deaths are necessary in order to check weaknesses and improvement in health system in order to save mothers. Hence; the present study was carried out to find out reason of maternal deaths and to calculate maternal mortality ratio at JPMC, tertiary care Hospital.

METHODOLOGY:

This study was carried out in department of Obstetrics and Gynecology JPMC from Jan 2019- Dec.2020 after ethical approval from institutional review board. This was an observational analytic study. The study was conducted with approval from institutional review board of JPMC letter no.F.2-81/2021GENL/6275/JPMC). Relevant data of number of obstetric admissions, number of childbirth, number of live births, number of maternal deaths and their characteristics have been obtained from the records of the department. Patients were selected through non probability consecutive sampling technique, meeting inclusion criteria in which all pregnant patients of any age, any parity at any gestational age, irrespective of their booking status, with or without medical disorders, disregarding the delivery status, died due to direct or indirect reason of maternal deaths. Pregnant brought dead patients and those who died accidently were excluded from the study. The reasons of mortality were categorized as in chapter 15 of the tenth revision of the international statistical classification of diseases and related health problems (ICD10) 4. More than one factor may have been the cause of death but the seemingly dominating factor was marked as the cause of death. This was based on clinical judgment, as no autopsy was performed in any case. Data is analyzed on SPSS Version 23. The qualitative variables such as maternal deaths, booked or un-booked cases, age, parity, delivery status and causes of deaths presented by their frequencies along with percentages and 95% confidence intervals. The effect modifier such as age and parity were grouped.

RESULTS:

During two years period total number of deaths certified in the department were 90, during the same year the number of childbirth and number of live births were 19084 and 17892 respectively. Maternal mortality Ratio was 503.01 per 100,000 live births.

The demographic profile of all maternal deaths is given in (Table 1). Direct causes were responsible for 74.4% of deaths. Haemorrhage was the main direct cause and was seen in 21 (23.3%) deaths, nearly 71.4% of the patients died of post-partum haemorrhage. Eclampsia was responsible for 18 (20 %) deaths. It was the leading cause among all women having their first baby. Total seven (7.8 %) patients died as a result of complications of unsafe abortion. Total twenty-three (25.5%) of the patients died as a result of severe anemia, cardiac disease and hepatic failure. (Table 2).

DISCUSSION:

MMR in JPMC in the last three decades from 1960-1969 was 889, 1981-1990 was 710 and 1991- 1999 was 883 however the current study shows a slight decrease in MMR.[12,13] In our study maternal mortality ratio is 503.01 per 100,000 live births. One study which was conducted at Lahore reported MMR of 451/100,000 live birth.[14] Almost similar result was obtained from the study conducted at Peshawar and reveals MMR of 431/100,000 live birth.[15]Maternal Deaths due to pregnancy related problem are highest and same in JPMC when we compared with other teaching institutes of Pakistan and other developing countries.[14, 15, 16]Direct causes of maternal mortality are still the most frequent causes in this institution, Haemorrhage alone is responsible for 21(23.3%) of maternal deaths, during the study period; this is much lower than the other studies reported from other tertiary care centers in Pakistan.[14,15,17]This is generally due to delay of referral of serious and complicated cases to the hospital. and they have usually delivered either at their home or at some small private maternity clinics. These women came in deteriorated condition, in irreversible hypovolemic shock and died despite availability of specialist doctors and blood transfusion facilities. Eclampsia was found to be 2nd commonest and leading cause of maternal death in our study similar finding noted from other studies.[14, 15,18]In this study 13(14.4%) of the patients had ruptured uterus due to previous scar, CPD and malpresentation. It is also comparable with one study reported from Nigeria where 3(11.8%) maternal deaths from ruptured uterus.[19] while other study from Pakistan shows high rate (34%) of maternal deaths from ruptured uterus.[20]

Unsafe abortion were accounted for 7(7.8%) of maternal deaths in our study, These were due to septic induced abortions. This is much lower than reported from Karim K.[21] where it was responsible for 10-12% of maternal deaths while in Sudan the abortion was seen in 3.9 % of maternal deaths.[22,] This reconfirms the fact that even in a metropolitan city like Karachi where access to family planning clinics is

Table 1: Demographic Profile of Maternal Deaths

	Maternal Deaths	**95% CI***	
No. of Maternal Deaths	**90 (506 Per 100,000)**	**72 - 109 (410 – 618) Per100,000**	
Booked	16 (17.7%)	10.9 – 26.7	
Un-booked	74 (82.3%)	73.3 – 89.1	
Age in years			**Cumulative (%)**
15 – 20	4 (4.4%)	1.4 – 10.4	4.4 %
21 – 30	58 (64.4%)	54.2 – 73.8	68.9 %
31– 40	26 (28.9%)	20.2 – 38.8	97.8 %
> 40	2 (2.2%)	1.4 – 10.4	100.) %
PARITY			**Cumulative (%)**
0 + 0	8 (8.9%)	4.2 – 16.2	8.9 %
1 – 4	62 (68.9%)	58.8 - 77.8	77.8 %
5 & more	20 (22.2%)	14.5 – 31.7	100.0 %
Delivery Status			
Abortion	4 (4.4%)	1.4 - 10.4	
Un-delivered	13 (14.4%)	8.3 – 22.1	
Delivered	73 (81.2%)	72.0 – 88.2	

Table 2: Cause of deaths

Causes of death n = 90		**95% Confidence Interval**
DIRECT	**67 (74.4 %)**	**64.7- 82.6**
Haemorrhage	**21 (23.3%)**	**15.5 – 32.1**
Postpartum Haemorrhage	15(16.7%)	**10.0 – 25.4**
• Placenta accreta	7 (7.8%)	**3.5 – 14.8**
• Atony of uterus	5 (5.6%)	**2.1 – 11.9**
• Trauma (cervical & perineal tears)	3 (3.3%)	**0.9 – 8.8**
Antepartum hemorrhage	6 (6.7%)	2.7 – 13.6
• Abruptio	4 (4.4%)	1.4 – 10.4
• Placenta previa	2 (2.2%)	0.4 – 7.1
Eclampsia	**18 (20 %)**	**12.7 – 29.2**
• Antepartum	16 (17.8%)	**10.9 – 26.7**
• Postpartum	2 (2.2%)	**0.4 – 7.1**
Ruptured uterus	**13 (14.4 %)**	**8.3 – 22.9**
• Previous scar	7 (7.8%)	**3.5 – 14.8**
• CPD	5 (5.5%)	**2.1 – 11.9**
• Malpresentation	1 (1.1%)	**0.06 – 5.4**
Sepsis	**7 (7.8%)**	**3.5 – 14.8**
Abortion	**7 (7.8%)**	**3.5 – 14.8**
Embolism	**1 (1.1%)**	**0.06 – 5.4**
INDIRECT CAUSES	**23 (25.5%)**	**17.4 – 35.3**
Cardiac disease	11 (12.2%)	**6.6 – 20.25**
Anemia	8 (8.9%)	**4.2 – 16.2**
Hepatic failure	4 (4.4%)	**1.4 – 10.4**

not an issue, women do not use contraception but opt for abortion to terminate an unwanted and unplanned pregnancy, usually under unsafe conditions.[7,23] Similar results were also shown in other studies from outside country.[23,24]

In the current study cardiac diseases was the main indirect cause of maternal death. This is not comparable with other national and international studies which showed anemia was the leading indirect cause of maternal deaths.[14, 22] Most of the cardiac disease patients were nonbooked and received in moribund condition from the other hospitals and periphery. Deaths from severe anemia are still high, as shown in our previous study and studies from other teaching institutions of this country, [14,] due to high prevalence of anemia in the population especially in pregnant women. We found same results from the national or international studies.[24, 25] Another major thing is booking status, Majority of women in our study were non booked that is 74(82.3). Most of the women in the country and neighboring countries do not realize the significance of antenatal care and therefore do not seek advice and remain untreated.[15,26,27]

There are some limitations of this study. First, this is a secondary data analysis and data were extracted from patient's file which is not collected for this study therefore there could be missing variables. Second, the low number of maternal deaths were reported due to precautions taken by the government to prevent the COVID-19 infection and therefore, chances of underreporting cannot be ruled out. Third, in COVID-19 era, few deliveries occured that can lead to high maternal mortality because of small denominator.

CONCLUSION:

Maternal mortality rate is higher at JPMC, being tertiary care hospital due to referrals of very serious and complicated cases from all over the city as well as from interior of Sindh. There is a need to pay attention to peripheral hospitals by periodic teaching training through workshops for midwifes, doctors and general practitioners and by creating awareness programs through media for patients. Moreover, emphasis on importance of antenatal care for early identification of risk factors, prompt referral of complicated cases with quick involvement of skill persons by taking multidisciplinary approach in case of medical co- morbidities is needed which can save lives of mothers

Authors Contribution:
Shazia Naseeb: Conception and design of study, writeup, and data analysis.
Piranka Kumari: Data collection
Iqra Jam: Data collection,
Haleema Yasmeen: Supervising the work and proof reading

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Original Article **Open Access**

Assessment of Knowledge and Practices of Wearing Medical Masks and Respirators during COVID-19 Pandemic

Javaria Saleem, Eelaf Karar, Omer Farooq Choudary, Faiq Munir Shaikh, Rida E Fatima, Farooq Azam Rathore

ABSTRACT

Objectives: To determine the gap between knowledge and practices of using face masks and respirators among Pakistani Health care professionals (HCPs) during peak of first wave of COVID-19.

Study Design and Settings: A Cross-sectional online survey of HCPs from different parts of the country was conducted from April-July 2020.

Methodology: A self-administered questionnaire was created using guidelines issued by World Health Organization (WHO) and Centre of Disease Control (CDC) on use of masks and respirators in COVID-19 pandemic. It was distributed via email and social media platforms. Valid responses (402) were analyzed by SPSS V.26. Descriptive statistics and chi square test was applied and p-value < 0.05 was considered statistically significant.

Results: The knowledge of Pakistani HCPs about masks and respirators was satisfactory but practices were not in line with current guidelines by WHO and CDC. Majority reported that they considered wearing mask/respirators in correct way but only 34% participants knew all steps of wearing a surgical mask and few knew all steps of wearing an N95 respirator. Concepts like fit test, seal and integrity of mask and respirators, hand hygiene, life of one mask/respirator and their reuse were not clear among most of respondents.

Conclusion: In this diverse sample of Pakistani HCPs, practice of using face masks and respirators was not as per the guidelines despite adequate knowledge. Lack of sufficient practice in using mask and respirators were noticed.

Keywords: COVID-19, Health Care Professionals, N95 Respirators, Pandemic.

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INTRODUCTION:

The novel corona virus (COVID-19) infection originated from Wuhan city, China in December 2019 and rapidly spread to more than 200 countries around the globe over the next 4 months. World Health Organization (WHO) declared it a pandemic on 11th March 2020.[1,2]

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WHO has issued guidelines regarding protective measures in order to prevent further transmission of COVID-19. Personal Protective Equipment (PPE) is recommended for Health care professionals (HCPs). The type of PPE depends on settings, target personnel and activity. The use of PPE must be combined with proper hand hygiene, respiratory hygiene, and adequate training on donning, doffing and disposal of the PPE.[3] Other important measures include hand hygiene and avoiding the entry of the virus through mouth, nose and eyes by avoiding touching these areas.[4]

WHO advised face masks for protection of HCPs, however, incorrect use reduces their effectiveness and makes one prone to getting infected. Hence, adequate knowledge among HCPs is necessary for their protection.[5] Lack of knowledge not only reduce the effectiveness of the protective barriers worn but also give a false sense of security to one, making them more vulnerable to infection. In July 2020, it was reported by a local newspaper that as many as 5367 healthcare professionals were diagnosed with COVID-19 in Pakistan out of which 58 had died.[6] Since the only way to control the

infection is through non-pharmacological methods like use of masks and other PPE combined with hand hygiene. Hence, the knowledge and practice is critical and must be satisfactory among HCPs because they are the high risk group. If the cases among HCPs rise further, it will put even more burden on the healthcare system of Pakistan.

Use of face masks by general population specially in crowded and public spaces helps to reduce the spread of virus in epidemic areas.[7,8] Face masks are the commonest PPE used both by public and HCPs. However, few HCPs were using them before the pandemic but now they are widely used. However, there are concerns regarding proper selection, fitting, and disposal of masks. Incorrect use of medical masks, including re-using one time use disposable masks or incorrectly putting on an N95 respirator or adjusting it due to discomfort can reduce its protective effect as well increase chances of infections.[1,9]

Few studies address correct use of masks and respirators and most of them are from Europe and the Western countries. A study on HCPs from major public hospital in Karachi assessed masks wearing during the current pandemic revealed gaps in knowledge of HCPs.[10] Many respondents (43.6%) were not sure of which side of surgical mask should face outwards. A large number of respondents (70.9%) believed that wearing a surgical mask will protect them from COVID-19. The study concluded that "overall results" were good and only 35.2% respondents fell into that category. The study focused mainly on the knowledge and practices of surgical mask use.[10] To explore it further and evaluate actual practices and knowledge of use of surgical mask as well as respirators in a larger sample of HCPs. This study was aimed to document knowledge and practices of a wide range of masks and respirators used among Pakistani HCPs.

METHODOLOGY:

A nationwide cross-sectional survey to assess knowledge and practices of Pakistani HCPs regarding masks was conducted from 15th April-10th July 2020. Approval of hospital ethics review committee was obtained before commencing the study. An English language self-administered questionnaire was created after literature search and consulting guidelines issued by WHO and Centers for Disease Control and Prevention (CDC), USA.[5] It was pilot tested and revised based on the feedback of the respondents.

The questionnaire was created using Google forms, (a free and powerful online software commonly used for online surveys), consisting of 25 items and 4 sections.[11] First part was informed consent which explained aim of the study and ensured anonymity of participants. Second part consisted of demographics including age, gender, province of residence and job designation. The third section documented knowledge by asking 6 questions regarding use of masks and respirators and the last section assessed practices of wearing masks. The assessment of practices was done by asking a series of questions regarding different kinds of masks and inquiring about the steps that they followed while wearing and removing surgical masks and N95 respirators. These questions were based on the recommendations of CDC and WHO.[12,13] The questions on the steps of wearing the mask and respirator were optional so respondents could answer about the masks and/or respirator that they wore most of the time in their medical practice. However, steps of removal were similar in both surgical and N95 Respirators therefore, this question was mandatory for all respondents. The sample size was calculated by using WHO sample size calculator. Considering 5% precision, with a 95% confidence interval, and prevalence taken as 56.4% of HCPs correctly knowing how to wear a mask.[10] Sample size was calculated as 378 by keeping margin of 10 % for invalid responses and aimed for 400 responses.

Estimated time for completing the questionnaire was 8-10 minutes. The questionnaire was emailed and sent via Social Media applications to HCPs from different background all around the country. Participants included physicians, paramedical staff (PMS), and Allied Health care Professionals (AHCPs) all around the country. Incomplete questionnaires and other professional were excluded from the study. The HCPs working at the hospital of researchers were approached in person and asked to fill in the questionnaire online using a tablet. All HCPs were categorized into groups on the basis of their job hierarchy and their knowledge and practices were compared. The data was analyzed using SPSS version 26.0. Frequencies and descriptive statistics were calculated and Pearson's Chi square test was applied p-value < 0.05 was considered significant.

RESULTS:

Total four hundred and six health care professionals participated in the study and 402 were valid responses. The demographics are displayed in Table 1. The mean age was 30.92 (±9.16) and range was 20-72 years. Total one hundred and forty eight (36.7%) respondents had a contact with confirmed COVID-19 patients. Around one third (29.1%) regularly wore mask in hospital before this pandemic. However, after the pandemic 345 (85.8%) respondents wore a mask daily. Around nineteen (4.7%) respondents still did not wear a mask at all. Out of the 386 (96.0%) HCPs who wore masks, (67.4%) 271 wore a surgical mask, and (12.2%) 49 wore N95/N99 respirator and (18.2%) 66 used a combination of masks with surgical mask being the most used one.

Knowledge about the general use of mask and respirators was overall adequate among all the groups of HCPs (Table 2), except for the knowledge about the type of mask a patient with active COVID-19 infection should wear only 28.4% (114) knew COVID-19 patient should wear surgical mask. This knowledge was found to be inadequate in all the groups of health care professionals (p-value= 0.086). When questioned the need for N95 respirator use among the general

Table 1 Demographics

Parameters	Total Number = 402 (%)
Age	20- 72 Mean age 30.92 (±9.16)
Gender	
Male	182 (45.3 %)
Female	220 (54.7 %)
Education	
Matriculation	3 (0.7 %)
Intermediate	20 (5.0 %)
Under graduate	10 (2.5 %)
Graduate	197 (49.0 %)
Post-graduate	172 (42.8 %)
Residence	
Sindh	255 (63.4%)
Punjab	113 (28.1%)
Baluchistan	8 (2.0%)
KPK	14 (3.5%)
Gilgit-baltistan	9 (2.2%)
Kashmir	3 (0.7%)
Job status	
House Officers	119 (29.6%)
Residents	90 (22.4%)
Consultants	88 (21.9%)
Para medical staff (including nursing, midwifes, sanitation, pharmacy, physiotherapy assistants, laboratory technicians)	63 (15.6%)
Allied health professionals (including dental hygienists, diagnostic medical sonographers, dieticians, medical technologists, occupational therapists, physical therapists, radiographers, respiratory therapists, and speech language pathologists)	23 (5.7%)
Medical Officers	19 (4.7%)

public, most of the respondents knew that it was not meant for public use (p-value <0.05).

About 81.6% (328) participants indicated that that they wore their mask in a correct way, while 16.9% were not sure of their way. However, when their knowledge and practice of wearing N95/N99 respirator and surgical mask was evaluated only 14.8% knew all the steps of wearing a respirator scoring 9/9 (p-value= 0.016) and 34% knew all the steps of wearing a surgical mask scoring 6/6 (p-value= 0.002). A quarter (25%) of respondents followed all the steps in removal of a mask (p-value= 0.039). (Table 2)

Questions evaluating the practice of respondents of donning and doffing the mask and respirators are listed in table 3. Only 62.5% people performed the fit test before wearing respirator, 56.8% people checked its integrity before wearing it, 71.6% performed hand hygiene before wearing a mask, 44.3% respondent checked the seal by blow test after wearing it and only 20.4% people know that in people with facial hair it is not ideal to wear N95/N99 respirator as it doesn't create an efficient seal. (Table 3) Around 62% respondents wore a mask in a way that the bendy nose strip went on bridge of the nose. Around half (54.23%) of the respondents did not know the correct way to store/dispose a mask or respirator when not in use. Out of 402 respondents 211 (52.5%) HCPs were reusing their surgical masks, when inquired about the reason most HCPs responded with the reason of limited availability.

DISCUSSION:

Our study found that surgical masks were the most common form of masks used by HCPs irrespective of their contact with COVID-19 patients. Those who had contact with COVID-19 patients reported more usage of respirators. WHO recommends that a medical mask should be worn in areas with patients suspected or having a confirmed diagnosis of COVID-19 and an N95 respirator wherever aerosol is being generated.[5] Since the cost of an N95 is more than surgical mask it is not always practical and cost effective to wear N95 respirator unnecessarily.[14]

WHO recommends that proper hand hygiene must be combined with use of face masks among HCPs.[5] However respondents having lower education believed that the risk of infection was completely eliminated by a well fitted respirator and therefore hand hygiene was not needed (p-value <0.001). This is an alarming fact ignoring the hygiene and making them vulnerable to infections. This points out that training emphasis should me more towards low educated HCPs.

Previous studies have suggested that use of surgical masks is helpful in preventing transmission of human coronavirus virus infections if worn by infected persons yet most of the respondents were not aware that a patient of COVID-19 must wear a surgical mask and not an N95 respirator (p-value= 0.052).[15,16] Literature suggests that an N95 respirator is not more effective than a surgical face mask in protecting HCPs from acute respiratory infections in hospital setting.[9] But most (92.8%) of the respondents in our study responded that N95 respirator was more protective than a surgical mask and very few (7.2%) responded that N95 and surgical masks had equal efficacy (p-value= 0.769).

Only 71.9% of the respondents understood that they need to cover their mouths while sneezing and coughing despite wearing a mask. This is because surgical masks are a barrier for droplets not for aerosol particles and viruses can still cross the barrier.[17] This practice was not adequately followed among Residents/Trainees (p-value= 0.330). Lack of this knowledge can potentially lead to spread of virus and cause devastating increase in infected people even though all SOPs are followed.[17]

Around 62.96% respondents wore a mask in a way that the bendy nose strip went on bridge of the nose on the contrary

Table 2 Knowledge and practice regarding use of mask and respirator according to job status of HCPs

KNOWLEDGE

Statements	House officer	Residents	Consultant	Medical officer/ RMO	Para medical staff	Allied health professionals	P value
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Does a surgical mask help in reducing exposure of your saliva and respiratory droplets? (Yes)	114(95.7%)	82(91.1%)	82(93.1%)	18(94.7%)	56(88.8%)	23(100%)	0.353
Surgical mask should not be shared or reused? (Yes)	115(96.6%)	88(97.7%)	87(98.8%)	19(100%)	63(100%)	23(100%)	0.550
Do you think a properly fitted N95 or N99 respirator does not completely eliminate the risk of infection so it should be accompanied by hand and personal hygiene? (Yes)	104(87.3%)	84(93.3%)	85(96.5%)	19(100%)	57(90.4%)	23(100%)	0.062
What type of mask should a COVID-19 patient wear? (surgical)	30(25.2%)	20(22.2%)	34(38.6%)	5(56.3%)	18(28.5%)	7(30.4%)	0.086

PRACTICE

Statements		House officer	Residents	Consultant	Medical officer/ RMO	Para medical staff	Allied health professionals	P value
		N out of 26 (%)	N out of 29 (%)	N out of 17 (%)	N out of 4 (%)	N out of 10 (%)	N out of 2 (%)	
While wearing an N95 or N99 respirator what steps out of following do you follow?	0-3 (poor)	5 (19.3%)	9 (31.0%)	3 (17.6%)	2 (50%)	7 (70%)	2 (100%)	0.016
	4-6 (moderate)	8 (30.7%)	9 (31.0%)	2 (15.3%)	1 (25%)	1 (10)%	0	
	7-9 (good)	13 (50.0%)	11 (37.9%)	13 (76.4%)	1 (25%)	2 (20%)	0	
		N out of 117 (%)	N out of 28 (%)	N out of 18 (%)	N out of 18 (%)	N out of 62 (%)	N out of 22 (%)	
While wearing a surgical mask what steps out of following do you follow?	0-2 (poor)	39 (33.3%)	24 (27.27%)	17 (20.9%)	2 (11.1%)	27 (43.5%)	13 (59.0%)	0.002
	3-4 (moderate)	23 (19.6%)	29 (32.9%)	13 (16.0%)	7 (38.8%)	9 (14.5%)	3 (13.6%)	
	5-6 (good)	55 (47.0%)	35 (39.77%)	51 (62.9%)	9 (50%)	26 (41.9%)	6 (27.2%)	
		N out of 119 (%)	N out of 90 (%)	N out of 88 (%)	N out of 19 (%)	N out of 63 (%)	N out of 23 (%)	
While removing a surgical mask what steps do you follow?	0-1 (poor)	31 (26%)	24 (26.6%)	14 (16%)	1 (5.2%)	24 (38.1%)	12 (52.1%)	0.039
	2-3 (moderate)	31 (26%)	26 (28.8%)	29 (33%)	5 (26.3%)	16 (25.4%)	5 (21.7%)	
	4-5 (good)	57 (48%)	40 (44.4%)	45 (51%)	13(68.4%)	23 (36.5%)	6 (26.1%)	

to a previous study that showed 93% of HCPs knew this correctly.[10] CDC recommends this as metal strip improves the fit and filtration of surgical mask,[18] Even a correctly worn surgical masks is more effective than an N95 respirator even when respirators provide a better seal and fit.[19]

Most 81.6% of people were sure that they wore their masks correctly, However only 14.8% of those respondents who answered that they knew all the steps in wearing an N95 respirator, actually had a satisfactory practice. And 68% of those respondents who answered that they knew all the steps in wearing a surgical mask and actually had a satisfactory practice. Similar lack of practice was documented by a study in Hong Kong on general public about knowledge and practice of mask where 88.5% respondents had this perception and only 52.0%Êcorrect answers.[17] This drastic difference of knowledge and practice in may be due to the reason that masks and respirators have a simple design and HCPs can assume they know the its correct method of donning, doffing and use. The lack of knowledge about the correct steps and inadequacy to follow them may also be secondary to absence of instructions on packaging of masks and respirators. In most countries manufacturers have no guidelines on the packaging for masks and respirators to follow. Also designs, colours, types, size differ manufacturer to manufacturer and lack proper of knowledge and instructions make it difficult to wear mask and respirator properly.[17]

Previous study showed that, 80% of HCPs were aware that fit test should be done while using an N95 respirator.[20] But only 56.8% of HCPs in our study performed it while donning a respirator. Similarly our study shows 79.5% HCPs did not know that in people with facial hair it is not ideal to wear N95/N99 respirator as it doesn't create an efficient seal.[21] Without the fit test it is not known whether or not a seal is created and without a seal the efficacy of N95 to minimise transmission of infection is reduced.[22,23] This reveals that although people perceived that they are wearing their masks

Table 3 Steps of Practices followed By HCPs for Wearing and Removing Mask or a Respirator

Steps of wearing an N95 Respirator	**N Out Of 88 Who follow the steps %**
Making sure the mask is fit tested for you and you have correct size for your face.	55 (62.5%)
Check its integrity and the elastic bands.	50 (56.8%)
Clean your hands with soap and water or hand sanitizer.	68 (77.3%)
Hold mask over your nose and mouth with the nose clip facing top with the dominant hand.	63 (71.6%)
Holding the top strap and placing it over the crown of your head.	54 (61.4%)
Holding the bottom strap and placing it over the base of your neck.	53 (60.2%)
Pinch the nose strip with both hands to mold to the shape of your nose.	54 (61.4%)
Perform the air test (blowing air into your mask and checking if air escapes through the sides).	39 (44.3%)
Making sure person using N95 or N99 respirator does not have any facial hair.	18 (20.5%)
Steps of wearing a surgical mask	**N Out Of 388** Who follow the steps **%**
Clean your hands with soap and water, or hand sanitizer.	287 (73.97%)
Hold mask in a way that stiff bendable strip is on top.	244 (62.89%)
Secure mask over your nose and mouth by its band or loops.	254 (65.46%)
Pinch the nose strip to mold to the shape of your nose.	264 (68.04%)
Pull the top and bottom of the surgical mask over your mouth and chin.	233 (60.5%)
There should be no gap in between the skin and mask to allow unfiltered air to pass through.	208 (53.61%)
Steps of removing a mask	**N Out Of 402** Who follow the steps **%**
Avoid touching front of the mask.	257 (63.93%)
Clean your hands with soap and water, or hand sanitizer, before touching the mask.	193 (48.01%)
Remove mask by holding the loops/bands/elastic.	310 (77.11%)
Dispose of the mask in the trash bin designated for infected waste/yellow bins. (Not keeping it below your chin or in your pocket when not in use).	218 (54.23%)
Clean your hands with soap and water, or hand sanitizer again, before touching anything else.	250 (62.19%)
Practice	**N Out Of 402** Who follow the steps **%**
Do you cover your mouth and nose while sneezing or coughing even while wearing a mask? (yes)	289 (71.89%)

correctly, in reality they are not. (Table 3)

Regarding overall practice, the best practice is among the consultants, then house officers. Residents and paramedic staff had a similar practice. AHCPs have quite poor practice despite their good knowledge. This shows that HCPs do know sufficiently about the use of masks but when it comes to practically using one, they lack expertise. (Table 2)

Regarding comparison of level of education to practice, it can be concluded that the practice was best among postgraduate group overall yet still unsatisfactory. Matriculation group had very poor practice; this tells us there is more lack of training and teaching among those HCPs do not possess any higher education (p-value>0.05).

It can be concluded that consultants had the good practice regarding wearing an N95 respirator and surgical mask whereas PMS had the poorest practice. (Table 2)

During the initial days of COVID-19 there was a global shortage of masks, and patients and HCW were forced to reuse one time use disposable masks.[22] This is a unanimous observation that led us to include a question regarding the reuse of disposable surgical masks. Although, 98.3% of the respondents knew that the masks cannot be reused or shared, still 52.5% of them reported reusing the single use surgical masks. The main reason given by most was limited availability of mask and respirators. Similar practice was pointed out in a previous study that 20.2% HCPs reused their mask.[10] This shows that the availability of PPE for HCPs is limited in hospitals, forcing them to reuse surgical masks. This is similar to other reports.[22]

In the pre-COVID times, masks and specially N95 respirators were not used routinely even in hospitals. Therefore, the knowledge and practice about their use are inadequate. In order to improve the practice and knowledge among HCPs,

education and training through social media, print media, televisions, videos, virtual workshops and demonstrative workshops must be done along with their regular and repetitive reinforcement as mentioned in previous studies conducted in Pakistan.[22,24,25] As a previous study of Pakistan shows that only 58% of HCPs have institutional and departmental guidelines and 70% use online resources for knowledge.[22] Hence, mediums like social media, print media, virtual workshops and various online resources can be used to educate HCPs and public about the disease and prevention.

The strength of the study included a comprehensive questionnaire, diversity of respondents and a relatively larger sample of HCPs. However, considering the total number of HCPs in Pakistan, 402 appear to be a small sample size. In addition, there were very few respondents from Baluchistan, Kashmir and Gilgit-Baltistan.

CONCLUSION:

Knowledge of Pakistani HCPs about masks and respirators was satisfactory but the practice of wearing and removing is poor and not in line with the current guidelines by WHO and CDC. Majority HCPs reported that they considered wearing mask/respirators in correct way but in reality; only one third of participants knew all the steps of wearing a surgical mask and a few knew all the steps of wearing an N95 respirator. Concepts like fit test, seal and integrity of the mask and respirators, hand hygiene, life of one mask/respirator and their reuse were not clear to most of the respondents. We recommend that masks and other PPE must be available to HCPs at all times to ensure their safety and to avoid cross contamination between vulnerable patients. Moreover every person working in the hospital should be trained in the correct ways of donning, doffing and disposal of PPE.

Authors Contribution:
Javaria Saleem: Drafting of the work and Final approval of the version to be published
Eelaf Karar: Drafting of the work and Final approval of the version to be published
Omer Farooq Choudary: Interpretation of data and Final approval of the version to be published
Faiq Munir Shaikh: Conception or design of the work; or the acquisition, analysis, or interpretation of data for the work and Final approval of the version to be published
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Original Article **Open Access**

Mirizzi Syndrome: An Experience in Laparoscopic Era

Syed Mukarram Hussain, Asrar Ahmad, Muhammad Awais Mughal, Irum Saleem, Saqib Islam

ABSTRACT:

Objective: To assess the presentation and surgical management of Mirrizi syndrome patients who underwent Laparoscopic Cholecystectomy.

Study Design and Setting: Retrospective Descriptive Study was conducted at Surgical Department Combined Military Hospital Rawalpindi and Combined Military Hospital Quetta from 1st Jan 2010 to 20th Jan 2016.

Methodology: Patients undergoing laparoscopic cholecystectomy during this period were retrospectively reviewed. All cases of Mirizzi Syndrome (MS) were identified and data analysed.

Results: A total of 5500 patients underwent laparoscopic cholecystectomy during this period. Approximately 26(0.47%) cases were identified to be having MS. Out of these 26 cases only 8 (30%) were males while 18 (70%) were females. Age ranged from 25 to 80 years. Three patients (11%) had an endoscopic retrograde cholangiopancreaticography (ERCP) done. Type-I MS was found in 19 cases (73 %), Type-II in 3 cases (11%), Type-III and Type-IV in 2 cases each (7.69 %). Conversion to open surgery was carried out in 15 cases (57.6 %). All type-I MS had cholecystectomy except one case where partial cholecystectomy was done. T-tube closure of common bile duct was done in all Type-II MS. Similarly T-tube closure was possible in two cases of type-III while one had Roux-en-Y hepaticojejunostomy. All cases of type-IV MS had Roux-en-Y hepaticojejunostomy. One patient out of 26 (3.8 %) had carcinoma gallbladder. There was no mortality.

Conclusion: Type-I MS can be managed with laparoscopic cholecystectomy in selected patients.Type-II and type-III MS may need placement of T-tube while most of type-IV MS are managed with Roux-en-Y hepaticojejunostomy.

Key words: Cholecystectomy, Cholangiopancreaticography, Hepaticojejunostomy, Mirizzi Syndrome.

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INTRODUCTION:

Gallstone disease is a very common condition mostly affecting fertile females ranging from 11% to 36%.[1] It is most commonly seen in 3rd to 5th decade of the life.[2] Symptomatic gallstones can cause a number of complications including mucocele, empyema, xanthogranulomatous cholecystitis, emphysematous cholecystitis, gallbladder wall perforations, pericholecystic abscesses, Mirizzi syndrome, cholecystoenteric fistulas, choledocholithiasis, gallstone pancreatitis, porcelain gallbladder and obstructive jaundice due to the slippage of stones in common bile duct.[3] Mirizzi syndrome is defined by compression of the common hepatic duct (CHD) by a gallstone either in the Hartmann's pouch or cystic duct with the formation of cholecystobiliary fistula. The clinical features are that of obstructive jaundice, fever, and right upper quadrant pain. Due to the unusual nature of the disease, Mirizzi syndrome is rarely identified preoperatively.[4] It has been reported in the literature that MS is found in 0.3% to 5% of all cholecystectomies.[5]

Pablo Mirizzi explained this condition for the first time in detail hence it is named after him. A preoperative diagnosis or identification of MS during open or laparoscopic surgery can forewarn the operating surgeon and is necessary to avoid bile duct injuries in cases of complicated cholecystitis.[6] In laparoscopic era due to better visibility and appreciation of the anatomy most of the cases are easily diagnosed and promptly treated. Laparoscopic cholecystectomy can safely be attempted in type 1 MS and seems to have fewer overall complications and shorter length of stay compared with an open approach.[7] General surgeons without long experience in hepatobiliary surgery should refer the patient to a specialized hepatobiliary surgical center.[8] Therefore; this study was to retrospectively review all the cases of

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laparoscopic cholecystectomy for MS and their management during six years of experience.

METHODOLOGY:

This study was carried out at the Department of General Surgery, Combined Military Hospital Rawalpindi, Pakistan from 1st January, 2010 to 31st July, 2015 and then at Combined Military Hospital Quetta, Pakistan from 1st August 2015 to 1st February, 2016. All patients including males and females undergoing elective Laparoscopic Cholecystectomy with age ranging from 25-80 years were included. All patients with Acute Biliary Pancreatitis, Empyema Gall Bladder, Gall Bladder perforation and Cholecysto-enteric Fistula were excluded. Prior approval from hospital ethical review committee was taken. Hospital records of all the patients who had laparoscopic cholecystectomy were reviewed. Cases of MS were identified. Patient's demographic data, preoperative investigations, operative procedures carried out and outcome were analysed by using SPSS version-20.

RESULTS:

A total of 5500 patients underwent laparoscopic cholecystectomy during this period. Out of 5500 only 26 cases were identified to be having MS (0.47 %). Out of 26 only 8 (30%) were male patients while 18 (70%) were females. The youngest patient was 26 years old while the upper age limit was 80 years. Mean age was 46.5years. Preoperatively all the cases were investigated with an ultrasound abdomen and liver function tests. Three patients (11%) were preoperatively identified to be having obstructive jaundice and had an endoscopic retrograde cholangiopancreaticography (ERCP) done to rule out choledocholithiasis. Type-I MS was found in 19 cases (73 %), Type-II in 3 cases (11%), Type-III and Type-IV in 2 cases each (7.69 %). Conversion to open cholecystectomy was done in 15 cases (57.6 %). Single calculus was found in 4 cases (15 %) rest were having multiple calculi (85%). In all type-I MS, cholecystectomy was possible except one case where partial cholecystectomy was done. Stones were removed from the Hartmann's pouch and it was closed with interrupted absorbable sutures. T-tube closure of common bile duct was done in all Type-II MS. T-tube cholangiogram was carried out on seventh post-operative day and on finding no obstruction it was removed. Similarly T-tube closure was also possible in two cases of type-III while one had Roux-en-Y hepaticojejunostomy. All cases of type-IV MS had Roux-en-Y hepaticojejunostomy. One patient had minor wound infection post-operatively which was managed by laying open the wound and change of dressings. Only one patient out of 26 (3.8 %) was found to be having carcinoma gallbladder. The mean post-operative hospital stay was 7 days. There was no mortality.

DISCUSSION:

Mirizzi syndrome is a very well-known condition which is defined as "obstruction of the common hepatic duct (CHD) due to pressure or compression by a stone lodged in the neck or Hartmann's pouch of the gall bladder.[9]" However, a surgical case of MS has been reported by Milone M et al[10] which was due to acalculous cholecystitis. Since the publication of this case in 2014, we here propose a new definition as "obstruction of the CHD due to compression by the neck or the Hartmann's pouch of the gall bladder."

The incidence of MS reported in the literature during cholecystectomies varies from 0.7 to 1.8 %.[11,12] In this study; MS was among 0.47 % patients. It is almost similar to the findings of Xu XQ et al[13] (0.3%) but different from Erben Y et al (0.18%).[14] MS is clinically important because it may not be diagnosed preoperatively and during surgery the common bile duct (CBD) or common hepatic duct may be at a high risk of injury.[15] The most widely accepted classification, Mc Cherry[16] classified MS into two types in 1982. Type-I concluded only compression of the common hepatic duct while Type-II consisted of the more advanced form of disease with formation of cholecystocholedochal fistula. In 1989 another classification was proposed based on the presence and extent of fistula as follows:[17]

Type I – Compression of CHD by stone impacted at the neck of gallbladder without fistula

(Type II-IV – Cholecystocholedochal Fistula)

Type II- Fistula involving upto one thirds of diameter of CHD

Type III- Fistula involving upto two thirds of diameter of CHD

Type IV- Fistula involving more than two thirds of diameter of CHD

In this study proposed modification of the above classification incorporating MS due acalculous cholecystitis as follows:

Type-I : Compression of CHD without a fistula by the gallbladder neck or Hartmann's pouch

Type-II : Cholecystocholedochal Fistula

Type-IIa: Fistula involving less than half of diameter of CHD

Type-IIb: Fistula involving more than half of diameter of CHD

As this is a more practical classification as far as the treatment is concerned. Type-I cases are managed by partial or complete cholecystectomy by open or laparoscopic surgery. Type IIa cases can be managed by choledochoplasty or T-tube closure but type-IIb cases would require some form of bilioenteric anastomosis.

It was found that MS was associated mainly with multiple small calculi (85%) rather than single large calculus (15%) which is frequently thought to be the more common cause. MS can be clinically diagnosed by symptoms of obstructive jaundice with fever and pain in the upper abdomen on right side. [18] The preoperative diagnosis of MS can be made on

ultrasonography, ERCP, Magnetic resonance cholangiopancreaticography (MRCP) and percutaneous tranashepatic cholangiography (PTC). ERCP is preferred because it can be therapeutic at the same time as well by removing CBD stones and as placing a biliary stent.[11] In our study laparoscopic surgery was successful in 42.4 % cases. A systematic review of ten case series carried out by Antoniou SA et al[19] shows 59% successful laparoscopic management of MS. However in another retrospective analysis by Erben Y et al[14] laparoscopic surgery was possible in only 33% cases at Mayo's clinic.

In our series, 3.8 % (one out of 26) patients with MS harboured gallbladder cancer and Parsad TL et al[20] has reported an incidence of 5% (7 out of 133 cases) which is almost similar to ours.

CONCLUSION:

Type-I MS can be managed with laparoscopic cholecystectomy in selected patients.Type-II and type-III MS may need placement of T-tube while most of type-IV MS are managed with Roux-en-Y hepaticojejunostomy.

Authors Contribution:
Syed Mukarram Hussain: Data collection
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Muhammad Awais Mughal: Acquistion of data
Irum Saleem: Drafting of work
Saqib Islam: Drafting of work

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Original Article **Open Access**

Interest and Attitudes of Medical, Dental Students and Graduates Towards Pursuing Career in Basic Sciences

Emal Heer, Sohail Saadat, Omaima Anis Bhatti

ABSTRACT

Objectives: To assess attitudes and perception of medical as well as dental students and graduates about a career in basic sciences from a public sector institute of Karachi.

Study design and setting: A cross-sectional survey carried out using an online questionnaire amongst medical and dental final year students and graduates from Dow University of Health Sciences, Karachi, Pakistan.

Methodology: Data collected was analyzed using SPSS version 24.0. Chi-square test was used to compare categorical variables with likert scale responses regarding attitudes and perceptions about a career in basic sciences.

Results: Out of 315 participants, 41.3% showed interest in basic sciences career. 46.4% of graduates showed interest in basic sciences compared to 15.4% of students. Chi-square test did not reveal any significant association between medical and dental students and graduates and their attitudes and perceptions regarding a career in basic sciences.

Conclusion: Overall, a more positive response towards basic sciences was observed in our study, with graduates reported being more attracted to a basic sciences career than students. However, majority believed there is lack of motivation and awareness about this career path, limited career and post-graduation options in basic sciences, no patient interaction and pressure from family creates disinterest in this career.

Keywords: Attitudes, Basic science career, Medical and Dental, Students.

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INTRODUCTION:

Basic sciences build the foundation for understanding clinical teaching and learning.[1] In Pakistan, Basic Medical Science subjects such as Anatomy, Physiology, Biochemistry, Pharmacology, Pathology and Microbiology are taught at an undergraduate level in the five-year and four-year curriculum of Bachelors of Medicine and Bachelor of Surgery (MBBS) and Bachelors of Dental Surgery (BDS), respectively. Additionally, Basic Dental Science subjects such as Oral Biology and Tooth Morphology, Oral Pathology, Community Dentistry and Science of Dental Materials are taught in preclinical years of BDS.

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Deciding a future career path is an important yet complicated task especially for medical and dental students. An individual's inclination toward a particular career depends on various factors coupled with awareness and attitude towards different pathways in their field of study.[2] For a medical graduate, future certainty, good earning and a better working environment direct the preference for a career path.[3] Furthermore, rotating in different specialties during their time in medical school help students decide a career path in a particular specialty after graduation.[4] Basic sciences can be opted as a potential career rather than just a prerequisite to get promoted to clinical years, a concept that needs reinforcement amidst students.[5] Career options after graduating from a medical school initially fall into two broad categories, namely clinical sciences and basic sciences.[6]

It has been observed that students become more averse to basic sciences as they progress through medical school,[7] resulting in graduates distributing unevenly throughout different medical specialties leading to shortage in one field and overload in an other[8,9] Medical students of Juntendo University School of Medicine in Tokyo, Japan reported a 24.5 % rate of interest in basic sciences and considered it as one of their career paths, They also described the shortage of teaching faculty required in basic sciences and are working on it to alleviate this problem.[10]

Another study found that only 10% of third-year MBBS students in a medical college in Lahore, Pakistan, were interested in basic medical sciences. Therefore, reasons for lack of inclination towards basic sciences in our region also need to be explored. While several studies have been conducted on MBBS students showing lack of interest in basic sciences and considering it as a career option, there is little information available about the perspectives of medical and dental students and graduates regarding it. Therefore, the objective of this study was to assess the interests attitudes and perceptions of medical as well as dental students and graduates towards pursuing a career in basic sciences from a public institution in Karachi, Pakistan,

METHODOLOGY:

This cross-sectional survey was carried out amongst medical and dental final year students and graduates including house officers from four medical and three dental constituent colleges of Dow University of Health Sciences, a public sector university in Karachi, Pakistan, regarding their attitudes and perception about a career in basic sciences. Approval from Institutional Review Board of Dow University of Heath Sciences was taken before the start of study [Ref: IRB-1815/DUHS/Approval/2020] dated 1st December, 2020. Objective of the study was explained in questionnaire, consent of participation and assurance of confidentiality of all the information provided was acknowledged. Participants were allowed to refuse or withdraw from study at any time.Final year students and graduates within 5 years of graduation were chosen. Respondents who provided incomplete responses were excluded. Sample size was calculated using an Open Epi calculator. The proportion of considering basic sciences as a career path was 23.0% among medical students according to Y.Yamazaki et al.[10] With 5% margin of error and 95% confidence level, the total estimated sample size came out to be 273. A self-designed questionnaire was made using Google docs, adopted from a study conducted at a medical school in Tokyo, Japan[10]. After the approval from Institutional Review Board, study tool questionnaire was applied to 30% of total sample size (n=80) for the purpose of validation. Cronbach's Alpha was used to evaluate internal consistency of the questionnaire which was within an acceptable range (0.644). After validation of the questionnaire, participants who fulfilled the inclusion criteria were contacted through social media (eg: WhatsApp, Instagram, Gmail, Facebook) and were asked to fill out an online questionnaire with informed consent.

Questionnaire consisted of 3 sections; 1: basic demographic details, 2: interest/disinterest in pursuing a career in basic sciences, which consisted of three sub headings as follows: a) interest in basic sciences as a career option, b) reasons of interest in basic sciences and c) reasons of disinterest in basic sciences and 3: a 5 point Likert scale questions ranging from "strongly agree "to "strongly disagree" on attitudes and perception about a career in basic sciences. Responses were analyzed first which were later merged (strongly agree/agree=1, neutral=2, strongly disagree/disagree=3)-Table 1. Data collected was entered and analyzed using SPSS version 24.0. Frequencies of categorical variables and multiple responses were calculated. Chi-square test was used to compare categorical variables with Likert scale responses regarding attitudes and perceptions about a career in basic sciences and interest in basic sciences. P-value of <0.05 was considered significant. Results were presented using tables and figures.

RESULTS:

A total of 316 individuals responded to the questionnaire, out of which one participant was excluded from study for not fulfilling the inclusion criteria. Demographic details of participants were shown in Table 1. Mean age of participants was 25.37±2.150. Ratio of females and dentists/dental students who responded were more than medical students and males, as study design was convenience sampling, results made were according to questionnaires returned by the population *Interest in Basic Sciences as a career option:* Overall, a total of 130 (41.3%) participants showed interest in basic sciences as a career option while 120 (38.1%) showed no interest and 65 (20.6 %) were not sure about it (Table.1**)**. Reasons of interest and disinterest are shown in Table 1. Chi-square test was applied between categorical variables and their interest in basic sciences as a career option. Educational level and marital status had a significant association with interest in basic sciences, out of all graduates, 46.4% showed interest whereas amongst final year students only 15.4% of students showed interest in basic science career from both disciplines MBBS and BDS respectively (p-value: 0.001). Similarly, out of all married individuals, 47.5% showed interest in basic science career that was slightly higher than those who were single 37.4% (p-value: 0.032). Gender, professional qualification, and employment status did not significantly influence the interest towards choosing a career in basic sciences (p-values: 0.586, 0.171 and 0.472 respectively) (Table.2) Attitudes and perception about a career in Basic Sciences: Chi square test was used to compare different variables with relevant Likert scale questions regarding their attitudes and perception about a career in basic sciences. Chi square test did not reveal any significant difference as any level of education or graduation, employment status, gender, field of study or marital status did not impact their attitudes and perceptions towards a career in basic sciences. Almost similar agreement responses among both medical and dental students and graduates were observed. Majority of students and graduates agreed to statements regarding a perception that "There is a lack of awareness amongst medical students/graduates regarding basic sciences as a career option" (p-value=0.092), also that "There are limited post-graduation or employment options in basic sciences" and "lack of motivation for pursuing career in basic sciences due to no patient interaction and

Table.1. Attributes of participants(n=315)

Demographics		**N**	**%**
Gender	Male	52	16.5
	Female	263	83.5
Age	21-23	78	24.8
	24-26	131	41.6
	27-29	106	33.6
Professional qualification	MBBS	110	34.9
	BDS	205	65.1
Current educational level	Final year student	52	16.5
	Medical house officer	18	5.7
	Dental house officer	55	17.5
	Graduated done with house job	190	60.3
Current position after graduation	House officer	69	21.9
	Post graduate trainee	43	13.7
	Employed	91	28.9
	Unemployed	60	19
	Not applicable	52	16.5
Marital status	Single	195	61.8
	Married	120	38.1
Interest/Disinterest in pursuing a career in basic sciences			
		N	%
Interest in basic sciences as career option	Yes	130	41.3
	No	120	38.1
	Not sure	65	20.6
Reasons of interest in Basic sciences (multiple responses)	I am interested in research	53	27.5
	I am interested in teaching and/or non-clinical job	45	23.3
	Better balance between work and life	54	28
	Better working place/environment and/or working hours	34	17.6
	No particular reason	7	3.6
Reasons of disinterest in Basic Sciences (multiple responses)	I entered medical college to become a clinical practitioner	117	52
	I am not interested in pursuing a career in basic sciences	45	20
	I am not interested in academia related career	29	12.9
	Basic sciences won't pay me enough	9	4
	Family/peer pressures	7	3.1
	No particular reason	18	8

Table-2. Comparison between variables and Interest in basic sciences or research as career option

Variables		**No (n/%)**	**Yes (n/%)**	**Not sure (n/%)**	**P-value**
Gender	Male	23(44.2)	20(38.5)	9(17.3)	0.586
	Female	97(36.9)	110(41.8)	56(21.3)	
Professional qualification	MBBS	49(44.5)	43(39.1)	18(16.4)	0.171
	BDS	71(34.6)	87(42.4)	47(22.9)	
Current educational level	Final year students	27(51.9)	8(15.4)	17(32.7)	0.001
	Graduates	93(35.4)	122(46.4)	48(18.3)	
Current position after graduation	Employed	72(35.5)	91(44.8)	40(19.7)	0.472
	Unemployed	21(35.0)	31(51.7)	8(13.3)	
Marital status	Single	73(37.4)	73(37.4)	49(25.1)	0.032*
	Married	47(39.2)	57(47.5)	16(13.3)	

Table 3. Attitudes and perception of medical and dental students and graduates about a career in basic sciences ($?^2$ test)

Statement		Agree	Neutral	Disagree	p-values
There is a lack of awareness amongst medical students/graduates regarding basic sciences a career option	MBBS	100(90.9%)	4(3.6%)	6(5.5%)	0.092
	BDS	173(84.4%)	22(10.7%)	10(4.9%)	
There are limited post-graduation or employment options in basic sciences	MBBS	75(68.2%)	27(24.5%)	8(7.3%)	0.418
	BDS	154(75.1%)	39(19.0%)	12(5.9%)	
There is a lack of motivation to pursue career in basic sciences because of no patient interaction and little use of medical training	MBBS	86(78.2%)	20(18.2%)	4(3.6%)	0.090
	BDS	179(87.3%)	20(9.8%)	6(2.9%)	
Basic science research is not as well recognized and not given enough importance as clinical research	MBBS	80(72.7%)	22(20.0%)	8(7.3%)	0.853
	BDS	155(75.6%)	37(18.0%)	13(6.3%)	
There a lack of encouragement for pursuing basic sciences by teachers and medical community around you	MBBS	82(74.5%)	21(19.1%)	7(6.4%)	1.000
	BDS	153(74.6%)	39(19.0%)	13(6.3%)	
Pressure from family and society makes most students choose clinical career path	MBBS	70(63.6%)	27(24.5%)	13(11.8%)	0.294
	BDS	114(55.6%)	55(26.8%)	36(17.6%)	

little use of medical training" (p-value=0.418 and 0.090 respectively). They also perceived that basic science research is not as recognized and given importance as clinical research (p value=0.853), "pressure from society makes most students choose clinical path" (p-value=0.294) and "There a lack of encouragement for pursuing basic sciences by teachers and medical community around you" (p-value: 1.000) (**Table.3**).

DISCUSSION:

Career in basic medical and dental sciences mainly revolves around academic teaching and research. Moreover, basic science research ultimately paves the way for thoroughly understanding and reforming clinical medicine and practice for the well-being of patients.[11] A study conducted in an Australian critical care unit stressed the importance of basic science research in clinical practice, where 74% of health professionals concluded that basic sciences holds a significant impact on clinical diagnosis.[12] Medical graduates find clinical sciences more attractive than basic sciences because there is a general perception that it offers a more secure and profitable job, on the other side, students avoid opting for basic sciences as they believe it may narrow down their skills to teaching only without any clinical development.[13] To reinforce this, a study in Nepal concluded that only 9% of students preferred basic sciences for post-graduation.[5]

Previous studies conducted at an undergraduate level and few among house officers of various medical colleges of Pakistan and abroad revealed a basic sciences career being least preferred by medical students.[5,9,10] This study, however, focused on final year students along with graduates including house officers up to five years of their graduation from both medical and dental backgrounds. Final year students and graduates within 5 years of graduation were chosen as they have understanding of both basic and clinical sciences and they still remain undecided about their career[3], with four medical colleges and three dental colleges affiliated with Dow University of Health Sciences, Karachi, Pakistan participating in the study. Overall, a more positive response towards basic sciences was observed in this study. Total 41.3% participants showed interest in basic science career which was comparatively higher than the studies conducted previously. For example, a similar study with contrasting results carried out at Dow International Medical College, Karachi, Pakistan, showed only 4.1% of medical students choosing basic sciences as a preference for a prospective career.[14]

In this study, graduates reported being more attracted to a basic science career than students. In a study conducted amongst final years and graduates (house officers) in Karachi, Pakistan, both groups showed no significant difference in choosing a career specialty, contrasting to this study where a larger sample of graduates was taken, and seemed to be more interested in basic sciences as compared to students.[15] One explanation to this could be that after graduation many students get more exposed to different specialties during house-job which might influence their choices, since they get to experience the clinical workload more closely. Secondly, country like Pakistan; there are limited seats in every post graduate program specially in dental medicine, along with a decreased passing ratio of post graduate exams and high saturation and competitiveness in employment in clinical fields, which might result in graduates being more inclined towards other specialties such as basic sciences.[16] Deducing from this study, married individuals showed more interest in basic science career, which could be result of prioritizing their family along with receiving a stable income and a better lifestyle which might lead to more preference for this specialty.

Studies suggest career counseling for medical students is imperative, as many students despite being exposed to every specialty still remained doubtful at the end of their undergraduate school.[17] However, it can be deduced from our findings that career related decisions may get defined

years past graduation as well and studies should not be limited to the student level only. Career choice is driven by an array of factors which leads to a final decision. One such factor is a promising lifestyle with a better work life balance along with flexibility in timings, which comes with a basic sciences job.[18] On the other hand, the desire of becoming a clinician proves to be a demotivating factor for a basic sciences profession. It has been seen that no patient interaction leads to decreased interest and motivation towards a basic sciences career.[19] Secondly, in this study only 3% considered pressure from family as a reason for disinterest in basic sciences, which is consistent with the results of another study where dental students perceived enforcement from family least important factor deciding a career.[20] However, on a larger scale, societal and family pressure does play a very influential role in deciding career paths in this part of the world, as clinicians are held in the highest regard and a basic sciences job is considered less important in society. This perception needs to change in the society as a whole, since basic sciences contribute heavily to evolving clinical medicine through advancing research in clinical pharmacology and understanding of disease pathology.

As many students opt for a career in clinical specialties rather than basic sciences, a deficiency of teaching faculty in many medical institutes is created[8], and this issue requires utmost attention, as 38.1% of respondents showed disinterest for basic sciences in the study which still a big number which should not be ignored. Hence, it's important to provide sufficient career counseling for both broad categories of career paths. Study showed no significant differences with nearly similar responses among variables regarding their attitudes and perception about a career in basic science. However, majority of the students in this survey from both disciplines agreed that there is lack of awareness among students about basic science career and there are limited post-graduation/employment options in basic sciences. In findings of a similar study, dental students reported being less aware of the variety of career options and were less interested in research related fields.[21] This could be linked to students from our study being unfamiliar about further studies and employment options in this specialty. In a similar research, dental students reported insufficient knowledge and awareness about research related career, as most perceive clinical experience being more essential than research.[22] In this part of the world, dental science students usually perceive that basic medical science careers are only available to medical students, a concept that needs to be redefined.

Respondents from study believed to some extent that basic sciences research is not given as much heed as clinical research which might result in little or no interest in basic sciences careers. Attention given to basic science research at undergraduate level is poor, which needs improvement as it can impact clinical skills as well as career choices later on.[23] As in a survey of 2019, basic science was not a preferred career among students as most of them were not satisfied with basic science teaching and did not feel it's relevance to clinical practice.[24] Similarly, in this study they also felt lack of interest in basic science career is due to no patient interaction in this field which leads to students being more attracted to clinical sciences. Opportunities should be given to those in basic sciences to have some patient interaction alongside research and academics or take part in clinical researches which might overcome this issue.[10] Many participants from study population also confessed that they face lack of encouragement from teachers and medical community for pursuing career in basic sciences, an issue that needs consideration. Students believe that a good teaching faculty plays a major role in creating fascination towards basic sciences.[25] Improvements in respect to awareness about career and post-graduation/employment options should be done. Teachers and fellow educators should work on encouraging and motivating students towards basic science career and more direct clinical role should be incorporated in basic sciences that might attract more professionals towards a career in basic sciences.

CONCLUSION:

More interest has been observed amongst graduates than in students for basic science career. Involving dental students in this survey augmented this study as their interests and perspectives about a career in basic sciences also came into light. However, majority of students and graduates from both disciplines believed there is lack of motivation and awareness about this career path, limited career and post-graduation options in basic sciences, no patient interaction and pressure from family creates disinterest in this career.

Authors Contribution:
Emal Heer: Authors contributed equally in data collection, analysis and writeup
Sohail Saadat: Authors contributed equally in data collection, analysis and writeup
Omaima Anis Bhatti: Authors contributed equally in data collection, analysis and writeup

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Original Article **Open Access**

Outcomes of Gestational Diabetes Mellitus in Pakistani Mothers: An Experience of a Tertiary Care Hospital

Samina Naseem Khattak, Abid Hussain Shah, Ayesha Imran, Muhammad Irfan Khattak, Khurram Mansoor, Asma Naveed Memon

ABSTRACT

Objective: To assess the incidence and outcome of gestational diabetes mellitus (GDM) during pregnancy among sample of Pakistani population.

Study Design and Setting: This was an analytic case-control prospective study carried out at two centers (CMH Kharian and PNS Shifa Hospital Karachi) from 1st Jan till 30th July 2021.

Methodology Previously healthy mothers were divided into three groups according to their risk of elevated glucose levels gestational diabetes mellitus (GDM) during pregnancy. Associations between GDM eminence (exposure variable) and pregnancy-related, fetal, and neonatal outcomes were reviewed (i.e., mode of delivery, preterm baby, pregnancy-induced hypertension, and fetal macrosomia, stillbirth, premature delivery etc. One way ANOVA was employed to compare the significant differences in different dependent variables amongst three groups. P Values of <0.05 were considered substantial.

Results: A total of 120 patients were divided into 3 groups Group 1 (uncontrolled sugar group) who could not achieve adequate sugar control, Group II (adequate sugar control group) and Group III as control group (Non-Diabetic). The mean age in our population was 24 (+ 4.15) years most of study population 70% of mothers were under 25 years of age. The majority (95%) of deliveries in the control group (Euglycemic) were uneventful, but poor fetal outcomes were noted in groups 1 2 (documented to have elevated blood sugars,) especially in the group with Uncontrolled Sugar. GDM was positively associated with preterm birth, stillbirth and macrosomia.

Conclusion: GDM is a prevalent disease in Pakistan and needs and has association with poor pregnancy outcomes. Urgent attention requires at individual and state level to reduce morbidity and mortality.

Keywords: Gestational Diabetes, GDM, Fetal outcomes.

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INTRODUCTION:

Lot of progress have been made regarding healthcare facilities especially during COVID pandemic and attention have been paid to the development of health disabilities across the world. However, it is feared that over occupation by COVID may result in suboptimal health care for Non COVID related illnesses.

Diabetes is a worldwide challenge and a big health concern. Economic and social development in various countries has led to changes in dietary habits which in its turn posed a massive threat in community. The fact is that not only common population is at risk, but pregnant ladies are especially vulnerable to diabetes and its adverse effects for children and mother.[1] It is a well-known fact that pregnancy with diabetes carries an extremely poor prognosis as adverse fetal and maternal outcomes are usually associated with diabetes mellitus. Recently there has been a surge in diabetic cases, especially in underdeveloped countries. It is believed that excessive use of steroids in treating COVID and sedentary lifestyle during lockdown may be responsible for this phenomenon.[2] In contrast to developed countries surprisingly little research has been carried out in developing countries that are more vulnerable to diabetes mellitus as it is quite a common phenomenon in Asian countries.[3] Although accurate data on the burden of gestational Diabetes Mellitus

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(GDM) are not available because of the lack of unanimously accepted and adopted diagnostic standards and screening approaches.[4-7] GDM is estimated to affect around 1 in 10 pregnant women worldwide Most of the data regarding diagnosis and association of diabetes with other comorbidities has been taken from European countries. Likely, this data may not apply to our communities because of diverse cultural, social, and geopolitical differences.[3,8,9]

In underdeveloped countries like Pakistan GDM has been an immense problem since long time.[10] Recently due to over commitment for COVID and relative in sensitivity of the local communities, it is important that latest trends of GDM and its implications are documented .It is likely that the changed lifestyles and excessive use of medication such as high dose steroids for covid in the recent past has resulted in aggravation of the incidence of GDM .This study can help in getting deep insight into this under recognized problem. This valuable information can be used in further research projects and may help in health care planning in future. Hence; this can add vital information for understanding, planning, and management of this complex regional and global health care issue. This can be compared to the world literature and help to ascertain whether the findings of the international literature are true in this part of world. Therefore: the aim of the study was to assess the incidence and poor outcome of gestational diabetes mellitus (GDM) during pregnancy among sample of Pakistani population.

METHODOLOGY:

This was an analytic case-control prospective study carried out at two centers (CMH Kharian and PNS Shifa Hospital Karachi) from 1st Jan till 30th July 2021. Both these hospitals are tertiary care hospitals. Ethical approval for this study was attained from the PNS SHIFA Ethics Committee for Students Research Projects at PNS Shifa hospital Karachi. The study was conducted in accordance to standards and guidelines of the Declaration of Helsinki of medical research regarding human subjects.

All those patients who reported in the outpatient department for antenatal care were screened for risk factors of Gestational Diabetes (BMI >30kg/m, previous macrocosmic baby 4.5kg or more, previous gestational diabetes, family history of diabetes in first degree relatives, Glycosuria of 2+ or above on one occasion) women with any of these risk factors were tested for gestational diabetes using 75-gram 2-hour OGTT at booking appointment. In addition, women with fasting plasma glucose levels of 5.6 mmol/l or 2-hour postprandial plasma glucose level of 7.8 mmol/le or more were diagnosed as having GDM. They were divided into three different groups. Group 1 (GDM Uncontrolled Sugar group) consisted of patients who were diagnosed as GDM but failed to achieve their targets glycaemia goals because of non-compliance or any other reasons. The second group consisted of GDM patients who were compliant and achieved target glycaemic levels. They were labelled Controlled Sugar group. The third group was the control group, and these patients did not suffer from any comorbidity. All patients who were previously known as diabetic, hypertensive, renal or heart patients were excluded. Similarly, those patients using any medications chronically for reasons other than nutritional supplements were excluded from the study. Sample was calculated using Raosoft sample size calculator. With 95% confidence interval ,and 50% response distribution the sample size was 100 .A recently published study by Musarrat Riaz was also consulted in sample calculation.[11]

Details of the patients were noted and entered on a designated electronic proforma. All the patients were followed up till delivery. Data was analyzed using SPSS v 28. Descriptive statics were obtained for age, parity, blood pressure and adverse fetal outcome. They were expressed as means and percentages. Fetal adverse outcomes were noted as percentages of preterm deliveries, stillbirth, macrosomia, and shoulder dystocia. Associations between GDM eminence (exposure variable) and pregnancy-related, fetal, and neonatal outcomes were reviewed (i.e., mode of delivery, preterm baby, pregnancy-induced hypertension, and fetal macrosomia, stillbirth, premature delivery etc. One way ANOVA was employed to compare the significant differences in different dependent variables amongst three groups. P Values of <0.05 were considered substantial.

RESULTS:

The mean age of study sample was 24 years S.D (+4.15). Mean age was 25 years S.D (+5.23) in uncontrolled sugar group and 26 S.D (+2.72) years in the Controlled GDM group. Significantly, lower mean age was noted in the non-diabetic group at 21 years S.D (+4.15).

Positive family history was strongly suggestive of GDM.A total of 16 (43%) in group 1, 16 (43%) in group II and 5 (14%) in the group III volunteered family history of diabetes mellites. Thereby >80% of the GDM population had a suggestive family history of DM.

Mean systolic Bp was 118 mmHg S.D (+ 9.63) in GDM group as compared to the mean systolic Bp 112mmHg ($p<0.05$). Most (95%) of deliveries in control group were un-eventful. Regarding **fetal outcomes** n=5 still births were noted in the study group and all of them occurred in the GDM group 1. So poor glycaemic control was significantly associated with still births .GDM was decisively associated with other poor fetal outcomes such as shoulder dystocia n=2 (5%), macrosomia n =4 (10%) in GDM Uncontrolled sugar group. Fetal outcome was good in non-diabetic group .A total of n=38 (95%) , normal births were recorded in control group. Merely only n= 19 (48%) of Uncontrolled GDM group had normal births. One way ANOVA test was used to know the significance of difference of poor outcomes results between three study groups. Unfavourable fetal

outcomes were significantly more common in the Uncontrolled GDM group-table-2P value<0.05. In the Controlled sugar GDM group p-value became insignificant. So, good glycaemic control improved fetal outcomes in the second study group but remained above the control group.

DISCUSSION:

This study is the first in Pakistan to substantiate the impact of GDM and its treatment on fetal outcomes and compare it with controls. In this study advanced age, family history of DM/GDM, and previous history of giving stillbirth / miscarriage and suboptimal glycaemic control were associated with increased risk of complicated pregnancy. As far as GDM effects on maternal outcomes, mothers suffering from GDM compared to those without GDM were at elevated risk of C/section delivery, preterm deliveries, pregnancy-related hypertension, and having a macrocosmic Newborn. Mean age was 25 years S.D (+5.23) in GDM Un Controlled sugar group and 26 years S.D (+2.72) in the treated GDM group. Mean age was significantly low in the control group at 21 years S.D (+4.15). This finding signifies the risks associated with increasing age during pregnancy. This fact has been observed in other international literature which states that increased maternal age in pregnancy leads to various complications.[12]

A recently published study in Kuwait by Z Groof, et al addressed the same issue.[8] Their study design was different and included a bigger population size. They noted that the prevalence of GDM was positively associated with advancing maternal age and pre-pregnancy body mass index. They found that GDM was associated with caesarean section delivery (OR=1 76, 95% CI: 1.17, 2.66) and increased birth weight in the fetus (OR=2 36, 95% CI: 1.14, 4.89)5. They also reported poor maternal and fetal outcomes in GDM mothers as was the case in our study. However, their study was limited by the retrospective design and relied on the mother subjective history of being exposed to GDM in the past. This study design lacked objectivity as recall of the previous DM and adverse outcomes cannot be used as reliable criteria to draw credible inferences. Despite having small, control group in the study added an extra dimension to the credibility of data for comparison. All the data was objectively taken and authenticated. The confounder of recall bias was absent in this study.

The mean age of the GDM Uncontrolled Sugar group and Controlled sugar group was around 26 which was significantly higher than the control group 22 years. This finding was in keeping with international studies which state that increased maternal age was associated with poor outcomes for mothers and newborn. Mary Carolan et al linked several factors to increasing prevalence including older maternal age and non-Caucasian ethnicity.[12] They believed increasing maternal age is a risk factor for GDM which is associated with poor pregnancy outcomes. It was mentioned that the highest GDM frequency was seen among Asian women at 11.5%, compared with Australian origin women at 3.7%. They also suggested that there was robust evidence that women born in all regions except North America were more likely to develop GDM in pregnancies at grown-up ages (p<0.001). Study included only Asian ladies only and as mentioned earlier GDM was quite common in the population >25 years of age.[12,13]

Despite the substantial progress in the treatment of diabetes mellitus, still the situation is that both pregestational (PGDM) and gestational diabetes (GDM) poses an additional risk to the embryo, newborn, and course of pregnancy. PGDM usually increase the rate of congenital deformities; especially nervous system, cardiac, and limbs. GDM can interfere with fetal growth, often leads to macrosomia, but in the presence of severe maternal complications, especially nephropathy.It can inhibit fetal growth (IUGR).[3,14] GDM can induce a variety of perinatal problems such as stillbirth and perinatal death, cardiomyopathy, respiratory illness, and perinatal

Table-1: Difference between three groups for adverse Fetal outcomes

Comparison	Sum of Squares	df	Mean Square	F	P-value*
Between Groups	4.550	2	2.275	13.738	<.001
Within Groups	19.375	117	.166		
Total	23.925	119			

***One way ANOVA**

Table 2: Adverse fetal outcomes in GDM group

I) GDM Group	(J) GDM Group	Mean Difference (I-J)	Std. Error	P-Value*
GDM group I (Uncontrolled)	GDM group (Controlled)	.275*	.091	.009
	control	.475*	.091	**<.001**
GDM group II (Controlled)	GDM group (Uncontrolled)	-.275*	.091	.009
	control	.200	.091	.076
Control group III	GDM group (Uncontrolled)	-.475*	.091	**<.001**
	GDM group (Controlled)	-.200	.091	.076

***One way ANOVA**

asphyxia. GDM that develops in the second half of pregnancy induces similar but less severe complications. This severity is directly linked to earlier answers of diabetes, and it reduces with control of blood sugar. Early initiation of GDM might cause some increase in the rate of malformations. all our findings were in confirmation of Asher Ornoy et al.[13] Most of the poor fetal outcomes such as still both, shoulder dystocia and macrosomia occurred in the GDM Uncontrolled Sugar group. Preterm deliveries before 37 weeks (about 8 and a half months) of gestation were noted in all three groups with the predominant percentage in group 1. n=8 (20%) was registered in GDM Uncontrolled Sugar group while n= 6 (15%) and n =1 (2.5%) was found in Controlled Sugar group and control group, respectively. On the other hand, >95% of births in the control group were normal.

Figure: 1 Pie chart showing clustering of suboptimal outcomes in GDM Uncontrolled Sugar group

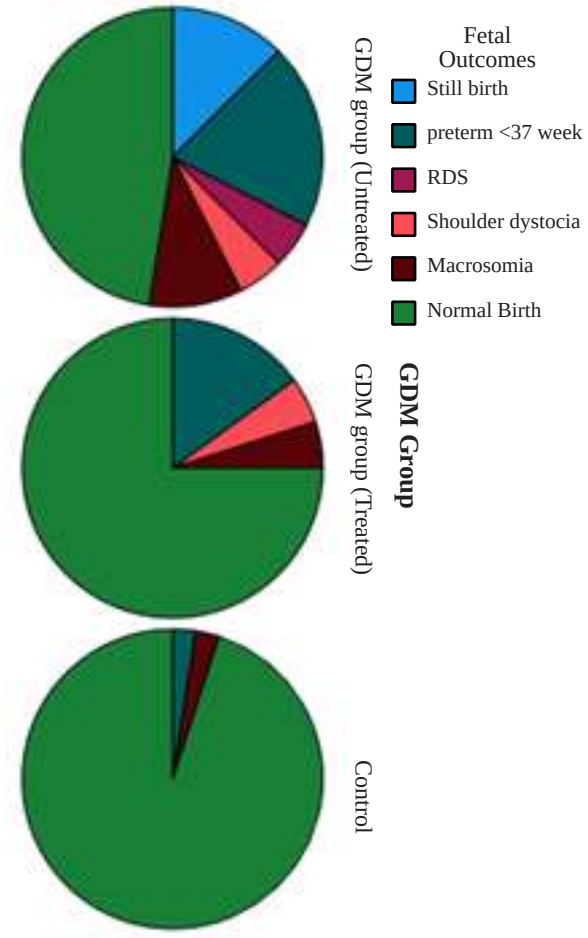
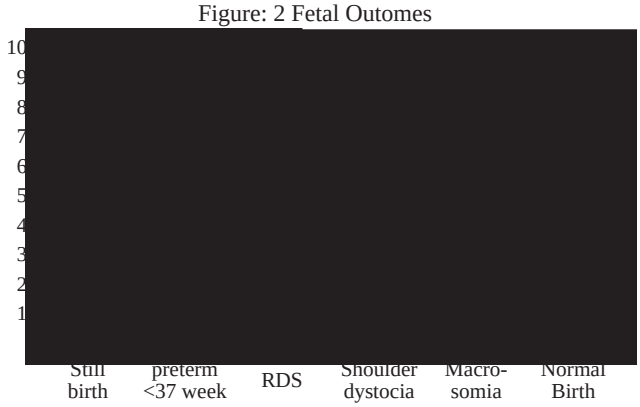


Figure: 2 Fetal Outomes



Another important aspect of our study was that in group 2 where GDM patients who received adequate treatment and attained fair glycaemic control were shown to carry better outcomes than group 1. However, fetal outcome remained poor even in this group in comparison to controls. Ornoy A et al extended their study to long term follow up of various complications in new-born such as attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder etc.[13] This study did not include a long time follow up of such children.

Overall, the findings of this study were in keeping with most of the robust Asian and international literature however the exact magnitude and size of the impact on various variables differed widely.[3,13,15-17]Although there was a lack of quality local literature, no major disparities were noted when compared with our findings.[11,18-21]

This study was limited by a small number of patients and financial constraints. These limitations were the result of a substantial number of study dropouts and poor prenatal follow-up of patients. Individual treatment protocols administered to patients were not studies. The different treatment procedures and protocols for sugar control may have contributed to the different outcomes. Insulin therapy and oral antidiabetic therapy was not observed separately, which could have been a potential confounder. Our sampling method was non-probability random sampling, which may have introduced selection bias. Moreover, PNS Shifa Hospital is the referral hospital for all the naval hospitals in Balochistan, Sind and even Skardu. Of course, only complicated pregnancies are managed in our hospital, which might have led to inflated numbers in the study.

It is recommended that aggressive screening programmes need to be implemented for early diagnosis and treatment of gestational diabetes. More research is needed with larger population size and robust study design to explore this emerging major health issues.

CONCLUSION:

Gestational diabetes is prevalent in Pakistan. Suboptimal sugar control is associated with adverse fetal outcomes. Early recognition and treatment lead to a substantial reduction in various complications like stillbirth, macrosomia, and shoulder dystocia.

Authors Contribution:
Samina Naseem Khattak: Questionnaire designing and improvement, sample collection, statistical analysis, writeup
Abid Hussain Shah: Data analysis, write up
Ayesha Imran: Data analysis, write up
Muhammad Irfan Khattak: Data collection
Khurram Mansoor: Data collection and analysis
Asma Naveed Memon: Data collection and analysis

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Original Article **Open Access**

Anaesthesia Concern in High-Risk Cases Under-Going Ambulatory Laparoscopic Cholecystectomy

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ABSTRACT:

Objective: To evaluate pre-operative implications, anesthetic management and post-operative anesthetic concerns in patients with co-morbid diseases undergoing ambulatory laparoscopic cholecystectomy under general anesthesia.

Study Design and setting: Retrospective study was conducted at Rawal Institute of Health Sciences, Islamabad from 8th Oct 2017 to 5th Nov 2018.

Methodology: Total one hundred and twelve patients were placed in American society of Anaesthesiologist (ASA) class II, III & IV (medically optimized) on pre-operative evaluation for ambulatory laparoscopic cholecystectomy. General anesthesia was administered with co-induction (nalbuphine 0.1mg/kg plus midazolam 0.01mg/kg) tracheal intubation facilitated by 0.15mg/kg cis-atracurium. Post-operatively on clinical status evaluation and Post Anesthesia Discharge score, patients were shifted to respective ward /intensive care. Statistical analysis was done by SPSS v.21.

Results: Pre-operatively medical and cardiologist evaluation was taken in 34(30.35%) and 42(37.5%) cases respectively whereas consultant anesthesiologist reviewed all cases. In study single case was converted to open method due to mirrizi syndrome and adhesions creating difficult laparoscopic dissection in 9(8.03%) of cases. Post-operatively in single case atrial fibrillation with fast ventricular response noted followed by sudden bradycardia, managed and sinus rhythm restored, whereas in other case of ischemic heart disease with viral respiratory infection, needed ventilatory support after 2 hours due to respiratory distress and weaned off after 24hrs. In the study 76(67.9%) cases were shifted post-operatively to surgical ward and 36 cases (32.1%) needed intensive care treatment.

Conclusion: Laparoscopic cholecystectomy in patients with co-morbid states requires balanced anesthetic technique considering consequences of pneumoperitoneum to decrease morbidity.

Keywords: Co-morbid, General anesthesia, Gallstones, Laparoscopy.

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INTRODUCTION:

Since Phillipe Mouret had described his initial experience with successful laparoscopic cholecystectomies,[1] the procedure has gained vast popularity on various grounds. The major benefits include lesser post-operative pain, early mobilization, and a shorter hospital stay.[2] After the surgery, the physiological effects of CO_2 induced pneumoperitoneum are mainly due to mechanical effects of increased intra-peritoneal pressure as well as chemical effects of carbon dioxide itself, that may cause significant cardiovascular side effects due to patient positioning[3] These can have marked impact in patients with compromised reserves.

The restriction of day case surgical procedures of American society of Anaesthesiologist[4](ASA) class I and II do not uphold nowadays, as advanced medical treatment has resulted in patients with cardiac and non-cardiac illnesses for surgical procedures in geriatric age. Few years back physicians treated cases of acute cholecystitis with gallstones conservatively and surgery was performed later, but now surgeons operate acute cholecystitis with gallstones cases urgently. Also, invasive procedures such as total knee arthroplasty, advanced laparoscopic surgery which were considered inappropriate for are done on day-case basis these days.[5] The national data from American College of Surgeons-National Surgical Quality Improvement Program

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reports incidence of morbidity and mortality within 72 hours of ambulatory surgery in adults to be less than 0.1%, whereas high body mass index and ASA[5] physical status class, chronic obstructive pulmonary disease, prolonged surgery time, previous cardiac intervention, hypertension, and an advanced age (> 80 years) were identified as independent risk factors in ambulatory surgery.[6]

The co-morbid diseases defined as cerebrovascular disease, previous myocardial ischemia, renal disease, heart failure, diabetes mellitus, peripheral vascular disease, and obesity were all found to be independent risk factors for complications in cholecystectomy.[7] In view of these considerations a study was planned at our hospital to analyze various clinical management steps in high-risk cases (multiple co-morbid states) undergoing day case laparoscopic cholecystectomy in a private teaching hospital setting. The pre-operative implications of study included patient optimization with review by concerned medical departments. Anesthetic management included smooth induction, maintenance of hemodynamic stability, safe recovery evaluated by fast track criteria[8] inside operating room fifteen minutes after extubation, and post anesthesia discharge scoring system[9,10] in post anesthesia care unit before shifting patient to either ward or intensive care unit.

This study was aimed to evaluate pre-operative implications, anesthetic management and post-operative anesthetic concerns in patients with co-morbid diseases undergoing ambulatory laparoscopic cholecystectomy under general anesthesia.

METHODOLOGY:

A retrospective analysis study was conducted at Rawal General and Dental Hospital in Rawal Institute of Health Sciences, Islamabad from 8th Oct 2017 up to 5th Nov 2018.The sampling technique was purposive. Head of Research Ethics Committee, Rawal Institute of Health Sciences, and Dean consented for study vide (letter No. RIHS-REC/001/54 of 21-06-2019). Analysis of 112 patients assessed and placed in respective American Society of Anesthesiologist[4] physical status class I-II and medically optimized III was conducted who underwent elective laparoscopic cholecystectomy were included in the study. Inclusion criteria was gall stones, acute/chronic cholecystitis, medically optimized hypertension with systemic involvement like pulmonary hypertension, non- restrictive valvular heart disease like mitral / tricuspid regurgitation, controlled asthmatic and obstructive pulmonary diseases, cardiac diastolic dysfunction, controlled diabetes mellitus with organ involvement, like nephropathies. Exclusion criteria was patients with acute bleeding disorder, gastro-esophageal diseases (e.g., hiatal hernia) and ASA[4] physical status class-IV and V patients. Patients were given tablet lorazepam 1mg and ranitidine 50mg at night. On arrival in operating room large bore intravenous cannula was placed under local infiltration. General anesthesia was begun with co-induction[10,11] by injection nalbuphine 10mg plus midazolam in dose of 0.01mg/kg. Inj. ondansetron 4 mg and dexamethasone 8mg was given as anesthetic adjunct in all cases. Electrocardiograph (lead II and V), pulse oximetry, end-tidal CO_2 and inhalational anesthesia agent percentage monitoring, non- invasive blood pressure monitors, volume and pressure sensors parameters were monitored. The balanced anesthesia technique[12,13] (employing 2 or more agents that are considered safe rather than using large dose of single agent with adverse effects) started with co-induction (which results in improvement in induction, reducing maintenance need and facilitating recovery phase of anesthesia) was further continued by using according to baseline monitoring parameters and ASA[5] physical disease status, employing sevoflurane 6-8% with oxygen and /or propofol 1mg/kg incremental titrated dose till patient lost control to verbal command. Injection lidocaine 1mg/kg was given to attenuate laryngoscopy hypertensive response. Endo-tracheal intubation was eased with 0.2mg/kg cisatracurium administration. Hemodynamic stability at intubation (heart rate, blood pressure, oxygen saturation) was particularly monitored and treated. Injection paracetamol 15mg/kg was given to all patients as non-narcotic analgesia. Maintenance of anesthesia was done in all cases with sevoflurane 1-2% with 50% oxygen in nitrous oxide. Patients were extubated and assessed by fast track criteria[8] after 10 minutes before shifting to post-anesthesia care unit where clinical monitoring continued, all patients received 2L/minute supplemental oxygen via nasal canula. Port sites were infiltered with 0.5% lidocaine local anesthetic agent by surgeon at end of procedure. Patients were assessed by Post Anesthesia Discharge score[9], prior shifting to respective ward /intensive care. All the data was entered on statistical analysis SPSS v.21.

RESULTS:

A total of 112 patients were enrolled in the study; all of them presenting with symptomatic gall stones. Eighty-three of them (74%) were females and 29 males (26%). As regard co-induction and securing airway is concerned in study, at intubation (loss of consciousness) was attained in 69.6 seconds (SD +31.32) and endotracheal intubation was completed in mean time of 4.42 minutes (SD +1.30). Smooth uneventful intubation was achieved in 106 patients (94.64%) and only 6 patients (5.4%) had minor unexpected movement noted at time of intubation. The mean extubation time from stopping anesthesia in study being 9.00 minutes (SD +6.123). In 45 cases (40.17%) lidocaine had to be administered at extubation also because of its membrane stabilizing effect. The mean recovery fast track score[8] inside operating room being 11.37(SD +1.73). The post-anesthesia care unit assessment prior to shifting was done by post anesthesia discharge scoring[9] (mean score being 8.70) with SD +.721. The ASA[4] class II cases were 47 (42%), while class III were

Table-1: Demographic data.

	Mean	Std Deviation +
Age(years)	49.13	15.08
Hematocrit (%)	39.49	4.66
Weight(kg)	71.89	13.57
Surgery time(minutes)	54.25	33.61
Discharge time from Post Anesthesia Care Unit(min)	54.95	14.34.
Crystalloid fluid (ml)	1103.57	261.29

65 (58%). To optimize the various co-morbid states, the peri-operative consultation included medical advice for 40 cases (35.71%) cases, and cardiologist consultation in 38 cases (33.92%) cases respectively whereas consultant anesthesiologist reviewed all cases. The mean systolic and diastolic blood pressure readings in study were 128.6 mmHg (+ 27.3) and 78.7 mmHg (+ 18.6) respectively; while mean heart rate was 86.3/minute (+ 17.7). In 48 cases (42.85%) intra-venous labetalol was used to control blood pressure and in 11 cases (9.82%) anticholinergics were administered during anesthesia. In study 76(67.9%) cases were shifted post-operatively to surgical ward and 36 cases (32.1%) to intensive care. In study within few hours after surgery analgesia was given in only 15 cases (13.4%) and in 97 cases (86.6%) no rescue analgesics was needed. Demographic data depicted in table-1. The co-morbid disease pattern depicted in table-2. The per-operative implication presented in table-3.

DISCUSSION:

In the study per-operatively in single case sudden atrial fibrillation with fast ventricular response was noted followed by sudden bradycardia, managed with beta-blocker, along with 100% oxygen, lowering of intra-abdominal pressure to 8cm/H_2O the sinus rhythm restored, whereas in other case with old ischemic heart disease and recent viral respiratory infection, being extubated successfully inside operating room was not maintaining saturation in intensive care after 2 hours and needed ventilatory support due to respiratory distress and weaned off after 24-hours. In Post-anesthesia care unit, low pulse oximeter readings were noted, managed by 60% venturi mask oxygen attachment with oxygen at 12L/minute,45^0 head-up position done given oxygen saturation improved to 92% and in few minutes to 98%; intra-venous dexamethasone and hydrocortisone was given. In various studies, pre-operative morbidity risk factors included; body weight, high ASA class (III), acute attack of cholecystitis(leukocytosis), were morbidity risk factors delaying discharge, whereas male (gender), and operative factors (surgeon skill), vessels and bile ducts injury may lead to complicated surgery, while respiratory acidosis and systemic CO_2 systemic absorption, may show adverse effects in patient with co-morbid diseases while use of lower intra-abdominal pressure is helpful[14,15,16,17]. In this study insufflation pressure was kept at or below 8 cmH_2O.

A study entailing intra-venous (propofol) with volatile anesthetic (isoflurane employed) noted that in depth of anesthesia and recovery phase there was no significant difference statistically therefore they can be used as part of general anesthetic technique[18].

Another study to foresee hemodynamic stability (suppress adverse response) particularly at intubation as well as at extubation stated that lidocaine (being the commonest agent) showed good analgesic effect in the immediate post-surgical period, among the other agents in study stable mean blood pressure values were noted with no statistical difference[19].

In other studies, they patients with gall stones and acute cholecystitis attack the management was guided on basis of symptoms severity. ASA class, CCI index (Tokyo Guidelines severity risk scale grading) planned for laparoscopic cholecystectomy need to be done at a tertiary care set-up with support of functional intensive care after full peri-operative optimization and these patients cannot be discharged on same day of procedure[20,21,22]. Early surgical laparoscopic cholecystectomy for acute cholecystitis cases even with medical diseases is the approach recommended in another study[23,24]. Literature revealed, a balanced anesthesia (intra-venous induction and top-up drugs, volatile inhalational agent such as sevoflurane and optimal use of non-depolarizing neuro-muscular blockers) was used to achieve smooth anesthesia course and recovery profile, while suggesting use of local wound infiltration, non-narcotic agents etc. help in providing post surgery pain relief [25].The study had limitations as it was not multicentered, invasive monitoring was not available and morbidly obese population were not extrapolated.

CONCLUSION:

This study highlighted the advantages of anesthesiologist first as peri-operative physician and later employing balanced anesthetic management plan in high-risk cases for favorable outcome. On statistical evaluation, in study at 72 degree of freedom, Pearson Chi square test probability value falls between 0.975 and 0.20 and shows a significant chance that patients with co-morbid diseases will need further intensive care treatment post-operatively.

Authors Contribution:
Muhammad Salman Maqbool: Concept & design of study, drafting, revisiting critically, data analysis, final approval of version.
Muhammad Alam: Concept & design of study, drafting revisiting critically
Muhammad Umer Draz: Concept & design of study, drafting, data analysis
Ayesha Shahid: Concept & design of study, drafting, revisiting critically
Shumaila Ashfaq: Concept & design of study, drafting, revisiting critically

Table-2: Peri-operative co-morbid diseases patterns. (n=112)

Comorbid disease states causing Anesthetic concerns	**Number**
Acute abdomen, Acalculous cholecystitis (sepsis), empyema, left ventricular dysfunction, Ejection Fraction (EF)35%, pulmonary hypertension, Tricuspid regurgitation (TR), Mitral regurgitation (MR).	1
Old Ischemic heart disease known case	10
Acute calculus cholecystitis	53
EF 60%, AS moderate, AR mild, Severe Tricuspid regurgitation (TR), PAP of 123mmHg,	1
Myocardial ischemia, EF60%, E/A ratio reversed, Hypertension	2
EF60%, Diastolic dysfunction Grade-1, Pulmonary HTN, Moderate TR	1
Fibrotic lung patch, Old Pulmonary tuberculosis	1
Asthma/Chronic Obstructive Pulmonary Disease/Viral upper respiratory tract infection	6
Hypertension, Diabetes Mellitus, grade-I diastolic dysfunction	2
Hypertension, mild Tricuspid regurgitation, Aortic valve sclerotic EF 60%,	1
Known case of thyrotoxicosis (Euthyroid on thyroid function test)	5
Pancreatitis, Pulmonary Hypertension, Ischemic Heart Disease, Sclerotic aortic valve, RVSP 98mmHg, grade-I diastolic dysfunction, Mild Tricuspid regurgitation	1
Pan-endoscopy report of gastritis & duodenitis	1
Fatty infiltration liver, hepatomegaly, splenomegaly, Biliary Acute pancreatitis with modified CTSI value of 6.	3
Uncontrolled diabetes mellitus, angina pectoris, stopped antiplatelet drugs perioperatively	1
Ischemic Heart Disease, grade-1 left ventricular dysfunction, moderate cardiac risk, grade-III fatty liver infiltration	1
Biliary Pancreatitis, Sclerotic Aortic degenerative valve,60%EF, Trivial AR, Mild Concentric LVH, Grade 1 Diastolic dysfunction, Hypertension	1
Obstructive jaundice, Chronic calculus cholecystitis	2
NYHA class-III	1
Empyema gall bladder, Chronic liver disease, Hypertension, Angina pectoris, Grade-1 diastolic dysfunction, calcified mitral leaflet, Diabetes Mellitus	1
Hypertension, Diabetes Mellitus, EF60%, Concentric LVH	1
Ischemic heart disease, Trace Tricuspid regurgitation (TR), Hypertension, Rt renal stones	1
LBBB, Septal paradoxical movement, Tricuspid regurgitation, Mild Pulmonary Hypertension	1
Mild AR, EF60%, Grade-1 diastolic dysfunction with PVC unifocal	1
Mucocele gall bladder with acute cholecystitis	2
Repeated biliary attacks, chronic calculus cholecystitis, moderate TR, MR with mild pulmonary hypertension	4
Rheumatic heart disease, Mild MR, RVSP of 55mmHg, angina pectoris, Hypertension, EF 55%.	1
Sclerotic Aortic valve, Concentric LVH, HTN, Grade-1 diastolic dysfunction.	1
Sclerotic aortic valve, grade-1 LVDD	1
coronary artery disease with acute cholecystitis	1
Trivial TR, EF60%, Concentric LVH, Grade1DD	1
Vitamin K therapy pre-operatively to correct coagulopathy	1
Hereditary Spherocytosis (clinical hematologist consulted)	1

Table-3: Per-operative implications

Implications	Number
Adhesions creating difficult laparoscopic dissection	09
Mirrizi syndrome. (Converted to open cholecystectomy)	02
Cirrhotic liver finding during surgery	01
Premature Ventricular Contractions & Premature atrial contraction noted during anesthesia	2
Bigeminies noted at induction settled with intra-venous lidocaine	2

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Case Report **Open Access**

Primary Renal Lymphoma – A Challenging Diagnosis

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ABSTRACT:

Primary renal lymphoma is rare challenging diagnostic dilemma. Many cases have been found in literature, but a clear diagnostic criterion is still evolving. Chemotherapy is the treatment of choice, however due to its rarity; it is often misdiagnosed, which leads to nephrectomies resulting in unnecessary morbidity. A case of a 60 years old male found to have a renal mass, being treated as renal cell carcinoma. Exploration for radical nephrectomy resulted in an open biopsy instead due to a fixed, hard, inoperable renal mass. Diagnosis of lymphoma was made by histological confirmation of the disease and patient was treated with chemotherapy.

KEY WORDS: Lymphoma, Mass, Primary, Renal

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INTRODUCTION:

Primary renal lymphoma is a rare entity and is often overlooked when diagnosing renal mass. It represents less than 1% of all renal lesions of which diffuse large B cell lymphoma is the more common pathological variant.[1-3] Renal parenchyma is devoid of lymphoid tissue; hence, it has been suggested that the lymphoma may originate from lymphatics in the renal capsule, which then invades the renal parenchyma.[4, 5] Its prognosis is usually poor and surgical treatment is rarely feasible.[6] However, early diagnosis and prompt treatment with chemotherapy may improve the prognosis of the patient. Thus although rare, it is very important to distinguish between renal cell carcinoma and primary renal lymphoma during workup of renal mass.

CASE REPORT:

A 60 years old male presented with pain in the left lumbar region for the past 3 months. His pain was mild in intensity, dull and gradual in onset. He also had an episode of painless hematuria.

Clinical examination revealed a diffuse, non-tender, firm mass in the left flank and there was no cervical or other lymphadenopathy or hepatosplenomegaly. Complete blood picture, coagulation profile, diabetic profile, liver function tests and renal function tests, were within normal parameters. Urinalysis was unremarkable. The Ultrasonogram of left kidney showed a rounded isoechoic mass measuring 7.7x7.0 cm filling most of the medullary area of the pelvis and showing vascularity on color Doppler. It also revealed a large cystic area measuring 5.9x4.7 cm with calcific foci at the superior pole of right kidney. Contrast Enhanced Computed Tomography of kidney ureters and bladder displayed a heterogeneous hypodense lesion measuring 7.2x6.9 cm with ragged margins showing mild enhancement and occupying the whole renal pelvis and proximal ureter on left side. Loss of interface was also noted with infiltration of left psoas muscle posterior-inferiorly and Gerota's fascia anteriorly with perinephric fat strandings (Fig 1&2). However, there was no renal vein involvement noted. Few para-aortic lymph nodes were also noted. The largest one was anterior to the crura on left side measuring 1.8x0.9 cm, another below renal vein measuring 1x0.4 cm and another one along

Fig 1. The ultasonogram of left kidney showing isoechoic mass filling the medullary area

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celiac axis measuring 9x0.6 cm. Contrast Enhanced Computed Tomography of chest was normal. The radiological features were favoring renal cell carcinoma Stage IIa so radical nephrectomy was attempted

On exploration, the tumor was nodular and hard with extensive desmo-reaction around tumor area abutting pancreas and jejunum. Descending colon was also densely adherent to anterior surface of the tumor extending to splenic and pancreatic region. Posteriorly the tumor was fixed to the wall. Hilar region was immobile and renal vein and artery could not be identified. The operative findings concluded that the tumor was irresectable, so open biopsy was taken before closing the wound. The histopathology of specimen revealed sheets of intermediate to large round to oval cells having vesicular nuclei with clear cytoplasm (Fig 3). Immunochemical stains were positive for LCA, CD 3 and Ki 67, suggesting that the mass is non-Hodgkin lymphoma diffuse large B cell type. His bone marrow aspiration from posterior iliac spine showed reactive changes. The patient was started on chemotherapy cycles with vincristine, doxorubicin, cyclophosphamide, dexamethasone, and prednisolone. He showed complete regression of lymphoma with disappearance of the tumor. He was on monthly follow-up for 9 months followed by 6 monthly follow-up for 2 year with no remission of lymphoma, which confirmed it to be primary renal lymphoma.

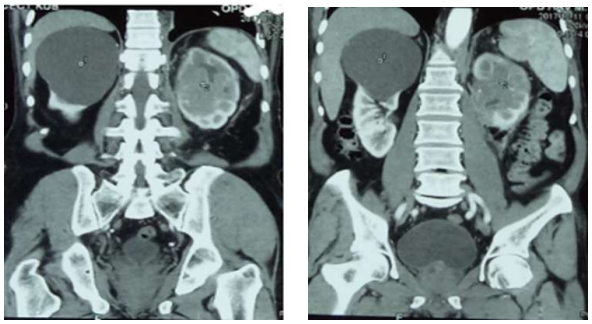

Figure 1: Lesion occupying the renal pelvis and upper ureter in left kidney

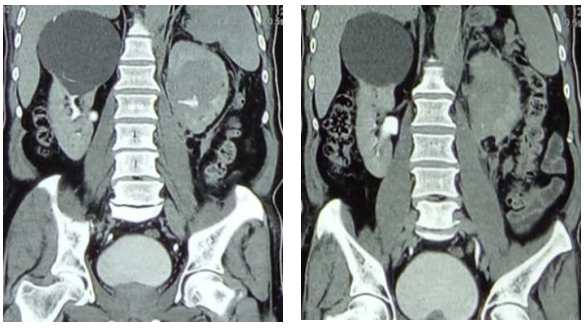

Figure 2: Lesion appearing hypodense on contrast enhancement

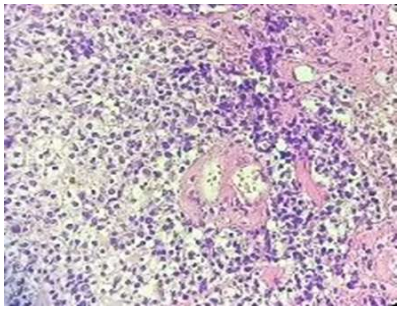

Figure 3: Intermediate to large round to oval cells with vesicular nuclei and clear cytoplasm

DISCUSSION:

Primary extra-nodal Non-Hodgkin lymphoma accounts for one-third of all non-Hodgkin lymphoma[3]. Primary renal lymphoma is defined as non-Hodgkin lymphoma originating from renal parenchyma in the absence of extra renal lymphatic disease. In 1980, Coggins reported the first confirmed case of primary renal lymphoma[7]. It is an uncommon entity that accounts for only 0.1% of all malignant lymphomas and 0.7% of all extra-nodal non-Hodgkin lymphomas[8]. However, secondary renal involvement in cases of non-Hodgkin lymphoma is very common and usually occurs in disseminated cases[9].

Renal parenchyma is devoid of lymphatic tissue hence the origin of primary renal lymphoma has been considered uncertain. There are several pathogenic mechanisms proposed about its origin including the lymphatic vessels of renal capsule or sub capsular tissue that progresses to penetrate renal parenchyma and extension of an inflammatory disease with lymphoplasmacytic infiltrates that then endures oncogenic transformation.[5, 7, 10, 11] However, the later phenomenon is not well known in other case reports including our own case.

Primary renal Lymphoma is an infiltrative tumor that attacks without disrupting the architecture or function of the kidney. It usually affects adults. The most common presenting symptoms include flank pain and mass[7]. Acute kidney failure is also a common clinical exhibition documented in literature.

According to Stallone et al, the criteria for diagnosing primary renal lymphoma includes lymphomatous renal dissemination, non-obstructive unilateral or bilateral renal expansion and no extra renal involvement of the disease at the time of diagnosis.[2] Some studies emphasize on the absence of lymph node involvement for primary renal lymphoma, whereas in others, coexisting para-aortic lymph node involvement may be present along with a renal lesion, which was present in our case.[4]

Imaging plays a vital role in diagnosing primary renal lymphomas. On ultrasonography, it may appear as hypo to isoechoic mass with decreased vascularity. The most common encountered Computed Tomography patterns include multiple renal masses, renal invasion from adjoining retro peritoneal disease, perirenal or diffuse renal infiltration in the absence of hydro nephrosis and solitary lesion.[12] It is very challenging

to distinguish radiologically between primary renal lymphomas and renal cell carcinomas especially in cases of unilateral masses. On computed tomography, post contrast hypodense or non-enhancing lesion points more towards primal renal lymphoma whereas existence of renal vein thrombus and calcification, pressure effect on pelvicalyceal system and renal vessels, hyper vascularity and invasion of inferior vena cava hints towards renal cell carcinoma.[3] On magnetic resonance imaging, lower signal strength on unenhanced T1-weighted images than normal renal cortex and less enrichment on early gadolinium-enhanced images are more suggestive of primary renal lymphoma.[11, 13]

Renal biopsy has revealed a sensitivity of 70% to 92% and specificity of nearly 100% in the diagnosis of primary renal lymphoma.[14] Diffuse large B cell type is the most frequent histological variant of primary renal lymphomas.[3] However, other histological types such as follicular lymphoma, MALToma or small lymphocytic lymphoma have also been reported.

It is vital to distinguish primary renal lymphoma from other masses because of the disparity in their treatment. Treatment of choice in renal malignancies is usually radical nephrectomy, on the contrary, primary renal lymphoma responds well to systemic chemotherapy using CHOP (Cyclophosphamide, Adriamycin, Vincristine and Prednisone) regime.[15] Recent studies have also shown that adding rituximab to the classical CHOP (Cyclophosphamide, Adriamycin, Vincristine and Prednisone) chemotherapy improves outcomes.[7, 16, 17] The prognosis of primary renal lymphoma is promising only if early diagnosis and prompt chemotherapy is started.

CONCLUSION:

Although primary renal lymphoma is an uncommon disease, it should always be kept in mind when exploring a renal mass. A thorough workup should be carried out and biopsy is mandatory if radiological features are suggestive, to confirm the diagnosis as it will avoid unnecessary nephrectomy.

Authors Contribution:
Kanwal Ali: Substantial, design, writeup
M. Anis Ul Islam: Analysis
Fahad Mushtaque: Analysis
Hussain Ahmad: Contribution of concept
Haroon Sabir Khan: Analysis design, contribution of concept
Mahwish Mahboob Bhutta: Data analysis

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Commentary **Open Access**

Ameliorate Patient Care and Safety with Technology

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The word “Patient” has been derived from the Latin word "Patior" which means "to suffer". It represents the sense of feeling pain as well as sense of forbearance.[1]Whereas patient care is defined as the prevention, treatment and management of diseases and the preservation of physical and mental well-being.[2] This is attained by the services of health professionals. Patient safety is a discipline that emphasizes in through the prevention, reduction, reporting, and analysis of and other types of unnecessary harm that often lead to and even deaths by these medical errors.[3]

Healthcare information technology is the processing of information that deals with storing, retrieving, sharing, and using health care information data as patient records. These records are used for diagnostic, treatment and prognostic purposes, knowledge for communication and decision making etc. This was attained initially by utilizing computer hardware and software but later on mobile applications, wearable and non-wearable medical devices and virtual reality sessions were also included under its umbrella.[4]

The main technological strategies implemented in developed countries concerning patient care and safety are as follows:

(A) Electronic prescribing and patient electronic portal: is entering medication orders using a computer or mobile application. This is of great help in improving the safety of medication orders and hence patient safety. It facilitates the prevention of errors by ensuring the availability of information regarding preferred drug doses, route and frequency of administration, patient allergies, drug-drug or drug-lab interactions, and also helps prescribing based on standard clinical guidelines, ordering of tests, procedures and even consultations etc. Patient electronic portals are also in use to provide access to patients to personal health information and an opportunity for electronic communication with respective care provider through the computer or mobile device.[5]

(B) Clinical decision support: is the provision of helping tools to the clinicians in the form of notifications, alerts, reminders, clinical guidelines, condition-specific order sets, patient-specific clinical summaries, documentation templates, investigation and diagnostic support etc.[6]

(C) Bar coding on medications: is the method to integrate electronic medication administration records with bar code technology to ensure the provision of right medicines to the right patient and at the right time. Soft wares are used which create alerts when an error is liable to occur due to confusion between drugs having look alike and sound alike similarities.

Thus barcoding of medications improve their administration at the patient`s bedside and helps to meet the five standard steps of medication administration guidelines: the correct drug, dose, time, route, and patient. The barcoding is linked in developed countries with the wristband or armband code so that the nursing staff matches the bar code of the patient`s band with the medications making it an effective way to reduce if not completely control the incidence of adverse drug events.

(D) Telemedicine and tele-monitoring: is facilitating patient`s communication to prescriber/ provider and vice versa by using telecommunication technologies. It could be synchronized with real-time 2-way video communication or just an asynchronous transfer of patients` clinical information. Conversely this could also act as a tool to track patients and change their behaviour. The strategy is being utilized to monitor patients at remote sites specially for monitoring chronic conditions like, cardiac failure,[7] cerebral stroke, bronchial asthma, hypertension etc. A Patient data management system (PDMS)[8] is also available to automatically retrieve data such as from bedside patient monitor, ventilator, intravenous pump etc.[9]

(E) Electronic incident reporting: is an automated web-based system to report safety events voluntarily. Such reporting may improve clinical processes and reduce medical errors. The incident report consists of only relevant factual details, date, time, location of the incident, witnesses and their statements regarding the incident. This also includes actions taken by all concerned during the immediate time frame, any observations related to the incident, record of associated injuries, presence of contributing environmental factors,

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corrective action(s) accomplished and preventative measures identified and undertaken. Developing automated system for incident reporting management has eliminated the risk of duplication and differing reports since the paper is no longer used for reporting. It is an effective means of sharing the real time information with consistency and accuracy through drop-down menus generations. Moreover, tracking is also possible if required later on.[10]

(F) Virtual reality sessions: are being used to help ease situations in a controlled environment such as for relieving pre-operative surgery anxiety, post-traumatic stress disorder (PTSD), phobias and in pain management. In addition, it is practical component of geriatric rehabilitation for patients with Alzheimer's disease, Parkinson`s disease etc.

(G) Wearable medical devices: These are devices which the patient can easily worn such as exercise trackers, calorie trackers, biosensors for heart rate, respiratory rate and temperature measurements, sweat meters, oximeters, smart watches, blood pressure monitors, devices to determine the degree of the sickness of the user, long-term ECG having cardiac and circulatory problems, devices for measurement of weakness and risks of various age-dependent diseases, devices to predict changes in mood, stress, and health, measurement of alcohol content in the blood, assessment of athletic performance, etc.[11]

(H) Non-wearable medical devices: (a) 3-D printing: this additive manufacturing process that creates a physical object from a digital design. The process works by laying down thin layers of material liquid or powdered, plastic, metal or cement and then fusing the layers. This technology is facilitating many areas of surgery like total joint replacement, cranio-maxillofacial reconstruction etc. It is also helpful in development of specific patient-matched devices like prostheses. Printed casts are in use for broken bones that can open up allowing the wearer to scratch, wash and ventilate the damaged area. Production of 3D printed tablets is another use of this technique employed in the pharmaceutical industry (b) bio-printing: is used for tissue engineering applications to develop organs and body parts by use of inkjet techniques (c) Robotic surgery: also called robot-assisted surgery, allows surgeons freedom to perform the procedure with more accuracy and precision than the conventional means. It has the advantage of minimal invasiveness as procedures are performed after giving small incisions[12]

Technology outburst that has taken place in this century beyond doubt is improving patient care and safety around the globe. It is worth mentioning here that awareness must be created followed by initial investment, sufficient training of users, gradual implementation and sincere gauging of pacing to build up and sustain a robust system based on technology. In Pakistan use of limited technology during covid-19 pandemic has shown a positive and significant impact on patient safety and quality of care. It has reduced the travelling cost, travelling time, helped for getting faster lab results, immediate accessibility of medical information to doctor and patient for timely diagnosis and start of therapy. The knowledge and awareness of people must be enhanced regarding the importance to adopt information technology.[13] Some challenges prevailing in Pakistan are also recognized which include limited availability of internet facilities, cell phone ownership, network coverage, non-availability of regulatory frameworks, regulations for data protection and security,[14]accessibility, affordability and last but not the least the habit of using paper-based health records.[15]

Despite of all these challenges healthcare information technology must be adopted with an affordable and feasible framework suitable for our country to ameliorate the patient care and safety.

Healthcare and information technology professionals, pharmaceuticals and NGOs should play their role in developing this framework. Whereas due addressing by Governmental sectors in this context is the need of today in the vested health care interest of the people linked with economy of Pakistan.

Authors Contribution:
Nasim Karim: Substantial contributions to the conception criticaly evaluation of intellectual content, final approval of the version to be published.

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Letter to Editor **Open Access**

Transition from Conventional Teaching to Remote Setting in Health Education

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Dear Editor,

The global pandemic has introduced uncertainty in almost all aspects of society; similarly it has caused a drastic transformation in the education field. The way student's learn and the way knowledge is being delivered to them has all changed, as a result, education has been affected dramatically.[1]

Though this mode of online teaching results in healthy active interactions between students and their instructors contributing to critical thinking, problem solving attitude and hence better understanding of topics. The main advantage of this kind of hybrid learning is that students become self-directed learners by high quality learning on their own irrespective of time. They are taking notes by their own and trying to get maximum benefits from this opportunity. With the distinctive rise of e-learning, everyone is striving to learn the technological transformation as to learn more efficiently in remote setting. On the other hand the slow learners have to work hard to understand the content which was available virtually. Furthermore despite of continuous access to presentations, course objectives, and recorded class debates round the clock, relatively weak student become more negligent towards attending and participating in remote setting. [2,3]

When we talk about online classes and online assessment, we must consider those students who are unable to make it due to unforeseeable circumstances such as absence of technologies, access to internet in remote areas of Pakistan financial and economic reasons. [4, 5] This is a notable issue in rural neighborhoods or households where daily wages or monthly income is not enough to make ends meet. Besides this everyone is well aware of third world problems where there is lack of electricity, load-shedding even in urban areas, these situations are not in anyone's control. Thereby online education is a great challenge.

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Though, technology has made educational process available at door steps during pandemic. In this regard, training of faculties and students had played significant role to make it more user friendly. It should not be forgotten that senior faculties who were not familiar with these educational innovations prior to pandemic, worked really hard to become well versed with latest gadgets as to deliver teaching effectively. To deliver the education in hybrid mode, it is utmost important to realize that clinical part of the curriculum which cannot be instructed in remote setting such as procedures being performed in real patient settings.[3]

In a nut-shell transition from conventional teaching method to online teaching has brought immense challenges for both teachers and students, each has its own pros and cons as one size does not fits all. We should not ignore the importance of clinical content which can only be delivered face to face. As undergraduate curriculum make today's learners to tomorrow's doctor. Consistent evaluation and continuous amendment is significant to make the remote teaching more effective in every aspect of curriculum.

Authors Contribution:
Hajra Asghar: Substantial contributions to the conception
Kulsoom Fatima Rizvi: Proofreading

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b) Organization as author

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

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