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Editorial Different Researches on Health Benefits of Green Tea

MohsinMasud Jan

Editor

All true teas—green, black and white—contain disease-fighting antioxidants because they come from the same plant. But green tea has much higher levels than most of catechins, a particularly potent antioxidant. While the evidence to support green tea's use in preventing or treating any health problem is not crystal clear, research in both animals and humans has shown some possible associations between these naturally occurring antioxidants in green tea and protection against health problems that affect men. Many of the studies showing positive results have been performed in Asian countries, where large populations of men drink green tea on a regular basis.

Green tea contain rich in polyphenol, catechins and flavonoid compounds. Green tea can prevent prostate cancer, breast cancer, reduce weight, reduce the risk of cardiovascular diseases, prevent tooth decay, reduce the risk of caries, good for oral health. Green tea act as high antioxidant that can improve the function of body and brain and reduce the risk of Alzheimer's and Parkinson's. Green tea also helps in diabetes and blood pressure according to different studies. It helps to reduce the cholesterol.

Now, researchers have new clues about how it may work to help prevent or slow the growth of prostate and breast cancers. Researchers presented the new findings here today at the American Association for Cancer Research meeting on cancer prevention. Men with prostate cancer who drank green tea had less prostate tissue inflammation, linked to cancer growth, and other changes than those who did not drink it, says Sussane M. Henning, Adjunct Professor at the David Geffen School of Medicine at the University of California, Los Angeles.

"We were able to show the green tea polyphenols (antioxidants) reached the prostate tissue and they did modify inflammation of the prostate," she says. Polyphenols are antioxidants that protect against cell damage. Henning's team assigned 79 men with prostate cancer scheduled to undergo surgery to drink either six cups of brewed green tea or water daily. They did so for three to eight weeks, depending on when their surgery was scheduled. Before and after the study, Henning obtained urine and blood samples. She collected samples of prostate tissue after the surgery.

She reported on the 67 men who finished the study. Levels of prostate-specific antigen, or PSA, were lower after the study in those who drank green tea. Higher levels of PSA, a protein produced by the prostate gland, may reflect prostate cancer. An indicator of inflammation, called nuclear factor-kappa B, was also reduced in those who drank green tea compared to those who did not, Henning found. Inflammation is linked to cancer growth. "We were not able to inhibit tumor growth," she says. But the study length may not have been long enough to show that; a longer-term study is needed, she says.

Prostate cancer is typically a slow-growing cancer, Henning says. That makes it an ideal cancer to try diet interventions to slow it even more. "Green tea is high in polyphenols and it's convenient," she says. Other research has found that green tea may slow prostate cancer. An Italian study found that men who had a precursor to prostate cancer and drank green tea were less likely to get prostate cancer, Henning says.

Now, Henning is studying whether adding quercetin, an antioxidant found in apples and onions, to the green tea will ramp up its cancer-fighting ability. Sumanta Pal, Assistant Professor of medical oncology at the City of Hope Comprehensive Cancer Center in Duarte, Calif., reviewed the study findings for Web. Studies such as this are critical to confirm or support a plausible explanation for how green tea may work," he says. More study is needed, however, before making any diet recommendations. Other researchers reported that an extract from green tea, Polyphenon E, may help inhibit breast cancer by affecting substances called growth factors. Growth factors are involved in the signals that tell breast cancer to grow.

In earlier research, Katherine Grew, assistant professor of Medicine and Epidemiology at Columbia University Medical Center in New York, had assigned 40 women already treated for breast cancer to take 400,600 or 800 milligrams of the extract or to take a placebo twice daily for six months. That was a study to examine any toxic effects of the extract. For the current study, she evaluated blood and urine samples from 34 of the women to see how the extract might work as a cancer fighter. "We wanted to better understand the biological effect," she says.

"After two months of Polyphenon E, there was a reduction in hepatocyte growth, spread and invasion. That reduction declined and was not different from the placebo group at four months, however. It's still too early to recommend green tea extract as a way to prevent breast cancer, Crew says.

The new research on green tea and breast cancer adds to growing evidence of its benefits, according to Joanne Mortimer, Director of the Women's Cancer Program at the City of Hope Comprehensive Cancer Center. "There really does seem to be something there," she says. The new study provides a potential explanation for why green tea may help, she says. So should women drink green tea with an eye to prevention of breast cancer? "I don't think we are quite ready to make that leap," Mortimer says, "But it is pretty interesting."

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- University of Maryland Medical Center: Green Tea.
- USDA: Brewing up the latest tea research.

Frequency of Right Ventricular Dysfunction in Patients Suffering Coronary Artery Disease

Muhammad Inam Qureshi¹, Afzal Qasim², Nadeemuddin³ and Muhammad Umar Khan⁴

ABSTRACT

Objective: To assess the significance of right ventricular dysfunction in patients suffering from coronary artery disease.

Study Design: Observational study.

Place and Duration of Study: This study was conducted at Karachi Institute of Heart Diseases and Dow University Hospital OJHA Campus Karachi from 1st March 2017 to 31st August 2017.

Materials and Methods: A total of 561 patients with documented CAD matched our inclusion criteria. Patients with congenital heart defects, valvular heart diseases or those with any surgical intervention were excluded. Following parameters were measured on echocardiography: ejection fraction, two-dimensional size assessment and TAPSE.

Results: It includes 381 (70%) males and 180 (30%) females. The mean age of patients was found to be 54.3 ± 11.4 years. Mean age of female patients was found to be 56.5 ± 7.8 years and those of male patients is 51.5 ± 12.3 years. Mean right ventricular ejection fraction was found to be $42.7\% \pm 6.7\%$. In male patients the mean RV ejection fraction was $43.61 \pm 8.11\%$ as compared to $39.32 \pm 9.14\%$ in female patients ($p=0.432$). According to TAPSE measurements right ventricular dysfunction was present in 26.5% ($n=149$) patients. Statistically significant differences were found between RV ejection fractions of females and males with 23% and 29.6% patients respectively ($p=0.021$). 31.5% of patients having right ventricular dysfunction had a previous history of myocardial infarction.

Conclusion: There is moderate prevalence of right ventricular dysfunction in patients with CAD. It should be assessed and treated at the earliest for better outcomes. Further studies should be carried out on large scales in all patients with CAD.

Key Words: Prevalence, Right ventricular dysfunction, Coronary artery disease.

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INTRODUCTION

Coronary artery disease (CAD) is one of the biggest cause of deaths and long-term disabilities, accounting for 19% of all deaths worldwide. It is multifactorial and risk of acquiring disease increases with age¹. It is responsible for one third of deaths in persons older than 35 years. CAD includes a spectrum of manifestations like myocardial infarction, angina pectoris and sudden death². National heart institute established Framingham heart study which published a description "factors of risk in development of coronary heart disease".

¹. Department of Cardiology, Karachi Institute of Heart Diseases (KIHD), Karachi.

¹. Department of Cardiology / Nursing³ / Medicine (NIDE)⁴, Dow University Hospital OJHA Campus Karachi.

Correspondence: Dr. Muhammad Inam Qureshi, Assistant Professor Cardiology, Karachi Institute of Heart Diseases, Karachi.

Contact No: 03002675634

Email: danishin1@hotmail.com

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The description indicated that elevated blood pressure and cholesterol levels were associated with increased risk of myocardial ischemia. Atherosclerosis is the initiating event for CAD, it begins as qualitative change to the endothelial lining due to hemodynamic and biochemical stimuli. Other risk factors include decreased physical activity, consumption of unhealthy food, smoking, inherited genetic mutations and multiple chromosome loci associated with it³. Right ventricular dysfunction is a proficient indicator of mortality after myocardial infarction and chronic heart failure. The primary function of right ventricle is to pump blood to pulmonary circulation for oxygenation. Right ventricular dysfunction present as ascites, oedema, exercise intolerance due to low systolic reserve and arrhythmias⁴. Right ventricular alterations occur in close relation to left ventricular dysfunction in patients with CAD, accounting to the post ischemic changes. Eventually ventricular dysfunction leads to symptomatic heart failure⁵. Assessment of right ventricular size and function can be done by echocardiography, normal right ventricle is two third the size of left ventricle. Evaluation of right ventricular function is done by measuring its area in

four chamber view and length in parasternal long axis⁶. Another way for quantitative evaluation of right ventricular function is measurement of tricuspid annular plane systolic excursion (TAPSE) in the four-chamber view. TAPSE was measured as the total displacement of the tricuspid annulus (mm) from end-diastole to end-systole⁷. Doppler index of myocardial performance can also be used to determine RV function. Tissue doppler imaging with peak systolic velocity of less than 11.5cm/sec indicates presence of right ventricular dysfunction. Cardiac MRI is the most accurate method for quantitative size and function estimation of right ventricle but it is not feasible to perform in a large population⁸. As RV dysfunction is a major predictor of left sided heart failure, the correlation of heart failure with reduced ejection fraction is unclear⁹. Right ventricle dysfunction has been defined as RV ejection fraction of less than 35% corresponding to mean three standard deviations of controls¹⁰. Chronic ischemia of left ventricle due to coronary artery disease has more pronounced symptoms than right ventricle ischemia. A study done in September 2002 in Italy suggests that ventricular dysfunction is found in less than 20% of cases of CAD. Right coronary artery disease if present has prominent clinical manifestations due to hemodynamic load of pulmonary hypertension simultaneously¹¹. With the background of pulmonary hypertension, right ventricular dysfunction is linked with higher morbidity and mortality. Current researches focuses on new echocardiographic techniques to diagnose subclinical RV dysfunction and therapeutic targets can be devised to improve its management¹².

MATERIALS AND METHODS

This study was carried out at Karachi Institute of Heart Diseases and Dow University Hospital OJHA Campus Karachi, from from 1st March 2017 to 31st August 2017. This study has been carried out in the cardiology department. Inclusion criteria were all patients visiting outpatient department having documented coronary artery disease for more than three months, irrespective of their age and gender. Patients with congenital heart defects, valvular heart diseases, pulmonary artery hypertension. A total of 561 patients with documented CAD matched our inclusion criteria. Patients who have undergone any intervention for management of CAD were also off the list. All patients were examined clinically, and comprehensive echocardiography was performed.

While performing echocardiography, following parameters were measured:

- i) Evaluation of right ventricular size and ejection fraction
- ii) Two-dimensional measurement of right ventricular in four chamber view and parasternal long axis view

- iii) Tricuspid annular plane systolic excursion (TAPSE) with an M-mode cursor placed at lateral annulus
If TAPSE measurement is 5mm, it denotes 20% RV function
If TAPSE measurement is 10mm, it denotes 30% RV function
If TAPSE measurement is 15mm, it denotes 40% RV function
If TAPSE measurement is 20mm, it denotes 50% RV function

RESULTS

In the given time interval, there were total 561 patients fulfilling our inclusion criteria for right ventricular function assessment at our centre. This data included 381 (70%) males and 180 (30%) females. The mean age of patients was found to be 54.3 ± 11.4 years. Mean age of female patients was found to be 56.5 ± 7.8 years and those of male patients is 51.5 ± 12.3 years. Mean left ventricular ejection fraction measured was 49.83 ± 7.4 . Mean right ventricular ejection fraction was found to be $42.7\% \pm 6.7\%$. In male patients the mean RV ejection fraction was $43.61 \pm 8.11\%$ as compared to $39.32 \pm 9.14\%$ in female patients ($p=0.432$). According to TAPSE measurements right ventricular dysfunction was present in 26.5% ($n=149$) patients. Statistically significant differences were found between RV ejection fractions of females and males with 23% and 29.6% patients respectively ($p=0.021$). Patients having right coronary artery occluded was associated with more severe right ventricular dysfunction ($<37\%$). 31.5% ($n=47$) of patients having right ventricular dysfunction had a previous history of myocardial infarction.

DISCUSSION

Right ventricular function is a sensitive predictor of exercise tolerance and its contribution in chronic heart failure cannot be overlooked. Owing to its complex geometry and functional assessment the right ventricular function is important in determining post-operative survival in CAD¹³. Right ventricular dysfunction in coronary artery disease is due to right coronary artery occlusion leading to dilation. Multivessel artery disease causes significant ischemia, ultimately affecting cardiac output. Dilation causes stiffening of ventricles, they're unable to pump blood and become volume dependent¹⁴. TAPSE continued an independent predictor of survival, suggesting that twice the TAPSE value was associated with reducing 26% of death, whereas left ventricular ejection fraction had no independent prognostic information when TAPSE was included¹⁵.

Our study focuses on prevalence of right ventricular dysfunction as its contribution to cardiac output is frequently neglected. RV infarction responds provocatively responds to volume treatments and early

reversal of occlusion improves clinical outcome¹¹. Our study shows that right ventricular dysfunction was present in 26.5% patients with the background of coronary artery disease. As compared to a study done by La Vecchia, our study concludes that right ventricular dysfunction is present in more male patients than female patients (23.9% versus 29.6%) with a p-value of 0.021. A research conducted in April 2017 studied the effect of right ventricular dysfunction on surgical left ventricular restoration. The presence of right ventricular dysfunction adversely affected the surgical outcome of left ventricle. They had 139 study participants having mean left ventricular ejection fraction of 27% + 7% eligible for left ventricular surgical intervention. Echocardiography demonstrated 39% patient had impaired right ventricle functional parameters. Impaired right ventricle functional parameters were associated with increased 30-day mortality so it's important to diagnose this condition¹⁶. Right ventricular function needs to be assessed separately as it has weak correlations with left ventricular ejection fraction. A study done in May 2002 on right ventricular dysfunction and heart failure showed that each 5% RV fractional area change was associated with 16% increased risk of cardiovascular mortality. After adjusting for age, gender, diabetes mellitus, hypertension, previous MI, LVEF, infarct size, cigarette smoking and treatment assignment, RV function remained an independent predictor of total mortality, cardiovascular mortality and HF¹⁷. Another study indicates increased prevalence of cardiovascular events in patients with COPD. In COPD, RV ejection fraction is preserved at early stage but hemodynamic instability is present in advanced cases¹⁸.

CONCLUSION

Our study concludes that right ventricular dysfunction is moderately present along with coronary artery disease. It is as frequent in our setup as in western population. If appropriate investigations are carried out, right ventricular dysfunction can be diagnosed at subclinical stage. Early diagnosis leads to better management and good survival. In our population, right ventricular dysfunction is more common in common in males than females. Large scale studies should be carried out to study more about prognostic significance of early right ventricular dysfunction in CAD.

Author's Contribution:

Concept & Design of Study:	Muhammad Inam Qureshi
Drafting:	Afzal Qasim
Data Analysis:	Nadeemuddin, Muhammad Umar Khan
Revisiting Critically:	Afzal Qasim, Muhammad Inam Qureshi
Final Approval of version:	Muhammad Inam Qureshi

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A Histopathological Study of Hysterectomy Specimens in Gujrat – Pakistan

Abdul Rauf and Muhammad Adnan Zaman

ABSTRACT

Objective: To study the pattern of histopathological lesions in hysterectomy specimens.

Study Design: Observational study.

Place and Duration of Study: This study was conducted at the Department of Pathology, Nawaz Sharif Medical College, University of Gujrat, Pakistan from Jan 2015 to August 2017.

Materials and Methods: The study consisted of 150 uterus specimens that were studied grossly and histologically. These specimens were received at department of Pathology and in a private hospital in Gujrat. The data of all the cases was retrieved from registers of histopathology. It was compiled and analyzed with the help of Microsoft Excel software.

Results: Mean age of the patients was 44.7 years in this study. Most (44%) patients were in fifth decade of their life. Chronic cervicitis was the most common finding in the cervix with a frequency of 88.7%. The other lesions were far less common in cervix. Carcinoma cervix was seen in 2.7% of the specimens. Atrophic endometrium, Endometrial Hyperplasia, Endometrial polyp were the three most frequent lesions in endometrium with frequencies of 8.0%, 7.3%, 6.7% respectively. Carcinoma of endometrium was found in 1.3% of cases. Leiomyomas were the most common (44.7%) lesions in myometrium followed by adenomyosis (29.3%). No case of malignancy was found in the myometrium.

Conclusion: The findings in our study corroborated well with most studies within as well as outside the country. Among the significant lesions, leiomyomas and adenomyosis were the most common ones.

Key Words: Uterus, Hysterectomy, Leiomyoma, Adenomyosis, Cervix.

Citation of articles: Rauf A, Zaman MA. A Histopathological Study of Hysterectomy Specimens in Gujrat – Pakistan. Med Forum 2018;29(6):6-10.

INTRODUCTION

Hysterectomy is the most common major surgical procedure done for gynecological problems.¹ Hysterectomy provides a definitive and acceptable form of treatment as well as ultimate diagnosis for several gynecological disorders that do not respond to medical treatment.^{2,3} Hysterectomy is best form of treatment for most Pakistani women because they present late in the course of their gynecological problems and new modalities of treatment like endometrial laser ablation (ELA), transcervical resection of endometrium (TCRE) and uterine artery embolization are not widely available.¹ Abnormal uterine bleeding/ dysfunctional uterine bleeding (DUB) and abdominal mass/ fibroid are the most common indications.^{4,5,6} Other indications include prolapsed uterus, polyp uterus, fibroid polyp, cervical polyp, cervical dysplasia, pelvic inflammatory disease (PID), adenomyosis, carcinomas of cervix and endometrium etc.^{1,6}

A majority of these procedures are done for benign indications.³ Peak age of incidence of hysterectomy is in the 5th decade. Total abdominal hysterectomy is the most common type of procedure employed for removal of uterus.⁷ The most common histopathological diagnosis is chronic cervicitis in cervix, leiomyoma in myometrium and atrophic endometrium in endometrium.⁸ The correlation of clinical features with histopathological findings is good when the preoperative diagnosis is fibroid and poor in cases of abnormal uterine bleeding.⁹

Several incidental pathological lesions are likely to be found in the hysterectomy specimens. Therefore all the uterine specimens should be subjected to histopathological analysis.¹⁰

MATERIALS AND METHODS

The present study is based on gross and microscopic examination of the uterine specimens received for histopathology from Jan 2015 to August 2017 in Pathology department, Nawaz Sharif Medical College in University of Gujrat and at a private hospital in Gujrat city. Incomplete or partial hysterectomy specimens were excluded from the study. All the specimens were examined grossly and representative sections were taken for processing. Slides were prepared and stained with hematoxylin and eosin. The records of all the patients were retrieved, compiled and

Department of Pathology, Nawaz Sharif Medical College, University of Gujrat.

Correspondence: Dr. Abdul Rauf, Asstt. Prof. of Pathology, Nawaz Sharif Medical College, University of Gujrat.

Contact No: 03006209693

Email: abdulrauf64@live.com

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analyzed with the help of Microsoft Excel software. The findings were compared with similar national and international studies.

RESULTS

The study consisted of 150 patients. Age of 147 patients was known. Mean age was 44.7 years and age ranged from 24-80 years. Most of the patients were in fifth decade i.e. 44% followed by 39% in fourth decade (Table 1).

Table No.1: Age distribution of cases (n=147).

Age group	#	%
21-30 years	2	1.4
31-40 years	58	39
41-50 years	64	44
51-60 years	18	12
61-70 years	3	2
71-80 years	2	1.4

The cervix was most commonly affected site numerically with 96.1% (133) of the cases (Table 2). However, most of these cases (n=130, 88.7%) were that of microscopic finding of chronic nonspecific cervicitis (Figure 1).

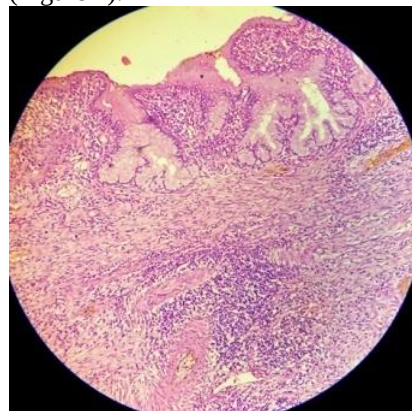


Figure No. 1: Chronic cervicitis. Endocervical lining, glands and chronic inflammatory cell infiltrate are evident.

Table No.2: Distribution of pathological findings in cervix.

Lesion/ Finding	#	%
Cervicitis	133	88.7
Squamous Metaplasia	8	5.3
Carcinoma	4	2.7
Endocervical Polyp	3	2
HSIL	2	1.3
LSIL	1	0.7
Ectopic Gestation	1	0.7
Total	144	96.1

Of the remaining three cases of cervicitis, there were two cases of papillary endocervicitis (1.3%) and one cases of ulcerative cervicitis (0.7%). The four cases of carcinoma contained one case of each of the following:

Large cell keratinizing squamous cell carcinoma, well differentiated adenocarcinoma, well differentiated papillary adenocarcinoma and small cell non keratinizing (poorly differentiated) squamous cell carcinoma (Figure 2). The case of well differentiated adenocarcinoma actually involved lower uterine segment also.



Figure No. 2: Gross picture of a squamous cell carcinoma in cervical canal.

There were 41 endometrial pathological findings in the study (Table 3). Majority of these cases were that of atrophic endometrium, hyperplasia and polyp (Figure 3).

Table No.3: Distribution of pathological findings in endometrium.

Lesion/ Finding	#	%
Atrophic endometrium	12	8
Endometrial Hyperplasia	11	7.3
Endometrial polyp	10	6.7
Endometritis	3	2
Carcinoma	2	1.3
Cystic atrophy	1	0.7
Organizing Products of conception	1	0.7
Decidual change	1	0.7
Total	41	27.4

Among the 7.3% cases of hyperplasia, most i.e. 4.7% (7) were that of simple hyperplasia. There were 1.3% cases of complex hyperplasia without atypia, 0.7% cases of complex hyperplasia with atypia and 0.7% of cystic hyperplasia. Further division of three cases of endometritis is as follows: two cases of chronic nonspecific endometritis (1.3%) and one case of acute endometritis (0.7%). Only two neoplastic cases of carcinoma were found. One of these was a grade I

adenocarcinoma of endometrioid type and other was a moderately differentiated papillary adenocarcinoma.



Figure No. 3: A pedunculated endometrial polyp extending into the cervical canal.



Figure No.4: A specimen of uterus with an adenocarcinoma filling the entire endometrial cavity.

The myometrium is the most common site of mass lesions and least affected site with **malignancies** (Table 4).

Table No.4: Distribution of pathological lesions of myometrium.

Lesion/ Finding	#	%
Leiomyomatous masses (All)	67	44.7
Adenomyomatous lesions (All)	44	29.3
Leiomyoma + Adenomyosis	8	5.3
Caseating Granulomatous Inflammation	1	0.7
Total	120	80

Most of the mass lesions are benign neoplasms of smooth muscles (Fig 5). These leiomyomatous lesions were further subdivided into single leiomyomas (26.7%, n=40), multiple leiomyomas (13.3%, n=20) and leiomyomatous polyps (or polypoidal leiomyomas) projecting into endometrial cavity (4.7%, n=7).

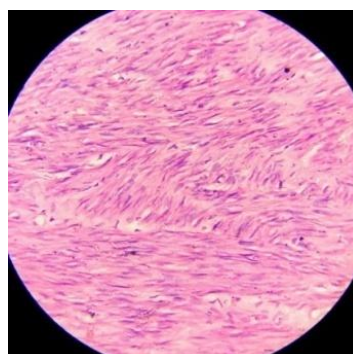


Figure No. 5: A photomicrograph of a leiomyoma, the most common mass lesion in the uterus.

Adenomyomatous lesions were further subdivided into adenomyosis (Figure 6), adenomyomas and adenomyomatous polypi comprising 26.7%, 1.3% and 1.3% of the cases respectively. One case of caseating granulomatous inflammation involved serosal surface of uterus as a part of widespread peritoneal disease.

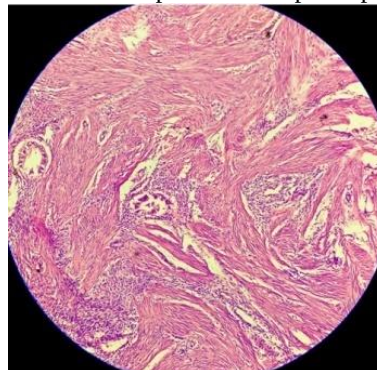


Figure No. 6: Adenomyosis showing endometrial glands along with stroma penetrating in deeper areas of myometrium.

As a whole, cervicitis was the most common finding followed by leiomyomatous lesions and adenomyomatous lesions comprising 88.7%, 44.7% and 29.3% of specimens respectively.

There were six malignant cases in the study (4%) and all of these were carcinomas. Cervix contained four of these cases (2.6%) and endometrium contained two (1.3%).

Table No.5: Comparison of age distribution with other studies.

Study	Year	# of cases	Mean Age	Cases in 5th decade
Present	2017	150	44.7	44%
Majeed(11)	2013	150	45	55.30%
Medhi (12)	2016	150	40.3	49.30%
Verma R (13)	2016	200	44.6	
Rather	2013	698		47.30%
Raza (14)	2017	202		31.70%
Gupta A	2016	400	44.2	46.50%
Gupta G		500	45.6	51.40%
Sreedhar (15)	2016	200		42%

DISCUSSION

The present study is a histopathological analysis of 150 uterus specimens. Mean age of our patients was 44.7 years. This finding is similar to several studies (Table 5).^{3,6,8,11-15} Age range of our patients was 24 to 80 years. This finding is very close to the findings of Domblae at 21-75 years and Gupta G at 20-80 years.^{3,7} The fifth decade contained more cases than any other decade in our study, a finding in agreement with several other studies. Although the proportions of the cases in fifth decade varies but all studies mentioned in Table 5 contained most cases in fifth decade.^{3,6,8,11-15}

Cervicitis was the most common finding seen in 88.7% of our specimens. The finding is similar to that of Majeed at 85%, Rather at 89.4% and Verma D at 93%.^(8,11,16) However there is wide variation in the reported frequency of cervicitis in literature e.g. Perveen 59.2%, Raza 34.3%, Verma R 11% and Neelgund 9.3%.^{4,13,14,17} In our opinion, the reason for this wide variation may be lack of uniformity of reporting rather than actual variation. There was a low frequency of papillary endocervicitis (1.3%) and ulcerative cervicitis (0.7%) in our study like in the study of Gupta A. with a frequency of 0.5% in each of these two findings.⁶ The frequency of squamous metaplasia (5.3%) in present study matches with that of Medhi (4.7%).¹² Cervix was the most frequent site of malignancy as 4 out of 6 carcinomas in our study were seen in it comprising 2.7% of cases. The finding is in concordance with Raza 1.9%, Gupta A 2.5% and Sreedhar at 3%.^{6,14,15}

Endocervical polypi were seen in 2% of our cases. Sreedhar and Raza have reported 2.5% and 2.9% cases of endocervical polypi.^{14,15} There were 2% cases of squamous intraepithelial lesions in our study, a proportion similar to that of Raza (1.9%).¹⁴ There were 1.3% cases of high grade squamous intraepithelial lesion that are close to a proportion reported by Neelgund.⁴ The frequency of low grade squamous intraepithelial lesion in our study (0.7%) matches that of Verma D (0.7%).¹⁶

Leiomyomas were next in frequency after the cervicitis and were found in 44.7% of cases. The finding is similar to Verma R at 40% and Baral at 48.6%.^{13,18} Multiple leiomyomas (two or more) occurred in 13.3% of our and 9.5% of cases in the study of Sreedhar.¹⁵ Leiomyomatous polypi (polypoidal leiomyomas) comprised 4.7% of our cases. The finding is in likeness with 5% reported by Perveen.¹⁷

Adenomyosis was next most common lesion after leiomyomas seen in 26.7% of our cases, a finding in correspondence with the studies of Medhi (26%), Dhuliya (25.3%) and Bhatti (24.7%).^{1,12,19} Adenomyomas, the masses consisting of smooth muscle bundles and islands of benign endometrial tissue occurred with low frequency of 1.3% in our study

and 0.2% in the study of Gupta A.⁶ Leiomyomas coexisted with adenomyosis in 5.3% of our cases. There were 6% cases of leiomyomas with adenomyosis in the study of Majeed, 6% in the study of Verma R and 4.6% in that of Baral.^{11,13,18}

Atrophic endometrium was seen in 8% of cases in present study. The nearest findings to this are 5.4% by Rather and 12.8% by Raza.^{8,14} The proportion of endometrial hyperplasia (all cases) in our study and the study of Majeed is same at 7.3%.¹¹ The percentage of our cases of simple adenomatous hyperplasia (4.7%) is lower than reported by and Medhi (14%) and Sreedhar (14.5%) while it is higher than that of Verma D (3%).^{12,15,16} The amount of our cases of complex hyperplasia without atypia (1.3%), complex hyperplasia with atypia (0.7%) and cystic Hyperplasia (0.7%) matches with that of Rather (1.14%), Verma D (1%) and Medhi (1.4%) respectively.^(8,12,16) The volume of cases of endometrial polypi in our study (6.7%) is commensurate with the studies of Majeed (6.7%) and Sreedhar (6%).^{11,15} The proportion of cases of endometritis (all cases) in the study of Yadav (1.9%) is similar to ours (2%).²⁰ There were 1.3% cases of chronic endometritis in this study and Majeed has reported 2% cases in her study.¹¹

Our finding of 1.3% cases of malignancy (all carcinomas) in endometrium is matching with 1.2% of Perveen and 1.14% of Baral.^{11,18} The proportion of adenocarcinoma is same (1.3%) in studies of Dhuliya and ours.¹⁹

CONCLUSION

Chronic cervicitis, leiomyoma and adenomyosis are the three commonest findings in our study. Other lesions including malignancies are relatively less in frequency in Gujrat. The findings in our study are similar to most of the published studies.

Author's Contribution:

Concept & Design of Study:	Abdul Rauf
Drafting:	Muhammad Adnan Zaman
Data Analysis:	Muhammad Adnan Zaman
Revisiting Critically:	Abdul Rauf, Muhammad Adnan Zaman
Final Approval of version:	Abdul Rauf

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Smile arc Preference in Various Facial Proportions

Nabila Anwar, Rizwan Shah and Hassan Naveed

ABSTRACT

Objective: To elucidate the effect of alteration of smile arcs on attractiveness of the smile and to find the most attractive smile arc for a particular face type.

Study Design: Cross sectional analytic study.

Place and Duration of Study: This study was conducted at Rehmat Memorial Post-graduate Teaching Hospital (Women Medical and Dental College, Abbottabad for a period of June 2017 to February 2018.

Materials and Methods: Photographs of two selected male and female subjects were altered to produce three face types for each individual. Smile arc was then altered in the produced facial types. The pictures were then rated for attractiveness by different professionals.

Results: The total number of raters was 100 with the mean age of 30.3 years $\pm$ 8 years. The alterations in the smile arc produced statistically significant difference in the attractiveness of faces whereas the perception difference was found to be insignificant amongst raters of different professions. Consonant smile arc was preferred in all subjects except for brachyfacial subjects where a flat smile arc was preferred.

Conclusion: The variability in various smile arcs showed significant difference in the esthetic score. Preferred smile arc was found for individual face types.

Key Words: Face types, Smile arc, Facial esthetics

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INTRODUCTION

Facial esthetics and appearance have attained a pivotal role in personal, professional and social life of individuals in the modern era.^{1,2} In the light of modern orthodontics, soft tissue paradigm in clinical orthodontics has made smile analysis and designing, key elements in treatment planning. Orthodontists are involved in treatment which can alter a patient's facial appearance and particularly a patient's 'smile'. Orthodontists are accustomed to patients who often complain of their inability to smile due to their unattractive appearance of teeth and this ultimately becomes a social disability. This situation becomes the prime reason for patients to seek orthodontic treatment in view of correcting their social handicap.³

Smile has been described as posed smile and spontaneous smile by Ackerman et al, a concept based on the studies of facial expressions.⁴

Smile is an integral constituent of the facial attractiveness of a person.^{5,6}

Department of Orthodontics, Women Medical & Dental College, Abbottabad.

Correspondence: Nabila Anwar, Associate Professor, Department of Orthodontics, Rehmat Memorial Dental Hospital, Abbottabad.

Contact No: 0300-5564464

Email: drnabilaanwar@gmail.com

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It is a sum of many attributes amongst which smile arc is one of the most important constituent. Smile arc, by subjective definition is a virtual line that connects the incisal edges of the maxillary anterior teeth that commonly follows the upper border of the lower lip. The ideal relationship on smiling is considered to be parallel and is known as a consonant smile.⁷ If the two are not parallel (with flatter maxillary incisal curvature to the upper border of lower lip), it is called a non-consonant smile.⁷ Average and parallel smile lines are most common and are mainly influenced by the age and gender of a person along with other factors like orthodontic treatment, inherent growth pattern, attrition etc.⁸

In the current orthodontic era, the orthodontists aim to treat the face in 3 dimensions i.e. the vertical, sagittal and transverse dimensions. Each dimension has its own importance and hence needs to be considered thoroughly while sorting a viable treatment plan for the patients. These facial dimensions also have an influence on the smile design of the individuals. Hence the teeth have to exist in a balanced environment with the facial dimensions in order to produce acceptable esthetics. In vertical dimension, the face has been divided in to three subjective facial types which are the long- face (dolichofacial), short- face (brachyfacial) and normal face (mesofacial).⁹

In clinical practice, faces with various facial proportions are encountered having smile problems. Literature reveals that vertical proportions have not been studied thoroughly while considering the smile architecture.^{1-4,6-8} Our aim was to clarify the effect of

alteration of different smile arcs on attractiveness, to find out the most attractive smile arc for a particular face type and to determine any difference in perception of esthetics amongst people belonging to different professions.

MATERIALS AND METHODS

This cross sectional analytical study was done at the Rehmat Memorial Post-graduate Teaching Hospital. After taking the informed consent, various subjects were selected for posed frontal smiling photographs. One male and one female subject was finalized on the basis of optimal harmony and symmetry in their face and smile. A new set of different frontal posed smiling pictures were taken for the two selected subjects to capture the best frontal smiling photograph. The photographs were then altered using adobe photoshop version 8.0 (Adobe Systems, San Jose, CA, USA) with some professional help in this regard. The pictures were first altered to make three face types for the same subject by altering the facial height to width ratios as shown in Figure 1. Smile arc was then altered for various facial proportions as shown in Figure 2.

Smile arc was changed as consonant, flat and reverse types. The modified images were imported into Microsoft Power Point (Microsoft, Redmond, WA, USA) as a presentation in a predetermined order for evaluation by 100 judges belonging to 4 groups including orthodontists, restorative dentists, arts and fashion designers and laypeople. A five point visual analogue scale with an interval of a whole number on a data collection form was used to rate the provided images, projected for a set number of seconds in order to standardize the rating of every picture for each rater.

RESULTS

The total number of raters was 100 amongst them 25 were orthodontists, 25 were restorative dentists, 25 were arts and fashion designers and 25 were laypeople. The mean age of the raters was 30.3 years $\pm$ 8 years. Results of ANOVA showed that there was no statistical difference in age amongst all the groups ($p = 0.20$). Result of Chi square showed equal gender distribution in all groups with p -value of 0.23. Table I shows the results of multiple factor ANOVA for altered smile arcs.

Table No.I: Result of Repeated Measure ANOVA for Smile Consonance

Variable		Gender	Face Type		
			Dolichofacial p-value	Mesofacial p-value	Brachyfacial p-value
Smile Consonance	Factor	Male	0.05*	0.04*	0.03*
		Female	0.05*	0.02*	0.01**
	Factor & Category	Male	0.1	0.69	0.32
		Female	0.9	0.6	0.21

* $P = .05$; ** $P = .01$; *** $P = .001$

Table No.2: Mean Scores for Smile arc Preferences in the Three Face Types

Smile ARC	category	Dolichofacial Male		Mesofacial Male		Brachyfacial Male		Dolichofacial Female		Mesofacial Female		Brachyfacial Female	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
consonant smile	orthodontist	3.80	1.0	4.20	1.0	3.80	0.8	4.25	1.1	4.00	0.7	4.10	0.8
	restorative dentist	4.20	1.1	4.10	0.9	4.00	1.3	4.30	1.4	4.20	0.8	3.80	1.2
	arts and fashion	3.89	1.1	3.80	1.0	4.20	1.0	4.20	1.0	4.10	0.8	3.90	0.9
	lay person	4.20	1.0	4.50	0.8	3.70	1.0	4.00	1.3	4.09	1.0	3.90	1.1
	Total	4.00	1.1	4.20	0.9	4.00	1.1	4.20	1.2	4.10	0.9	3.90	1.0
flat smile	orthodontist	2.92	1.0	3.00	1.0	4.20	0.9	3.50	0.9	3.80	1.1	4.20	1.0
	restorative dentist	2.20	1.1	3.08	1.1	4.00	1.3	3.80	1.0	4.00	0.6	4.00	1.0
	arts and fashion	2.40	1.0	3.00	0.9	4.30	1.1	3.90	1.3	3.90	0.9	4.50	1.0
	lay person	2.45	1.0	3.64	1.0	4.50	1.0	4.00	0.9	4.10	1.3	4.30	1.0
	Total	2.60	1.0	3.16	1.0	4.20	1.1	3.80	1.1	3.90	1.0	4.30	1.0
reverse smile	orthodontist	1.50	0.7	1.40	1.0	2.33	0.8	2.17	0.7	2.83	0.9	2.92	0.8
	restorative dentist	2.08	1.1	2.00	0.9	2.54	1.1	2.54	1.3	2.85	0.8	2.31	0.9
	arts and fashion	1.07	1.3	1.36	0.7	3.00	1.0	2.14	1.2	2.70	0.8	3.07	1.0
	lay person	2.00	1.1	1.90	1.3	3.18	1.3	2.82	1.1	2.90	1.6	3.18	1.1
	Total	1.60	1.1	1.70	1.0	2.76	1.1	2.4	1.1	2.80	1.1	2.86	1.0



Figure No.1: Different Face Types for the Female and Male Subjects

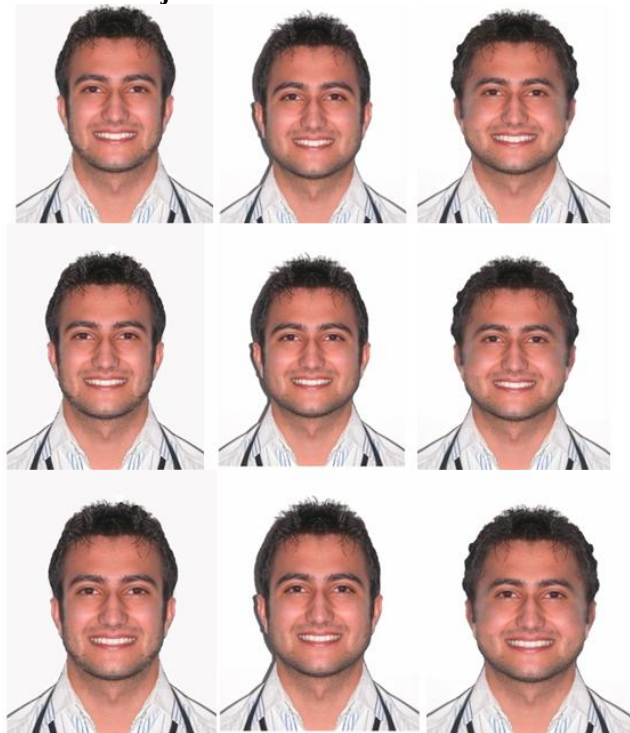


Figure No.2: Frontal face showing smile arc variations for various facial proportions

The factor denotes the variability in the parameter chosen whereas the category denotes the raters belonging to different professions in order to note any possible difference in the perception of esthetics. When the category and the factors are taken together there is statistically insignificant difference in the perception of esthetics for the altered parameters in all the three face types which shows insignificant difference in perception of esthetics amongst the different professionals. However, when only factor is considered, the alterations in smile arc resulted in statistically significant difference in the perceived attractiveness of the face. Table II shows the mean scores for various

smile arc preferences. Smile consonance was preferred for all face types in both genders except in brachyfacial subjects where flat smile arc was preferred.

DISCUSSION

Recognition of the smile characteristics for variant facial types is of vital importance for the orthodontists in this era of information where all sorts of knowledge and information is accessible to the patients on the internet. Not only the treatment should be aimed at achieving the consonant smile arc but due importance need to be given to the facial vertical types as well. Various researches show that the consonant smile arc is attractive when compared to a non-consonant smile arc but its relevance to the specific facial types has not been established.^{7,10,11} Moreover, the evaluation of smile parameters separate from the facial features has been studied by various authors.^{3,7,12-15} Our research was hence aimed at developing a broader understanding of the impact of specific face types on the smile arc and to establish current concepts of smile arc preferences according to the face type.

Smile perception is a highly varied entity and defining an ideal smile is a difficult task. Various smile attributes have been widely studied to define the ideal smile esthetics.¹⁻³ Thus an attempt was made to define smile perception among various groups of individuals in our research. The contribution of various raters from different professions in search for the ultimate attractive smile for a particular face type was the rationale of the current study. The diversity amongst various groups of individuals was taken in to consideration so as to determine the preferred smile arcs for various facial patterns. The technique used in our research of alteration of the same face into three face types freed the raters from the concern of other confounding features of the face. The ratings have enabled the formulation of some guidelines in designing an attractive smile for a particular face type.

Our study involved 100 raters, 25 from each group of different professions and laymen who rated 3 variations of smile arcs on 3 variations of face types. The 3 types of smile arcs included consonant, flat and reverse smile arcs. The 3 distinctive facial types were defined according to the vertical height of the face i.e. brachyfacial which is broader face type. The mesofacial face type in which the height and width ratio of the face are rather proportional resulting in a normodivergent facial pattern, and the dolichofacial type in which there is an increased anterior facial height.⁹ Smile esthetics have been widely studied in terms of smile arc effecting the esthetic attractiveness¹⁶⁻²² but have seldomly correlated with vertical facial patterns. Our research thus aimed to define the interaction and the influence of smile arc on various vertical facial patterns.

AlShahrani²³ considered smile arcs among various undergraduate professional students involving the

medical, dental and IT departments. They concluded that all students were able to identify the consonant smile arc as being more beautiful than the flat and reverse smile arcs. Ker et al., Badran et al. and Parekh et al. also indicated similar results claiming that flat and reverse smile arcs have a negative effect on laypeople's perception.¹⁹⁻²¹ Parekh et al.²⁴ further stated that less attractive smiles have excessive buccal corridors and flat smile arcs. Additionally, flat smile arcs appear to decrease attractiveness ratings regardless of the buccal corridors. This is in agreement with our study findings indicating that reverse and flat smile arcs were the least preferred among all the groups for all facial types except the brachyfacial face type for which the flat smile arc was chosen as the preferred one. A flat smile arc according to the author might add harmony to the brachyfacial face profile and therefore look more attractive than the consonant smile arc. It is interesting to note at this point that the vertical facial patterns can have an effect on the smile dimensions and can affect the smile preferences as well.

Smile arc should also be considered in treatment planning and bracket positioning when executing comprehensive orthodontic treatment for the patients. As indicated by Krishnan et al.⁷ and Wong et al.²⁵ orthodontist's lack of consideration of the smile arc in treatment planning and mechanics can result in flattening of the smile arc and consequently less esthetic smiles. In this regard, consideration should be given to ideal smile arcs for specific types of face which is addressed in our study. Insufficient literature is available to relate smile arc with various vertical facial types and further research is required in this regard in order to determine the ideal smile esthetics for specific facial types in vertical plane of space.

Our study indicated that smile perception difference among various studied groups was almost similar as indicated by the multiple factor ANOVA. Similar results were indicated by various other studies^{13,14,20,21} which compared the perception of laypeople, orthodontists and various other professions. Krishnan et al.⁷ analyzed the perception difference between lay persons and dental specialists and found no difference in perception between lay persons and specialists on the smile evaluation. No differences were found between the perception of male and female raters. This is consistent with the findings of Moore et al.¹⁰, Ker et al.¹⁹ and Martin et al.²⁶

The end treatment smile should be planned to address both the patient's need as well as the perception. Not all face types suit the same smile perspectives and so individual face types need to be given their due importance when considering the smile design for individual patients.

CONCLUSION

The variability in smile arcs showed significant difference in the esthetic score; however, statistically insignificant differences were found in the perception

between raters of various professions. Consonant smile arc was preferred in dolichofacial and mesofacial face types in both male and female subjects. In brachyfacial subjects however, a flat smile arc was chosen as more attractive feature.

Author's Contribution:

Concept & Design of Study:	Nabila Anwar
Drafting:	Rizwan Shah
Data Analysis:	Rizwan Shah, Hassan Naveed
Revisiting Critically:	Nabila Anwar
Final Approval of version:	Nabila Anwar

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Role of Prognostic Factors in Success of Intrauterine Insemination (IUI) Procedure

Fazia Raza, Ghulam Murtaza, Roohi Gul and Shabana Gul

ABSTRACT

Objective: To confirm-cum-identify important prognostic factors to improve outcome and provide a model to centers with lower success rates and newly developed centers.

Study Design: Descriptive study

Place and Duration of Study: This study was conducted at the Center for Reproductive Medicine, Rehman Medical Institute, Peshawar from January 2015 to January 2017.

Materials and Methods: One hundred and thirteen patients who were eligible for the inclusion criteria were included. In this study controlled ovarian stimulation was started giving HMG injections to patients following follicular tracking accordingly to get required size and number of follicles. After administration of IVF-C 10,000 IU twice insemination was performed at 36 and 44 hours with 0.5 ml volume of prepared semen sample via gradient or swim-up method.

Results: We found that >2 follicles was a fruitful prognostic factor (value 0.02) than 1-2 follicles. The semen preparation in culturing media produced better percentile 29.03% as compared to sperm wash media 12.19% in positive and negative case. While preparing semen sample through gradient method we got 28.57 % positive result as compared to swim-up method (P value 0.06). During this research we found that our pregnancy rate was 16.81 % pregnancies with take home baby rate of 63.15%.

Conclusion: In treating infertile couple, prognostic factors play a key role in improving IUI success rate.

Key Words: Intrauterine insemination, Controlled ovarian stimulation, Prognostic factors

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INTRODUCTION

Initial procedure in the assisted reproductive technology (ART) is intrauterine insemination (IUI) along with controlled ovarian stimulation (COS) to cure patient with male factor infertility, unexplained infertility, endometriosis with one patent tube and anovulation^{1,2}. In this reproductive age, research studies have shown varying rates of infertility in developed 8%-32% and in developing countries it is more than 180 million³⁻⁹. Many retrospective studies have given prognosis factors for IUI outcome such as, insemination count of motile sperm and progressive motility¹⁰⁻¹⁵, duration and number of insemination^{10,17-16}, endometrium size and no of follicles at the time of LH surge^{10,12,14}, type and duration of infertility and the women age^{12,13,18}.

Center for Reproductive Medicine, Rehman Medical Institute, Peshawar.

Correspondence: Fazia Raza, Assistant Professor, Center for Reproductive Medicine, Rehman Medical Institute, Peshawar.
Contact No: 03459648667
Email: faziaraza@yahoo.com

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MATERIALS AND METHODS

This descriptive study was performed between January 2015 to January 2017 at Centre for Reproductive Medicine (CRM), Rehman Medical Institute (RMI), Peshawar, Pakistan. 113 patients who were eligible for the inclusion criteria was included in the study. Permission to conduct the study was taken from the institutional Ethical committee. Data was collected by reviewing the charts of the patients. The inclusion criteria included patients with unexplained infertility, bilateral patent tubes, mild male factor subfertility and minimal to mild endometriosis. The exclusion criteria were patients with poor response which means no follicular growth, endometrial lining less than 6 mm, or more than 4 follicles or patients who developed ovarian hyper-stimulation syndrome. On the 2nd day of the cycle a baseline Transvaginal scan (TVS) was carried out. Stimulation was started on cycle day 2 using human menopausal gonadotropin (HMG) 75- IU IM daily. Ovarian-cum-endometrial response monitored via TVS on day 5, 7 and 10 and when at least one dominant follicle of >1.7cm/17mm, then under the ultrasound guidance using Cook catheter (Shepherd) twice intrauterine inseminations were performed at 36 and 44 hours after the administration of 10,000 IU of human chorionic gonadotropin (HCG). If more than 4 mature

follicles developed, the cycle was cancelled and the couple was advised to avoid sexual intercourse in this cycle.

Most importantly, whole semen preparation was carried out maintaining positive pressure of andrology section. Semen collected was through masturbation, and processed performing swim up and density gradient methods using sperm wash (Invitro cell) and culturing media. Under aseptic conditions IUI was done with cook catheter with insemination volume of 0.5 ml under ultrasound guidance.

Following IUI patients were advised for 30 minutes rest and for luteal support cyclogest 400 mg per vaginal given for 14 days post IUI. A SBHCG was done after 14 days and if positive an obstetrical ultrasound was done two weeks later. Women were followed till delivery and the neonatal outcome was recorded. Two groups were made based on the success of treatment of IUI (positive SBHCG) and comparison was done in the following variables age, number and size of dominant follicles, endometrial size, gradient versus swim up method and culture media versus sperm wash media. For continuous variables mean and standard deviation was used and for categorical variable p value was calculated using chi-square test. Data was analysed using SPSS version 20.

RESULTS

The mean age of female patients was 27.05 with SD of 4.14. Causes of infertility were anovulation in 35%, male factor in 20%, and endometriosis in 12% and unexplained infertility in 33%. Out of 113 patients SBHCG was positive in 19 cases (16.84%). Clinical pregnancy rate was 16.84%. Out of 19 patients, 15.78% of them had first trimester miscarriage and two patients had ectopic pregnancy 10.52%. In this research we found that take home baby ratio was 63.15% and continued pregnancies 10.52% with gender male 61.52 and female 38.46 percentile. Out of 19 patients one had twin pregnancy (Figs. 1-2).

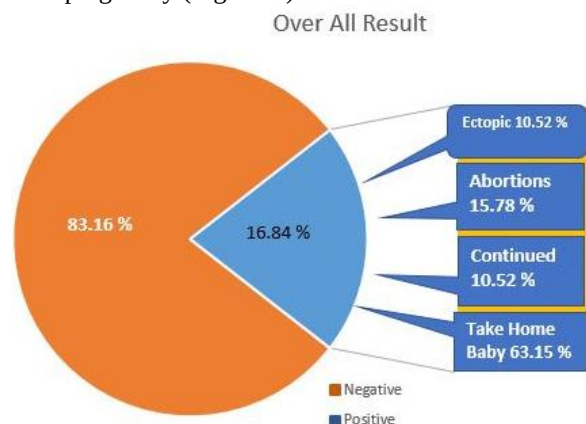


Figure No. 1: Comparison of outcome in positive cases
Maternal age, endometrial size and follicle size once it was 1.7 was not an important prognostic factor in our

study (Table 1). We found that >2 follicles is a valuable prognostic factor for better pregnancy rate 79% as compared to 1-2 follicles and had a safe twins percentile of 5.26. Semen preparation via gradient method was associated with higher pregnancy rate as compared to swim-up. Using culturing media, we got improved outcome against sperm wash media comparing to positive and negative (p. value 0.08) (Table 2)

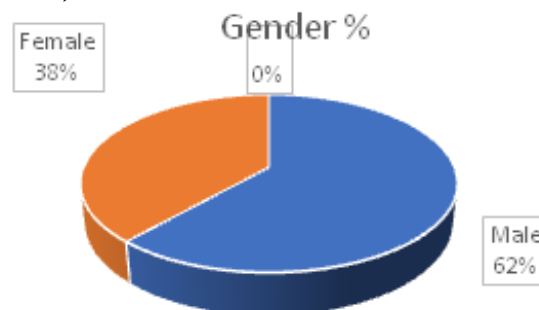


Figure No. 2: Comparison of gender outcome in positive cases

Table No.1: Average of parameters

Parameter	Mean±SD	P value
Age	27.05±4.14	0.703
Size 1	1.88±0.92	0.145
Endometrial size	0.77±0.24	0.128

Table No.2: Comparison of following parameters versus positive and negative cases

Parameter	Positive (n=19)	Negative (n=113)	P value
1-2 follicle(s)	4	5	0.02
3-4 follicles	15	58	
Gradient	10	35	0.06
Swim-up	9	78	
Culturing media	9	31	0.08
Sperm wash	10	82	

DISCUSSION

In our study an effort was made to determine the prognostic factors for IUI and ovulation induction. Our success rate was 16.81%, for all cycles, which is comparable to other international studies.¹⁹⁻²³ In this study female age did not show any influence on IUI outcomes (p. value 0.73). However literature shows that advanced age decreases female fecundity²⁴ and this is due to reduced uterine receptivity and decreased oocytes quality²⁵. Even more advanced treatment options such as IVF and ICSI cannot completely overcome the negative impact of age²⁶. However, women's age was not significant in other study²⁷ which is comparable to our study.

For conception optimal endometrial thickness (>8mm) is essential. There are scarce data regarding the role of endometrial thickness and pattern on the success of

IUI²⁸. In our study we found that it is not an important prognostic factor (Table 1).

In our study we found that >2 follicles is a valuable prognostic factor for better pregnancy rate 79 % as compared to 1-2 follicles with a safe with twins percentile of 5.26 which is in contrast to study done by Bages et al which said that three or four follicles instead of two follicles don't add any advantage in IUI outcome²⁹ (Table 1).

In most studies, the density gradient method has showed advantage in sperm recovery compared to swim-up method. It yields not only the highest number of motile sperm, mature sperm and better DNA quality but also reduces contamination³⁰. These findings were supported by our research in which use of gradient method for semen preparation and culturing media as compared to sperm wash media was associated with improved outcome (Table 2).

CONCLUSION

Presently, first line treatment offered to selected patients with less compromised parameters is IUI with controlled ovarian stimulation, which is easy, cheap and less invasive as compared to expensive IVF especially in low resource setup. Identifying definitive prognostic factors for predicting success will help in counselling patients regarding the modality of the treatment.

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Author's Contribution:

Concept & Design of Study:	Fazia Raza
Drafting:	Ghulam Murtaza
Data Analysis:	Roohi Gul, Shabana Gul
Revisiting Critically:	Fazia Raza, Ghulam Murtaza
Final Approval of version:	Fazia Raza

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Supraclavicular Flap as a Better Option Than Skin Graft in Postburn Mentosternal Contractures

Ijaz Hussain Shah, Muhammad Bilal Saeed and Naheed Ahmed

ABSTRACT

Objective: To determine the functional and aesthetic outcome of the use of supraclavicular artery flap versus skin graft in release of post burn mentosternal contractures, in terms of contracture reformation and aesthetic outcome.

Study Design: Quasi-experimental study.

Place and Duration of Study: This study was conducted at the PIBC, Nishtar Medical University Multan from January, 2017 to January 2018.

Materials and Methods: This study included 60 patients of post burn mentosternal contracture divided in two groups A and B with 30 patients in each group, in group "A" skin grafting was done and in group "B" Supraclavicular artery flap was done after release of contracture. Functional and aesthetic outcome in terms of contracture reformation, colour matching and texture was compared in both groups.

Results: The graft was "take" well as the functional and aesthetic outcome was good but reformation of contracture seen in 18 (60.0%) cases. The colour match was excellent in only 4 (13.3%) patients, good in 13 (43.3%) and satisfactory in 10 (33.3%) while poor results due to hyperpigmentation were seen in 3 (10.0%) patients. All flaps survived except in 04 case; due to formation of band in the suture line, the functional outcome was excellent in only 9 (30.0%) cases and good in 19 (63.3%) cases; 2(6.7%) cases had satisfactory results and no patient showed poor results after flap being done.

Conclusion: The aesthetic outcomes was excellent in 23 (76.7%) patients, good in 5 (16.7%) patients and 1 (3.3%) patient fell in satisfactory and poor group.

Key Words: Neck contracture, Supraclavicular artery flap, Skin grafting, Burn reconstruction

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INTRODUCTION

The treatment of postburn scar deformities and contractures of the neck is one of the complicated challenges in reconstructive surgery. The skin of the neck is thin and pliable and as flexion is position of comfort it is prone to the formation of contractures¹. They can lead to deformities of the lower face and can be reduced by keeping the neck extended during the periods of rest by placing a pillow under the neck or by use of cervical collar and Watusi Splint². The traction forces caused by burn scar contracture may pull the chin, cheeks, and lower lip caudally, resulting in incomplete oral occlusion and aldopion, in addition to possible tracheal alterations affecting respiration and to distortions of the cervical spine.

Many surgical procedures have been used to correct these contractures, including free skin grafts, local flaps

with or without tissue expansion, and free flaps³. To achieve good functional and cosmetic results the operative procedure should fulfill the cosmetic and functional criteria of the neck. Split Skin graft remains the standard and acceptable resurfacing option for graftable wounds following incisional release of contractures and excisional removal of hypertrophic scars. Skin graft is easily available from any site and can easily be applied in patients of neck contracture⁴. But there is problem of mismatch and reformation of contracture. Fasciocutaneous flaps based on the supraclavicular artery is an extremely reliable local flap for this purpose. It offers thin and pliable skin with good colour match, with respect to the cervicohumoral shoulder region and minimal donor site morbidity.

As a basic concept, first formulated by Gillies in 1920, the more adjacent the donor site is, the better the skin will match the recipient⁵. The head and neck region itself suffers from a lack of local tissues available for reconstruction. The areas which are adjacent to the head and neck are chest and shoulder.

The supraclavicular and shoulder areas can provide skin which fulfils most of the criteria of an 'ideal flap' for this region. The flap raised from this area, known as supraclavicular artery flap, is an extremely reliable, local, pedicle fasciocutaneous flap. It is based on the supraclavicular artery, which is a branch of the

Department of Plastic Surgery, Pak Italian modern burn center, Multan.

Correspondence: Ijaz Hussain Shah, Assistant Professor of Plastic Surgery, Pak Italian modern burn center, Multan.
Contact No: 03216358098
Email: drijazshah@gmail.com

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transverse cervical artery, or, less frequently, of the suprascapular artery. Its skin paddle consists of a defined region around the shoulder cap. It can be pre-expanded to cover larger defects and further reduce donor site morbidity³. An additional advantage is that when used for neck resurfacing after release of post-burn contractures, this skin can stretch postoperatively to allow further improved neck contour and mobility¹.

On the other hand the limitation in the use of supraclavicular flap is that, mostly in cases of burn neck the area to be used as a flap and/or its feeding vessel is in zone of trauma, and some times primary closure of the donor site is not possible so a skin graft is to be applied there causing further cosmetic problems.

MATERIALS AND METHODS

It was a Quasi experimental study and was conducted in Pak Italian Modern Burn Center, Nishtar medical University, Multan from January 2017 to January 2018.

Sample Size: A total number of 60 patients of Mentosternal contracture divided into 2 groups of 30 each.

Sampling Technique: Convenience non probability sampling technique.

Data Collection Procedure: Informed consent was taken from all the patients admitted from out door patient department or shifted from other wards before including them in the study and purpose was also explained. Sixty confirmed cases of Mentosternal contracture based on clinical features were divided into two equal groups by using the random numbers table. All the patients were assessed by detailed clinical history and physical examination.

Skin grafting was performed in patients of group 'A' by taking a split skin graft with a dermatome and tie over stitches were applied over the graft. Whereas the patients in group 'B' was managed by doing Supraclavicular artery based flap.

All the patients were subsequently followed-up at one, three and five months. Some patients were followed-up for even more than six months.

Data Analysis: The collected data was analyzed by SPSS statistical package. Following variables were studied:

Age & sex. "Take" of graft i.e. survival (percentage).

Flap survival (percentage). Functional restoration at one, three and five months follow-up. Aesthetic restoration at one, three and five month follow-up.

RESULTS

A total number of 60 patients divided in two groups of 30 patients each, were included in this study. All of them were studied during the six months of this one year study. Out of 30 patients in group A, 11 (36.67%) were male and 19 (63.33%) were female. In group B, 14 (46.67%) were male and 16 (53.33%) were female.

At one month follow-up, the functional

restoration in group A was noted to be excellent in 2 (6.7%) patients, good in 18 (60%) patients, and satisfactory in 10 (33.3%) patients. None of the patients (0%) at one month follow-up was found to have a poor functional restoration. Functional restoration in group B at one month was excellent in 4 (13.3%) patients, highest number that is 22 (73.3%) patients had good results while 4 (13.3%) had satisfactory and none had poor results.

The functional restoration deteriorate in group A with skin grafting as at three months follow-up it was excellent in only 1 (3.3%) patient while good and satisfactory results in 14 (46.7%) patients each and 1 (3.3%) had poor results. The results showed improvement in group B patients at three months follow-up as it was excellent in 10 (33.3%), good in 18 (60.0%) and only 2 (6.7%) had satisfactory results, there was no case with poor results at this stage.

At six months follow-up, still further deterioration in results was noted in group A. It remained excellent in 1 (3.3%) patient; good in 11 (36.7%) patients, satisfactory in 13 (43.3%) patients and 5 (16.7%) had poor results. Improvement was seen in the functional restoration in group B Patients. It became excellent in 9 (30.0%) patients, good in 19 (63.3%) patients, and remained satisfactory in 2 (6.7%) patients. Again none of the patients (0%) was found to have a poor functional restoration at this stage of follow-up.

At one month follow-up, out of 30 patients of skin grafting the aesthetic restoration was noted to be excellent in 9 (30.0%) patients, good in 15 (50.0%) and satisfactory in 5 (16.7%) patients. One patient (3.3%) had a poor aesthetic outcome. While the 30 patients of Flap the colour match was found to be excellent in 18 (60.0%), good in 7 (23.4%) patients, 4 (13.3%) had satisfactory result while 1(3.3%) patient had poor result as in group A.

Like the functional restoration, the aesthetic restoration regarding colour match was also seen to be decreasing in patients of skin grafting as only 5 (16.7%) patients had excellent result at three month follow up, 15 (50.0%) had good results and number of patients with satisfactory and poor results increase as 8 (26.6%) and 2 (6.7%) respectively. While the patients in other group in which flap was done the colour match also improved with the passage of time. At three months follow-up, it became excellent in 22 (73.3%) patients, good in 5 (16.7%) patients and remained satisfactory in 2 (6.7%) patients. One of the patients (3.3%) had a poor aesthetic outcome at this follow-up.

At six months follow-up, in patients of skin grafting the results remained almost static with little deterioration. It became excellent in 4 (13.3%) patients, good in 13 (43.3%) patients and remained satisfactory in 10 (33.3%) patients. The patients with poor results increased to 3 (10.0%). On other hand some further improvement was noted in the aesthetic restoration in

the group in which flap was done but the results were almost the same as at three months follow up. It became excellent in 23 (76.7%) patients, good in 5 (16.7%) patients, satisfactory in 1 (3.3%) patient. Again one of

the patients (3.3%) was seen to have a poor aesthetic outcome regarding colour match at this stage of follow up, as shown in table 2.

Table No.1: Functional Restoration at 1, 3 and 6 Months

N=30

	Group A Skin Graft			Group B - Supraclavicular Flap		
	1m	3m	6m	1m	3m	6m
Excellent	2 (6.7%)	1 (3.3%)	1 (3.3%)	4 (13.3%)	10 (33.3%)	9 (30.0%)
Good	18 (60%)	14 (46.7%)	11 (36.7%)	22 (73.3%)	18 (60.0%)	19 (63.3%)
Satisfactory	10 (33.3%)	14 (46.7%)	13 (43.3%)	4 (13.3%)	2 (6.7%)	2 (6.7%)
Poor	(0%)	1 (3.3%)	5 (16.7%)	(0%)	(0%)	(0%)

Table No.2: Aesthetic Outcome at 1, 3 and 6 Months

N=30

	Group A Skin Graft			Group B - Supraclavicular Flap		
	1m	3m	6m	1m	3m	6m
Excellent	9 (30.0%)	5 (16.7%)	4 (13.3%)	18 (60.0%),	22 (73.3%)	23 (76.7%)
Good	15 (50.0%)	15 (50.0%)	13 (43.3%)	7 (23.4%)	5 (16.7%)	5 (16.7%)
Satisfactory	5 (16.7%)	8 (26.6%)	10 (33.3%)	4 (13.3%)	2 (6.7%)	1 (3.3%)
Poor	1 (3.3%)	2 (6.7%)	3 (10.0%)	1(3.3%)	1(3.3%)	1 (3.3%)



Figure No.1: Skin grafting for neck contracture

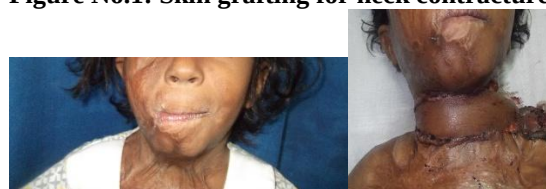


Figure No.2: supraclavicular artery flap for neck contracture

DISCUSSION

Reconstructive procedures in the postburn mentosternal contractures have to take account of anatomic, aesthetic and functional aspects.⁶⁻¹⁰ First, normal contours have to be achieved; in the neck, the cervico-mandibular angle has to be reformed. Second, the aesthetic units have to be taken into account. Third, the functional outcome has to ensure full range of movements, both of the lower face and neck. Finally, additional scarring of the upper chest should be avoided. To achieve these goals, a thin reliable flap, harvested close to the face/neck region with good colour and texture match, and a smooth hairless skin surface is needed. Everyday clothing should conceal the donor site.

Numerous methods have been used to restore form and function in the head and neck region. The best colour and texture match is achieved with local and regional flaps.^{5,11} The skin graft has the obvious advantage of having large donor site availability away from the

contracture, like thighs of the patient¹². It is easy to learn and swift to perform. Modern uses of skin grafting were described in the mid-to-late 19th century, including Reverdin's use of the pinch graft in 1869 (Davis, 1994); Ollier's and Thiersch's uses of the split-thickness graft in 1872 and 1886, respectively. As reformation of contracture was a problem in skin graft after release of neck contractures, in 1961 Cronin TD¹³ published his research of use of molded splint to prevent reformation of neck contracture after splint skin grafting on neck.

In our study we used skin grafting after release of mentosternal contracture in 30 patients. The "TAKE" of graft was 100% in 17 (56.7%) patients, it was 70-90% in 7 (23.3%) patients and remaining 6 (20.0%) patients the "TAKE" was less than 70%. Babar AH et al.¹² also reported similar results in their study on 65 patients in 1999. In our study the aesthetic outcome regarding colour match was seemed to be good in more than 50 % of patients but 43% had poor results due to pigmentation of the grafted skin, as the neck is an area which is exposed to ultraviolet rays from sunlight. Babar AH et al.¹² also reported similar results in their study on 65 patients in 1999. For thin, flexible and smooth hairless resurfacing with acceptable donor site camouflage, supraclavicular artery flap which is raised from region of shoulder seems to be the best choice. Lamberty was the first to describe a supraclavicular artery based flap in 1979.¹⁴ Pallua modified it as an island flap to increase its versatility and to minimize dog ears and scars in the supraclavicular region.¹⁵

Each patient was followed up for a period of at least six months. Chaudhry et al.¹⁶ have also presented their results after a follow-up of six months. Functional and aesthetic restorations were recorded at one; three and

five months follow up. With the passage of time, a progressive improvement in the range of motion in reconstructed areas. At one month follow-up, the functional restoration was noted to be excellent in 4 (13.3%) patients, good in 22 (73.3%) patients, and satisfactory in 4 (13.3%) patients. None of the patients (0%) at one month follow-up was found to have a poor functional restoration. At three months follow-up, it became excellent in 10 (33.3%) patients, good in 18 (60.0%) patients and remained satisfactory in 2 (6.7%) patients. Not a single patient (0%) was found to have a poor functional restoration at this stage. At six months follow up, 9 (30.0%) patients had excellent, 19 (63.3%) patients had good while 2 (6.7%) patients had satisfactory functional restoration. None of the patients (0%) had poor functional outcome. This significant deterioration in function was mainly due to band formation in the suture line of the flap and the tenting of flap, this tenting later settle due to postoperative expansion of the flap. These results are comparable to those reported by Rashid et al.¹ They followed-up their patients at 3, 6 and 12 months, measured the width of the flap at each follow-up and found an average of 63% increase in width at one year. We used Philadelphia neck collar for three months and stretching exercises for up to six months. Significant improvement in the release of the tenting of flap was noted but the bands formed in suture line needed surgical revision like Z-Plasty.

The gradual improvement was seen in the aesthetic appearance with the passage of time. At one month follow-up, the aesthetic restoration was noted to be excellent in 18 (60.0%) patients, good in 7 (23.4%) and satisfactory in 4 (13.3%) patients. one patient (3.3%) had a poor aesthetic outcome due to the necrosis of distal 10% of the flap. At three months follow-up, it became excellent in 22 (73.3%) patients, good in 5 (16.7%) patients and remained satisfactory in 2 (6.7%) patients. one of the patients (3.3%) had a poor aesthetic outcome at this follow-up. At six months follow-up, excellent aesthetic restoration was seen in 23 (76.7%) patients, good in 5 (16.7%) patients and remained satisfactory in 1 (3.3%) patients. one of the patients (3.3%) with tip necrosis and healing of the part of defect had a poor aesthetic outcome. These results are comparable to those reported by Di Benedetto et al.¹⁷ and Chaudhry et al.¹⁶

CONCLUSION

From the knowledge of the present study the following conclusions can be made. The supraclavicular artery flap is one of the reconstructive techniques of choice for medium to large defects of the cervico-facial region. It is a reliable, thin and pliant fasciocutaneous flap, and expands significantly postoperatively. The functional restoration has some problems due to the vertical suture line in flap in-setting; band formation

occurs which needs further surgery like Z- plasty that increases the cost and hospital stay of the patient.

Skin grafting has its own advantage as it can be done in patients in which the flap pedicle is in the zone of trauma (burn), it can be done quickly, no much expertise are needed but still the problem is poor aesthetic outcome like colour match and hard texture.

Author's Contribution:

Concept & Design of Study:	Ijaz Hussain Shah
Drafting:	Muhammad Bilal Saeed
Data Analysis:	Naheed Ahmed
Revisiting Critically:	Ijaz Hussain Shah, Muhammad Bilal Saeed
Final Approval of version:	Ijaz Hussain Shah

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Outcome of Off Pump and On Pump Coronary Artery Bypass Grafting in Patients with End Stage Renal Disease

Aqeel Ahmad, Zahid Parvez and Oneeb Sanaullah

ABSTRACT

Objective: To study the outcome of, off pump and on pump coronary artery bypass grafting in terms of morbidity and mortality in patients with end stage renal disease (ESRD).

Study Design: Randomized controlled trial study.

Place and Duration of Study: This study was conducted at the Department of Cardiothoracic Surgery, Shaikh Zayed Hospital, Lahore from 2014 to 2017.

Materials and Methods: The study comprised 52 patients. We divided these patients into two groups; Group:1 (on pump coronary artery bypass grafting) and Group:2 (off pump coronary artery bypass grafting [OPCAB]). We enrolled all patients with chronic kidney disease on maintenance hemodialysis, those needed coronary artery bypass grafting.

Results: There was no significant demographic difference in both groups preoperatively. Triple vessel coronary artery disease (CAD) was present in 28 (53.8%) patients; double vessel CAD was present in 18 (34.6%) patients and severe left main CAD was present in 6 (11.5) patients. Peroperatively 3.5 and 3 number of grafts were used in group:1 and group :2 respectively. Number of blood and blood products were used more in group:1 as compare to group:2. The use of inotropic support and Intra aortic balloon pump (IABP) was significantly higher in group:1. We found increased extubation time, ICU stay and hospital stay in group:1 as compare to group:2. Early postoperative mortality in group:1 and group:2 was 7.7% and 3.8% respectively. Six months survival rate was equal in both groups.

Conclusion: Off pump coronary artery bypass grafting is encouraging operative strategy in patients with End stage renal disease. In this technique less number of blood and blood products are used and it has lower morbidity, mortality and hospital stay.

Key Words: Chronic kidney disease, Ischemic heart disease, Hemodialysis, Off pump coronary artery bypasses grafting

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INTRODUCTION

Acute myocardial infarction continues to be a major public health problem despite revolutionary advancements in diagnosis and management over the last three decades.^{1,2} Patients with End stage renal disease on maintenance hemodialysis are another leading cause of mortality and morbidity worldwide, and these patients have significant correlation with ischemic heart disease. It is widely reported that cardiovascular disease and ischemic heart disease is a common cause of death in patients suffering from End stage renal disease.¹

Department of Cardiothoracic Surgery, Shaikh Zayed Hospital, Lahore.

Correspondence: Aqeel Ahmad, Assistant Professor of Cardiothoracic Surgery, Shaikh Zayed Hospital, Lahore.
Contact No: 03009440432
Email: zahid2477@gmail.com

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Advancements in dialysis treatment have resulted in a progressive increase in the prevalence of people living with ESRD. The Japanese Society for Dialysis Therapy recently reported that the number of patients with ESRD increased by approximately 10,000 cases every year.²

End stage renal disease patients represent more frequently with debilitating coronary artery disease and these are very challenging patients for coronary artery bypass grafting.³ Studies are available that shows CABG is the most successful strategy of revascularization for dialysis patients.⁴ While other authors document that there are greater complications and a higher mortality rate of CABG for dialysis patients, though the later studies agree for performing CABG in these patients.^{5,6}

In 1974, Menzoin and associates⁷ went for first successful CABG in patients with end stage renal disease and since then many case reports and retrospective study in small group of patients have been published regarding the benefit and feasibility of coronary artery bypass grafting in this population. Literature is available that shows improved survival and

quality of life after CABG in patient with ESRD.⁸⁻¹⁰ Some other studies suggest that although there is an improved quality of life but no improvement in survival in these patients.¹¹⁻¹³ Coronary artery bypass grafting is the best available approach for the management of severe coronary artery disease in patients with ESRD. Surgeons have been trying to get better outcome of off pump technique in coronary artery bypass surgery in these patients but the results are still obscure.

MATERIALS AND METHODS

During this study 52 patients with ESRD were selected for coronary artery bypass grafting (CABG) at Shaikh Zayed Hospital, Lahore from 2014 to 2017. These patients were randomly divided in to two groups, Group:1 (on pump coronary artery bypass grafting) and Group:2 (off pump coronary artery bypass grafting [(OPCAB)]. Each group comprised equal number of patients. Written consent was taken from each patient. All patients with ESRD on maintenance hemodialysis go through pre-planned workup regarding End stage renal disease to optimize patient's conditions for surgery. We planned this protocol with the involvement of department of nephrology, anesthesiology and Cardiology. We admit our patients 5 days before surgery and Haemodialysis carried out on 4th, 2nd, 1st day preoperatively (as per need of the patient). We improved the Hb ≥ 10 g/dl, serum creatinine ≤ 4 mg/dl, serum potassium around 3.5 mmol/dl and no pulmonary edema and signs of volume overload with this judicious use of hemodialysis.

Coronary artery bypass surgery is carried out by using cardiopulmonary bypass or by off pump technique. Moderate hypothermia (28°C) is achieved. Cold blood cardioplegia is opted for myocardial protection. Ultra filtration is carried out to eliminate extra fluids used for priming solutions to keep central venous pressure around 7 cm of water. Heparin was used to keep activated clotting time (ACT) around 350-500s. Half dose of calculated anticoagulant (injectable Heparin) is given in off pump coronary artery bypass grafting, to keep ACT around 200 to 350s.

In early postoperative period intravenous fluids are carefully planned according to metabolic needs of the patient {500-700 ml/24 hours + volume to urine output if any}. Blood loss in surgical drains is replaced by pack blood cells and fresh frozen plasma (FFP). Hemodialysis carried out on 2nd postoperative day in intensive care unit and on 4th post-operative day in dialysis department to keep the laboratory test around our pre-planned protocols and central venous pressure ≤ 10 mm. Regular follow-up of these patients was carried out according to the study protocol after 30 days, 6 months and 1 year in our OPD. These patients are also advised to take regular follow up from the Nephrology department. The data was entered and analyzed by SPSS-20.

RESULTS

Fifty two patients of End stage renal disease (ESRD) were randomly selected for coronary artery bypass grafting (CABG). There was no significant difference of demographic characteristics in both groups. The demographic data of both groups is given in table 1. Peroperatively the average numbers of grafts were 3.5 in-group: 1 (on pump patients) and 3 in Group 2 (OPCAB patients). Total bypass time was 142.3 $\pm$ 17.8 minutes in-group 1 patients operated with cardiopulmonary bypass (CPB). Blood and blood products were used more in-group 1 as compare to group 2 (Table 2).

Table No. 1: Preoperative demographic characteristics of both groups of patients with CKD undergoing CABG

Variable	On pump (n = 26)	Off Pump (n = 26)
Male	21 (80.7%)	19 (73.07%)
Female	5 (19.23%)	7 (26.9%)
Diabetes mellitus	17 (65.4%)	18 (69.2%)
Hypertension	21 (80.7%)	22 (84.6%)
Smoking	16 (61.5%)	15 (57.7%)
Age	54.7 $\pm$ 10.8	53.9 $\pm$ 10.8
Ejection Fraction (EF)	39.4 $\pm$ 6.4	40.4 $\pm$ 7.0

Table No.2: Per operative data of on pump (n=38) and off pump (n=8) CABG in patients with chronic kidney disease

	On pump	Off pump
No. of grafts(average)	3.5	3
Pack cells used (units) average	4	2
FFPs used(average)	3	1
P value	P<0.05	

Table No.3: Postoperative data of on pump and off pump CABG in patients with chronic kidney disease

Variable	On pump	Off pump	P value
Inotropes used	12(46.2%)	6(23.1%)	0.05
IABP used	1 (3.8%)	--	0.05
Extubation time(Hours)	7-10	3-5	0.05
Length of ICU stay	4.03 $\pm$ 0.7	2.04 $\pm$ 0.07	0.05
Length of Hospital stay	10.47 $\pm$ 0.87	6.56 $\pm$ 0.7	0.05
Reopen surgery	1 (3.8%)	--	0.05
Atrial fibrillation	3 (11.5%)	1 (3.8%)	0.05
Neurological complications	1 (3.8%)		0.05

Prolong extubation time was noted 7-10 hours in group1(on pump) as compare to 3-5 hours in group2 (off pump). Similarly length of stay in ICU and hospital was significantly higher in group 1 as compare to group:2. The use of inotropic support was higher in-group 1 as compare to group 2. Intra aortic balloon pump (IABP) was used in one patients in-group 1 while no IABP was used in-group 2. In early post operative period reopen surgery, wound infection and neurological complications were noticed more frequently in group 1 as compare to group2 as shown in table 3. Table 4 shows postoperative results of on pump and off pump CABG in patients with end stage renal disease in terms of freedom from angina, freedom from acute MI, freedom from sudden death and so on. We found freedom from acute MI was 88.4% in-group:1and 84.6%in group 2,. The results of freedom from angina and failure to work were 84.6% and 73.1% in-group: 1 and 80.4% and 76.9% in group2 respectively. Early postoperative mortality in group 1was 7.7% and 3.8% in group 2 respectively (Table 4).

Table No.4: Midterm postoperative results of on pump and off pump CABG in patients with ESRD

Variable	On pump (n = 26)	Off Pump (n = 26)
Freedom from Angina (patients)	22 (84.6%)	21 (80.4%)
Freedom from MI(patients)	23 (88.4%)	22 (84.6%)
Freedom from failure to work(patients)	19 (73.1%)	20 (76.9%)
Freedom from unsatisfactory quality of life(patients)	18 (69.2%)	20 (76.9%)
Mortality	2(7.69%)	1 (3.8%)

DISCUSSION

Cardiovascular diseases are one of the biggest causes of death in end-stage renal disease.¹⁴ Coronary arteries are very badly affected by uremia and uremia associated factors.¹⁵ In these patients myocardial Infarction is directly related to more 30% of cardiac deaths.¹⁶ Since the beginning of PTCA, early and late outcomes suggest a high rate of acute complications and poor long term results in patients with ESRD especially restenosis rate.^{16, 17} So, from a recent studies and previously published literature, coronary artery bypass grafting appeared to be the preferred mode of treatment in this population.¹⁸⁻²⁰ End-stage renal disease patients tend to have longer time on pressors and mechanical ventilation, longer ICU stay and hospital stay. Our study showed prolonged ventilation time of 7-10 hours in on pump group in comparison to 3-5 hours in off

pump group. There was longer ICU stay of 4.0 ± 0.7 days in group:1 than 2.04 ± 0.07 days in group:2 ($p < 0.05$). Similarly we noticed increased hospital stay of 10.47 ± 0.87 days in group1 as compare to 6.56 ± 0.7 days in group2 with (p value < 0.05).

In patients undergoing On pump CABG it very necessary to maintain good perfusion pressures to maintain capillary bed perfusion. This very high perfusion pressures will shift fluid to interstitial spaces which will lead to intravascular fluid deficit. To keep the balance mean perfusion pressure on heart lung machine should ideally be maintained between 50 mm Hg and 65 mm Hg.^{21, 22}

Many researcher prefer to get hemodialysis 24 hour before Coronary artery bypass on CPB,²³⁻²⁵ but in our protocols it is best to use dialysis as close to the procedure as possible. We chose intraoperative hemofiltration to keep the central Venous pressure around 7 to 10 cm of water.

Where we opted CPB, average extracorporeal circulation time and cross-clamping time was increased in these patients because of more diffuse and extensive calcification of the coronary vessels. The average extracorporeal circulation time 142.3 ± 17.8 minutes and cross clamp time was 63.4 ± 13.2 minutes respectively. Many of the complications associated with CABG in dialysis patients may be related to the use of CPB. Disorders such as platelet dysfunction and susceptibility to infection and neurological complications increase the operative morbidity and mortality. The cerebrovascular accident rate was 3.8% in our patients we did on CPB but no such incident was noticed in OPCABG patients. The cerebral complications are leading cause of death in ESRD patients falling behind the cardiovascular complications and sepsis.²⁶

In our experience we identified that although the in hospital results of OPCAB are better than conventional CPB but the midterm results are comparable. As we illustrated the midterm postoperative results in terms of freedom from angina (84.6% and 80.4%), freedom from acute MI (88.4% and 84.6%), freedom from failure to work (73.1% and 76.7%) respectively are equally good in both groups. Coronary artery bypass grafting can be opted in end stage renal disease patients either on pump or off pump depending upon the preoperative conditions of the patient and the nature of coronary artery disease. Overall mortality among dialysis patients was 7.7% and 3.4% in both groups respectively. Our operative mortality has improved in comparison to widely variable range of previous reports stated by Rostand et al²⁷ and Blum and coworkers.¹⁹

Coronary artery bypass grafting and entire preoperative management in ESRD patients is very challenging and complicated, however satisfactory mid term results can be achieved using both techniques when specific requirements of these patients are accounted and managed successfully.

CONCLUSION

The off pump coronary artery bypass grafting technique in patients with end stage renal disease is associated with less mortality and decreased use of blood products and lower hospital stay than on pump technique. In end-stage renal disease patients OPCAB is encouraging operative strategy, and it has comparable midterm results with on pump CABG.

Author's Contribution:

Concept & Design of Study: Aqeel Ahmad
 Drafting: Zahid Parvez
 Data Analysis: Oneeb Sanaullah
 Revisiting Critically: Zahid Parvez, Aqeel Ahmad
 Final Approval of version: Aqeel Ahmad

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Frequency of Sheesha Smoking Among the People of Karachi

Tafazzul H. Zaidi¹, Tariq Kamal Jafri² and Kiran Mehtab¹

ABSTRACT

Objective: To assess the frequency of Sheesha Smoking among People of Karachi.

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at the Sheesha bars, hospitals and different places in Karachi from November 2017 to March 2018.

Materials and Methods: 264 people had taken part in this study, n=264. A self administered structured questionnaire after an informed verbal consent was distributed and got filled. A pilot study was conducted to assess the validity of questionnaire. Data was analyzed using SPSS version 20 with 95% confidence interval, margin of error was taken as 5% and P-value 0.05 was considered significant.

Results: 264 Sheesha smokers participated in the study. Amongst all the 74.2% were students, 22.7% were employed while 2.3% of people owned shop. 85.6 were males while 14.4 were females. The highest number of people started Sheesha smoking in 15-20 year of age with the value of 60.6%. 83.7% people were introduced to Sheesha through their friends. Most of the people accepted that the flavor of Shisha attracted them a lot and 52.7% of them had been smoking Shisha for more than one year. The highest number of people took money from their parents for Sheesha smoking. Research showed that 64.6% people smoked Sheesha for fun. Most of them accepted that Sheesha affected their mood and 71.6% knew its hazardous effects on health and 56.8% of them were trying to give up their habit.

Conclusion: The study concluded that the trend of Sheesha smoking is increasing at high rate. Most of the people who are indulged in this activity are young people who are our future but due to unawareness of its hazardous effects, people start smoking Shisha, they use it for fun with friends and spend more than an hour in smoking. The trend is also getting popular among families. The society as well as Government must take steps to stop this menace from spreading and spoiling our youth.

Key Words: Shisha, Frequency, Awareness, Hazards, Effects, Routine, Life

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INTRODUCTION

Sheesha Smoking is a way of smoking tobacco, sometimes mixed with fruit or molasses sugar through a bowl and hose or tube. The tube ends in a mouthpiece from which the smoker inhales the smoke. It has been claimed that more than 100 million people worldwide smoke Shisha daily. It is a common practice in the Middle East, Turkey, India, Pakistan, Bangladesh and some Parts of China. Estimates showed that tobacco related deaths are expected to rise from 5.4 million in 2005 to 6.4 million in 2015 and 8.3 million in 2030¹⁰. Tobacco is used in different forms and among these smoking Sheesha is gaining immense popularity mainly because of youth appeal^{13,14}.

Social acceptability, poor knowledge of sheesha smoking health related hazards and certain socio demographics are favoring the increasing current trend of shisha use among adolescents in Al Hassan, Saudi Arabia.¹⁸

Despite perceptions among young adults that Sheesha smoking is safer than cigarette smoking. Studies to date do not support these perceptions. In 2005, the WHO advisory panel on Sheesha smoking pioneered in putting forth a set of recommendations to help countries to plan strategies against this practice¹¹. It was strongly recommended that Sheesha should be subjected to the same regulations as cigarette and other tobacco products. Unfortunately Pakistan failed to implement any of those recommendations.

Literature showed that in Pakistan, the information regarding Sheesha smoking is scarce and very few studies have been carried out to determine the prevalence of Sheesha smoking¹². The purpose of this research is to highlight the growing trend of Sheesha smoking in peoples of different age groups despite its harmful effects which include diseases like pulmonary diseases causing shortness of breath, stroke, heart diseases and cancer.

¹. Department of Community Medicine / Physiology², SMC, JSMU, Karachi.

Correspondence: Dr. Tafazzul H. Zaidi: Associate Professor of Community Medicine, SMC, JSMU, Karachi.

Contact No: 0300-9232695

Email: drtaf2002@yahoo.com

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There is high frequency of tobacco usage in the form of cigarettes, chewable tobacco and snuff tobacco among Sheesha smokers of Pakistan²⁰. The highest frequency is for cigarette smoking.¹⁹ The rise in Sheesha smoking as a trendy social habit appears to be occurring despite emerging scientific evidence of its potential health risks.⁴ Socializing, relaxation, pleasure and entertainment were the main motives for Sheesha use. While Sheesha users were aware of the health hazards of Sheesha smoking, they perceived it as less harmful, less addictive and more socially acceptable than cigarette smoking and were confident about their ability to quit.¹⁶

MATERIALS AND METHODS

A cross-sectional study was conducted on a sample size of 264 people, n=264. The sample was taken through non probability purposive sampling from individuals using public cafe, Shisha bar and shopping malls with in a study period of five months from November 2017 to March 2018. A structured self-administered

questioner was constructed for interview. An informed verbal consent was taken from the people. To ensure the validity of the questioner a pilot study was conducted and the structured questioner was distributed and got filled. The questioner consisted of personal questions like gender, field of work, smoking habits (shisha, cigarette, pipe and cigar), age of onset, frequency, duration, place of smoking and diseases developed due to Shisha smoking. The response was entered and analyzed using SPSS version 20 with 95% confidence interval and margin of error 5% and p-value of 0.05 was considered as statistically significant.

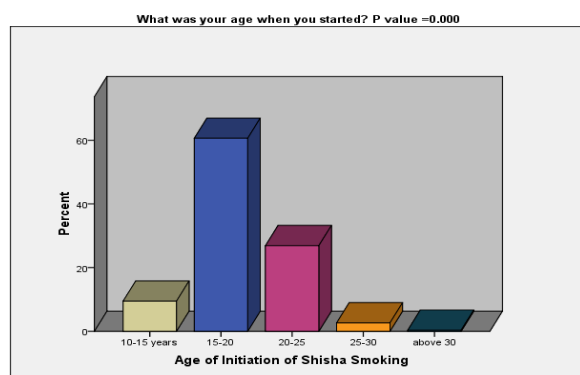
RESULTS

A total of 264 Sheesha smokers of different age groups belonging to different fields from Karachi filled the questionnaires. The mean age of people who smoke Sheesha was 21.5 ± 3.55 (Range: 16-38 years). Amongst all the participants 74.2% were students, 22.7% were employed while 2.3% of people owned shop. And 85.6 were males while 14.4 were females.

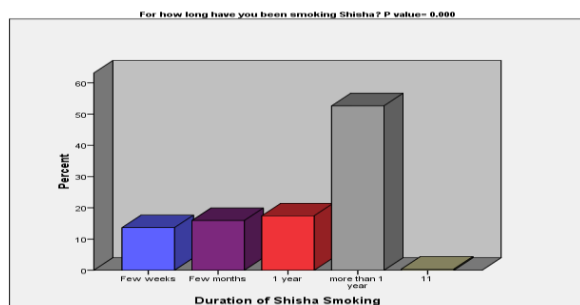
Table No. 1: Questionnaire

S No	Questions	Percentage %	Mean	CI 95% (Lower - Upper)	P-value
1	What was your age when you started?		2.239	2.16-2.32	0.000
	10-15yrs	9.5			
	15-20yrs	60.6			
	20-25yrs	26.9			
	25-30yrs	2.7			
	Above 30yrs	0.4			
2	For how long have you been smoking Shisha?		3.125	2.98-3.27	0.000
	Few weeks	13.6			
	Few months	15.9			
	1 year	17.4			
	More than 1 year	52.7			
3	How often do you smoke Shisha?		3.496	3.32-3.67	0.015
	Daily	12.9			
	Weekly	20.5			
	Fortnightly	6.1			
	Monthly	25.4			
	Occasionally	35.2			
4	In what mood do you smoke the Shisha?		2.125	2.05-2.21	0.018
	Depressed	16.7			
	Happy	54.9			
	Other	27.7			
5	From whom do you get the money for Shisha smoking?		2.288	2.13-2.44	0.029
	Parents	46.2			
	Siblings	4.9			
	Friends	22.7			
	Other	26.1			
6	How Shisha smoking is affecting your daily performance?		2.909	2.77-3.05	0.001
	Affecting studies	19.3			
	Low performance in office	12.1			
	Can't Exercise/walk for a long period	31.4			

The percentage of people who started smoking Sheesha in 10-15 years was 9.5% and those who started in 15-20 years was 60.6% while 26.9% started at 20-25 years of age, 2.7% were those who started smoking Sheesha in 25-30 years and 0.4% being those who started to smoke Sheesha when they were above 30 years (p value 0.000). Research showed 83.7% people were introduced to Sheesha by their friends while 5.7% indicated that they were introduced by their family and 7.2 % said that they got to know about it through social media, 1.5% were those people who got introduced to Shisha smoking by electronic media, on the other hand 1.9% by some other source (p value 0.028). There were 17.4% of people who had been smoking Shisha for a year, 15.9% were those who had been smoking it for few months and 13.6% were indulged in it for few weeks and the rate of those who had been smoking Shisha for more than a year was 52.7% (p value 0.000). Majority of the people did not smoke Sheesha daily or weekly -- 12.9% were in the habit of smoking Shisha daily, 20.5% used to smoke weekly, 6.1% were in the habit of smoking it fortnightly and 25.4% indicated that they smoke Shisha monthly and 35.2% were those who smoke occasionally (p value 0.015).



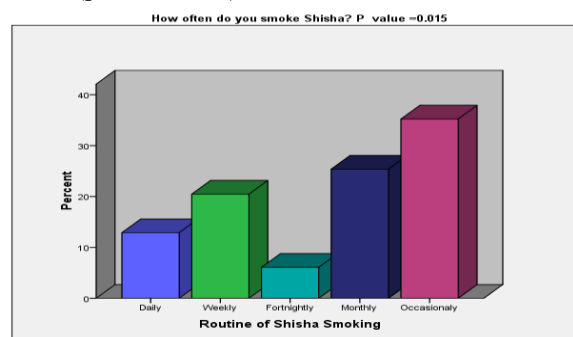
Graph No.1: Relationship of age of initiation of Sheesha Smoking to percentage



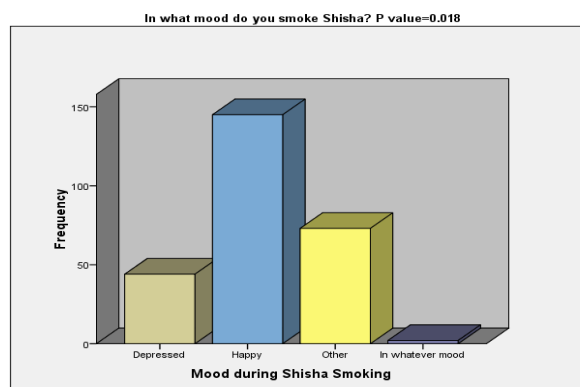
Graph No.2: Relationship of Duration since Sheesha smoking to percentage of smokers

The percentage of people of different age groups who spent more than 1 hour in Shisha smoking was 28.8%, those who spent 1 hour was 26.1%, while those who utilized half an hour was 20.5% and 23.1% were those who spent even less than half an hour (p value 0.393).

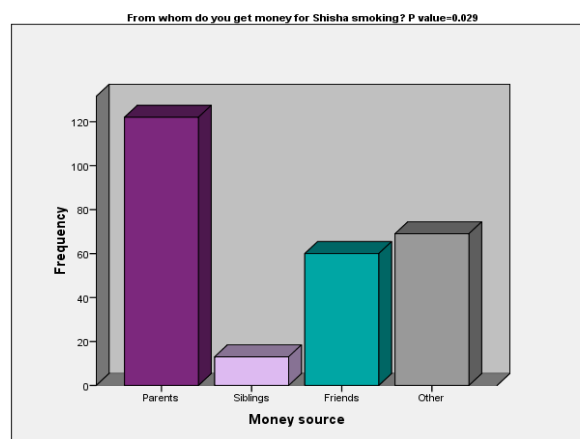
16.7 % of people smoked Shisha when they were depressed and those who indicated that they smoked Shisha in happy mood were 54.9% while others who could not figure out that in what mood they smoke Shisha were 27.7% (p value 0.018). The people who said that they took money from their parents for Shisha smoking was 46.2% while 4.9% were those who borrowed money from their siblings to smoke Shisha, the people who took money from their friends for Shisha smoking was 22.7% and 26.1 % had other source (p value 0.029).



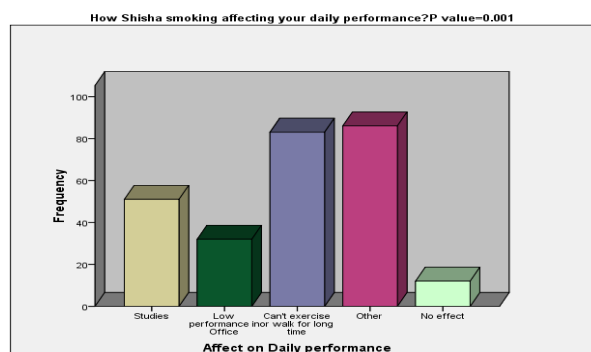
Graph No.3: Relationship of percentage of Sheesha smoker s to the Routine.



Graph No.4: Relationship of Frequency to Mood during Sheesha Smoking.



Graph No.5: Relationship of Money source to Frequency.



Graph No.6: Relationship of Effect on Daily Performance to Frequency.

Among those who indicated that they smoke Shisha to feel relaxed were 12.9%, 8% people were those who smoked Sheesha to get rid of tension while 1.9% confessed that they smoked Shisha when their parents had a fight while people who indulged in Shisha smoking just for fun were 64.6% (p value 0.153).

The people who knew that Shisha smoking is hazardous to health were 71.6% while 15.5 didn't even consider it harmful (p value 0.756). Among all the participants, 19.3% accepted that Shisha smoking was affecting their studies while those who said that their performance had become poor in office after Shisha smoking was 12.1%, 31.4% said that Shisha smoking has affected them by their inability to exercise and walk for longer periods while others were 32.6% (p value 0.001). People who thought that Shisha smoking has less nicotine content than cigarettes were 30.7% while those who didn't think so were 42.8% (p value 0.70). 29.2% of the people felt ashamed of this habit while rest i.e. 70.5% didn't consider it act of shame. (P value =0.082)

The research indicated that 26.5% of the participants were also indulged in other addiction while 73.5% just smoked Sheesha. (P value=0.028).

DISCUSSION

With a population of 14.9 million recorded in the 2017 Census of Pakistan¹⁷, we have confined our data to 264 Shisha smokers, covering major areas of Karachi like Defence, Clifton, Gulshan and Saddar etc. The fact behind collection of data from these areas was because of easy approach and availability of shisha to people through Cafes, Bars etc.

The study conducted on 264 Shisha smokers of all districts of Karachi. The Study resulted that 60.6% people started smoking Shisha before the age of 20 years. These figures showed similar tendency of age as the other studies reported from Middle Eastern Countries. A study done in Oman stated the same fact of Shisha smoking that 88% people were at mean age of 15 years⁵. Another study done in Karachi showed the same correspondence of age that was 22.1% in their study found to be little Higher than adolescents in Pakistan³.

This little rise in age from adolescents to young adults might be due to more independence with age and incorrect perceptions. These include the popular belief that the nicotine content in shisha is lower as compared to that in cigarettes and that the water used in this form of tobacco intake filters out all the hazardous chemicals such as carbon monoxide, nicotine and tar¹².

52.7% responders of this study showed that they have been smoking Shisha for more than one year and this frequency is increasing day by day.

Despite fact of this ongoing trend of shisha smoking, our study showed only 12.9% of people smoked Shisha daily, this indicates that most of people don't prefer to smoke on daily basis. However, 35.2% people smoked shisha occasionally and it was mood dependence which led them to have occasional smoking. Our study showed that 50.4% of people intended to have Shisha smoking in their happy mood. This figure showed a much correspondence to other study that was conducted on students of Karachi⁶. More than half of people of our study stated that they used to have shisha smoking just for fun and this idea is more preferable by young adults. This idea was strengthened by survey in Pakistan university students which stated that most of young students tend to smoke shisha for pleasure-seeking and fun⁷.

Shisha smoking definitely demands huge amount of money because of ongoing trend of assimilating, fascinating and furnishing life style - Such Shisha Bars also try to be more attractive and beautiful that also advocates a big amount of money. To pay off this amount by young adults which are definitely unemployed and depended upon their parents. Our study showed that 46.2% got money from their parents to have shisha smoking.

Shisha smoking has very harmful and profound adverse effects on our body and health which in turn leads to negative effects on our daily performance. Our study enlightened us that 31.4% people could not Exercise or walk for a long period of time, 19.3% had effects on studies, and 12.1% showed lower performance in their office and 32.6% showed other adverse effects on their health.

CONCLUSION

The research concluded that most of the Shisha smokers were around 20-25 years of age and many started smoking Shisha by the age of 20 years. The research concluded that most of the smokers were though aware of its hazardous effects and had some effects on their routine life but smoked for fun and in happy mood. Most of the people got introduced to Shisha by their friends but family was also found as source in familiarizing this. Most people didn't smoke Shisha regularly but it was mood dependent.

Author's Contribution:

Concept & Design of Study: Tafazzul H. Zaidi
 Drafting: Tariq Kamal Jafri
 Data Analysis: Kiran Mehtab
 Revisiting Critically: Tafazzul H. Zaidi, Tariq Kamal Jafri
 Final Approval of version: Tafazzul H. Zaidi

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Frequency of Anemia Among Children Presenting with Breath Holding Spells

Sami ul Haq¹, Jalil khan² and Hazrat Bilal Khan³

ABSTRACT

Objective: To determine the frequency of anemia among children presenting with breath holding spells.

Study Design: Descriptive / cross-sectional study

Place and Duration of Study: This study was conducted at the Pediatrics Department, Postgraduate Medical Institute, Hayatabad Medical Complex Peshawar from March 2015-August 2015.

Materials and Methods: All children meeting the inclusion criteria and presenting with Breath-holding spells(BHS) were included in the study. All information was recorded in a pre-designed proforma and strictly exclusion criteria was followed to control confounders and bias in the study results. Data was stored and analyzed in SPSS version 20. Anemia was stratified among age and gender to see the effect modifications. Post stratification was done through chi-square test keeping p-value ≤ 0.05 was taken significant. All results were presented in the form of table and graphs.

Results: The mean age group of our sample was 2.6 ± 1.4 years of which 63.5% were male and 36.5% were female children. The mean hemoglobin concentration was 8.6 ± 1.9 gm/dl of blood and 39.9% of children were confirmed to have anemia.

Conclusion: There is a high incidence of anemia associated with breath holding spells. A full blood count and where possible serum ferritin level would therefore be warranted in the work up of children presenting with breath holding spells.

Key Words: Breath holding spells, hemoglobin, anemia, ferritin.

Citation of articles: Haq S, khan J, Khan HB. Frequency of Anemia Among Children Presenting with Breath Holding Spells. Med Forum 2018;29(6):35-38.

INTRODUCTION

Breath-holding spells (BHS) are among the common benign paroxysmal non-epileptic disorders occurring in healthy otherwise normal children¹. The prevalence has been estimated between 0.1% and 4.6% in the general population². These episodes are often precipitated by emotional stimuli like anger, frustration, sudden fright, or minor trauma³. Iron therapy, piracetam, levetiracetam, and atropine are considered as treatment and have shown variable efficacy⁴.

The spells most commonly begin in the first 6 to 12 months of life and almost always by 2 years of age. In 90% of children the spells got remission by school age⁵.

¹. Department of Peads, Bannu Medical College, Bannu.

². Department of Pediatrics, Khalifa Gulnawaz Teaching Hospital, Bannu.

³. Department of Peads, Gajju Khan Medical College & Bacha Khan Medical complex Sawabi.

Correspondence: Dr.Sami ul Haq, Assistant Professor, Department of Peads, Bannu Medical College & Khalifa Gulnawaz Teaching Hospital/Women & Children Teaching Hospital, Bannu,Khyber Pakhtunkhwa.

Contact No: 0333-5579218

Email: dr.samiulhaq@yahoo.com

The presence of autonomic imbalance with cerebral anoxia, anemia and genetic disorders may be responsible in these spells⁶.

A study showed complete resolution of spells in 50% patients on iron therapy and 50% reduction in another 36.4%⁷.

It has been documented that iron deficiency anemia may lead to adverse effects on oxygen uptake in the lungs and reduce available oxygen to the tissues, including central nervous system tissues⁸. In one study, association of breath holding spells with iron deficiency anemia in children revealed as 56.67% anemia in cases with BHS and 3.33% in controls without BHS (P value 0.0001)⁹. In another study, 7.5% of anemic children had history of BHS¹⁰.

A study at start of therapy, 25 patients were having more than 10 episodes per week while no patient was having such episodes at 12 weeks of therapy (p-value=0.000)¹¹.

The present study is designed to determine the frequency of anemia among children presenting with BHS. Since, very rare work has been done on this issue throughout Pakistan. So, this study will be an attempt to establish the local magnitude of the anemia among children with BHS

MATERIALS AND METHODS

This was a Cross sectional, descriptive study and conducted through Non-probability consecutive

sampling. Duration of study was six months and it was conducted in pediatric department Hayatabad medical complex Peshawar (EPI) center. Sample Size Was 148, keeping frequency of 56.6%⁹ proportion of anemia among children with Breath-holding spells (BHS), with 95% confidence interval & 8% margin of error using World Health Organization (WHO) sample size calculator.

Data Collection Procedure: The study was conducted after approval from hospitals ethical and research committee. All children meeting the inclusion criteria (Age: 6 Months- 5Years, both gender and presenting with BHS) were included in the study. The purpose and benefits of the study was explained to the patient's attendants and a written informed consent was obtained. All patients were subjected to complete history and clinical examination. From all the children, a 5cc of blood was obtained and sent to hospital laboratory. All the laboratory investigations were done under supervision of same consultant pathologist. All the above-mentioned information was recorded in a pre-designed proforma and strictly exclusion criteria (Children with thalassemia, Congenital malformations of throat, malnutrition) was followed to control confounders and bias in the study results.

Data Analysis Procedure: Data was stored and analyzed in SPSS version 20. Mean $\pm$ SD was calculated for quantitative variables like age and hemoglobin level. Frequencies and percentages were calculated for categorical variables like gender and anemia. Anemia was stratified among age and gender to see the effect modifications. Post stratification was done through chi-square test keeping p-value $\leq$ 0.05 was taken significant. All results were presented in the form of table and graphs.

RESULTS

The study was conducted on 148 children presenting with breath holding spells. We analyzed their serum hemoglobin concentration to determine the presence or absence of anemia. The mean age of the sample was 2.6 ± 1.4 years. The range of age in our study was 4.20 years with minimum age of 0.8 years and maximum age of 5.00 years. On grouping the sample in different age groups, we observed that 30.4% of patients were in the age group between 6 months and 1.5 years, 27.7% were in the age group 1.51 to 3.00 years and 41.9% of patients were in the age group 3.01 to 5.00 years.

While distributing the patients with regards to gender, we observed that in our study 63.5% of the sample was male and 36.5% were female gender.

The mean hemoglobin concentration was 8.6 ± 1.9 gm/dl of blood. As per operational definitions, we observed that 39.9% of children were confirmed to have Anemia. (Table 1)

While we stratified Anemia with regards to age groups, we observed that the difference was statistically significant after applying chi-square test with a p value of 0.035 (Table 2)

While we stratified Anemia with regards to gender, we observed that the difference was statistically significant after applying chi-square test with a p value of 0.023 (Table 3)

Table No.1: Frequency of Anemia (n=148)

Anemia		Frequency	Percent
	Yes	59	39.9
	No	89	60.1
	Total	148	100.0

Table No.2: Age group wise stratification of anemia (n=148)

		Anemia		Total
		Yes	No	
Age Groups	6.00 months to 1.5 years	25	20	45
		55.6%	44.4%	100.0%
	>1.5 to 3 years	13	28	41
		31.7%	68.3%	100.0%
	>3 years to 5 years	21	41	62
		33.9%	66.1%	100.0%
Total		59	89	148
		39.9%	60.1%	100.0%

P Value: 0.035

Table No.3: Gender group wise stratification of anemia (n=148)

		Anemia		Total
		Yes	No	
Gender of the Child	Male	44	50	94
		46.8%	53.2%	100.0%
	Female	15	39	54
		27.8%	72.2%	100.0%
Total		59	89	148
		39.9%	60.1%	100.0%

P Value: 0.023

DISCUSSION

Breath Holding Spells usually begin between the ages of 6 and 24 months of life, peaking in frequency by around 2 to 3 years, and 90% or more of patients have their initial spells by age 2 years.¹²⁻¹⁵ It may begin as early as during neonatal period, and almost never after the age of 5 years.^{16,17,18} About half of the children stops experiencing spells by age 4 years, and almost all by age 6 years⁴¹, beyond which their occurrence is extremely uncommon.^{12,19,20}

Episodes are described as infants crying, for up to a minute, and while crying excessively they will hold their breath to a point at which they might lose consciousness. Soon thereafter, the infant will usually regain consciousness and breathe normally. Breath-holding spells are not harmful and pose no long-term risks for the infant.¹²

Many episodes of breath holding are associated with an inciting incident in which the infant is irritated, is being disciplined, or is angry. Examples include when infants are having their hair splashed in the bath, when they

insist on holding a toy, or when they experience a minor injury.^{19,20}

In a recent study from Turkey, children with breath-holding spells and a matched control group were subjected to a brainstem auditory evoked potentials test, and the inter-peak latencies were significantly prolonged in the breath-holding spells group compared with the control group ($P = .009$ and $P = .03$, respectively, for type III–V and type I–V interpeak latencies). This might mean that maturation delay in myelination of the brainstem could be the cause of breath-holding spells in children.²¹

Several studies suggest an association between breath-holding spells and anemia in young infants. Among 91 children 6 to 40 months of age who were followed prospectively for an average of 2 years, 63 (69%) were found to have iron deficiency anemia.²² About half (47.9%) of 165 children in another group from Turkey with breath-holding spells were found to have iron deficiency anemia,²³ and a recent larger Turkish study also confirms these findings.²⁴

Two studies established the benefit of treatment with iron. In one group treated with iron (6 mg/kg daily) for 3 months, a significant reduction in cyanotic spells was recorded, compared with those not treated (84% vs 21%).²² In the second study, mean levels of hemoglobin and total iron-binding capacity were predictive of a substantial reduction in the frequency of spells (88% vs 6%) for iron-treated versus untreated children, respectively.¹⁸ Owing to the high frequency of anemia among children with breath-holding spells, testing for anemia or treating empirically for iron deficiency anemia is recommended.¹⁸

Iron deficiency anemia has also been shown to play a role in the pathophysiology of breath holding spells.^{25–26,27} A study showed complete resolution of spells in 50% patients on iron therapy and 50% reduction in another 36.4%.¹⁸ A recent study has also suggested a possible relationship between maternal iron deficiency anemia and children with breath holding spells.²⁸ Iron's role is thought to be due to it being a cofactor in catecholamine metabolism and neurotransmitter function.¹⁸

Although the pathogenesis and the triggering factors of the disease are not quite understood, there are studies indicating that iron deficiency anemia is frequently observed in children with spells which respond well to iron therapy.^{18,29} Piracetam treatment has been demonstrated to be effective in children without anemia.³⁰ It is well known that children with iron deficiency cry more frequently, become easily depressed, and are more irritable.¹²

Similarly, the present study also documented that anemia was observed with higher frequency in patients with breath-holding spells. In another study association of breath holding spells with iron deficiency anemia in children revealed as 56.67% ($n=17$) in cases and 3.33% ($n=1$) in control group while remaining 43.33% ($n=13$) in cases and 96.67% ($n=29$) in control group had no findings of this association. P value was calculated as

0.0001 and Odds Ratio was 37.92 which show a significant difference between the two groups.⁹

In another study, a total of 165 children with BHS comprised the study group. A matched group of 200 children with febrile convulsions served as controls. Among the first-degree relatives, 13.3% had BHS, 1.8% had febrile convulsions and 12.1% had epilepsy. The spells were cyanotic in 140 (84.8%) children and pallid or mixed in the remainder. Eighteen patients had abnormalities in electroencephalography, however only one patient was diagnosed with epilepsy. Sixty nine (47.9%) patients were found to have iron deficiency anemia.²³

Iron deficiency is implicated in conditions other than anemia and BHS. It is increasingly recognized to be a cause of restless legs, febrile seizures, thrombosis, impaired immunity and poor behavior.³¹

It is not known how iron deficiency leads to BHS. It may involve the role of iron in catecholamine metabolism and the functioning of enzymes and neurotransmitters in the central nervous system.^{32,33}

In another study, anger and pain were the most common triggering factors (65.1 %) for BHS. A positive family history of BHS was identified in 51% and parental consanguinity was found in 30% of cases. The spells were cyanotic in 79.1% (34 children). 78% of cases were iron deficient and 53% of cases had iron deficiency anemia.³⁴

Infancy and childhood is the critical period for brain growth, and nutrient deficiencies during this time may affect psychomotor development and neurocognition.³⁵ It is less well known that long-term neurocognitive impairment may persist. Young children with iron deficiency anemia have been found to score 12 to 15 points lower on the Bayley infant development scale than their iron sufficient peers.³⁶

CONCLUSION

There is a high incidence of anemia associated with breath holding spells. A full blood count and where possible serum ferritin level would therefore be warranted in the work up of these children. Treatment of BHS is more likely to be successful when there is concomitant treatment of associated anemia.

Author's Contribution:

Concept & Design of Study:	Sami ul Haq
Drafting:	Jalil khan
Data Analysis:	Hazrat Bilal Khan
Revisiting Critically:	Sami ul Haq
Final Approval of version:	Sami ul Haq

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Birth Preparedness and Complication Readiness (BPCR) Among Women of Child Bearing Age

Saira Khalid, Nosheen Rehman and Faiqa Zarreen

ABSTRACT

Objective: To determine the status of birth preparedness and complication readiness in relation to educational status of women of child bearing age group.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Indus Hospital (MSSH), Lahore from 1st January 2017 to 30th June 2017.

Materials and Methods: This study comprised 384 delivered women. The socio-demographic characteristics, obstetric history, awareness of obstetric complication danger signs and practice of BPCR, and personal and social factors influencing the practice of BPCR were recorded.

Results: Most of the women were in age group 26-35 years i.e. 211 (54.9%), education till matric had 201 (52.4%) women, housewives 338 (88%) and monthly income more than 15,000 per month i.e. 158 (41.2%) and 132 (34.4%) mothers were well prepared with mean BPCR score is 6.94 ± 1.99 .

Conclusion: Most of the women in the study were not prepared for birth and its complications. However, highly educated women have better BP/CR score than less educated women.

Key Words: Birth preparedness and complication readiness, Women, Education, Employment, Maternal mortality, Antenatal

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INTRODUCTION

Pregnancy is a normal, healthy, enjoyable event in women of childbearing age, yet it carries the risk of morbidity and mortality for many women.¹ Globally maternal mortality is one of the greatest challenges in the field of health and development. In the developing world like in Pakistan, maternal mortality ratio is high; 276 per 100,000 live births, with a mother dying as a result of giving birth every 20 minutes.^{1,2} The major causes of death in pregnancy are hemorrhage, hypertensive disorders, sepsis, obstructed labour, anemia and unsafe abortions.¹ Pakistan is also struggling to bring about a decline in statistics regarding maternal mortality by implementation of millennium goals MGD4 and MGD5.^{3,4} Despite this, to achieve MGD4 and MGD5, the community needs to focus its resources on effective strategies to reduce maternal deaths by following the concept of birth preparedness and complication readiness (BPCR).⁵ Antenatal care is defined as having one or more visits to a skilled person during pregnancy. It comprises routine

follow-up of pregnant women from screening to intensive life support during pregnancy and up to delivery.⁶ Antenatal visits raise awareness about the need of care at delivery and create familiarity of women and their families to health facilities, so as to enable them to seek care in times of emergency. Antenatal care increases the use of safe delivery by promoting the use of health professionals and creating awareness about birth preparedness.⁷ WHO and UNICEF models now include antenatal component of BPCR as a part of antenatal education in clinical settings.⁶ Birth preparedness and complication readiness is an intervention which addresses these delays by encouraging women and their families to plan for birth. It also allows identification of trained birth attendants through antenatal visits.^{4,6} Kushwah and Dubey⁶ showed that high BP index of 47.5%. BP index was positively associated with primipara (59.3%), poverty (50.9%), educational status of mother and business group. It was negatively associated with antenatal care (24.1%), knowledge of danger signs (18.6%) and transport facilities.

MATERIALS AND METHODS

This cross-sectional study was conducted at Indus Hospital (MSSH), Lahore from 1st January 2017 to 30th June 2017 and comprised 384 delivered women. Women who have delivered a baby within one month were included. Those women having more than 2

Department of Paediatrics, Indus Hospital (MSSH), Lahore.

Correspondence: Saira Khalid, Women Medical Officer,
Department of Paediatrics, Indus Hospital (MSSH), Lahore.
Contact No: 0336-4775661
Email: sairataurian@gmail.com

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children were excluded. The questionnaire was designed to measure socio demographic characteristics, obstetric history, awareness of obstetric complication danger signs and practice of BPCR, and personal and social factors influencing the practice of BPCR. The woman was considered as prepared for birth and its complications if she had made arrangements for at least three of the BPCR component practices (identified place of delivery, identified skilled health care provider, saved money, identified transport ahead of emergency, and identified blood donor) by translating BPCR practices into a single outcome variable. Data was entered and analyzed in SPSS-20.

RESULTS

One hundred and thirty eight (35.9%) women belonged to age 15-25 years, 211 (54.9%) women between 26-35 years and 35 (9.2%) women between 36-45 years of age. There were 338 (88%) women were housewives and 46 (12%) were working women.

Table No.1: Demographic information of the women

Variable	No.	%
Age (years)		
15 – 25	138	35.9
26 – 35	211	54.9
36 – 45	35	9.2
Employment status		
Housewives	338	88.0
Working women	46	12.0
Educational status		
Matric	201	52.4
Intermediate	72	18.7
Graduation	68	17.7
Post-graduation	43	11.2
BPCR category		
Well prepared	132	34.4
Not prepared	252	65.6
Monthly Income (rupees)		
<5000	31	8.0
5000 – 10000	86	22.4
11000 – 15000	109	28.4
>15000	158	41.2
Place of delivery		
Yes	315	82.0
No	69	18.0
Arrangement of transport		
Yes	178	46.4
No	206	53.6

Two hundred and one (52.4%) women have matric level, 72 (18.7%) women have intermediate level, 68 (17.7%) were graduate and 43 (11.2%) have done their post-graduation. There were 132 (34.4%) women have well prepared BPCR category and 252 (65.6%) have not prepared BPCR category. Regarding monthly income, 31 (8%) women have <5000 rupees income, 86

(22.4%) between 5000-10000 rupees income, 109 (28.4%) between 11000-15000 rupees income and 158 (41.2%) have >15000 rupees income. Three hundred and fifteen (82%) have identified their place of delivery while 69 (18%) have not identified. One hundred and seventy eight (46.4%) have arrangement of transport while 206 (53.6%) have not (Table 1). Birth preparedness and complication readiness score showing mean of 6.48 ± 1.99 (Fig. 1).

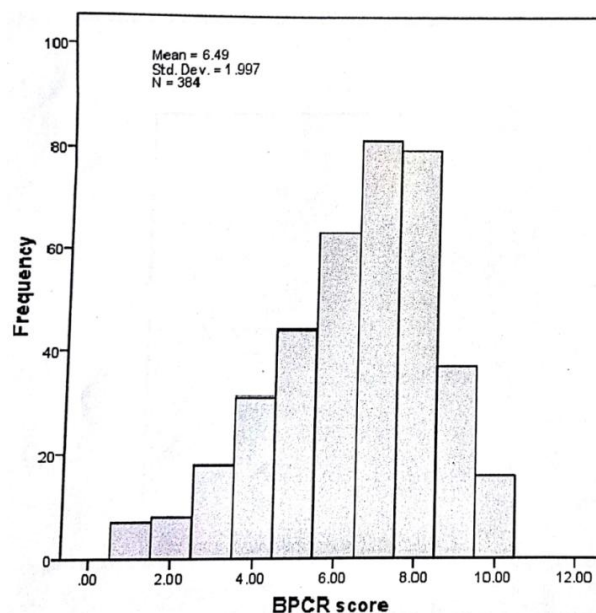


Figure No. 1: Birth preparedness and complication readiness score

DISCUSSION

In the present study the results showed that most of the women belonged to age group 26-35 years (55.9%). The results of this study supported by study carried out in South Eastern Nigeria⁸ which showed that 49% of women belonged to 20-39 years and rural Uganda. Pakistan, South-Western Nigeria in which average age between 20-40 years respectively. The current study showed that 88% of women were housewives and 12% women were working. This factor affecting antenatal care in Karachi supported our results which showed 85% women to be housewives.²

The results of this study showed that 52.4% women had education up to level of secondary education which is supported by researchers carried out in South-Western Nigeria and South-Eastern Nigeria which showed that 60% of women and 54.8% of women have secondary education respectively.^{9,10} The present study showed that 34.28% were well prepared for delivery. Onayade et al⁸ supported our results which showed that 35% women in Uganda and 28.3% in Nigeria were prepared for giving birth.

Choice of place of delivery was made before hand by 82% of women while 18% had not chosen any place of delivery before. These are favored by a study done in

Nigeria which showed that 87.5% of women had decided place of delivery.⁹

Transport arrangement was present to 46.4% of women while study showed that 53.6% had made no arrangements for transport. These were favoured by research in Koupila District which reported 46.1% women had transportation arrangement.¹¹ However, a study was done in Rural Uganda, Ethiopia and a community survey did not favour our results which showed 61%, 77% and 83% women to have had arrangement for transport.¹²⁻¹⁴

It was seen that 60.9% of women in our study had saved money for delivery, 39.1% women had no savings which comparable to study done in Nigeria reported 64.8% women had saved money.⁸

87.5% women had undergone antenatal checkups more than 3 times while 12.5% women did not have antenatal checkups. Research on factor affecting antenatal care in Karachi, community survey and a study made in Nigeria showed 51%, 64% and 71% women visits antenatal clinics.^{2,9}

CONCLUSION

Most of the women in the study were not prepared for birth and its complications. However, highly educated women have better BP/CR score than less educated women. Those who were prepared identified that the need of tertiary care hospital, timely management of transport to place of delivery and saving money for delivery, regular antenatal check-ups are important aspects of safe delivery. Doctor identification for the proper management of delivery plays an important role in preventing complications.

Author's Contribution:

Concept & Design of Study:	Saira Khalid
Drafting:	Nosheen Rehman
Data Analysis:	Faiqa Zarreen
Revisiting Critically:	Saira Khalid, Nosheen Rehman
Final Approval of version:	Saira Khalid

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Frequency of Spontaneous Abortions in Low Socio-Economic Women of Karachi

Tariq Kamal Jafri¹, Tafazzul H. Zaidi² and Kiran Mehtab²

ABSTRACT

Objective: To assess the frequency of abortion in women of low socioeconomic status of Karachi.

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at the four hospitals of Karachi, two from public and two semi- Government hospitals, namely Jinnah Postgraduate Medical Center, Civil Hospital, Lady Dufferin and Sobraj hospital, Karachi from February to October 2017.

Materials and Methods: A cross sectional study was conducted on a sample size of 205 women, that is n=205. The sample was taken through Non-probability purposive sampling from low socio-economic class women from different hospitals of Karachi including Jinnah Postgraduate Medical Center, Civil Hospital, Lady Dufferin and Sobraj hospital, within a period of 9 months from February to October 2017. A structured self administered questionnaire was distributed which was filled after an informed verbal consent from the women. A pilot study was conducted to assess the validity of questionnaire. Data was analyzed using SPSS version 20 with 95% confidence interval, margin of error was taken as 5% and P-value 0.05 was considered significant.

Results: A total of 205 women were interviewed through structured questionnaire. The median age of women was between 26-35 years. Family monthly income in (55.6%) was <10,000 Rs and 91 women had income between Rs.11000-17000. 154 women visited the doctor for vaginal bleeding suggesting threatened abortion (75%, p=0.037) 108 women had abnormality of aborted baby showed on Ultra Sound (52.7%, p=0.040) 78 women had infections in 1st trimester of pregnancy (38.0%, p=0.029), 70 had taken capsules (antibiotics) for infection in 1st trimester of pregnancy (34.1%, p=0.040), 64 had trauma (31.2%, p=0.003) 154 women had cervical incompetence (75%, p=0.021) and 76.6% women lifted heavy objects during pregnancy p=0.059.

Conclusion: The study concluded frequency of threatened abortion in low socioeconomic status women is high and level of awareness about the causes and risk factors of spontaneous abortion is unsatisfactory. Increased efforts are needed to help both adolescent women and adult women of low socio-economic status to avoid unwanted outcomes of pregnancy. There is a crucial need to take preventive measures in low socioeconomic class to save the health of women and children.

Key Words: Spontaneous Abortion+ infections + Cervical Incompetence + Awareness +Trauma

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INTRODUCTION

Abortion refers to expulsion of products of conception before 24th week of gestation, when the fetus weighs 500g or less.¹ An abortion that occurs naturally without any medical intervention when there is a physical problem with a pregnancy is called a spontaneous abortion². It is of 2 types:

A) Early Pregnancy Abortions B) Late Pregnancy Abortions gestation hence it is called "First Trimester Miscarriage".

¹. Department of Physiology / Community Medicine², Sindh Medical College, (JSMU) Karachi.

Correspondence: Dr. Tariq Kamal Jafri, Associate Professor of Physiology, Sindh Medical College, (JSMU) Karachi.

Contact No: 0300-216 37 90

Email: dr_tariqkamal@yahoo.com

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Early pregnancy abortions occur before 12th week of Late pregnancy abortions occur between 12th and 24th weeks of gestation, so also known as "Second Trimester Miscarriage". Among these two, early pregnancy abortions are more common.

The risk factors which predispose to susceptibility to abortions are poor socioeconomic status, genital tract infections, and increase maternal age, History of previous abortion or preterm birth and smoking. The most important cause of early pregnancy loss is chromosomal abnormalities. Other causes are endocrine disorders, uterine abnormalities, infections and immunological factors.³

In a population, younger maternal age was significantly and consistently associated to greater risks of fetal death and anaemia and to lower risks of adverse obstetric outcomes.⁴

According to study from Karachi 10% of maternal deaths were due to unsafe abortion. According to the study conducted in Liaquat Medical College Hospital, Hyderabad, Pakistan from January 2005 to December 2006 to find out the rate of abortion in Pakistan. Most cases of abortions occurred in women aged between 26-

35 years. The prevalence of abortion increase as the parity increases. Commonest type of abortion found was incomplete and mostly occurred at 8-12 weeks of gestation.⁵

The study tried to find out the frequency and causes of spontaneous abortions in low socio-economic women as low income group is a risk for increasing abortion, through this study we can conclude the most common causes and risk factors of abortion and what measures are to be taken to improve the abnormal pregnancy end results and awareness for preventive measures must be introduced in low socio-economic class to save the outcomes of pregnancy.

Abortion: Spontaneous abortion is defined as, clinically recognized pregnancy loss before 20th week of gestation. According to WHO, Expulsion or extraction of an embryo or fetus weighing 500gm or less is termed as 'Abortion'.

Pregnancy is a significant event in a woman's life, and emotional attachment to the pregnancy and developing baby may begin early in the first trimester. For most women, experiencing a first trimester loss is a difficult and vulnerable time. When it occurs, the grief can be as profound as for any peri-natal or other major loss. Spontaneous abortion (a pregnancy that ends spontaneously before the fetus has reached a viable gestational age) is among the most common complications of pregnancy. Approximately 12–15% of recognized pregnancies and 17–22% of all pregnancies end in spontaneous abortion.^{6,7}

The term 'miscarriage' is synonymous to spontaneous abortion which occurs spontaneously in the absence of medical or surgical measure. This is used often and the word abortion is associated with elective termination. Spontaneous pregnancy loss has been recommended to avoid term abortion and acknowledge the emotional aspect of losing a pregnancy.⁸

Risk Factors: There are certain risk factors that can potentially increase the chances of a spontaneous abortion. These include: Radiation exposure, heavy weight lifting, no visit to health professionals, recurrent infections, use of antibiotics, NSAIDS increases the risk of abortions in early pregnancy and obesity in pregnant women can have a much higher risk of miscarriage, previous miscarriage also increases the risk of subsequent abortion, Anti-depressants reported as 68% increase in the risk of miscarriage among pregnant women using Anti-depressants.^{9,10}

Rationale: The rationale is to assess the frequency of abortions in low socio-economic women of Karachi in order to increase awareness about spontaneous abortion, to increase preventive measures in low socio-economic class to save the outcomes of pregnancy with repeated abortions women lose blood and their haemoglobin level decreases and they become more prone to infections, Assessment should be done by karyotyping, uterine and ovarian assessment, anti-

cardiolipin antibodies, lupus anticoagulant, thyroid function test, screening for diabetes and endometrial biopsy. The general population should be informed about life-threatening complications of abortions like uterine infections, tears and perforations, blood clots in uterus, hemorrhage, cardiac arrest and death.

MATERIALS AND METHODS

A cross sectional study was conducted on a sample size of 205 women, n=205. The sample was taken through Non-probability purposive sampling from four (04) tertiary care hospitals, Two from Government hospitals and two from semi Government Hospitals namely; Jinnah Post Graduate Medical Center, *Civil Hospital, Lady Dufferin Hospital and Sobraj Hospital Karachi*, within a period of 9 months from February to October 2017. An informed verbal consent was taken from the women. A pilot study was conducted to assess the validity of questionnaire. A structured self administered questionnaire was distributed which was filled by women. Data was analyzed using SPSS version 20 with 95% confidence interval, margin of error was taken as 5% and P-value 0.05 was considered significant.

Selection Criteria

Inclusion Criteria: Spontaneous abortion with first live birth in women age between 15-35 belonging to low socioeconomic class income within the range of 10,000- 17,000 PKR

Exclusion Criteria: All women belonged to high socio-economic class, women with no live child, infertile and induced abortion.

Data Entry and Analysis: The Data Collected was analyzed through Statistical Package for Social Sciences (SPSS) version 20. Frequencies And Percentages were calculated for numerical variables like age. Chi- square has been used for establishing association between variables, confidence level of 95% was taken and bound of error was taken as 5% and the calculated P value of < 0.05 was taken as significant. The statistical tool used in the research is cross tabulation.

RESULTS

A total of 205 women were interviewed through self administered structured questionnaire. Median Age of women was between 26-35 years. Family income of (55.6%) women was <10000Rs and (44.4%) women had monthly family income between 11000-17000. (42.9%) women who had 2-3 children (p=0.000). 192 women were housewife (93.7%, p=0.000. Out of 205, 117(57.1%) women had abortion between 11-20 weeks of gestation (p=0.045). 199 (97.1%) women had 2-3 abortions. 154(75%) women had visited the doctor for vaginal bleeding suggesting threatened abortion (p=0.037). 108 women had abnormality of aborted baby showed on Ultra Sound (p=0.040).

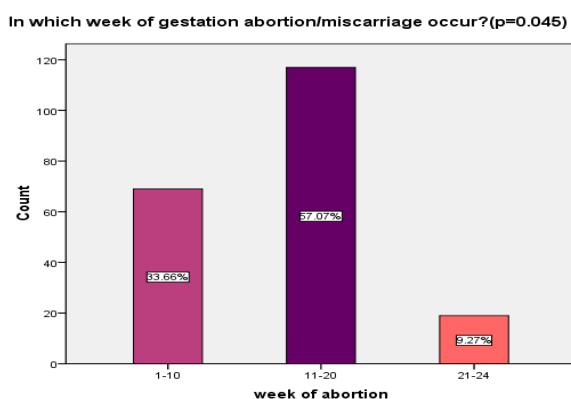


Figure No.1: Week of abortion occur.

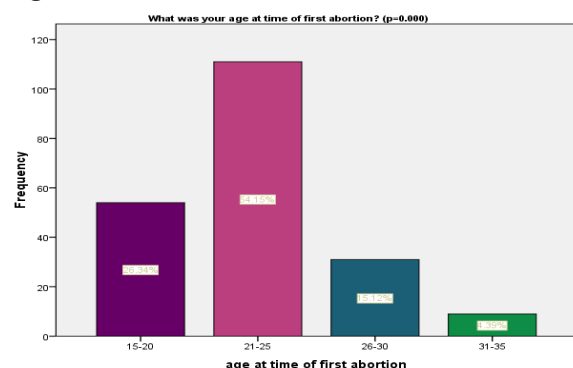


Figure No.2: Age at time of first abortion

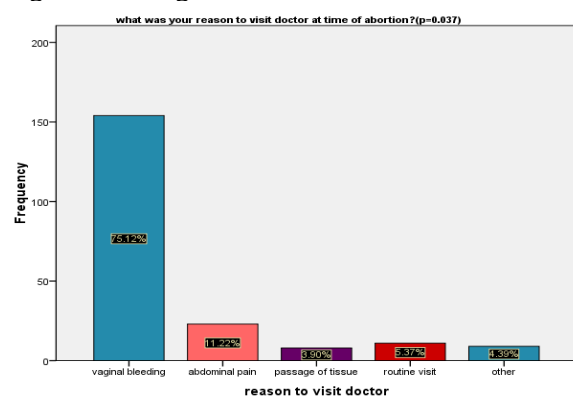


Figure No.3: Reasons to visit doctor.

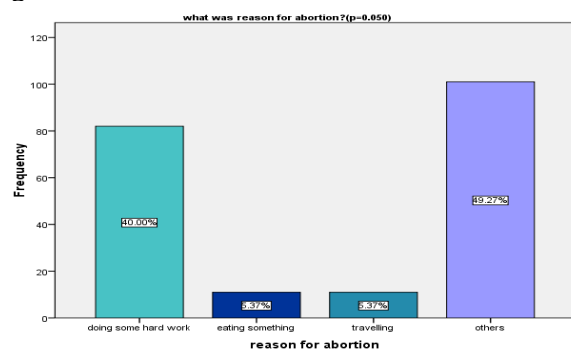


Figure No.4: Reasons for abortion.

78 women had infection in 1st trimester of pregnancy (p=0.029), 70 women took capsules (antibiotics) for

infection in 1st trimester of pregnancy (34.1%), (p=0.010), 64 women had trauma (p=0.003) 154 women had cervical incompetence (p=0.021). 76.6% women had lifted heavy objects (p=0.059). 113 (55%, p=0.035) women knew the cause of abortion 126 (61.5%, p=0.049). 114 (55.6%) women sought medical advice (p=0.062) & 47 (22.9%) women were advised to avoid lifting heavy weights for 4-6 months (0.012). 133 women were advised to take folic acid before on next conception (p=0.050).

DISCUSSION

Pakistan population council's research suggests: a) the annual abortion rate in Pakistan is about 29 According to the study conducted in Liaquat Medical College Hospital, Hyderabad, Pakistan from January 2005 to December 2006 to find out the rate of abortion in Pakistan. It is estimated that out of 2014 gynecological patients, 240 cases were of abortion i.e. 11.4% was prevalence of abortion. Most cases of abortions occurred in women aged between 26-35 years. The prevalence of abortion increase as the parity increases per 1,000 women aged 15-49 years. ¹¹If this persist every Pakistani women will have abortion in her life. b) About 1 in seven pregnancies is terminated by abortion. c) Associated mortality & morbidity rates are high. d) 23% of all Pakistani women who get an abortion are hospitalized for treatment of complications.) Abortion rate is higher in Pakistan than India. ¹²The aim of our study was to evaluate impact of low socioeconomic status on pregnancy outcome for this purpose we have interviewed around 250 women that typically displayed social pattern in risk of spontaneous abortion. The indicators of socioeconomic status selected are primarily family income, parent's occupation, lifestyle factors, nutrition status and proper attendance at antenatal setups that are either qualitatively or quantitatively effecting pregnancy outcome.

According to study conducted in 2005 by Dickson suggest two fold risk of spontaneous abortion in lower compared with that of higher socioeconomic class. ¹³

One more study supports our result that estimates that among all abortions 86% are spontaneous and due to malnutrition, intrauterine growth retardation and high rate occurs among teenage mothers. ¹⁴

A Study recent research study conducted in Karachi by Salem and Fikree articles on induced abortion in low socioeconomic also concluded that risk of spontaneous abortion are increasing parallel to induced abortion. ¹⁵

The annual hospitalization rate varies from a low of about 3 per 1000 women in Bangladesh to a high of about 15 per 1000 in Egypt and Uganda. Nigeria, Pakistan, and the Philippines have rates of 4-7 per 1000, and two countries in Latin America with recent data have rates of almost 9 per 1000. ¹⁶

Induced septic abortions contribute significantly to maternal morbidity and mortality. Improving literacy

rate in our female population and effective family planning should reduce its incidence. Different resources should be used to develop awareness of the hazards of induced abortions in the community.¹⁷

In countries where abortion is restricted, women have to resort to clandestine interventions to have an unwanted pregnancy terminated. As a consequence, high rates of unsafe abortion are seen, such as in Sub-Saharan Africa where unsafe abortion occurs at rates of 18–39 per 1 000 women.¹⁸

The study was focused on low socio economic women, belonging to income group >Rs10, 000- 20,000/- As we considered occupation as risk, mostly women were house wife whom we interviewed. Most of the women 42.4% were between 26-35 years of age, as age is the risk factor for abortion and most of the women had their first abortion in 21-25 years of age. Similar Findings were made by a Study in China .¹⁹ Women of this age were having only 2-3 children and their total no. of abortions range from 1 to 4 suggest a wide range of abortions as it is a great demise for a women. Only half of women knew their cause of abortion rest didn't asked from doctor or cause was unknown. 61% of abortion carried out at home as there is trend in Pakistan to have consultation with dais and ayas. Almost half of abortions (57.1%) occurred in first trimester.

The study found most common reason to visit a doctor or dais was vaginal bleeding suggesting threatened abortion. Probable reason for abortion according to our research was abnormality of aborted baby shown in Ultra Sound done in first trimester, any infection in 1st three months of pregnancy for which women took antibiotics/capsule, any trauma during her ante natal period, women who suffer cervical incompetence, and some lifted heavy objects which most commonly a heavy bucket. As most women seek advice from doctor regarding next conception and their future pregnancy outcome & doctor advised to avoid pregnancy for 4-6 months after this abortion. Women also advised to take folic acid before next conception in order to prevent defects in child.

Post-abortion care focuses on treatment of incomplete abortion and provision of post-abortion contraceptive services. To enhance women's access to postabortion care, focus is increasingly being placed on upgrading midlevel providers to provide emergency treatment as well as implementing misoprostol as a treatment strategy for complications after unsafe abortion.

Spontaneous pregnancy loss is common, with approximately 15% of all clinically recognized pregnancies resulting in miscarriage.²⁰

These are preventable causes and can be prevented by an effective family planning services and by improving women educational and social status providing maximum awareness about antenatal care, thus reducing the incidence of abortion.

CONCLUSION

The study concluded that frequency of abortion in low socioeconomic status is high and the level of awareness about the preventive measures and risk factors of spontaneous abortion is unsatisfactory. In addition, increasing rate of abortion increases morbidity and mortality, broadly affecting health care and cost. Research and policy that acknowledge the importance of all aspects of women's reproductive health—including proper antenatal care, good support including social and financial to women bearing pregnancy, awareness about pre-natal, natal and postnatal care—are essential to meeting the reproductive health care needs of low-Socio-economic women. Increased efforts are needed to help both adolescent women and adult women of all economic statuses avoid unwanted outcomes of pregnancy. There is a crucial need to take preventive measures in low socioeconomic class to save the morbidity and mortality of women and children to make our society flourish and sound.

Author's Contribution:

Concept & Design of Study:	Tariq Kamal Jafri
Drafting:	Tafazzul H. Zaidi
Data Analysis:	Tariq Kamal Jafri, Kiran Mehtab
Revisiting Critically:	Tariq Kamal Jafri, Tafazzul H. Zaidi
Final Approval of version:	Tariq Kamal Jafri

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Prevalence of Coronary Artery Disease in Patients with Zero Calcium Score on Coronary CT Angiography

Tariq Abbas¹, Abubakr Ali Saad², Raheel Iqbal¹ and Muhammad Amin¹

ABSTRACT

Objective: To determine the frequency of coronary artery disease in suspected patients with zero calcium score on coronary CT angiography.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Cardiology, Ch. Pervaiz Elahi Institute of Cardiology, Multan 1-Aug-2017 to 31-Jan-2018.

Materials and Methods: A total number of 86 patients having age 18 to 65 years, with suspicion of coronary artery disease and having zero calcium score on CT angiography were included in this study. The data was analyzed through statistical analysis software (SPSS version 21.0). Qualitative variables e.g. gender, diabetes and presence of CAD was presented as frequency and percentage. Stratification of confounder variables was done. Post-stratification Chi-square test was applied.

Results: Mean age of study patients was 49.43±8.16 years. There were 71 (82.56%) male patients and 15 (17.44%) female patients. There were 37 (43.02%) diabetic patients. Coronary artery disease was diagnosed in 5 (5.81%) patients, while remaining 81 (94.19%) patients were having normal coronary arteries. There was no effect of age and gender on frequency of CAD. In diabetic patients, CAD was diagnosed in 4 patients and in only 1 patient without diabetes mellitus. Frequency of CAD was high in diabetics but statistically insignificant.

Conclusion: In our study, frequency of coronary artery disease in patients with zero calcium score on CT angiography was 5.81%.

Key Words: Coronary artery disease, coronary artery calcium score, CT angiography.

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INTRODUCTION

Coronary artery disease (CAD) is one of serious disease which has attained epidemic proportions and affecting people globally. Coronary artery disease (CAD) with an estimated 17.5million deaths worldwide in 2005 is a leading cause of mortality from non-communicable diseases.^{1,2} Cardiovascular disease is the most common cause of death in the UK, responsible for 238,000 deaths in 2002 or 39 % of all deaths.³ Countries with low-to-middle income share more than 80% of the global disease burden.⁴ South Asians are among the highest susceptibility population with an alarmingly high incidence rate at younger age.⁵

Although there are no absolute figures available as yet on morbidity and mortality related to CAD in Pakistan,

the anticipated prevalence is inordinately high and severe.⁶ According to the National Health Survey, every third Pakistani over the age of 40 years is hypertensive and 20%population of ≥60 years of age is facing hypercholesterolemia.⁷

The disease has been controlled in the west through pharmacotherapy, proper medical treatment and life style modification,⁸ however coronary artery disease (CAD) overall impact is greater in South Asians especially in Indo-Pakistani population and it affects the younger productive population of this continent⁹ as well as has become one of the death leading cause. It includes comparatively lesser incidence of traditional risk factors and at the same time relatively higher prevalence of newer risk factors.^{10,11}

Previous literature reported that in low and middle income countries, three fourth of global death is due to coronary artery disease. The World Health Organization (WHO) published its report and estimates that by 2020 the global number of CAD will rise from 7.1 in 2002 to 11.1 million.¹²

Coronary artery calcium (CAC) is present in only atherosclerotic arteries which helps to measure subclinical coronary artery disease. Coronary CT angiography helps to detect and quantify small amounts of CAC⁽¹³⁾. Electron beam chromatography-derived coronary artery calcium scores (CaSc) are directly

¹. Department of Cardiology, Ch. Pervaiz Elahi Institute of Cardiology, Multan.

². Nishtar Medical University and Hospital, Multan.

Correspondence: Tariq Abbas, Associate Professor of Cardiology, Ch. Pervaiz Elahi Institute of Cardiology, Multan.

Contact No: 0333-6146264

Email: Bilal200@yahoo.com

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associated with the number and severity of diseased vessels¹⁴ However, hardly few studies of CaSc as a predictor of coronary artery disease have been conducted worldwide. Experts have concluded in their studies that a limited understanding exists regarding the utility of CAC as predictor of coronary artery disease. Larger data is needed to assess the clinical usefulness of CAC evaluations^{15,16} Nevertheless, In previous literature a high variation from 2 to 32 % was reported in the incidence of obstructive CAD in patients with a CaSc of zero.¹⁷De Carvalho et al found 12.4% incidence of coronary artery disease in patients with zero CAC core.¹⁸

Recent studies have also shown that in patients with a CaSc of zero, obstructive CAD was found which was associated with increased cardiovascular events. Unfortunately no study has been reported in Pakistan and neighbor countries about the relationship of coronary artery disease (CAD) patients with zero calcium score on coronary artery CT angiography (CCTA). Although Pakistan reported higher prevalence of CAD and its risk factors.¹⁹ The purpose of this study is to evaluate prevalence of coronary artery disease in patient with zero calcium score on coronary CT angiography. The results of this study will give us better estimates about the presence of CAD in suspected patients having zero CaSc on CCTA. Because CaSc is a potent marker of the presence or absence of CAD but in some cases it is not reliable and patients with zero CaSc are of having CAD. So this study will help us to get estimates that how many patients will be of having CAD.

MATERIALS AND METHODS

After informed consent eligible participants were selected who were referred from OPD for evaluation of possible CAD The research was initiated and data was only collected after approval from the Ethical and Scientific review committee, Ch. Pervaiz Elahi institute of cardiology, Multan. It was a Cross-sectional study and was conducted from 01-Aug-2017 to 31-Jan-2018. All Patient with suspicion of coronary artery disease with calcium score zero on CCTA, of either gender, age greater than 18 years of age and less than 65 and willing to give informed consent were included.

Patients with congenital heart disease, valvular heart disease, cardiomyopathy, cardiogenic shock ,previous Myocardial infarction and/or Coronary revascularization, valvular or aortic surgery patient ,suspected acute coronary syndrome ,previous coronary artery bypass or stent implantation ,patient with known cognitive impairment, patients with acute or chronic kidney disease were excluded. The sample size calculated was 86.

Diagnosis of coronary artery disease was made on angiography reporting of the patients. All the angiographic procedures were performed by a senior

cardiologist having a minimum of 5 years post-fellowship experience. I (the investigator) served assistant in all these procedures. Diagnosis of coronary artery disease was confirmed according to the findings given in operational definitions. Data regarding confounder variables e.g. diabetic history of the patients was also collected based on the previous history of patients.

The data was analyzed through statistical analysis software (SPSS version 21.0). Initially, the descriptive statistics was performed. The quantitative variables i.e. age was presented as mean $\pm$ SD. The descriptive variables i.e gender, diabetes and presence of coronary artery disease was measured and presented through frequency and percentages. Stratification of confounding variables e.g. age, gender and diabetes was done. Chi-square statistics was performed post-stratification. For all analysis P-value less than or equal to 0.05 was considered significant.

RESULTS

A total number of 86 patients were included in this study. Mean age of study patients was 49.43 ± 8.16 years. The minimum age of study patients was 23 years and maximum age of study patients was 65 years (Table 4). There were more males as compared to the female patients. There were 71 (82.56%) male patients and 15 (17.44%) female patients in this study. Regarding diabetes mellitus, there were 37 (43.02%) diabetic patients and 49 (56.98%) non-diabetic patients in this study (Fig. 1).Coronary artery disease was diagnosed in 5 (5.81%) patients. while remaining 81 (94.19%) patients were having normal coronary arteries (Fig. 02).

Stratification of age of patients was performed. In patients having age <50 years, CAD was diagnosed in 2 patients and in patients having age $\geq$ 50 years, CAD was diagnosed in 3 patients. This difference in frequency of CAD in patients of different age groups was not statistically significant (p-value 0.68) [Table 5]. Stratification of gender was performed. In male patients, CAD was diagnosed in 3 patients. While in female patients CAD was diagnosed in 2 patients. This difference was not statistically significant (p-value 0.17) [Table 1].

Table No.1: Stratification of Gender of Patients.

Gender	Coronary Artery Disease		P-value
	Yes	No	
Male	3	68	0.17
Female	2	13	

Stratification of diabetes mellitus was also performed. In diabetic patients, CAD was diagnosed in 4 patients and in only 1 patient without diabetes mellitus. Frequency of CAD was high in diabetic patients as compared to the non-diabetic patients but this

difference was not statistically significant (p-value 0.08).

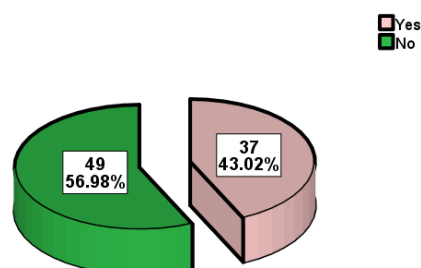


Figure No.1: Frequency of Diabetes Mellitus.

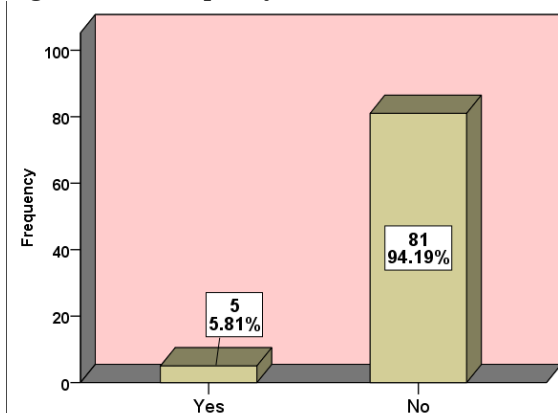


Figure No.2: Frequency of Coronary Artery Disease.

DISCUSSION

In this study, we found a low prevalence of coronary artery disease in patients with zero calcium score on CT angiography. The prevalence of coronary artery disease in patients with zero calcium score was 5.81% in our study. deCarvalho et al. found a very low prevalence of obstructive CAD (1.6 %) in the subset with a CaSc of zero. When considering the degree of stenosis, only 0.6% had a stenosis $\geq 70\%$.¹⁸ Rubinshtein et al. found 7.0% prevalence of coronary artery disease in patients having zero calcium score on CT angiography.¹⁶

The prevalence and clinical significance of obstructive CAD on coronary CT angiography among patients with a calcium score of zero has been evaluated in several cohorts, but with conflicting results, depending on the population included. Data from Nieman et al.¹⁰ the CONFIRM registry,²¹ and Akram et al.²² are in line with our results, with a low prevalence of obstructive CAD (2%, 3.5%, and 8.2 %, respectively).

In contrast, in the work of Harberlet al.²³ and Gottlieb et al.²⁴, there was a high prevalence of CAD (32% and 19.4 %, respectively), which can be related to the fact that these studies included patients referred for conventional angiography, including patients with possible acute coronary syndromes.

There is no doubt that CTCA provides comprehensive assessment of CAD with demonstration of plaques with quantification of stenosis, thus providing greater

accuracy for diagnosis and prognosis. CTCS, on the other hand is a relatively crude technique, but is much simpler to perform without the need for contrast and beta-blockers, as well requiring less time for reporting. The 2010 NICE chest pain guideline²⁶ had recommended CTCS as the initial test to rule out coronary disease in low-risk individuals, but the recently updated guidance advises CTCA as the first-line investigation for all patients with angina, independently of CTCS.²⁷ Our data suggest that even amongst patients with typical or atypical angina, as many as 50% will have a ZCS with an excellent prognosis.

Our data suggests that, although the absence of calcium does not exclude the presence of CAD, it was associated with a very low probability of obstructive lesions. This was especially true in cases of low and intermediate pretest CAD probability, as in the study from Werkhoven et al.²⁸ in which the prevalence of obstructive CAD, in the absence of calcium, was only 3.4 and 3.8 % in patients with low and intermediate pretest CAD probability, respectively. This is in line with the excellent prognosis that has been demonstrated for patients with a calcium score of zero.^{29,30}

In this population of stable patients referred for evaluation of possible CAD that had a calcium score of zero, about 5.81% had obstructive CAD ($\geq 50\%$ stenosis). Therefore, and despite the known high negative predictive value of CaSc for coronary events, the absence of coronary artery calcification does not exclude the presence of coronary artery disease, but the prevalence of obstructive disease is very low.

CONCLUSION

In our study, frequency of coronary artery disease in patients with zero calcium score on CT angiography was 5.81%.

Author's Contribution:

Concept & Design of Study:	Tariq Abbas
Drafting:	Abubakr Ali Saad
Data Analysis:	Raheel Iqbal, Muhammad Amin
Revisiting Critically:	Tariq Abbas, Abubakr Ali Saad
Final Approval of version:	Tariq Abbas

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Frequency of Iron Deficiency Anemia in Breast Fed Versus Bottle Fed

Iron Deficiency
Anemia in Breast
Versus Bottle Fed

Muhammad Aqeel Khan¹, Irum Naz³, Ashraf Khan² and Muhammad Arif¹

ABSTRACT

Objective: To determine the frequency of iron deficiency anemia in infants with highly suspected clinical features and to compare frequency of iron deficiency anemia between breastfeeding and bottle feeding.

Study Design: Prospective / cross sectional study

Place and Duration of Study: This study was conducted at the Pediatrics department Hayatabad Medical Complex, Peshawar from 22-01-2016 to 22-07-2016.

Materials and Methods: A total of 164 infants with age up to 9 months of either sex and with clinical suspicion of anemia were included in the study, using probability consecutive sampling technique. Infants who were on multivitamin or iron therapy and/or with history of blood transfusions in the last three months were excluded from the study.

Results: The mean age of the overall sample was 5.5 ± 2.3 months. The mean age of breast fed infants was 5.7 ± 2.1 months and that of bottle fed was 5.4 ± 2.4 months ($p = 0.329$). We had 59.8% males in breast fed and 50% in bottle fed infants. Female infants were 40.2% in breast fed and 50% in bottle fed infants. IDA of the overall sample was 19.5%. We observed IDA in 9.8% of breast fed and 29.3% of the bottle fed infants ($p = 0.002$).

Conclusion: IDA was prevalent in both breast fed and bottle fed infants with significant incidence in bottle fed infants as compared to breast fed infants.

Key Words: Iron deficiency anemia, Ferritin, Hemoglobin, Red blood cells, Breast feeding, Bottle feeding.

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INTRODUCTION

Iron-deficiency anemia (IDA), defined as iron deficiency (serum ferritin $<12 \mu\text{g/L}$) with hemoglobin levels $<110 \text{ g/L}$,¹ usually present within infancy and childhood period¹. Iron is required for the synthesis of hemoglobin and is placed and stored in the body for this very purpose. Iron deficiency is clinically observed when this store is depleted². IDA develops when iron is depleted to an extent that anemia is found clinically and hypochromic microcytic red blood cells are found³. The clinical presentation of IDA ranges from asymptomatic condition to cognitive and behavioral problems⁴. Inadequate content of food i.e. milk is the major cause of IDA in infants and followed by protein intolerance and worms infestation⁵. The total body content of body iron of a healthy newborn is 250mg, obtained from maternal source⁶.

The World Health Organization (WHO) advises use of breast-feeding only and only during the initial six

months of first year of life also called as exclusive breast feeding. At six months of age the infants are introduced with semisolid or solid food called as complementary or weaning food. The breast milk should be continued for two years of life⁸.

Though both micronutrients and macronutrients deficiency are prevalent around the globe but micronutrient deficiency is quite common with its generalized presence in most of the parts of the globe. The prevalence of Iron deficiency anemia (IDA) is approximately 42% in developing region of the world and 17% in developed nations⁹. Therefore it is too important to add iron to the complementary feeding of the infant and the need is quite prominent from month seven to one year of life. Pediatric guidelines including German and European recommend the introduction of the weaning food item from 17weeks to 26weeks of life⁹. The awareness about iron presence during the first year of life is increasing day by day, but even now with all these commitments to healthy infant life the use of this essential element is not encouraging¹⁰.

Those infants who are on bottle feeding (cow or formula milk) are prone to develop IDA because of decrease amount of iron in cow's milk, occult blood loss associated with it from GIT and thirdly decrease absorption of iron from gut by increase content of calcium and casein. Therefore extra iron should be given to infants and young children to avoid and prevent IDA^{11, 12}. A high correlation of IDA has been found with unfortified formula and cow's milk in

¹. Department of Pediatrics / Pathology², KGMC/MTI HMC Peshawar.

³. Department of Pediatrics, Naseer Teaching Hospital, Peshawar

Correspondence: Dr. Muhammad Aqeel Khan, Associate Professor of Pediatrics, KGMC/MTI HMC Peshawar.

Contact No: 0300 5938566

Email: khattakdr@yahoo.com

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different studies, while it was reported low with the breast milk^{13,14,15}.

The present study was therefore designed and conducted to determine the frequency of IDA among infants presenting with highly suspected clinical features and comparing the frequency of bottle feed versus breast feed among IDA positive infants. The significance of this study is good enough that it will provide local data and aware about regional situation.

MATERIALS AND METHODS

This prospective cross sectional study was carried out at the department of pediatrics, Hayatabad Medical Complex, Peshawar from 22-01-2016 to 22-07-2016. A total of 164 infants with age up to 9 months of either sex and with clinical suspicion of anemia were included in the study using probability consecutive sampling technique. Infants who were on multivitamin or iron therapy and history of blood transfusions in the last three months were excluded

Data Collection Procedure: The study was conducted after approval from hospitals ethical and research committee. All infants who were according to inclusion criteria were taken in the study via OPD. The purpose and benefits of the study was discussed with the mothers or attendants and a written informed permission was taken. All infants included in the study were subjected to detailed history and were examined in detail. In all cases 5cc of venous blood was obtained and was sent to hospital laboratory for measuring Hb level. The investigations were done by single experiences hematologist having minimum of five years of experience. Once the anemia detected, the parents were carefully interviewed for the history of milk consumption by the infant in last six months i.e. bottle feeding or breast feeding.

The information regarding name, age, gender and type of feeding was recorded in a pre designed proforma. The exclusion criteria were strictly followed to control confounders and bias in the study results.

Data Analysis Procedure: The collected data was stored and analyzed in SPSS version 20. Mean $\pm$ SD was calculated for numerical variables like age, Hb. Frequencies and percentages were calculated for categorical variables like gender and IDA. IDA in both groups was compared (bottle vs breast feeding) by using chi square test with a p value of ≤ 0.05 as significant. IDA in both groups was stratified among age and gender to see the effect modifications. All results was presented in the form of tables and graphs.

RESULTS

The study included 164 infants suspected of having iron deficiency anemia (IDA) with equal number i.e. 82 children each from breast and bottle fed infants. The mean age of the overall sample was 5.5 ± 2.3 months. The mean age of breast fed infants was 5.7 ± 2.1

months and that of bottle fed was 5.4 ± 2.4 months (p 0.329). The mean age in our study was 7.5 months with minimum age of 1.5 months and maximum age of 9 months. We divided the age in three different groups i.e. 0 to 3 months, > 3 to 6 months and > 6 to 9 months. In our study we found that 59.8% were males in breast fed and 50% in bottle fed infants while female infants were 40.2% in breast fed and 50% in bottle fed infants. The mean Hb of the overall sample was 10.9 ± 1.5 gm/dl. The mean Hb of breast fed and bottle fed groups can be seen in Table 1.

Table No.1: Serum hemoglobin concentration

Overall Sample

	n	Range	Min.	Max.	Mean	Std. Deviation
Serum Hb Level	164	5.00	7.50	12.50	10.9323	1.51588

Group wise statistics of Mean Hb

	Feeding group	n	Mean	Std. Deviation	P value
Serum Hb Level	Breast Fed	82	11.3854	1.04233	< 0.001
	Bottle Fed	82	10.4793	1.76696	

Table No.2: Frequency of iron deficiency anemia in infants with breast feeding and bottle feeding

Overall Sample

IDA	Frequency	Percent
Yes	32	19.5
No	132	80.5
Total	164	100.0

Groups wise statistics of IDA

		Feeding group		P value
		Breast Fed	Bottle Fed	0.002
Iron Deficiency Anemia	Yes	8 9.8%	24 29.3%	
	No	74 90.2%	58 70.7%	
Total		82 100.0%	82 100.0%	

Table No.3: Age group 0-3 months wise stratification of ida in both feeding groups

		Feeding group		P Value
		Breast Fed	Bottle Fed	< 0.001
Iron Deficiency Anemia	Yes	0 0.0%	16 100.0%	
	No	16 100.0%	0 0.0%	
Total		16 100.0%	16 100.0%	

Table No.4: Age group >3-6 months wise stratification of ida in both feeding groups

		Feeding group		P value
		Breast Fed	Bottle Fed	
Iron Deficiency Anemia	No	25	33	NA
		100.0%	100.0%	
Total		25	33	
		100.0%	100.0%	

Table No.5: Age group >6-9 months wise stratification of ida in both feeding groups

		Feeding group		P value
		Breast Fed	Bottle Fed	
Iron Deficiency Anemia	Yes	8	8	0.623
		19.5%	24.2%	
	No	33	25	
		80.5%	75.8%	
Total		41	33	
		100.0%	100.0%	

Table No.6: Male gender wise stratification of ida in both feeding groups

		Feeding group		P Value
		Breast Fed	Bottle Fed	
Iron Deficiency Anemia	Yes	0	16	< 0.001
		0.0%	39.0%	
	No	49	25	
		100.0%	61.0%	
Total		49	41	
		100.0%	100.0%	

Table No.7: Female gender wise stratification of ida in both feeding groups

		Feeding group		P Value
		Breast Fed	Bottle Fed	
Iron Deficiency Anemia	Yes	8	8	0.623
		24.2%	19.5%	
	No	25	33	
		75.8%	80.5%	
Total		33	41	
		100.0%	100.0%	

The overall incidence of IDA in our study sample was 19.5%. We found IDA in 9.8% of breast fed and 29.3% of the bottle fed infants. (p 0.002) table 2.

Table 3-5 elaborate age groups wise and Table 6,7 elaborate gender wise stratification of the IDA in both breast fed and bottle fed groups.

DISCUSSION

IDA is the most frequently occurring anemia associated with nutritional deficiency and/or blood loss around the globe¹⁶. Therefore earlier recognition of iron deficiency

in its subclinical form is important to avoid the clinical manifestation of the disease¹⁷. Timely diagnosis of iron-deficient anemia (IDA) which may due to any reason including absence of iron in the food, by malabsorption, or by excessive loss secondary to bleeding as the underlying reason for anemia, as this condition responds promptly to iron therapy¹⁸. It is extremely important to keep the iron level within normal limits during initial few months or first year of life to help in both physical and mental development in late childhood, adolescence and adulthood¹⁹. The clinical manifestation of iron deficiency has been found not only in developing world but also in developed part of the globe as well^{20, 21}.

In our study population we found association between milk feeding and IDA in infants. The same study findings were found in other studies especially during initial few months of life. A study including 183 infants in Mexico City (OR: 12.2, 95% CI: 2.4–62.1) found ultimate anemic status of the infants at 9 months of age who were only breast fed and not started with complementary feeding²². The same outcome was found in a case-control study of 150 patient aged 1 to 2 years in Pakistan (60% of cases and 9% of controls were weaned late, $P < .001$)²³. In another international study at US which comprised of 9930 children; had concluded as that Hb rose up in children from age group one to two years who had been given breast feeding ≥ 25 weeks ($P < .00001$)²⁴. Another study comprised of 245 subjects with age range 12 to 24 months detected that the odds with low ferritin were in low number with subject who had only breastfeeding for 4 to 5 months as compared to those patients who were only breast fed ≥ 6 months (OR: 0.19, 95% CI: 0.06–0.57) without any complementary feeding added to their routine feeding²⁵. In an RCT, low ferritin was observed with breastfeeding without complementary feeding for 6 months as compared to those cases in which the weaning was started earlier i.e. 4 months in 141 low-income children (relative risk: 2.93, 95% CI: 1.13–7.56)²⁶. In another RCT conducted on 77 infants, the level of serum ferritin was present in infants with exclusive breastfeeding for 6 months as compared to those infants who were also exclusive breast fed but were given iron supplementation from 1 to 6 months of age (33% vs 7%)²⁷. Due to all these findings and low serum ferritin and iron level in exclusive breastfed infants AAP committee on Nutrition recommends iron supplementation in exclusively breastfed infants beyond six months of age²⁸. The reason that very few studies have been conducted to comment on relation of iron status and breast feeding is mainly due to WHO recommendation of breastfeeding for two years of life²⁹. One of the study which was carried out on infant feeding types during the second half of first year of life concluded that children on exclusive feeding or on cow's milk and not on fortified formula milk had more

prevalence of anemia (hemoglobin <110 g/dL) but no such effect on ferritin level at 8 and 12 months as compared to those cases who received fortified formula milk at 8 months. Furthermore, infants receiving <6 breastfeeds per day, compared with ≥ 6 breastfeeds per day, obtained greater energy from solids and greater total iron³⁰. In our study we found that iron deficiency was highly prevalent in bottle fed children especially on cow's milk as compared to breast fed children. Almost same was finding in a study conducted by Ziegler EE³¹.

CONCLUSION

Iron Deficiency Anemia (IDA) is prevalent in both breast fed and bottle fed infants with significant incidence in bottle fed infants as compared to breast fed infants.

Author's Contribution:

Concept & Design of Study: Muhammad Aqeel Khan
 Drafting: Irum Naz
 Data Analysis: Ashraf Khan,
 Muhammad Arif
 Revisiting Critically: Muhammad Aqeel Khan,
 Irum Naz
 Final Approval of version: Muhammad Aqeel Khan

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Importance and Need of Radiology in Medical Education: A Comparative Study Conducted At Central Park Medical College, Lahore

Muhammad Wasif Iqbal and Zahid Ahmad

ABSTRACT

Objective: To evaluate the importance and need of Radiology (imaging technology) in medical education.

Study Design: Comparative study

Place and Duration of Study: This study was conducted at the Central Park Medical College and its Teaching Hospital Lahore during From Feb 2014 to Dec 2014.

Materials and Methods: In this study a complete survey was conducted aimed to the value of radiology in medical education. We included 430 individuals of college (70 teaching faculty 360 medical students) and 100 non-radiologist doctors for this survey, a questionnaire distributed among all individuals asking to provide their suspensions of imaging technology education. And need and importance of radiology education, and their education regarding radiology is sufficient or not, satisfied with teaching methodologies and how much they were confident to use their abilities in basic radiology i.e. x-rays and ultrasound.

Results: There were 60% females and 40% males. In teaching faculties 40 (57.14%) were males and 30 (42.86%) were females. In non-radiologist (65%) were females and 35% were males. Out of 360 medical students 75 % students were satisfied and 25% students were not satisfied to their education regarding radiology. 98% non-radiologist doctors were agreed to radiology education as a basic education in medical colleges. 38% of the students and teachers favored committed clerkships. The most usual teaching methodology was 1-on-1 interaction. Teaching with radiology films (85%) was the mode of instruction.

Conclusion: All individuals were admitted that radiology education in medical colleges is a basic need for health care. The most frequent teaching method was one on one interaction and use of films/image. More work and efforts are required for providing quality education regarding radiology

Key Words: Medical education, Importance, Imaging technology

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INTRODUCTION

Go through the last ten years, we will found a lot of confirmations that medical students were not receiving a sufficient education in imaging technology/radiology.¹ But currently medical education related to health care realized the need of quality radiology education is much important for medical students as radiology is a basic and useful method to diagnose problems in patients. In un-segregated medical education, the radiology education is must in their pre-clinical duration.² Radiology education requires a well trained and experienced radiologist to supervise the imaging technology/radiology educational programs.

Department of Radiology, Central Park Medical College & Teaching Hospital Lahore.

Correspondence: Dr. Muhammad Wasif Iqbal, Professor of Radiology, Department of Radiology, Central Park Medical College & Teaching Hospital Lahore.

Contact No: 0308-2921933

Email: zahidkhan1957@yahoo.com

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In medical colleges of USA and UK, there has been a experienced and self-motivated radiologist to enhance the performances and abilities of medical students with respect to imaging technology/radiology.^{3,4} However, in Pakistan, there is lack of teaching faculties regarding radiology educational program. Undergraduate national or international student of radiology education is not given a dominant position in medical colleges.⁵⁻⁸

Pakistan has limited health related resources and facilities with respect to radiology education in spite of its important, and it could be the serious challenge for our future radiologist and clinical physicians. Gov should have to pay more intension to improve the educational program regarding radiology, and it is the main requirement for perfect patients care.⁹

Now PMDC furnish a fixed educational program that every medical student must be trained to radiology (such as x-rays, CT, MRI, and ultrasound) due to the importance and need of radiology education for patients care. In 5 years study forty hours is mandatory regarding teaching time of imaging technology/radiology, Because of pliant structure of education there have a versatility in teaching methods for undergraduate students in medical colleges.^{5,10} There is

a lack of skilled radiologist in Pakistan and only few students are applying for postgraduate in radiology education.¹¹

MATERIALS AND METHODS

This comparative study was conducted at Central Park Medical College Lahore During From 2014 to 2015. In this study a complete survey was conducted aimed to the value of radiology in medical education. We included 430 individuals (70 teaching 360 students) and 100 non- radiologist for this survey, A questionnaire distributed among all individuals asking to provide their suspicions of imaging technology education. And need and importance of radiology education, and their education regarding radiology is sufficient or not, satisfied with teaching methodologies and how much they were confident to use their abilities in basic radiology i.e. x-rays and ultrasound.

RESULTS

We included 430 individuals of medical college (70 (16.27%) teaching faculty, 360 (83.72%) were medical students) and 100 non- radiologist doctors for this study. Out of 360 students females were 60% and males were 40%, In teaching faculties 40 (57.14%) were males and 30 (42.86%) were females. In non-radiologist 65 (65%) were females and 35% were males.

Table No.1: Type of individuals

Characteristics	No.	%
Teaching Faculty	70	16.27
Medical Students	360	83.73

Table No.2: Gender-wise distribution of non-radiologists doctors

Participants	No.	%
Male	35	35.0
Female	65	65.0

Table No.3: Gender-wise distribution in teaching faculty and medical students

Participants	No.	%
Teaching faculty		
Male	40	57.14
Female	30	42.86
Medical students		
Male	144	40.0
Female	216	60.0

Out of 360 students 75 % students were satisfied and 25% students were not satisfied to their education regarding radiology. 98% non-radiologist were agreed to radiology education as a basic education In medical colleges. 38% of the students and teachers favored committed clerkships. The most usual teaching methodology was 1-on-1 interaction. Teaching with radiology films (85%) was the mode of instruction.

Table No.4: Frequency of teaching experience

Characteristics	No.	%
Medical students satisfaction		
Satisfied	270	75.0
Not satisfied	90	25.0
Teaching Time (hours/week)		
< 5	40	57.14
> 5	30	42.86
Teaching experience (years)		
< 5	50	71.43
> 5	20	28.57
Experience in medical education	57	81.43
Training for teaching skills	38	54.28

DISCUSSION

This study was conducted to evaluate the importance of radiology with aspect to teaching methods, hours given per week and students satisfaction about radiology education.

Radiologist were giving less time to their lectures preparation , teaching material preparation and it is the less amount of time given to the radiology study as compared to the other international medical education colleges.⁵ In USA teaching time given to the student (with respect to its important) is thirty hours/week.¹² Another study shows that the average hours for teaching and administrative study is nine hours/week.¹³ In this study 430 individuals of medical college (70 (16.27%) teaching faculty, 360 (83.72%) were medical students) and 100 non- radiologist doctors for this study. Out of 360 students, females were 60% and males were 40%, In teaching faculties 40 (57.14%) were males and 30 (42.86%) were females. In non-radiologist doctors 65 (65%) were females and 35% were males. Out of 360 medical students 75 % students were satisfied and 25% students were not satisfied to their education regarding radiology. 98% non-radiologist doctors were agreed to radiology education as a basic education In medical colleges. 38% of the students and teachers favored committed clerkships. The most usual teaching methodology was 1-on-1 interaction. Teaching with radiology films (85%) was the mode of instruction. Most of the medical colleges giving less average time/week to the radiology education and this will be the serious issue for our future radiologist and students. Because radiology plays an important role to diagnose perfectly patients diseases.

In this study we found all non-radiologist doctors were agreed for the basic education of radiology in medical colleges. 75% medical students were satisfied to their future career but 25 % students were not satisfied as a radiologist. It may be the result of quality education not given in the medical colleges.

In Pakistan, PMDC furnish a fixed educational program that every medical student must be trained to radiology (such as x-rays, CT, MRI, and ultrasound) due to the importance and need of radiology education for patients care. In 5 years study forty hours is mandatory regarding teaching time of imaging technology/radiology, Because of pliant structure of education there have a versatility in teaching methods for undergraduate students in medical colleges.^{5,10-14}

Today radiologist demand is much high than previous decade because of the objective of earn money and perfect patient care and this is the only attractiveness for students and radiologists to encourage them to work better.¹⁵⁻²¹ Model of reward and punishment when used appropriately can result in better work productivity.

CONCLUSION

All individuals were admitted that radiology education in medical colleges is a basic need for health care. The most frequent teaching method was one on one interaction and use of films/image. More work and efforts are required for providing quality education regarding radiology.

Author's Contribution:

Concept & Design of Study: Muhammad Wasif Iqbal
 Drafting: Zahid Ahmad
 Data Analysis: Zahid Ahmad
 Revisiting Critically: Muhammad Wasif Iqbal, Zahid Ahmad
 Final Approval of version: Muhammad Wasif Iqbal

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Frequency of Traumatic Amputation of Upper Extremity Presenting at Tertiary Care Hospital in Southern Punjab Pakistan

Zobia Zulfiqar, Saad Zulfiqar Bubak, Aimen Jahangir and Zulfiqar Ali

ABSTRACT

Objective: The purpose of this study was to provide a comprehensive perspective on the epidemiology and causes frequently seen in upper limb amputation.

Study Design: Descriptive / cross sectional study

Place and Duration of Study: This study was conducted at the Department of Orthopaedics, Bahawal Victoria Hospital, Bahawalpur, Punjab Pakistan from 1st March 2017 to 15th August 2017.

Materials and Methods: All the cases presenting with traumatic upper limb amputation were included in this study. Their age, gender, mode of injury, level of amputation and laterality was recorded.

Results: A total of 93 cases with traumatic upper limb amputation were reported. 75 of them were due to Tokka / Fodder Cutter. Other major sources were Bailna/Sugarcane Machine and Thresher. Most of the patients were in their second and third decade of life with mean age 28 years. Male to female ratio was 1:1. 62 patients had amputation at the level of hand. 63 patients had right side amputated.

Conclusion: Tokka / Fodder Cutter was the major source of traumatic amputation seen in Southern Punjab, equally seen in men and women with highest incidence in second and third decade of life.

Key Words: Upper limb, traumatic amputation, frequency, Tokka/ Fodder Cutter

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INTRODUCTION

Limb Amputation is one of the most ancient of all surgical procedures with a history of more than 2500 years dating back to the time of Hippocrates.¹ Limb amputation is considered the last resort when limb salvage is not possible or when the limb is dead or dying, viable but not functional or endangering the patient's life.² Man relies on his upper limbs for finer functions. Its loss is a potentially devastating incident in a person's life making him liable to physical, psychological and vocational consequences. Upper limb amputation can include finger amputation, hand amputation and arm amputation either below or above elbow.³ Its frequency and cause varies from region to region. Traumatic amputations of hand and wrist are common injuries in rural, agriculture related areas around the globe.⁴ In Southern Punjab agriculture is one of the largest primary industries consuming most of the labour force.

Department of Orthopaedic Surgery, B.V.Hospital
Bahawalpur.

Correspondence: Dr. Zulfiqar Ali, Associate Professor
Department of Orthopedic Surgery Quaid-e-Azam Medical
College / Bahawal Victoria Hospital Bahawalpur.
Contact No: 03006830434
Email: zobiazulfiqar01@gmail.com

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Since the introduction of machine in agriculture, incidence of upper limb trauma has increased drastically. There is lack of knowledge regarding its incidence and severity in Southern Punjab.

The primary objective of this descriptive cross-sectional study was to investigate major factors leading to upper limb amputation and their frequency presenting in Bahawal Victoria Hospital Bahawalpur. Secondary aims were to determine age, gender, level of amputation, laterality and their in-hospital management.

MATERIALS AND METHODS

This study was conducted in Department of Orthopaedics, Bahawal Victoria Hospital, Bahawalpur from 1st March 2017 to 15th August 2017. All the patients referred to Orthopaedics Department after initial resuscitation in the Emergency Department with traumatic upper limb amputation were included in this study. The patients who suffered amputation due to vascular disease and road traffic accidents were excluded from this study. All the cases were documented according to their age group, gender, mode of amputation, level of amputation and laterality. Statistical data entry and analysis was done by using SPSS version 20.

RESULTS

During the above mentioned time period 93 cases of traumatic amputations were received. Male amputees were 49.5% (n=46) and female amputees were 50.5%

(n=47). Age distribution was from 4 years to 78 years. Highest percentage of amputation was seen in second (32.3% n=30) and third (28.0% n=26) decade of their life. Mean age of the patients was 28 years.

Of the 93 cases Tokka/Fodder Cutter was the major source of amputation of upper limb accounting 80.6% (n=75) of the total. Other major modes recorded were Bailna/Sugarcane machine (6.5% n=6) and Thresher (6.5% n=6). Cases from other minor sources i.e. Vermicelli making machine, Mince making machine, wood cutter machine, Saylan Machine/Rice Miller accounted for 6.5% (n=6) in total.

All the patients presented with different level of amputation; 66.7% (n=62) of them had amputation at the level of hand. This shows the importance of usage of hand in manual work and incidence of injury it is prone to. 74.2% (n=46) of the hand amputees involved right hand and 25.8% (n=16) had left hand amputation. 17.2% of the amputees had amputation at the level of forearm; 5.4% (n=5) at the level of wrist; 2.2% (n=2) at the level of elbow; and 4.3% (n=4) at the level of arm. Laterality was also recorded. 66.7% (n=62) had right sided amputation and 29.0% (n=27) had left sided amputation. 4.3% (n=4) had bilateral amputations.

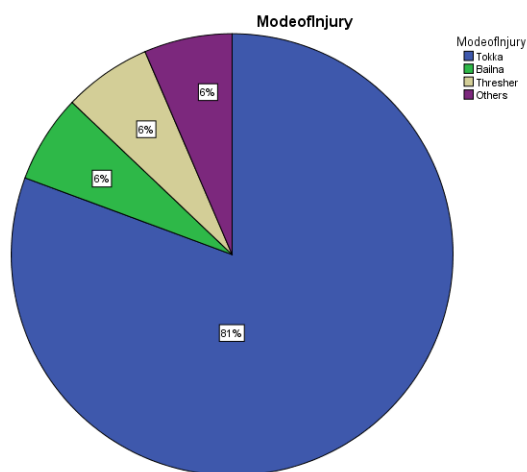


Figure No.1: Frequency of mode of injury documented

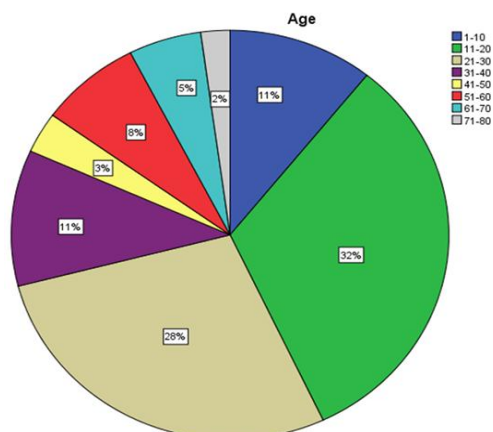


Figure No. 2: Age Distribution

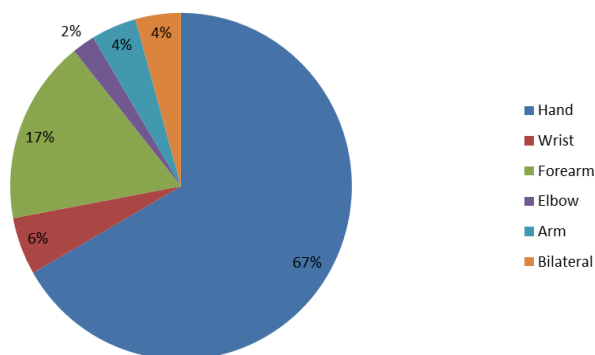


Figure No.3: Level Of Amputation

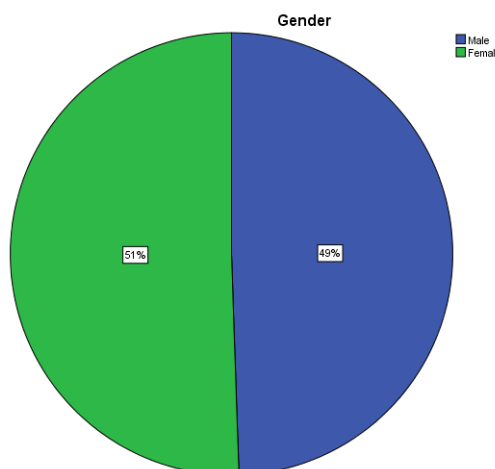


Figure No.4: Male to Female Ratio



Figure No.5: Electrical Tokka/ Fodder Cutter



Figure No.6: Thresher Machine

Table No.1: Age * Modeofinjury Crosstabulation

			ModeofInjury				Total
			Tokka	Bailna	Thresher	Others	
Age	1-10	Count	8	1	1	0	10
		% within Age	80.0%	10.0%	10.0%	0.0%	100.0%
		% within ModeofInjury	10.7%	16.7%	16.7%	0.0%	10.8%
		% of Total	8.6%	1.1%	1.1%	0.0%	10.8%
	11-20	Count	25	2	0	3	30
		% within Age	83.3%	6.7%	0.0%	10.0%	100.0%
		% within ModeofInjury	33.3%	33.3%	0.0%	50.0%	32.3%
		% of Total	26.9%	2.2%	0.0%	3.2%	32.3%
	21-30	Count	22	2	0	2	26
		% within Age	84.6%	7.7%	0.0%	7.7%	100.0%
		% within Mode ofInjury	29.3%	33.3%	0.0%	33.3%	28.0%
		% of Total	23.7%	2.2%	0.0%	2.2%	28.0%
	31-40	Count	6	0	3	1	10
		% within Age	60.0%	0.0%	30.0%	10.0%	100.0%
		% within ModeofInjury	8.0%	0.0%	50.0%	16.7%	10.8%
		% of Total	6.5%	0.0%	3.2%	1.1%	10.8%
	41-50	Count	3	0	0	0	3
		% within Age	100.0%	0.0%	0.0%	0.0%	100.0%
		% within ModeofInjury	4.0%	0.0%	0.0%	0.0%	3.2%
		% of Total	3.2%	0.0%	0.0%	0.0%	3.2%
	51-60	Count	5	0	2	0	7
		% within Age	71.4%	0.0%	28.6%	0.0%	100.0%
		% within ModeofInjury	6.7%	0.0%	33.3%	0.0%	7.5%
		% of Total	5.4%	0.0%	2.2%	0.0%	7.5%
	61-70	Count	5	0	0	0	5
		% within Age	100.0%	0.0%	0.0%	0.0%	100.0%
		% within ModeofInjury	6.7%	0.0%	0.0%	0.0%	5.4%
		% of Total	5.4%	0.0%	0.0%	0.0%	5.4%
	71-80	Count	1	1	0	0	2
		% within Age	50.0%	50.0%	0.0%	0.0%	100.0%
		% within ModeofInjury	1.3%	16.7%	0.0%	0.0%	2.2%
		% of Total	1.1%	1.1%	0.0%	0.0%	2.2%
Total		Count	75	6	6	93	
		% within Age	80.6%	6.5%	6.5%	6.5%	100.0%
		% within ModeofInjury	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	80.6%	6.5%	6.5%	6.5%	100.0%



Figure No.7: Sugar Cane Machine

DISCUSSION

Traumatic upper limb amputation is a common case managed by Orthopaedics Surgeons. It has a debilitating effect on patients and their families. Its indications and patterns differ within different regions of countries and between countries. This study was done to highlight indications and patterns observed in our tertiary care unit and to do its comparison with other regions. It would help in devising effective management and meaningful preventive measures.

Tokka/Fodder Cutter was observed as a major source of upper limb amputation. Akram M. ET all studied the incidence of agriculture machine injuries and found that 67.5% injuries were due to Fodder Cutter

machine.⁵ They also found 90% of hand injuries were due to Tokka/ Fodder Cutter. According to Annual Report of CIWCE & IRI, Lahore, Pakistan during the survey of just two villages of Punjab Pakistan they found five people with severe injuries to upper limb due to Tokka/ Fodder Cutter. Out of these five people two had amputation at arm level and three had amputation of digits.⁶ These findings are in line with our findings. This implies that agriculture mechanization is still in its infancy in most of the Asian countries. This leads to substandard manufacturing of agricultural machinery ignoring safety of the operator. Removal of safety shields and the use of machinery that does not conform to be manufacturer or safety-sigh standards is also a common contributing factor.⁸ Awareness regarding safe usage of agriculture equipment becomes inapplicable in our setting where literacy rate is low. In agriculture related injuries trauma to hand and upper extremity are extremely common representing from 40% to 70% of total admissions that occur on a farm yard.⁹ In a study conducted in Canada, injury pattern observed was tractor trauma 10.2-54%, power take off device (5.4%), grain augers (6.4-22%), balers and thrashers (3.9%) and harvest combines (8.6% to 16%).¹⁰

The majority of patients were in their second and third decade of life. In Nigeria, median age for limb amputation was 27 years.¹¹ This age group makes the most productive part of our society. Disability of this age handicaps them and makes them a social burden. Almost equal ratio of male and female were seen. It is in contrast to previous conducted studies where male preponderance was observed.¹²⁻¹⁴ It is due to home usage of most agricultural machinery and equal participation of women in farms.

Traumatic amputations require proper surgical management and post-operative rehabilitation. Most injuries require revision amputation and postoperative prosthesis fitting. Care should be taken to preserve maximal length of the limb and mobility of the remaining joints. For preservation of length skin grafting or free tissue transfer may be necessary. Early prosthetic fitting within 30 days of surgery should be performed so that amputee can start rehabilitation while the wound is healing and the stump is maturing.¹⁵ These interventions at present are unavailable in most tertiary care units of Pakistan. Therefore prevention of such injuries is the best available option. It can be achieved by redesigning agricultural machinery considering safety of the operator. "Safeguards" or protectors prior to the sharp blades should be added to the machines. In manufacturing machine should follow safety criteria as follows: disengage gear, conveyer belt, distance detector, emergency brake, increase rollers, flesh sensor, automatic switching, and retractable rollers.¹⁶ Proper education of the operator regarding safe and vigilant usage of the machine holds equal importance. Government should take proper steps for regulations of

safety criteria of agricultural machinery. Concept of prosthesis is underdeveloped in our country. A rehabilitation centers for amputees is the dire need of this region.

CONCLUSION

Tokka /Fodder Cutter is the major source of traumatic amputation in Southern Punjab. Its preponderance is highest in the second and third decade equally seen in both genders. Preventive cautionary measures are the best way to avoid amputation. Educational campaigns regarding safe usage of form machinery should be intensified throughout the year and directed more towards younger population. Multidisciplinary care is necessary for the complete care of the patient with traumatic limb amputate.

Author's Contribution:

Concept & Design of Study:	Zobia Zulfiqar
Drafting:	Saad Zulfiqar Bubak
Data Analysis:	Aimen Jahangir, Zulfiqar Ali
Revisiting Critically:	Zobia Zulfiqar, Saad Zulfiqar Bubak
Final Approval of version:	Zobia Zulfiqar

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Evaluation of Hypoglycemia in Low Birth Weight Babies

Hypoglycemia in
Low Birth
Weight Babies

Naveed Akbar Hotyana¹, Usman Asif¹ and Haris Nasrullah²

ABSTRACT

Objective: To determine the prevalence of hypoglycemia in low birth weight babies and to detect onset of hypoglycemia in first 24 hours.

Study Design: Observational study

Place and Duration of Study: This study was conducted at the Paediatrics Department, Ganga Ram Hospital, Lahore from January 2014 to August 2014.

Materials and Methods: Two hundred low birth weight babies delivered and shifted to neonatal nursery for observation and screening are included in the study. Screening was done 1 hourly for 4 hours and 4 hourly for next 20 hours by Gluco sticks and sample was taken from heel prick. Blood glucose levels are monitored for first 24 hours of life.

Results: Total 200 babies, were included in this study out of which 15 babies developed hypoglycemia so 5% prevalence of hypoglycemia was found of the babies developed asymptomatic hypoglycemia and 20% developed Symptomatic. Commonest symptoms for hypoglycemia are reluctance to feed. Eighty percent of the babies developed hypoglycemia within first 4 hours of life however 20% babies develop hypoglycemia up to 16 hours of life.

Conclusion: Five percent of babies developed hypoglycemia and onset of hypoglycemia occurs mainly in first 4 hours of life. Majority of the babies developed asymptomatic hypoglycemia however 20% babies develop symptomatic hypoglycemia. Suggestion all the low birth weight babies must be screened for hypoglycemia in first 4 hours in order to prevent complications and poor outcome due to hypoglycemia.

Key Words: Hypoglycemia, Low birth weight, Prevalence.

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INTRODUCTION

Clinically significant neonatal hypoglycemia is defined as plasma glucose levels of <40 mg/dL.¹ Transitional hypoglycemia is common in healthy newborns immediately after birth. These levels improve and reach to normal in the first few hours after birth.² No studies have demonstrated harm from these few hours of asymptomatic hypoglycemia during this period of physiologic adaptation.³ Babies less than 2500gm are low birth weight baby. Low birth weight babies have increased risk of developing hypoglycemia.⁴⁻⁸ The incidence of symptomatic hypoglycemia in neonates was found to be 3.4% in a study conducted in Israel in 2014.¹ Whereas in a prospective study conducted in Iran during January 2009-2010, the prevalence of hypoglycemia was found to be 0.4%.⁹

No reliable data is available from local studies. The objective of this study was to determine the prevalence of neonatal hypoglycemia during the first 24 hours and to detect the time of onset of hypoglycemia in low birth weight babies.

MATERIALS AND METHODS

This was an observational study conducted in the nursery of Ganga Ram Hospital, Lahore from January 2014 to August 2014. All low birth weight babies (<2500 gm) babies born in the hospital during this time were included in the study. Blood glucose levels were monitored 1 hourly for first 4 hours and then 4 hourly next 20 hours by Gluco sticks and sample was taken from heel prick. All the data were recorded and the prevalence of asymptomatic and symptomatic hypoglycemia was calculated.

RESULTS

A total of 300 patients were included in this study of these, 105 (52.2%) were males and 95 (47.8%) were females. Hypoglycemia was recorded in a total of 10 patients out of 200 (5%). 39 of them (18.50%) were LBW (low birth weight) and 161 (80.20%) were VLBW (very low birth weight) (Table 1). Of the 10 babies with hypoglycemia, 7 were males (70%) and 3 were females (30%) (Table 2)

¹. Department of Pediatrics, Sir Ganga Ram Hospital, Lahore

¹. Department of Pediatrics, Jinnah Hospital Lahore.

Correspondence: Naveed Akbar Hotyana, Associate Professor of Pediatrics. Department of Pediatrics Fatima Jinnah Medical University/Sir Ganga Ram Hospital, Lahore.

Contact No: 03454026158

Email: naveedakbar70@gmail.com

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80% of the babies developed asymptomatic hypoglycemia (having no clinical significance) and 20% developed symptomatic hypoglycemia as observed in 3 (Table 3). The highest prevalence was found in babies belonging to gestational age of 28-31 weeks (100%) (Table 4).

Table No.1: Distribution of Babies by birth weight

Weight	No of babies	percentage
1001-1500gm	161	80.20%
1501 – 2500gm	39	19.30%

Table No.2: Hypoglycemia According to Sex

Sex of babies		No of babies with hypoglycemia	Percentage
Male	115	7	70%
Female	85	3	30%

Table No.3: Babies with Symptomatic and Asymptomatic Hypoglycemia

Hypoglycemia	No of babies	Percentage
Asymptomatic	8	80%
Symptomatic	2	20%

Table No.4: Babies According to Gestational Age

Gestational Age	No of babies	Babies with hypoglycemia	%age
28 – 31 weeks	3	3	100
32 – 36 weeks	98	6	6.5
>36 weeks	99	1	1

DISCUSSION

Low birth weight babies are prone to developed hypoglycemia.¹⁰⁻¹¹ Low birth weight babies may include prematures, intra uterine growth retardation.¹³⁻¹⁵ These are the risk factors to develop hypoglycemia.¹⁶⁻¹⁷ Hypoglycemia in low birth weight may cause severe morbidity if not detected and treated early.¹⁸⁻¹⁹ In the study prevalence of hypoglycemia was found 5%. International studies conducted on neonatal hypoglycemia report an incidence of 14.7% in the United States, with the mean age of occurrence at 6.1 hours of life,²⁰ and 16.9% in China, occurring mainly in the first 3 days of life.²¹ In our study, onset of hypoglycemia was mainly in first four hours after delivery however 20% of the babies developed hypoglycemia up to 16 hours of age. Reluctance of feeding was the only symptom noticed in our study screening method and that reported.²² We used is comprehensive and picked all cases of hypoglycemia however in the resource constraint area we can monitor at least for first four hours of life for hypoglycemia. In this way we can reduce hospitalization, parental

anxiety, separation of mother and baby and economic burden on family.

The newborns at risk are preterm, LGA, SGA, and/or intrauterine growth retarded (IUGR) infants.²³ The early milk feedings with glucose administration is the usual treatment for asymptomatic hypoglycemia in these patients.²⁴ This method makes mothers and babies together, and supply glucose. If hypoglycemia remains after frequent milk feedings, a continuous intravenous dextrose infusion may be indicated. A dextrose infusion rate of 3–5 mg/kg/ min can be used. A dextrose infusion rate of 6–8 mg/kg/min often is necessary in IUGR infants. Glucose concentrations must be monitored. In fact, partial or complete resolution of the symptoms with correction of glucose concentrations.²⁵

CONCLUSION

Five percent of babies developed hypoglycemia and onset of hypoglycemia occurs mainly in first 4 hours of life. Majority of the babies developed asymptomatic hypoglycemia however 20% babies develop symptomatic hypoglycemia. Suggestion all the low birth weight babies must be screened for hypoglycemia in first 4 hours in order to prevent complications and poor outcome due to hypoglycemia.

Author's Contribution:

Concept & Design of Study: Naveed Akbar Hotyana
 Drafting: Usman Asif
 Data Analysis: Haris Nasrullah
 Revisiting Critically: Naveed Akbar Hotyana, Usman Asif
 Final Approval of version: Naveed Akbar Hotyana

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Frequency of Hyponatremia and Hypokalemia in Children with Protein Energy

Arshia Munir¹, Muhammad Ibrahim¹, Ashraf Khan² and Kalimullah Khan¹

ABSTRACT

Objective: To determine the frequency of hypokalemia and hyponatremia in pediatric patients with protein calorie malnutrition.

Study Design: Descriptive / cross sectional study.

Place and Duration of Study: This study was conducted at the Department of Pediatrics, PGMI, LRH, Peshawar, from August 2015 to February 2016.

Materials and Methods: 109 children with protein calorie malnutrition were selected by non-probability consecutive sampling technique.

Results: A total of 109 children with protein calorie malnutrition were included in the study. Male to female ratio was 0.94:1. Average age of the patients was 27.232 Months $\pm$ 15.59 SD with range 5-60 months. Hypokalemia in PEM was observed in 38 (34.9%) while Hyponatremia was little bit high which was observed in 44 (40.4%) of patients.

Conclusion: Hypokalemia and Hyponatremia are found high in patients with protein calorie malnutrition.

Key Words: Frequency, malnutrition, Hyponatremia, Hypokalemia

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INTRODUCTION

Balanced diet and optimal nutrition is required for normal body growth and development. Nutritional deficiencies, referred to as malnutrition, are common problems found in pediatric age group in the developing countries especially under five years of age.¹ Malnutrition (under nutrition) involve protein and energy (macronutrients) or vitamins and/or minerals (micronutrients). Protein energy malnutrition (PEM) is a disorder of macronutrients whereby the body fails to access adequate energy and protein needed for normal growth and development.³ Approximately 10.6 million children die before the age of five years each year. A major portion i.e. seven out of ten of these deaths is constituted by diarrhea, pneumonia, measles, malaria or malnutrition.⁴ Malnutrition may occur in children with dietary history revealing marked deficiency in the amount and/or quality of food intake.⁵ Several conditions and predisposing factors are responsible for malnutrition in children under five years of age including premature birth or low birth weight, lack of breastfeeding, twin birth; chronic diarrhea, pneumonia

and tuberculosis, HIV infection, malignancies and parental death^{6, 7}. World health organization (WHO) has designed guidelines for malnourished children and if followed can lead to survival of children with protein energy malnutrition. The deaths reduced to almost half of previously happening i.e. from 40% to 20% when WHO guidelines were followed including special feeds day and night, use of proper antibiotics, taking care of electrolytes, avoiding intravenous fluids administration except in shock, and also avoiding diuretics for edema^{8, 9}. The electrolytes including sodium and potassium are essential for human health and are extremely important required for human body and are responsible for a lot of physiologic and pathophysiologic processes of the body¹⁰.

Multiple alterations occur in body composition including loss of heart and skeletal muscle mass, and is further complicated by electrolyte abnormalities and mineral or vitamin deficiencies; with further fatal complications, including hypotension, cardiac arrhythmias, cardiomyopathy, cardiac failure and even sudden death¹¹. PEM-related diarrhea is another major problem responsible for morbidity and mortality in children under five years of age. Approximately 500 million children suffer from acute diarrhea each year and 5 million of these children die each year¹². In severe PEM risk factor for fatal diarrhea includes hypokalemia and metabolic acidosis as intracellular sodium ion retention occurs in PEM. The increase in intracellular Na^+ and decrease in K^+ may affect the function of important enzymes of carbohydrate metabolism and oxidative phosphorylation adversely^{13,14,15}.

¹. Department of Pediatrics / Pathology², HMC / KGMC, Peshawar.

Correspondence: Dr Arshia Munir, Assistant Professor of Pediatric, B Unit, MTI KTH/KMC, Peshawar.

Contact No: 03333 9343865

Email: drarshia@yahoo.com

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The purpose of this study to identify the prevalence of hypokalemia and hyponatremia in children up to the age of five years of age presenting with protein energy malnutrition.

MATERIALS AND METHODS

This Descriptive cross-sectional study was conducted at the department of pediatrics PGMI Lady Reading Hospital, Peshawar from August 2015 to February 2016. Consecutive (non probability) sampling technique was used for all those pediatric patient who visited the tertiary level hospital and diagnosed as Protein Energy Malnutrition (Marasmus, Kwashiorkor and Marasmus-Kwashiorkor) with age group 6 months to 5 years were included in the study. Patients with history of intravenous fluid administration in the last week, diagnosed as malabsorption on medical record and having renal disorder were excluded from the study.

The study was carried after approval from hospital ethical and research committee. The attendants of all children fulfilling the inclusion criteria were explained the purpose of the study and informed consent were taken in all cases. The bio-data of all patients was entered on proforma. All PEM patients with or without diarrhea were included in the study. In all cases detailed history was taken from the attendants and detailed examination was also done on all patients. A blood sample of 5 cc was taken from all cases under aseptic technique and immediately sent to hospital laboratory for measuring serum sodium and potassium level to detect hyponatremia and hypokalemia. The investigations were carried out by one expert pathologist. The patients result was documented on the proforma and patients were treated on ward protocol. Exclusion criteria were strictly followed to control confounders and bias.

Data Analysis: The data was analyzed by SPSS version 20. In case of numerical variables like age, serum sodium and potassium; mean $\pm$ SD was calculated; while for categorical variables like gender, type of PEM and status of diarrhea frequencies and percentages were calculated. Hyponatremia and hypokalemia were stratified among age, gender, type of PEM and status of the diarrhea to see the effect modifications. All results were presented in table form.

RESULTS

A total of 109 children with protein energy malnutrition were included in the study. There were 53(48.62%) male children and 56 (51.3%) female children with male to female ration of 0.94:1. Average age of the patients was 27.23 ± 15.59 SD with range of 5-60 months. The patient's age was divided into four groups with highest prevalence of PEM in age group ≤ 15 months as documented in table 1. The most common type of PEM in our study was kwashiorkor which

constituted about 42 (38.53%) followed by marasmus 37 (33.94%) and marasmic kwashiorkor 30 (27.52%) as shown in table 2. Hypokalemia was observed in 38 (34.9%) cases while hyponatremia in 44 (40.4%) cases as given in table 3.

Table No.1: Age wise distribution of PEM

Age Group	Frequency of PEM	Percentages
≤ 15 months	36	33
16-30 months	30	27.5
31-45 months	26	23.9
46-60 months	17	15.6

Table No.2: Type of Protein Energy Malnutrition in children ≤ 5 years of age

Type of PEM	Number	Percentages
Kwashiorkor	42	38.53
Marasmus	37	33.94
Marasmic-Kwashiorkor	30	27.52

Table No.3: Incidence of Hypokalemia and Hyponatremia in children with PEM

Type of Disorder	Number	Frequency
Hypokalemia		
Yes	38	34.9 %
No	71	65.1 %
Hyponatremia		
Yes	44	40.4 %
No	65	59.6 %

Table 4: Age wise distribution of hypokalemia and hyponatremia in children with pem

Age Group	Hypokalemia		Hyponatremia	
	Yes	No	Yes	No
≤ 15 months	9 (13%)	27 (75%)	13 (36.1%)	23 (53.9%)
15-30 months	25 (43.3%)	17 56.7%	11 36.7%	19 63.3%
41-45 months	10 (38.5%)	16 (61.5%)	10 (38.5%)	16 (61.5%)
46-60 months	6 (35.3%)	11 (64.7%)	10 (58.8%)	7 (41.2%)
p- value	0.451	0.451	0.409	0.409

Table No.5: Gender-wise distribution of hypokalemia and hyponatremia in children with pem

Gender	Hypokalemia		Hyponatremia	
	Yes	No	Yes	No
Male	16 (14.7%)	37 (33.9%)	26 (22.0%)	29 (26.6%)
Female	22 (20.2%)	34 (32.2%)	20 (18.3%)	36 (33.0%)
p-value	0.319	0.319	0.309	0.309

The incidence of hypokalemia and hyponatremia varied in different age groups. The details have been given in table 4. Hypokalemia was found in 14.7% of male patients and 20.2% of female patients while

hyponatremia was found in 22.0% of male and 18.3 % of female patients as shown in table 5. There was insignificant role of diarrhea and type of PEM on hypokalemia and hyponatremia.

DISCUSSION

Under five mortality is quite high and each year 10.6 million children die and do not reach their 5th birthday celebration. Seven out of ten die because of pneumonia, diarrhea, malaria, measles and malnutrition¹⁶. Malnutrition play an important role in under five children morbidity and mortality as these children can't cope with the pneumonia and diarrheal episode because of their low immunity. Severe acute malnutrition in an important condition which can be prevented and treated easily and thus under five mortality and morbidity can be easily decreased in this age group¹⁷. One of the study showed that out of sixty malnourished children seven suffered from septic showed. Out of these seven children, three malnourished children died. But shock was also associated by other co-morbid conditions including hypothermia, hypoglycemia, severe anemia, hyponatremia and hypokalemia¹⁸. Bronchopneumonia was also associated and close association has been established between malnutrition and infection^{19,20}.

In our study we found that there is definite association between malnutrition and electrolyte disturbance. We found both hyponatremia and hypokalemia in our study. Almost similar results have been given by a study done at Nepal. In this retrospective study they found that hyponatremia was present in 56% of study population while hypokalemia was present in 46% of cases. In another prospective study conducted in Nigeria where the study population age was up to fifteen years, they found hypokalemia incidence was 23.4% in their study population while hyponatremia was present in 13% of the patients^{21,22}.

Hypokalemia can alter all major body systems function but most commonly cause flaccid paralysis of muscles in the body^{23,24}. Though hypokalemia is subclinical in children with protein energy malnutrition but become clinical and prominent if these children suffer from diarrheal disease episodes. In our study population we found that hypokalemia is significantly present in children with PEM but the condition became prominent and clinical in patients suffering from diarrheal diseases. An other study documented that diarrheal episodes in PEM not only signify hypokalemia but also hyponatremia²⁵. Almost similar results were given in a study conducted in Egypt²⁶.

Wakwe VC et al found a significant decline in serum potassium level (p value <0.001) in patients with protein energy malnutrition cases compared to control group²⁷. The prognosis association with the type on electrolyte imbalance was different in different studies. Garrow JS et al found poor prognosis associated with hyponatremia in patients with PEM²⁸, while the results

given by Mittal et al²⁹ in their study found otherwise results to the study results of Garrow JS et al²⁸.

CONCLUSION

Both hypokalemia and hyponatremia are highly associated in children with protein energy malnutrition. The clinical must evaluate the biochemical abnormalities very cleverly while dealing with patients of PEM

Recommendation: We recommend more clinical trials with larger sample sizes to clarify role of potassium and sodium in dealing and treating patients with protein energy malnutrition.

Author's Contribution:

Concept & Design of Study:	Arshia Munir
Drafting:	Muhammad Ibrahim
Data Analysis:	Ashraf Khan, Kalimullah Khan
Revisiting Critically:	Arshia Munir, Muhammad Ibrahim
Final Approval of version:	Arshia Munir

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Diagnostic Accuracy of Appendicitis Taking Histopathology as Gold Standard

Usman Asif¹, Anam Zahira¹, Haris Nasrullah² and Suleman Asif¹

ABSTRACT

Objective: To fix diagnostic accuracy Appendicitis score for diagnosis of acute appendicitis (AA) taking histopathology as gold standard.

Study Design: Interventional (clinical trial) study

Place and Duration of Study: This study was conducted at the Emergency Department of Ganga Ram Hospital, Lahore from 1st July 2016 to 31st December, 2016.

Materials and Methods: 315 patients fulfilling inclusion criteria. Their basic demographic information like name, sex, age and contact details was obtained after taking an informed consent from patients or attendants. Appendicitis score was calculated as per operational definition. The decision of appendicitis was taken by a single consultant to minimize bias. After operation / appendectomy, the resected material / appendix was sent for final diagnosis to histopathology Lab of the hospital. Then diagnosis on appendicitis and histopathology was compared to calculate diagnostic accuracy of appendicitis.

Results: The mean age of patients was 34.42 ± 9.43 years with age range of 18-60 years. There were 179(56.8%) male and 136(43.2%) female patients in this study, the male to female ratio was 1.31:1. Sensitivity, specificity, Positive Predictive Value and Negative Predictive Value of appendicitis score keeping histopathology as gold standard was 96.68%, 90.91%, 98.5% and 81.63% respectively. The overall diagnostic accuracy of appendicitis score was 95.87%.

Conclusion: The sensitivity, specificity, Positive Predictive Value, Negative Predictive Value and overall diagnostic accuracy of appendicitis keeping histopathology as gold standard is high making it reliable and easier diagnostic tool.

Key Words: Appendix, surgery, histopathology, scoring system, Alvarado

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INTRODUCTION

Acute appendicitis (AA) is highly prevalent condition needing surgery in any emergency department.^{1,2} According to a local study over all prevalence of AA was found 8% in patients with acute abdominal pain.³ AA is commonly diagnosed on clinical presentation based on patient presenting history, laboratory testing and on physical examination.^{4,5} A negative appendectomy rate is also high prevalent with rate of 15-34%.⁶ Radiological diagnosis such as ultrasound technique has been widely used for the diagnosis of acute appendicitis⁷ while CT has 100% sensitivity and specificity for diagnosis of acute appendicitis.⁴ But both ultrasound and CT are operator dependent so results are influenced by the radiologists.⁷ On the other hand simple scoring systems are available such as Alvarado score that is the most widely used scoring system for early diagnosis of acute appendicitis.

¹. Department of Surgery, Ganga Ram Hospital, Lahore.

². Department of Surgery, Jinnah Hospital, Lahore.

Correspondence: Dr. Suleman Asif, Registrar/Medical Officer
Surgical Unit II, Ganga Hospital, Lahore.

Contact No: 0334-4165029

Email: suleman_esif6@yahoo.com

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The scoring system can diagnose by giving one point each for migratory right iliac fossa pain, nausea, anorexia and vomiting, fever, rebound tenderness, shift to left(segmented neutrophils) and two points to each for, leukocytosis and right iliac fossa tenderness with a total score of 10 points.⁶

Like Alvarado another simple score is available i.e. The Appendicitis score is a novel diagnostic score that was developed for diagnosis of acute appendicitis.^{2,8-10} Nanjundaiah N et al⁹ in 2014 reported that Sensitivity = 96.2% Specificity = 90.5% at cut of value 7.5 for RIPASA score. Chong C et al² in 2010 published that sensitivity was 88.46% and specificity was 66.67% at same cut of value i.e. at 7.5.

The rationale of this study is to determine diagnostic accuracy of appendicitis for our local population. Although data is available but there are inconsistent statistics regarding specificity of appendicitis i.e. 66.67%-90.5%⁵. If we get higher diagnostic accuracy of appendicitis then in future we can recommend appendicitis for diagnosis of AA. So that negative appendectomy can be minimized in future.

MATERIALS AND METHODS

This Interventional (clinical trial) study comprised 315 patients form Emergency Department of Ganga Ram

Hospital, Lahore from 1st July 2016 to 31st December, 2016- fulfilling inclusion criteria. Their basic demographic information like name, sex, age and contact details was obtained after taking an informed consent from patients or attendants. appendicitis score was calculated as per operational definition. The opinion of appendicitis was decided by a single consultant to minimize bias. After operation / appendicectomy, the resected material / appendix was sent for final diagnosis to histopathology Lab of the hospital. Then diagnosis on appendicitis and histopathology was compared to calculate diagnostic accuracy of appendicitis.

The collected data analyzed using SPSS version 20. Categorical data like gender and diagnosis of AA on appendicitis and histopathology (as per operational definition) was presented as frequency and percentages. Quantitative variables like age of patients, appendicitis score and duration of pain was presented in form of mean $\pm$ S.D. 2 x 2 table was generated for diagnosis of appendicitis and histopathology to calculate diagnostic accuracy (as per given below). Data was stratified for age, gender, duration of pain and obesity to address effect modifiers. 2x2 table was calculated to see significance of these effects modifiers.

RESULTS

The mean age of patients was 34.42 ± 9.43 years with age range of 18-60 years. There were 179(56.8%) male and 136(43.2%) female patients in this study, the male to female ratio was 1.31:1. The mean duration of pain among the patients was 4.46 ± 3.50 days with minimum and maximum duration of 1 and 7 days respectively. According to duration of pain there 80 (25.4%) cases who had 1-3 days of duration and rests of 235 (74.6%) of the cases had 4-7 days of pain. There were 81 (25.3%) obese and 234 (74.7%) non-obese patients in our study. The mean RIPASA score among the patients was 11.90 ± 4.51 with minimum and maximum score of 1 and 17.50 days respectively. Among all, 266 (84.4%) patients had RIPASA score of >7.5 and 49 (15.6%) had score of ≤ 7.5 . The histopathological findings showed positive result in 271 (86.0%) and negative in 44 (14.0%) patients (Table-1).

The sensitivity, specificity, positive predictive value and negative predictive value of appendicitis score keeping histopathology as gold standard was 96.68%, 90.91%, 98.5% and 81.63% respectively (Table 2).

The overall diagnostic accuracy of appendicitis score was 95.87% (Table 3). The sensitivity, specificity, PPV and NPV were almost same among young and older age group and both genders (Tables 4-6).

For lesser duration of pain (1-3 days) these measures were 100% while for duration of pain 4-7 days these measures were 95.57%, 87.5%, 97.98% and 75.68% respectively (Table-6). Similarly, the measures of

diagnostic accuracy were greater for obese patients compared to non-obese patients.

Table No.1: Frequency of histopathological findings (n=315)

Histopathological findings	No.	%
Positive	271	86.0
Negative	44	14.0

Table No.2: Comparison of RIPASA score and histopathology findings

RIPASA	Histopathology		Total
	Positive	Negative	
> 7.5	262	4	266
≤ 7.5	9	40	49
Total	271	44	315
Sensitivity			96.68%
Specificity			90.91%
Positive predictive value			98.5%
Negative predictive value			81.63%
Diagnostic accuracy			95.87%

Table No.3: Comparison of RIPASA score and histopathology findings with age stratification

RIPASA score	Histopathology		Total
	Positive	Negative	
Age 18-39 years			
> 7.5	186	4	190
≤ 7.5	6	29	35
Age 40-50 years			
> 7.5	76	-	76
≤ 7.5	3	11	14
		Age (years)	
		18-39	40-69
Sensitivity		96.88%	96.2%
Specificity		87.88%	100%
Positive Predictive Value		97.89%	100%
Negative Predictive Value		82.86%	78.57%
Diagnostic Accuracy		95.56%	96.67%

Table No.4: Comparison of RIPASA score and histopathology findings with gender stratification

RIPASA score	Histopathology		Total
	Positive	Negative	
Male			
> 7.5	150	2	152
≤ 7.5	6	21	27
Female			
> 7.5	112	2	114
≤ 7.5	3	19	22
		Gender	
		Male	Female
Sensitivity		96.15%	97.39%
Specificity		91.3%	90.48%
Positive Predictive Value		98.68%	98.25%
Negative Predictive Value		77.78%	86.36%
Diagnostic Accuracy		95.53%	96.32%

Table No.5: Comparison of RIPASA score and histopathology findings with duration of pain as stratification

Duration of pain (days)			Histopathology		Total
			Positive	Negative	
1-3	RIPASA	> 7.5	68	0	68
		≤ 7.5	0	12	12
4-7	RIPASA	> 7.5	194	4	198
		≤ 7.5	9	28	37
				Duration of pain	
				1-3 days	4-7 days
Sensitivity				100%	95.57%
Specificity				100%	87.5%
Positive Predictive Value				100%	97.98%
Negative Predictive Value				100%	75.68%
Diagnostic Accuracy				100%	94.47%

Table No.6: Comparison of RIPASA score and histopathology findings with obesity stratification

Obesity			Histopathology		Total
			Positive	Negative	
Obese	RIPASA	> 7.5	68	1	69
		≤ 7.5	1	11	12
Non-obese	RIPASA	> 7.5	194	3	197
		≤ 7.5	8	29	37
			BMI		
			Obese	Non-obese	
Sensitivity			98.55%	96.04%	
Specificity			91.67%	90.63%	
Positive Predictive Value			98.55%	98.48%	
Negative Predictive Value			91.67%	78.38%	
Diagnostic Accuracy			97.53%	95.3%	

DISCUSSION

Acute appendicitis is a common surgical emergencies, with a prevalence rate of about one in seven as described by Stephens P.¹⁴ The prevalence of this problem has been reported to be around 13-77%. Egyptian mummy of the Byzantine era displays sticking in right lower quadrant indicative of old appendicitis as reported by Shrivastava et al.¹⁶ Patients typically experience the typical relocation of pain to the right lower quadrant of the abdomen. Later, a worsening pain along with vomiting, nausea, and anorexia are labeled by the patient.¹⁷

It is difficult diagnosis mainly amongst the early, the ageing and females of reproductive age, where a host of other genitourinary and gynecological inflammatory conditions can exist (Gilmore).¹⁸

The appendicitis score has shown greater diagnostic accuracy than that reported for the Alvarado or Modified Alvarado scores.¹⁷

The mean age of patients in our study was 34.42 ± 9.43 years with age range of 18-60 years. There were 179 (56.8%) male and 136 (43.2%) female with male to female ratio of 1.31:1. The mean duration of pain among the patients was 4.46 ± 3.50 days with minimum and maximum duration of 1 and 7 days respectively. There were 81 (25.3%) obese and 234 (74.7%) non-obese patients in our study. In study by Khadda S. et. al., maximum number of patients were males (83) while maximum patients were in age group <30 (n=93). Mean age in females was 30.49 ± 15.68 while mean age in males was 28.65 ± 11.73 .¹⁷

Khadda et al., reported that among patients assessed for appendicitis score 55.3% were males and 44.7% were females. Out of total 150 patients 50 patients scored 5-7 appendicitis score, 71 patients scored 7.5-11.5 appendicitis score while 29 patients scored >11.5 appendicitis score. In our study, mean appendicitis score among the patients was 11.90 ± 4.51 with minimum and maximum score of 1 and 17.50 days respectively. Among all, 266 (84.4%) patients had appendicitis score of >7.5 and 49 (15.6%) had score of ≤7.5. The histopathological findings showed positive result in 271 (86.0%) and negative in 44 (14.0%) patients. The diagnosis of appendicitis score keeping histopathology as gold standard was 96.68%, 90.91%, 98.5% and 81.63% respectively. The overall diagnostic accuracy of appendicitis score was 95.87%. The mean age of the patients (92 male, 100 female) was 25.1 ± 12.7 years, which is moderately lesser than observed in our study. At the optimum cut-off edge score of 7.5 derived from the ROC, diagnostic accuracy of the RIPASA score were 98.0 percent, 81.3 percent, 85.3 percent, 97.4 percent and 91.8 percent.¹³

The study conducted by Erdem et. al., of the 113 patients (62 males, 51 females), the mean age was 30.2 ± 10.1 (range 18 to 67) years. The diagnostic accuracy of appendicitis was 100% and 28%, and negative appendectomy rate was 25%. When a cut-off value for the RIPASA system was set at 10.25, its sensitivity was 83.1%.¹⁹ Nanjundaiah et al reported diagnostic accuracy of appendicitis was 96.2% and 90.5% respectively.¹⁹

A Pakistani study with similar objectives. true positive were 147, false positive 8, false negative 5, and true negative 107. Sensitivity of appendicitis score was 96.7%, specificity 93.0%,¹² Conclusively, the diagnosis of acute appendicitis remains to be multifactorial.

CONCLUSION

The sensitivity, specificity, Positive Predictive Value, Negative Predictive Value and overall diagnostic accuracy of appendicitis keeping histopathology as gold standard is high making it reliable and easier diagnostic tool.

Author's Contribution:

Concept & Design of Study: Usman Asif
 Drafting: Anam Zahira
 Data Analysis: Haris Nasrullah,
 Suleman Asif
 Revisiting Critically: Usman Asif, Anam
 Zahira
 Final Approval of version: Usman Asif

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Outcome of Fixation of Displaced and Unstable 3-part Greater Tuberosity Fractures of Proximal Humerus by using PHILOS Plate

Outcome of Fractures of Proximal Humerus by using PHILOS Plate

Zulfiqar Ahmed, Muhammad Nasir Ali and Zirwa Nasir

ABSTRACT

Objective: To evaluate the outcome of fixation of displaced and unstable 3-part greater tuberosity fractures of proximal humerus by using PHILOS plate

Study Design: Prospective case series study

Place and Duration of Study: This study was conducted at the Orthopedic Complex, QAMC/B.V. Hospital, Bahawalpur from March 2017 to March 2018.

Materials and Methods: 30 patients (27 males and 3 females), age range 25 to 60 years having closed 3-part greater tuberosity fracture of proximal humerus (according to Neer's classification) were operated by using PHILOS plate and screws. Postoperative follow up evaluation was done for six months by Constant Scoring System for shoulder.

Results: Of the 30 patients operated all fractures healed satisfactorily except 3 patients who developed varus mal-union. Four patients (13.3%) felt mild pain with elevation of arm beyond 90 degrees while sub-acromial impingement was noted in 5(16.6%) patients. Overall functional outcome according to Constant Scoring system at six months follow up was excellent in 18 (60%) patients, good in 6 (20%) patients and moderate in remaining 6 (20%) patients.

Conclusion: The PHILOS plate system is a good option for the treatment of 3-part greater tuberosity fractures of the proximal humerus and especially reliable device in case of the associated osteoporosis and poor bone stock

Key Words: Three-part proximal humerus fracture, PHILOS plate

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INTRODUCTION

The incidence of proximal humerus fractures is about 5 to 7% of all fractures¹. These fractures involve both young and old age people but are more common in elderly². The mode of injury in young people is usually high energy trauma but in old age group these fractures occur mostly due to low energy trauma like fall from standing over the out-stretched hand³. A large number of these fractures (about 80%) are stable with no or minimal displacement and can be managed non-operatively^{4,5} with satisfactory or good outcome. In case of displaced and unstable fractures surgery usually becomes necessary⁶. Various surgical methods have been described in literature including closed reduction and percutaneous pinning^{7,8,9}, open reduction and internal fixation with K-wires, screws, rush pins,

tension band wiring¹⁰, trans-osseous sutures¹¹, conventional plates^{12,13,14,15}, locking plates^{16,17,18}, intramedullary nails¹⁹ and hemi-arthroplasty^{20,21} as per indications on case to case basis.

Displaced and unstable 2-part surgical neck fractures, 3-part tuberosity and surgical neck fractures or 4-part fractures according to Neer's classification of proximal humerus fractures in patients having additional problem of primary or secondary osteoporosis pose special challenge to the treating surgeon regarding the maintenance of the reduction of the fracture fragments by conventional non-locking or non-angle stable devices resulting in poor prognosis and high rate of post-operative loss of reduction and mal-union or non-union. Internal fixation in these categories of patients with locking plate and screw system devices presents the solution of these problems of loss of reduction, non-union or mal-union. Additional advantage of use of the angle stable locking devices is that the post-operative range of motion exercises can be started early with expedited and better rehabilitation results²². One such implant system is the PHILOS (proximal humerus internal locking system) which works as internal fixator which provides better anchorage of screws in osteoporotic bone^{23,24} and good functional outcome^{25,26}. Our study was aimed to evaluate the outcome of the fracture fixation in the patients having unstable 3-part

¹. Department of Orthopedic Complex, QAMC / Bahawal Victoria Hospital, Bahawalpur.

Correspondence: Zulfiqar Ahmed, Assistant Professor, Orthopedic Complex, QAMC/Bahawal Victoria Hospital, Bahawalpur.

Contact No: 0300-9683382

Email: drzulfiqarahmednasir@gmail.com

greater tuberosity fracture by use of this (PHILOS) locking device system in terms of fracture union, functional outcome and post-operative complications.

MATERIALS AND METHODS

This was a prospective case series study done at Orthopaedic Complex, Quaid-e-Azam medical college/ Bahawal Victoria Hospital, Bahawalpur from March 2017 to March 2018. 30 patients having 3-part greater tuberosity fracture of proximal humerus based on Neer's classification were operated by using PHILOS plate application. 27 were males and 3 were females. 12 patients were operated on right side and 18 were operated on left side (Table-1). Age range was 25 to 60 years. All patients having closed fracture with duration history of up to two weeks in the adult, middle and old age group and fit for anesthesia were included in the study while patients having pathological or open fractures or with previous surgery over the shoulder and all paediatric patients with open growth plate or those unfit for anesthesia were excluded. All patients were operated under general anesthesia and in supine or beach-chair position. Delto-pectoral approach was used for all patients. Fracture fragments were provisionally reduced with the help of sutures and 'K' wires and pre-contoured PHILOS plate and screws were applied over the proximal fragment. Then the distal fragment was reduced and locking screws were applied over the distal fragment. C-arm image intensifier was used to check the position of plate and screws and any unwanted intra-articular placement of screws. Wound was closed over the drain and dressed. The arm was placed in a sling. Post-operatively the passive movements over the shoulder were started during the first week as tolerated by the patient regarding pain. Stiches were removed at two weeks and active range of motion started at six weeks along with radiological evaluation. Subsequently the patients were followed up at 12 weeks and six months for clinical and radiological evaluation. Clinical evaluation was done according to the Constant Scoring System for shoulder. The Constant scores of 86 to 100 were considered as excellent, 71 to 85 as good, 56 to 70 as moderate while those in zero to 55 range were considered as poor.

RESULTS

Post-operatively the patients were followed up for a period of six months. No patient was lost to follow up. Results were evaluated on the basis of functional and radiological outcome as well on post-operative complications. All fractures healed satisfactorily except three patients in which varus mal-union occurred (Table-2). Shoulder range of movements was excellent in 18 (60%) patients, good in 7 (23%) patients and moderate in 5 (16.6%) patients (Table-3).

No patients developed post-operative infection, axillary nerve palsy, fixation failure or avascular necrosis of

humeral head. However four (13.3%) patients felt mild pain with elevation (abduction) of arm beyond 90 degree and sub-acromial impingement was reported by 5(16.6%) patients. Overall functional outcome according to Constant Scoring System was excellent in 18(60%) patients, good in 06(20%) patients and moderate in remaining 06(20%) patients (Table-4).

Table No.1: Demographic Data

Total Number of Patients	30
Male	27
Female	03
Right Sided Injury	12
Left Sided Injury	18

Table No.2: Radiological Results

Total Number of Patients	30
Normal Radiological Healing	27
Malunion	03
Non-union	00

Table No.3: Shoulder Range of Movements

Total Number of Patients	30
Excellent	18 (60%)
Good	07 (23.3%)
Moderate	05 (16.6%)

Table No.4: Functional Outcome (According to Constant Score)

Total Number of Patients	30
Excellent	18 (60%)
Good	06 (20%)
Moderate	06 (20%)
Poor	00



Figure No.1: Pre-operative



Figure No.2: Post-operative

DISCUSSION

The unique osteology and muscle attachment over the proximal humerus leads to the specific fracture patterns and demands special considerations for the choice of technique for a particular fracture type. In case of comminution every part of the fracture components has its specific importance regarding the restoration of the pre-injury functional status. Comminuted fractures of the proximal humerus especially when associated with the osteoporosis and poor bone stock remain at risk of re-displacement of fracture fragments, implant loosening and failure of fixation when treated with conventional non-locking technology devices or implants. Worth mentioning in this regard is the AO T-plate and screws which has been associated with high rate of implant loosening, sub-acromial impingement, poor prognosis and patient dis-satisfaction especially in osteoporotic patients^{12,13,14,15}. Among other techniques the minimally invasive methods may lead to increased risk of neurovascular structural damage^{27, 28}, the suture wires may lead to cut through and failure while the blade plate fixation technique has a high risk of perforation through the humeral head into the shoulder joint²⁹. Intramedullary nailing is also not a good choice for the 3-part greater tuberosity fractures due to the fracture over the entry site.

The PHILOS plate system addresses most of the problems associated with the 3-part fractures of the proximal humerus like reduction of the fracture fragments in anatomical position and prevention of the post-operative re-displacement especially in osteoporotic patients due to the special design and locking nature of the screws with provision of the advantage of angular stability.

In a study for fixation of 3-part fractures of proximal humerus with PHILOS plate by Martinez et al³⁰ the Constant Scoring System yielded excellent results in 21% patients, good in 64% patients and moderate in 15% patients along with sub-acromial impingement noted in 03(09%) patients while in another similar study by Vijay Sharma et al³¹ the excellent results were found in 57.1% patients, good in 14.2% patients, moderate in 28.7% patients and sub-acromial impingement reported in 01(0.07%) patient. In our study of the 30 patients the excellent results were noted in 18(60%) patients, good in 06(20%) patients, and moderate in remaining 06(20%)(Table-4). Sub-acromial impingement was noted in 05(16.6%) patients while mild pain reported by 04(13.3%) patients. All fracture united within 12 weeks period. Almost all of the patients were satisfied with the functional outcome.

However our study was limited to one specific fracture type group and further studies are needed for evaluation and comparison of the results of the PHILOS plate system technique in other fracture types like 2-part and especially 4-part fractures according to Neer's

classification of proximal humerus fractures and also other categories like open fractures or associated injuries or co-morbidities.

CONCLUSION

According to the results obtained in our study the PHILOS plate system yielded good to excellent results in most of the patients, so this is a good option for the treatment of 3-part greater tuberosity fractures of the proximal humerus and especially reliable device in case of the associated osteoporosis and poor bone stock.

Author's Contribution:

Concept & Design of Study:	Zulfiqar Ahmed
Drafting:	Muhammad Nasir Ali
Data Analysis:	Zirwa Nasir
Revisiting Critically:	Zulfiqar Ahmed, Muhammad Nasir Ali
Final Approval of version:	Zulfiqar Ahmed

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Quality of Root Canal Therapy (RCT) Performed by the Undergraduate Students at the Qassim University, Kingdom of Saudi Arabia (KSA)

Eman Abdulaziz Alhablain¹, Durr-e-Sadaf², Muhammad Zubair Ahmad³ and Banan Sulaman Alqanass¹

ABSTRACT

Objective: To evaluate the technical quality of root canal therapy using periapical digital radiographs performed by undergraduate dental students at the Qassim University College of Dentistry, Kingdom of Saudi Arabia.

Study Design: Retrospective study

Place and Duration of Study: This study was conducted at the college of Dentistry, Qassim University, Saudi Arabia from 2014-2017.

Materials and Methods: Digital periapical radiographs of endodontically treated teeth were collected to examine the parameters (length, density and taper) of root filling. The length of the root canal filling (RCF) was categorized as adequate, overfilled, and short to the radiographic apex. Density and tapering of the filling based on voids and uniform tapering from the orifice to the apex. Chi-square test was used to determine association between different variables. (tooth type, gender and year of student).

Results: The length of root canals fillings was acceptable in 89.6% (n=361) teeth. The poor density and tapering of RCF were more frequently found in premolars 26.1%, 22.8% respectively than molars and anterior teeth. The acceptable density of RCF was more in 5th year students and male students. The poor taper was significant in RCF performed by 4th-year students as compared to the 5th-year students ($P = 0.013$).

Conclusion: The radiographic quality of the root canal therapy performed by undergraduate students in the College of Dentistry, Qassim University has been found acceptable. However, there is a need to update the techniques of RCT at preclinical and clinical levels.

Key Words: Radiographic evaluation, root canal treatment, undergraduate students, digital radiography, technical quality.

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INTRODUCTION

According to European Society of Endodontology, the graduating students should be able to perform satisfactory nonsurgical RCT on single and multi-rooted teeth.⁽¹⁾ It has been found that standard and quality of RCT performed by general practitioners is poor. (2) One of the reasons for poor quality treatment in general practice may be inadequate clinical and preclinical training of under-graduate students.⁽³⁾

¹. Department of Dental Interim / Conservative Dentistry², College of Dentistry, Qassim University, Saudi Arabia.

¹. Department of Restorative Dental Sciences, Alrass Dental College, Qassim University, Saudi Arabia

Correspondence: Muhammad Zubair Ahmad, Assistant Professor, Department of Restorative Dental Sciences, Alrass Dental College, Qassim University, Saudi Arabia, Graduate reading, University of Oxford, UK.
Contact No: +966582527047
Email: m.muhammad@qu.edu.sa
Muhammad.ahmad@kellogg.ox.ac.uk

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There is a wide range between 13% -70% of good quality of endodontic therapy performed by undergraduate students.⁽⁴⁻⁷⁾

Several studies have shown that adequate root filling is associated with lower incidence of apical periodontitis,⁽⁸⁻¹⁰⁾ so this factor has to be taken into account for evaluating the success of root canal therapy. Radiographic evaluation of technical quality of root canal treatment is determined by a number of factors. It includes length, density and taper. Obturation length 0-2mm from the radiographic apex is considered acceptable. Obturation density is considered adequate if the root filling is homogenous with no visible voids within or between the filling and the root walls (Fig-1).⁽¹¹⁾

Many studies showed inadequate RCT performed by undergraduate students.⁽³⁻⁷⁾ The objective of this study was to evaluate technical quality of RCT performed by undergraduate students in the dental clinics of college of dentistry in the Qassim University, KSA. No such study has been done before in this setting. It will help to assess the adequacy of clinical skills of students in Endodontics.

MATERIALS AND METHODS

After the approval from Ethical Review Committee, 543 dental records including periapical radiographs of patients treated by 4th year and 5th year students were retrieved during the academic period of 2014-2017. Radiographs with poor quality, incomplete data of the patients, patients under 18 years of age, Teeth with no coronal restoration were excluded. Final sample was consisted of 403 periapical radiographs. Two senior endodontists (DS, MZA) evaluated the quality of radiographs. Twenty one periapical radiographs not included in the study were used to calibrate the examiners agreement. With regard to the evaluation of the root canal filling length, density and taper, inter-examiner reliability was determined by computing Cohen's Kappa value. The k-values were (0.88 and 0.84 and 0.60) respectively that was adequate and acceptable. After that, the radiographs were examined. The parameters used to assess radio graphical quality of root fillings are length, density and taper, previously described by Barrieshi-Nusair, Al-Omari⁽³⁾(Table-1). The data were entered into the computer in an MS Excel sheet and exported to SPSS 21 (Chicago, IL, USA) software.) for analysis purpose. Chi-square analysis was used to determine association of the technical quality of RCT with different variables e.g. tooth type, gender and year of student. *P* value of less than 0.05 was considered statistically significant at 95% confidence interval.

Table No.1: The criteria to record information from radiographs.

Variable	Criteria	Definition
Length of root canal filling	Acceptable	Root filling ending <2 mm short of radiographic apex.
	Over	Root filling ending beyond the radiographic apex.
	Under	Root filling ending >2 mm short of radiographic apex.
Density of root canal filling	Acceptable	Uniform density of root filling without voids and canal space is not visible.
	Poor	Not uniform density of root filling with clear presence of voids and canal space is visible.
Taper of root canal filling	Acceptable	Consistent taper from the coronal to the apical part of the filling, with good reflect to canal shape.
	Poor	Not consistent taper from the coronal to the apical part of the filling.

Table No.2: The length, density and taper by tooth type

Tooth Type	Total	Length			Density		Taper	
		Acceptable	Over	Under	Acceptable	Poor	Acceptable	Poor
Anterior	149 37.0%	129 [‡] 32.0%	13 3.2%	7 1.7%	65 [*] 16.1%	84 20.8%	79 [*] 19.6%	70 17.4%
Premolar	177 43.9%	160 39.7%	7 1.7%	10 2.5%	72 17.9%	105 26.1%	85 21.1%	92 22.8%
Molar	77 19.1%	72 17.9%	3 0.7%	2 0.5%	48 11.9%	29 7.2%	54 13.4%	23 5.7%
Total	403 100.0%	361 89.6%	23 5.7%	19 4.7%	185 45.9%	218 54.1%	218 54.1%	185 45.9%

* Statistical difference in density and taper between tooth type ($P > 0.05$)

‡ No statistical difference between tooth type and length of root filling ($P < 0.05$)

RESULTS

The root filling length was adequate in 361 (89.6%) of 403 teeth (Table 2). The majority of acceptable working length fillings were observed in premolars teeth 39.7%, whereas 3.2% were over extended in anterior teeth. The association between the tooth type and length was not statistically significant ($P > 0.05$). No voids were present in 72 (17.9 %) teeth. There was statistically significant association between density of the filling among the different tooth groups $P < 0.05$. The poor density and tapering of the root canal filling were more frequent in premolars than other teeth with 26.1%, 22.8% respectively. (Table 2).

Table 3 showed the quality of root fillings done by 4th and 5th year students in relation to anterior and premolar teeth. We exclude the molar teeth from the comparison because it was done by 5th year students only. Thus, the sample consist 150 teeth done by 4th year and 176 teeth by 5th year. However, the higher proportion of root fillings of acceptable length and lower proportion of root fillings of adequate density were observed for both 4th and 5th year students. No significant difference was observed for the length and density in 4th and 5th year students while there was significant difference in the taper. The poor taper ($P = 0.013$) was more prevalent in cases of the 4th-year students compared to the 5th-year students.

Table No.3: The length, density and taper of root canal fillings in relation to the student's level.

Student's level	Total	Length			density		taper	
		Acceptable	Over	Under	Acceptable	Poor	Acceptable	Poor
4 th year	150 46.0%	133 [‡] 40.8%	10 3.1%	7 2.1%	57* 17.5%	93 28.5%	65* 19.9%	85 26.1%
5 th year	176 54.0%	156 47.9%	10 3.1%	10 3.1%	80 24.5%	96 29.4%	99 30.4%	77 23.6%
Total	326 100.0%	289 88.7%	20 6.1%	17 5.2%	137 42.0%	189 58.0%	164 50.3%	162 49.7%

* Statistically significant difference in density and taper among 4th year and 5th year students (P=0.009). (P=0.001) respectively.

‡no significant difference in length between 4th year and 5th year students (P>0.05)

Table No.4: The length, density and taper of root fillings in male and female students

Student's gender	Total	Length			density		taper	
		Acceptable	Over	Under	Acceptable	Poor	Acceptable	Poor
Male	195 48.4%	174 [‡] 43.2%	11 2.7%	10 2.5%	99* 24.6%	96 23.8%	118* 29.3%	77 19.1%
Female	208 51.6%	187 46.4%	12 3.0%	9 2.2%	86 21.3%	122 30.3%	100 24.8%	108 26.8%
Total	403 100.0%	361 89.6%	23 5.7%	19 4.7%	185 45.9%	218 54.1%	218 54.1%	185 45.9%

• * Statistically significant difference in density and taper between male and female students (P=0.03). (P=0.008) respectively.

• ‡no significant difference in length between male and female students (P>0.05)

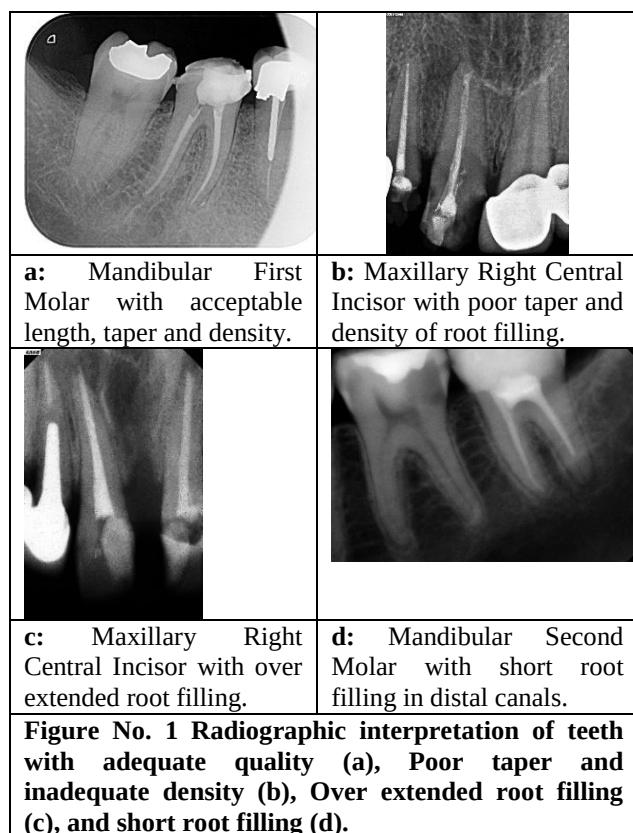


Figure No. 1 Radiographic interpretation of teeth with adequate quality (a), Poor taper and inadequate density (b), Over extended root filling (c), and short root filling (d).

Table 4 shows comparison between male and female students according to the quality of root fillings. Density and taper has been found better in RCF performed by male students. It showed significance association in the density (P = 0.03) and taper (P = 0.00) of RCF done by male and female students, but no

significant association existed in length of RCF done by male and female students, however overall percentage of acceptable length of RCF was more common in procedures done by female students (46.4%) than male students (43.2%).

DISCUSSION

Root canal therapy is one of the most important skill that students learn during their undergraduate course. The present study was conducted to assess the quality of root canal therapy performed by 4th year and 5th year students. Primarily three criteria, obturation length, density in terms of presence of voids and taper of the root filling were considered for evaluation. The root canal filling length is a much more reproducible quality parameter than others because it can be easily measured.⁽¹²⁾ In the present study, the percentage of root fillings with acceptable length was 89.6%. This percentage were superior when compared with other studies 61.3%, 67.4%, 73%, 75%.^(3, 13-15) This relatively high percentage may be the result of the fact that students use apex locator to estimate the working length along with the radiographs. Similar to some schools in Western Europe, Scandinavia and North America were routinely teaching the usage of electronic apex locators to aid in determination of working length.⁽¹⁶⁾

Radiographic density of root filling is one of the criteria used to estimate a potential defect of the root canal sealing.⁽¹⁷⁾ Inadequate density may lead to failure of RCT due to micro leakage along the root filling.⁽¹²⁾ Root fillings with homogenous mass of filling material and with no voids are strongly correlated with a lower

risk of post-treatment disease.⁽¹⁷⁾ Similarly Erisen & Bjertness stated that prevalence of apical periodontitis was higher in root filled teeth with poor densities.⁽¹⁸⁾ In this study, poor density in root canals (54.1%) had a higher percentage than other parameters. Poor density is an indication of lack of condensation of gutta percha. Obturation technique used by students in the Qassim university is cold lateral condensation.

Taper of the root filling is one of the most important factor considered for adequate quality of RCT. According to the European Society of Endodontology⁽¹⁾ the prepared root canal should be tapered from crown to apex. The importance of maintaining the original shape of a root canal during and after cleaning and shaping in order to promote periapical healing in endodontic cases has been demonstrated in several studies.⁽¹⁹⁾ The clinician's inability to maintain the original shape and to develop the proper taper of canals can result in procedural errors such as ledges and perforations. The taper of root canals is a more subjective criterion that may explain why only a few reports have been published on this matter.⁽³⁾ Adequate taper in this study has been observed in 54.1% of teeth. It was comparatively lower than the results of previous studies. Barrieshi-Nusair, Al-Omari^{(3), (4), (13)}

Our percentage of overall quality was 26.8% less than the reports from Turkey (33%), Jordan (50%), and Libya (53.9%), (3, 4, 20) but greater than reports from Saudi Arabia (23%) and Rafeek et al.(10.9%).^{(13), (21)} Although it is difficult to compare this finding with those of other studies because of the differences in outcome criteria used, sample sizes, and design. For example, when taper of the root canal filling was used as additional criteria for evaluation, the overall percentage of accepted root fillings was low.^{(13), (21)} The type of teeth examined has a great impact on the results. Lynch and Burke used only single-rooted teeth and reported overall 63% fillings were judge to be accepted.⁽²²⁾ Root canal procedures at the college of dentistry, Qassim University are done under supervision of endodontics faculty. The preclinical endodontic training is delivered to students in the fourth year for six months with one-hour lecture and three hours' preclinical lab per week. Extracted human teeth are used for practice. At the end of each semester, students are required to pass a written exam and practical exam for complete root canal treatment in order to progress to the course. Preclinical practice is held by specialists in endodontics at a 1:10 teacher-to student ratio, which is comparable to other colleges. In Reims (France), Turkey and Cork University this ratio was 1:11, 1:10 and 1:8, respectively.^(4, 6, 22) The students in our dental college use conventional manual techniques of root canal preparation (step-back & crown down) and cold lateral condensation technique for obturation. Studies have reported reduced errors during root canal treatment

when students used rotary NiTi instruments compared to using conventional stainless-steel instruments^(23, 24)

CONCLUSION

The radiographic quality of the root canal therapy performed by the undergraduate students in the College of Dentistry, Qassim University, Saudi Arabia, has been found comparable to other similar studies. However, there is need to improve curriculum and technical aspects of the endodontics in preclinical and clinical courses.

Recommendation: To enhance the clinical program of the undergraduates, changes can be incorporated in the preclinical program.

- Increase staff-student ratio in preclinical training sessions
- Crown down technique and thermo-plasticized obturation technique
- Training for rotary instrumentation of the root canal system

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Author's Contribution:

Concept & Design of Study:	Eman Abdulaziz Alhablain
Drafting:	Durr-e-Sadaf
Data Analysis:	Muhammad Zubair Ahmad, Banan Sulaman Alqanass
Revisiting Critically:	Durr-e-Sadaf
Final Approval of version:	Eman Abdulaziz Alhablain

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Epiphyseal Fusion of Radius and Ulna at Wrist Joint in Male and Female in the Population of Lahore – An Age Estimation Criterion

Age Estimation
in Epiphyseal
Fusion of Radius
and Ulna at
Wrist Joint

Syed Zia Uddin, Pervaiz Zarif and Naghmana Bashir

ABSTRACT

Objective: To ascertain the age of maturity from x-rays of wrist joint in the population of Lahore.

Study Design: Observational / cross sectional Study

Place and Duration of Study: This study was conducted at the Postgraduate Medical Institute/Ameer ud Din Medical College in the Department of Forensic Medicine & Toxicology Lahore General Hospital, Lahore from Jan-Dec 2017.

Materials and Methods: One hundred (100) patients reporting to radiology department of LGH between age group of 13 years to 21 years were included in this study, and these x-rays were reported by a radiologist of the hospital regarding the state of union of epiphysis of lower end of radius and ulna bones.

Results: Most of the people belong to Muslim religion (97%) of the total 100 reported to the General Hospital, Lahore. In females, age group of 13-15 years consisted 24% of the total cases in which 9 cases reported at stage II in which center appeared but no union found and 3 cases has early union. In age group 16-18 years, one case recorded in stage II and 9 cases were recorded at stage III in which early union appeared and 6 cases were recorded at stage IV in which complete union appeared in age group 19-21 years, only one case placed in stage III and 21 cases were placed in stage IV in which complete union was found. In males, age group of 13-15 years consisted 20% of the total cases in which 5 cases reported at stage II in which center appeared but no union found and 3 cases has early union. In age group 16-18 years, one case recorded in stage II and 11 cases were recorded in stage III in which early union appeared and 5 cases were recorded in stage IV in which complete union appeared and age group 19-21 years, 23 cases were placed at stage IV in which complete union found.

Conclusion: This study proved that x-rays of wrist joint can be used as an important tool for maturity assessment in the your of Lahore and it is consistent with the previous studies.

Key Words: Epiphyseal Fusion, Age Estimation, Radiology Department, Lahore General Hospital

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INTRODUCTION

Age certification has always been a challenging task for forensic experts. It is required to be ascertained in certain legal / judicial cases. Precise estimation of age without proper documentation is not a simple task. It requires expertise of many specialists like anthropology, odontology and radiology, so in a broader scene, “age assessment” refers to an attempt to establish an individual’s age including documentary evidence¹.

Maturity is not synonyms with calendar age, there are social, nutritional, racial and other biological variations. Females are almost always advance of males, maturity is also rapid in hotter climate².

Department of Forensic Medicine & Toxicology,
Postgraduate Medical Institute/ AMC, Lahore.

Correspondence: Dr. Syed Zia Uddin, Associate Professor & Head, Department of Forensic Medicine & Toxicology, Postgraduate Medical Institute/ AMC, Lahore.

Contact No: 0300-8450331, 0331-7336422

Email: syed_ziauddin@yahoo.com

Skeletal maturity is most widely used for age assessment³. This examination is universally used due to its simplicity and availability of multiple ossification centers for evaluation of maturity. The formation of bone tissue is called ossification which proceeds in a systematic and organized manner⁴.

Radiological examination of bone ends shows this process with accuracy till the ossification is completed in 22 years⁵. In dead bodies one can see the bone directly but in case of living it is not possible so x-rays are of much help⁶. The majority of current radiological standards are based upon Caucasian population. And growth standard deviation may be found in different nations which need more work⁷. The complete union of lower end of radius is seen in 100% boys at 20-21 years and is 100% in female at 19-20 years of complete union⁸.

The average age of fusion of lower end ulna in female is 15-16 years and 18-19 years in males⁹. Study of epiphyseal union of bones is law all over the world therefore it is necessary to follow the latest data

available for a particular place for estimation of age of the population of that place.

MATERIALS AND METHODS

It was a cross-sectional study conducted in 2017 in Department of Forensic Medicine & Toxicology, PGMI/AMC in Lahore General Hospital, Lahore forensic medicine department in collaboration with radiology department. The inclusion criteria comprised (1) individual of age from 13-21 years, both sex. Irrespective of socio-economic status. Person with congenital bone deformity fracture of wrist joint on steroid therapy and pregnant women were excluded. Patients were x-rayed for wrist joint after getting informed consent and age was assessed by some documentary evidences too. Sample size was 100 (50 of both sexes). These x-rays were reported by single Radiologist regarding state of epiphyseal fusion of lower end of radius and ulna and the data was analyzed.

RESULTS

These 100 subjects out of which male /female ration is 50/50 were x-rayed and the age range of 13-21 years for both sexes was strictly followed. 97% of the respondents were Muslims, 2% were Christian and one percent were from other religions. Occupation of the subjects were also recorded 2% were fine workers which are working in offices, 10% belongs to labourer category, 82% were student which was the highest numbers, 5% were house wives and 1% belonged to other occupations. Socio-economic status is also a major factor which was included in this research as 8% people belonged to upper class, 72% respondents were from middle class and 20% were from lower class.

Table No.1: Frequency of Ethnicity Variables among Study Subjects

		Frequency	%age
Religion	Muslims	97	97%
	Christians	2	2%
	Others	1	1%
Occupation	Fine Workers	2	2%
	Labourers	10	10%
	Students	82	82%
	House Wives	5	5%
	Others	1	1%
Socio-economic Status	Upper Class	8	8%
	Middle Class	72	72%
	Lower Class	20	20%
Mother Tongue	Punjabi	75	75%
	Urdu Speaking	16	16%
	Pashto	5	5%
	Saraiki	4	4%
	Others	0	0%

Different languages are being spoken in this country so mother tongue has also great importance in this region

and education level of the people is not so high also. That's why mother tongue is included in this study.

Table No.2: Frequency and extent of fusion of wrist joint in different age Groups in Females

Age Group (years)	Age	Stage I Center not	Stage II Center	Stage III Early Union	Stage IV Complete
13-15 Years (24%)	13	--	4	--	--
	14	--	3	--	--
	15	--	2	3	--
16-18 Years (32%)	16	--	1	3	--
	17	--	--	6	--
	18	--	--	--	6
19-21 Years (44%)	19	--	--	1	8
	20	--	--	--	7
	21	--	--	--	6

Table No.3: Frequency and extent of fusion of wrist joint in different age Groups in Males

Age Group (years)	Age	Stage I Center not	Stage II Center	Stage III Early	Stage IV Complete
13-15 Years (20%)	13	--	2	--	--
	14	--	4	--	--
	15	--	1	3	--
16-18 Years (34%)	16	--	1	5	--
	17	--	--	6	--
	18	--	--	--	5
19-21 Years (46%)	19	--	--	--	10
	20	--	--	--	8
	21	--	--	--	5

Table No.4: Frequency of Complete Union Versus Age

Age Group (years)	Age	Total No. of Cases (%age)	Total No. of cases in males (%age)	Total No. of cases in females (%age)
13-15 Years	13	--	--	--
	14	--	--	--
	15	--	--	--
16-18 Years (11%)	16	--	--	--
	17	--	--	--
	18	11 (11%)	5 (5%)	6 (6%)
19-21 Years (44%)	19	18 (18%)	10 (10%)	8 (8%)
	20	15 (15%)	8 (8%)	7 (7%)
	21	11 (11%)	5 (5%)	6 (6%)

This study is conducted in Lahore and it is the land of Punjabi speaking that's why a huge chunk which is 75% subjects were Punjabi speaking, 16% were Urdu speaking, 5% were belonged to pushto language, 4% respondents were saraiki speaking.

Regarding frequency and extent of fusion of wrist joint in different age groups from 13-15 year age group complete union occurred in zero % of cases. In males out of total 7 cases none got complete union. In 16-18 years total males were 17 and only 5 got complete union and 19-21 years total 28 cases were seen and all got complete union.

In female, 12 cases were from group 13-15 years, none got complete union, from age 16-18, out of 16 cases 6 got complete union and all 22 cases of age group 19-21 years got complete union, so it is evident from the data that females are faster in getting maturity than males.

DISCUSSION

This study was cross-sectional in nature and conducted at Department of Forensic Medicine & Toxicology, PGMI/AMC/LGH, Lahore, consent was taken in every case and x-rays were done of wrist joint on CR system. There was reported by single radiologist and it reflected that in male and female at 15 years wrist joint did not completely ossify¹⁰. It is proved that radiology can be used as a best tool to calculate the age in medicolegal and medical cases¹¹.

Regarding frequency and extent of fusion of wrist joint in different age groups from 13-15 year age group complete union occurred in zero % of cases. In males out of total 7 cases none got complete union. In 16-18 years total males were 17 and only 5 got complete union and 19-21 years total 28 cases were seen and all got complete union.

In female, 12 cases were from group 13-15 years, none got complete union, from age 16-18, out of 16 cases 6 got complete union and all 22 cases of age group 19-21 years got complete union, so it is evident from the data that females are faster in getting maturity than males.

CONCLUSION

This study drew the following scientific conclusion based on the observations and discussion. A number of participants did not report their correct age. In this study it was identified that 100% complete union at lower end of radius was 18-21 years in males and this age was 18-20 years in female¹². In lower end of ulna bone it was seen at the age of 16-18 years in males and in female at the age of 15-17 years¹³.

In females the fusion occurred 1-2 years earlier than males. It was also established by the study, that the epiphyseal fusion is a reliable scientific and economical tool in forensic radiology.

These findings will help in medicolegal cases where the courts will want to know the actual age of some person in both civil and criminal cases.

Author's Contribution:

Concept & Design of Study: Syed Zia Uddin
 Drafting: Pervaiz Zarif
 Data Analysis: Naghmana Bashir,

Revisiting Critically: Pervaiz Zarif
 Syed Zia Uddin, Pervaiz Zarif
 Final Approval of version: Syed Zia Uddin

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Serum Levels of Human Epididymis Protein 4 and Cancer Antigen 125 in Different Histological Types of Ovarian Cancer

Sonia Aziz¹, Ejaz Hassan Khan² and Mohsin Shaffi³

ABSTRACT

Objective: To determine level of HE4 and CA125 in patients of ovarian cancer, to determine diagnostic accuracy of HE4 alone and in combination with CA125 for ovarian carcinoma against histopathology report as the gold standard and compare the serum levels of HE4 and CA125 in different histological types of the tumor.

Study Design: Descriptive study.

Place and Duration of Study: This study was conducted at the Armed forces Institute of Pathology (AFIP), Rawalpindi in collaboration with North West School Of Medicine, Peshawar. Duration was one year from March 2015 to March 2016.

Materials and Methods: In this study a total of one hundred and twenty seven women (patients n=87, controls n=40), age greater than 18 years were enrolled. Women with suspected ovarian malignancy admitted in gynecology ward of North West School of Medicine, were included after written informed consent. Pregnant women, one receiving treatment of ovarian malignancy and those unable to give informed consent were not eligible. All patients underwent imaging by pelvic/abdominal ultrasound to document their presence of ovarian mass. Clinical information was retrieved from the patient's hospital notes. All patients were diagnosed preoperatively in laparoscopy/laparotomy and confirmed by histopathological evaluation. Ovarian cancer subjects were histologically typed according to WHO classification 2003 by specialized histo pathologists.

Results: Total number of patients were 127. Out of which 87 patients had ovarian cancer while 40 had benign disorders. The mean age of patients with benign tumors was 40 which were significantly lower than those with malignant tumors (58 years old, respectively, $p < .001$). The median range of CA125, 14 (12 -4140) and HE4, 913 (58 - 2612) tumor markers were significantly elevated ($P < .001$) in ovarian cancer group compared to benign group i.e CA125 14 (4-241) and HE4 60 (37-151). From Receiver operator characteristic curve analysis, the area under the curve (AUC) was higher for HE4 at 0.934 (95% CI = 0.875 to 0.970) compared to CA125 0.904 (95% CI = 0.839 to 0.949). Serum HE4 at cut off value of 80pmol/L had higher sensitivity (90 percent) and specificity (64 percent) for ovarian cancer, compared to serum CA 125 at cut off value of 53.7U/m L, sensitivity 86% and specificity 59%. The combination of HE4 and CA125 gave the highest sensitivity 96% and specificity 97% respectively for detecting ovarian carcinoma than either marker alone. The bulk of the ovarian cancers (81/87 % or 93% were of the epithelial variety with the serous subtype predominant (76.5%). It is the serous subtype of epithelial ovarian cancer (EOC) that were often biomarker positive (87.1%) compared to other subtypes (mucinous, clear cell and endometrioid). The few non-EOC cancers (n=6) were also biomarker positive.

Conclusion: HE4 had higher sensitivity and specificity for detecting ovarian carcinoma in women with pelvic mass compared to CA125. Dual marker combination of HE4 and CA125 was superior to either marker alone in predicting ovarian malignancy. Differential expression of biomarkers was noted among the various EOC varieties of ovarian cancer; serous EOC were more likely to be biomarker positive.

Key Words: Cancer Antigen (CA 125), Human Epididymis Protein 4 (HE4). Epithelial Ovarian Cancer (EOC)

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INTRODUCTION

Ovarian cancer is the leading cause of mortality from gynecological cancers World Wide.

¹. Department of Pathology, GKMC, Swabi.

². Department of Pathology, NWSM, Peshawar.

³. Department of Pathology, KMC, Peshawar.

Correspondence: Dr. Sonia Aziz, Assistant Professor of Pathology, Gajju Khan Medical College Swabi.

Contact No: 0333-9178696

Email: aziz_sonia@yahoo.com

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At present, the global incidence is approximately 165000 cases per year.¹ In Pakistan its incidence accounts for about 6%.² Presently over 80% of patients with ovarian cancer are diagnosed with advance stage 3 or 4 disease while only 20% are diagnosed with stage 1 or 2 disease.³ Traditional clinical signs of ovarian cancer and routine tumor markers lack diagnostic accuracy for detection and monitoring of the tumor. At present the diagnostic work up for women with pelvic masses is preoperative ultra sonography and CA125 to identify risk of ovarian malignancy; high risk subjects are referred to a tertiary centre with gynecologic oncology for further management.

CA125 is the most routinely used biomarker for detection of ovarian cancer, but it has been reported that CA125 is elevated in only 50% of clinically detectable early stage patients.⁴ It also been reported to be frequently elevated in women with benign gynecological conditions such as endometriosis, uterine fibroids and non ovarian malignancies.⁵ CA125 limited predictive power has challenged the clinicians to reexamine whether there is need for another test that can be used with certainty for detection of ovarian cancer.

Human epididymis protein 4 is one such promising biomarker.⁶ HE4 is found to be over expressed in ovarian cancers⁷ and is not elevated in benign gynecological conditions. Only a few studies have been done in Asians regarding HE4 diagnostic role in predicting ovarian cancer in women with pelvic masses. No such study is available on the population in Pakistan. The purpose of this study is to determine the role of HE4 in the prediction of ovarian cancer in women with pelvic mass. The study determined blood levels of HE4 and CA125 in patients with ovarian cancer, and compare the diagnostic accuracy of HE4 alone or in combination with CA125 for ovarian carcinoma in women presenting with pelvic mass. The levels of HE4 and CA125 in different histopathological types of ovarian tumor were also compared.

MATERIALS AND METHODS

This descriptive study was carried out in the Chemical Pathology Department of Armed Forces Institute of Pathology (AFIP), Rawalpindi in collaboration with North West School Of Medicine, Peshawar, after approval from the institutional ethical review committee. Research was carried out from March 2015-March 2016. A total of one hundred and twenty seven women (patients n=87, controls n=40) age greater than 18 years were enrolled. Women with suspected ovarian malignancy admitted in gynecology ward of North West School Of Medicine, Peshawar were included after written informed consent. All patients diagnosed with pelvic mass of suspected ovarian origin were scheduled for surgical intervention. Pregnant women, one receiving treatment of ovarian malignancy and those unable to give informed consent were not eligible. All patients underwent imaging by pelvic/abdominal ultrasound to document their presence of ovarian mass. Clinical information was retrieved from the patient's hospital notes. All patients were diagnosed preoperatively in laparoscopy/ laparotomy and confirmed by histopathological evaluation. Ovarian cancer subjects were histologically typed according to WHO classification 2003 by specialized histopathologist.

A blood sample (5ml) was obtained preoperatively into serum or serum separator tubes and centrifuged, aliquoted and frozen within 4 hours. The samples were

stored at -20°C until biochemical analysis. Blood samples were taken by trained personnel under strict hygienic conditions. Personal information of the participants were kept confidential and procedure of blood collection was explained to the patients in detail before taking the sample.

CA125 assay was performed on automated analyser VITROS. The reference range of CA125 is up to 35U/ml. HE4 assay was performed on automated analyser ARCHITECT. The reference range of HE4 is up to 1500pmol/L.

Data was entered and analyzed in SPSS (version 16.0). Mean $\pm$ SD was calculated for quantitative variables like age of patient. Frequencies and percentages were calculated for qualitative variables like ovarian cancer and sensitivity and specificity of serum CA125, HE4 and its combination. The mean age for patients with ovarian cancer and benign group was compared using the student's t-test. Tumor marker levels between groups were compared using Mann-whitney and Kruskal-Wallis test. Receiver Operating characteristic plots (ROC) were graphed and Area under the curve (AUC) was calculated for each marker. Sensitivity and specificity were compared using the McNemar test. We set the cut-off value at which the discrimination between the cases with positive diagnosis is optimal. The associations were quantified with 95% confidence intervals (95% CI). A two tailed value of <.05 was considered significant.

RESULTS

A total of 127 women with suspected ovarian cancer were admitted in gynecology ward of (North West School Of Medicine, hospital Peshawar). All women went through surgical intervention. Eighty seven were diagnosed histologically as ovarian carcinoma and forty as benign group. The mean age for patients with benign tumors was significantly lower than among patients with malignant tumors (40 vs 58 years old, respectively, $p < 0.001$). Of benign group, there were 4 (10%) serous & 4 (10%) mucinous cystadenoma, 4 (10%) endometriotic cyst, 13 (32.5%) leiomyoma, 15 (37.5%) benign gynaecological diseases, 2 (5%) dermoid cyst. Along with these, two non ovarian malignant cases, abdominal cancer (2.5%) and vulval cancer (2.5%) were also included in benign group.

Of malignancies, there were 81 (93.1%) epithelial ovarian tumors, out of which there were 62 serous tumors (71.3%), 14 mucinous tumors (16.1%), 3 endometrioid tumors (3.4%) and 2 clear cell tumors (2.3%). There were 6 (6.9%) cases in non-epithelial ovarian cancer group, out of which, there were 5 (5.7%) germ cell tumors and 1 (1.1%) sex-cord stromal tumor.

Table No.1: Histological type and distribution of benign disease

Histological type of benign disease	N	%
Cystadenoma	4	10
Endometriotic cyst	4	10
Dermoid cyst	2	5
Leiomyoma	13	32.5
Abdominal cancer	1	2.5
Vulval cancer	1	2.5
Other benign gynaecological diseases	15	37.5
Total	40	100

Table No.2: Histological type and distribution of malignant disease

	N	%
Histological type		
Epithelial	81	93.1
Serous tumor	62	71.3
Mucinous tumor	14	16.1
Endometrioid tumor	3	3.4
Clear cell tumor	2	2.3
Non-epithelial	6	6.9
Germ cell tumor	5	5.7
Sex cord stromal cell tumor	1	1.1
Total	87	100

Table No.3: HE4 and CA125 levels in different Types of ovarian cancer

Diagnosis	N	HE4 (pmol/L)			CA125 (U/ml)		
		Median	(range)	P-value*	Median	(range)	P-value*
Benign ovarian disease	40	60	37-151	<0.001	14	4-241	<0.001
Epithelial ovarian tumor	81	953.5	58-2612	<0.001	1134	12-4140	<0.001
Germ cell tumor	5	442	60-790	<0.001	123	18-256	<0.001
Stromal cell tumor	1	378	-	<0.001	121	-	<0.001

Biomarker values were reported as median (range). P-values are evaluated by Kruskal-Wallis test. P-values between groups are evaluated by Mann-Whitney U test. This table indicates that HE4 is significantly better than CA125 in detection of Benign and Malignant (epithelial, germ cell and stromal cell tumor) as shown in Table 3.

Table No.4: Sensitivity, Specificity and AUC of CA125, HE4, Combined CA125 + HE4

Biomarkers	Sensitivity	Specificity	AUC
CA125	86%	59%	0.904
HE4	90%	64%	0.934
CA125+HE4	96%	97%	0.944

DISCUSSION

The commonest cause of gynecological cancer associated deaths are related to ovarian cancer. At an early stage, the symptoms of ovarian malignancy are not specific, therefore ultrasound is used to assess patients for ovarian carcinoma. Ultrasound has the ability to detect pelvic masses but has poor specificity in detecting, that whether the mass is benign or malignant. Doppler ultrasound and a morphology index can be used to improve specificity but performance varies among different operators.⁸ Better detection of nature of pelvic mass will alleviate undue patient anxiety and will allow appropriate referrals to specialist centres for further assessment and treatment of patient. Improved outcomes have been seen in patients who are managed in specialized centres by gynecological oncologists⁹. The use of tumor markers to further

characterize the mass has come into clinical use. CA125 is cancer marker most significantly used for following response to treatment and detecting disease recurrence in patients with ovarian cancer¹⁰. Most of the ovarian cancer patients with late stages have raised levels of CA125 while in 50% of cases who are detected earlier, there is no rise of CA125.¹¹ High false rate has been observed for CA125 among women with non-malignant disease and non-ovarian malignancies.^{4,5} It has also been observed that expression of cancer antigen 125 has been lacked by about 20% of ovarian cancers.¹² Poor sensitivity and specificity of CA125 has hampered its use as a diagnostic test.¹³

In recent years, there has been search for new biomarkers and Human epididymis secretory protein 4 (HE4) is one of the most promising biomarkers for detecting ovarian carcinoma. It is expressed in reproductive and respiratory tracts^{14,7} and is over expressed in epithelial ovarian cancer¹⁵. HE4 gene product is an N-glycosylated protein which is secreted into extracellular environment and can be detected into the bloodstream of patients with ovarian cancer. It contains increase sensitivity for detecting ovarian malignancy at an early stage when compared with other markers that have been investigated earlier.^{16,17} It is highly expressive in serous tumors but endometrioid and clear cell ovarian tumors also show expression of HE4 on immuno-phenotyping.^{18,7} HE4 protein are not specific to ovarian carcinoma, a strong HE4 immunoreactivity is also found in number of cancers like endometrial cancer, breast cancer, transitional bladder cancer, lung adenocarcinoma, pancreatic cancer

etc^{19,20,7} (Bignotti et al.,2011;Kamei et al.,2010;Galgano et al.,2006)

In the present study, the diagnostic accuracy of HE4 and CA125 has been determined alone and in combination and we evaluated that whether HE4 can be used as a diagnostic tool for predicting ovarian malignancy.

According to our study the diagnostic sensitivity and specificity of CA125 was found to be (86% and 59%) while HE4 showed sensitivity of (90%) and specificity of (64%) which was higher than that of CA125.

The findings are consistent with other studies who also demonstrated high levels of HE4 in ovarian cancer patients.^{6,17,21,22}

Specificity of CA125 is low for detecting ovarian tumors because it has the ability to produce high false rate in many benign conditions while HE4 is less frequently positive in these conditions therefore it has advantage over CA125 assay.⁶ Moreover HE4 expression has found to become evident in half of tumors that lack expression of CA125 on immunophenotyping,¹⁷ so sensitivity of CA125 can get improved by adding HE4 biomarker for diagnosis of ovarian malignancy.

Several multiple marker panels have been investigated to increase sensitivity and specificity of ovarian malignancy diagnosis. In this regard, CA125 and HE4 together with or without the addition of other biomarkers such as SMRP,^{21,17} (MUC-1, Glycodelin, PAI-1,¹⁶ CA72-4 and Osteopontin¹⁷) have been analyzed. According to reports when these markers were combined together they showed higher sensitivity and specificity than when they are used alone. Moore et al (2008)¹⁷ investigated CA125, HE4 and seven other markers in patients presented with pelvic masses. In the study HE4 and CA125 combination was found to be best over other dual marker and triple marker combinations for detecting ovarian malignancy.

In our study, HE4 and CA125 combination has also been examined which demonstrated sensitivity and specificity of (96% and 97%) which is found to be higher than that achieved by HE4 (90% and 64%) and CA125 (86% and 59%) for predicting ovarian cancer.

Our study also demonstrated the cutoff value of HE4 and CA125 based on receiver operator characteristic curve. The cut-off value of HE4 was 80pM/L while that of CA125 was 53.7U/mL.

Three types of malignant ovarian tumors have been observed in the study i.e epithelial ovarian cancer, germ cell and stromal cell ovarian cancers. The frequent histological type found in epithelial ovarian cancer was serous followed by mucinous, endometroid and clear cell tumors. Same findings was found by Badgwell et al (2007)²² who demonstrated that serous tumors are the common histo-type of epithelial ovarian cancer.

In the study, HE4 missed 1 out of 2 cases of clear cell carcinoma while CA125 misclassified both the two cases of this type. HE4 showed better diagnostic performance over CA125 by not missing clear cell ovarian cancer^{18,7}

In non epithelial ovarian cancer, two major types, sex-cord and germ cell ovarian tumors have been observed.²³ Among the three types malignant groups, epithelial tumor group had the highest HE4 (953.5pmol/L) and CA125 (1134U/ml) median values while in other two groups the median values of HE4 and CA125 did not show significant increase i.e germ cell ovarian cancer (442pmol/l, 123U/ml) and sex-cord ovarian cancer (378pmol/L, 121U/ml). Similar findings were reported by Huhtinen et al (2009)²⁴ who showed raised levels of CA125 and HE4 in epithelial ovarian cancer group.

CA125 was found to be falsely elevated in 11 out of 40 benign cases. Among the 11 missed cases, two cases were of abdominal cancer and vulval cancer in whom CA125 were falsely raised.

The results were found to be in agreement with the studies demonstrating that CA25 is falsely elevated in non-malignant diseases as well as in non ovarian malignancies.^{4,5} In case of HE4, it misclassified 8 out of 40 cases. It correctly classified abdominal and vulval cancer. By these findings HE4 showed its superiority over CA125 by less frequently raised in patients with non-malignant ovarian diseases and non ovarian malignancies.⁷

In summary the results of the present study demonstrate that HE4 is a valuable marker and is better than CA125 for detecting ovarian cancer. Improvement of sensitivity of CA125 can get achieved by the addition of HE4. CA125 and HE4 biomarkers complement each other and should be used in combination for diagnosing ovarian carcinoma. Future studies including larger clinical trials are needed to be undertaken to evaluate utility of HE4 biomarker for prediction of ovarian cancer.

CONCLUSION

HE4 is more reliable biomarker for diagnosis of ovarian cancer than CA125. Dual marker combination of HE4 and CA125 showed to be more accurate predictors of ovarian malignancy than either marker alone.

Author's Contribution:

Concept & Design of Study:	Sonia Aziz
Drafting:	Ejaz Hassan Khan
Data Analysis:	Mohsin Shaffi
Revisiting Critically:	Sonia Aziz, Ejaz Hassan Khan
Final Approval of version:	Sonia Aziz

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Clinical Significance of ST Segment Depression in Lead aVR on ECG as a Predictor of Left Circumflex (LCx) Artery Involvement in Patients of Acute Inferior Wall Myocardial Infarction

Abubakr Ali Saad¹, Tariq Abbas², Saadat Hussain Khan Khakwani² and Muhammad Amin²

ABSTRACT

Objective: To determine the diagnostic accuracy of ST depression in aVR lead on electrocardiogram (ECG) in detecting left circumflex artery involvement in inferior wall myocardial infarction taking coronary angiography as gold standard.

Study Design: Descriptive / cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Cardiology, Ch. Pervaiz Elahi Institute of Cardiology, Multan from 13-Aug-2017 to 12-Feb-2018.

Materials and Methods: 191 patients with diagnosis of inferior wall MI having age 30-70 years were included in this study. Diagnosis of inferior wall myocardial infarction was made on the basis of ECG, and underwent coronary angiography. Data was analysed through computer software SPSS 20.0. 2×2 contingency table was used to calculate sensitivity, specificity, positive predictive value, negative predictive value of ST depression in aVR taking coronary angiography (CA) as gold standard.

Results: Mean age of study patients was 50.49±7.10 years. There were 156 (81.68%) male patients and 35 (18.32%) female patients. There were 79 (41.36%) smokers, 18 (9.42%) patients had positive family history, 111 (58.12%) were hypertensive and 17 (8.90%) patients were dyslipidemic. Sensitivity of ST segment depression in determining the LCx taking coronary angiography as gold standard was 91.8%, specificity 89.4%, positive predictive value (PPV) 75.0% and negative predictive value (NPV) was 96.9%.

Conclusion: ST depression in lead aVR has a good sensitivity and specificity (91.8% and 89.4% respectively) in determining the left circumflex artery (LCx) artery involvement in patients of acute inferior wall myocardial infarction.

Key Words: Inferior wall myocardial infarction, Lead aVR, Left circumflex artery.

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INTRODUCTION

Ischemic heart disease (IHD) is the leading cause of death and disability worldwide. Despite global reductions in age standardized incidence of acute myocardial infarction (MI) and in the prevalence of angina since the early 1990s, growing populations of aging high-risk individuals led to an increase in the global burden of IHD.¹ Slow normal turnover of cardio myocytes may be responsible for modest persistent elevations of troponin levels in certain normal individuals.^{2,3}

Although the majority of patients with MI have significant obstructive coronary disease, occasionally plaque rupture and ulceration can occur in the absence of an angiographic ally obstructive lesion⁴.

ROS scavengers significantly attenuate postischemic dysfunction, supporting the role of ROS in the pathophysiology of myocardial stunning^{5,6}. Specific mechanisms involved in systolic dysfunction may include decreased responsiveness of sarcomeric proteins to calcium, and calcium overload-induced protease activation, followed by proteolysis of contractile proteins (such as troponins and α -actinin)⁷.

The effects of ROS in myocardial stunning may involve alterations in calcium homeostasis, as free radicals are known to induce calcium overload in the heart and may reduce responsiveness of sarcomeric proteins to calcium⁸. ECG is an easy, cheap and universally accepted tool for the diagnosis, early risk factor stratification, and triage for guidance of therapy in patients with suspicion of acute MI.⁹ The relative prevalence of inferior wall myocardial infarction is 21% among all MIs.¹⁰ Therefore the prediction of

¹. Nishtar Medical University and Hospital, Multan

². Department of Cardiology, Ch. Pervaiz Elahi Institute of Cardiology, Abdali Road, Multan.

Correspondence: Dr. Tariq Abbas, Assoc. Prof. of Cardiology, Ch. Pervaiz Elahi Institute of Cardiology, Multan.

Contact No: 0333-6146264

Email: Bilal200@yahoo.com

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culprit artery in inferior wall myocardial infarction is often difficult because of relative dominance of right coronary or circumflex artery among patients.¹¹ Inferior wall myocardial infarction is usually manifested as presence of ST segment elevation in inferior leads (Lead II, III and aVF), along with ST changes in other leads that represent concomitant ischemia in other areas of heart or just reciprocal changes.¹²

Due to these “cancellation” effects, the relation between ECG changes and the location and extent of myocardial injury is very complex, which is detrimental to the proper identification of the culprit artery by means of ECG parameters.¹³ ECG helps to predict the culprit artery and locate the lesion within the infarct related artery (IRA), thus providing clinically important information to augment clinical decision making and tailor reperfusion therapy.^{14,15} ST segment changes in lead aVR are usually ignored in ECG interpretation.

Recently Gupta et al have concluded that ST depression > 1 mm in aVR lead predict involvement of left circumflex artery in patients of inferior wall myocardial infarction with sensitivity of 69% and 85% specificity.¹⁶ Another study found 53% sensitivity and 86% specificity of ST segment depression in aVR lead to diagnose left circumflex artery involvement in inferior wall myocardial infarction.¹⁷

MATERIALS AND METHODS

After approval from ethical review committee of the hospital, total number of 191 patients who presented in Department Of emergency, were selected. This descriptive, cross-sectional study undergone in, Ch. Pervaiz Elahi Institute of Cardiology, Multan from 13-Aug-2017 to 12-Feb-2018. Non-probability, consecutive sampling was done. All patients with diagnosis of inferior wall MI at presentation, both male and female and with age 30 to 70 years were included. Patients with MI other than inferior wall myocardial infarction, previous myocardial infarction, assessed on ECG findings (i.e. those having ST elevation in leads other than lead II, III and aVF, or presence of q waves on ECG) were excluded from this study.

Diagnosis of inferior wall myocardial infarction was made on the basis of 12 lead electrocardiogram (ECG). After taking informed consent, all patients underwent coronary angiography and findings were noted for presence or absence of involvement of left circumflex artery. Data regarding confounder variables such as family history, diabetes, smoking, dyslipidemia and hypertension will also be collected. Diagnosis of these confounder variables were made on the basis of previous history of patients or on the basis of new diagnosis of any of these co-morbidities during hospital stay (diagnosed on the basis of laboratory findings) was noted as presence of the disease. All this data was recorded on a specially designed Performa.

Collected data was analysed through computer software SPSS 20.0.

Mean and standard deviation were calculated for quantitative variables i.e. age. Frequency and percentage will be calculated for qualitative variables i.e. gender, family history, smoking, diabetes, hypertension, dyslipidemia, ST depression in aVR on ECG and presence of left circumflex artery involvement on coronary angiography. 2×2 contingency table was used to calculate sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of ECG in diagnosing left circumflex artery involvement taking coronary angiography (CA) as gold standard. Effect modifiers were controlled by stratification. Post-stratification sensitivity and specificity was calculated again to see the effect of confounder variables on diagnostic accuracy and p-value ≤0.05 was considered as significant.

RESULTS

A total number of 191 patients with diagnosis of acute inferior wall myocardial infarction were included in this study. Mean age of study patients was 50.49±7.10 years. Maximum age was 70 years and minimum age was 32 years.

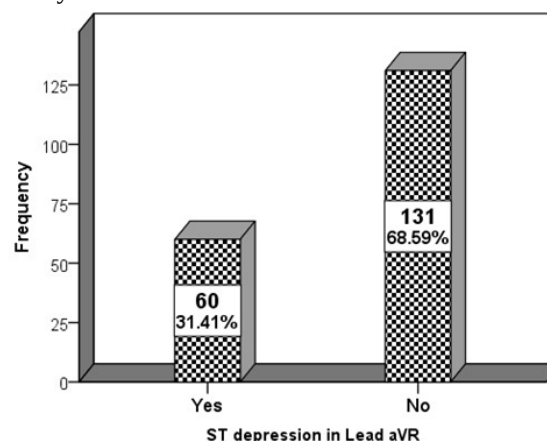


Figure No.1. Frequency of ST segment Depression in Lead aVR.

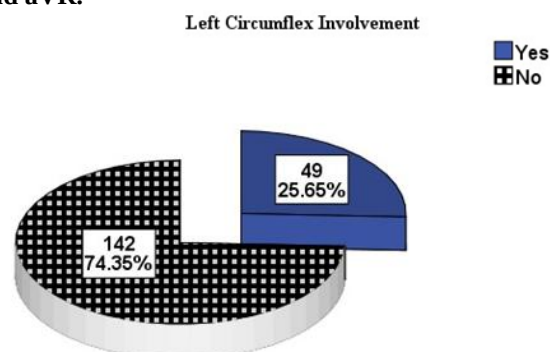


Figure No.2: Frequency of Left Circumflex Involvement on Coronary Angiography.

There were more males as compared to females who presented with acute inferior wall myocardial infarction. There were 156 (81.68%) male patients and 35 (18.32%) female patients. There were 79 (41.36%) smokers and 112 (58.64%) non-smoker patients in this study. There were 18 (9.42%) patients who were having positive family history of coronary artery disease. While in remaining 173 (90.58%) there was no history of coronary artery disease in 1st degree relatives.

Table No.1: Stratification of Age to determine the effect of age on sensitivity and specificity.

(i) Age ≤50 Years

		Left Circumflex Involvement on CAG		Total
		Yes	No	
ST depression in Lead aVR on ECG	Yes	22	13	35
	No	1	58	59
Total		23	71	94

Sensitivity = 95.7%

Specificity = 81.7%

(ii) Age <50 Years

		Left Circumflex Involvement on CAG		Total
		Yes	No	
ST depression in Lead aVR on ECG	Yes	23	2	25
	No	3	69	72
Total		26	71	97

Sensitivity = 88.5%

Specificity = 97.2%

Table No.2: Stratification of gender to determine the effect of gender on sensitivity and specificity.

(i) Male Gender

		Left Circumflex Involvement on CAG		Total
		Yes	No	
ST depression in Lead aVR on ECG	Yes	40	9	49
	No	3	104	107
Total		43	113	156

Sensitivity = 93.0%

Specificity = 92.0%

(ii) Female Gender

		Left Circumflex Involvement on CAG		Total
		Yes	No	
ST depression in Lead aVR on ECG	Yes	5	6	11
	No	1	23	24
Total		6	29	35

Sensitivity = 83.3%

Specificity = 79.3%

There were 111 (58.12%) hypertensive patients. There were 17 (8.90%) patients in whom dyslipidemia was diagnosed, while remaining 174 (91.10%) having normal blood cholesterol levels. On electrocardiograph

(ECG), ST segment depression was noted in 60 (31.41%) patients. while remaining 131 (68.59%) patients with inferior wall myocardial infarction were not having ST segment depression on ECG (Fig 01). On coronary angiography, left circumflex involvement was diagnosed in 49 (25.65%) patients and LCx was normal in remaining 142 (74.35%) patients (Figure 2).

Stratification of gender was done. In male patients, sensitivity of ST segment depression was 93.0% and specificity was 92.0%. In female patients, sensitivity of ST segment depression was 83.3% and specificity was 79.3% (Table 2).

Stratification of family history of coronary artery disease was done. In patients having positive family history, sensitivity was 100% and specificity was 92.9%. In patients having negative family history, sensitivity was 91.1% and specificity was 89.1%. Stratification of smoking was done. In patients having positive smoking history, sensitivity of ST segment depression was 88.2% and specificity was 90.3%. In patients having negative smoking history, sensitivity was 93.8% and specificity was 88.8% .

Stratification on the basis of hypertension was done. In hypertensive patients, sensitivity was 88.9% and specificity was 90.3%. In non-hypertensive patients, sensitivity was 93.5% and specificity was 88.8% . Stratification on the basis of dyslipidemia was done. In dyslipidemic patients, sensitivity was 50% and specificity was 80%. In patients with normal cholesterol levels, sensitivity of ST depression was 97.7% and specificity was 92.2% .

DISCUSSION

Inferior wall MI due to RCA occlusion frequently presents with STE in leads

II, III, and aVF, with reciprocal ST-segment depression (STD) in leads I and aVL. The ECG changes in LCX occlusions are highly variable. Approximately 30–50% of patients present with STE, usually in the inferior leads II, III, and aVF. Others show STD in leads V1–V4, or occasionally a tall R wave in lead V1. In up to 38% of patients, there is no discernible STE.¹⁸

In an I-AMI, the prognosis of patients depends on identification of the occluded artery (RCA or LCx). Patients with occlusion in the RCA (approx. 80% of cases) is frequently associated with right ventricle involvement and have a poorer outcome.^{19,20} The identification of arteries and the size of infarct plays an important role in guiding the reperfusion therapy. The display of lead aVR (–150°) in an inverted format as lead –aVR (+30°) lies between lead I (0°) and lead II (60°). Thus, aVR depression means –aVR elevation, which represents the infarct of the apical and inferolateral walls, usually supplied by the posterolateral branch of either the RCA or LCx itself. The aVR depression suggests the involvement of LCx or a large RCA with a large posterolateral branch

occlusion. This finding is consistent with the observation that 60% of both dominant RCA and dominant LCx infarctions had aVR depression.²¹

Several studies have considered the clinical importance of ST-segment depression in lead aVR in an I-AMI to identify the culprit artery. Tierala et al.²² in the HAAMU trial, a non-randomized prospective study of an acute I-AMI, proposed a new algorithm and compared it with the prior algorithm from Fiol et al.²³ to predict the culprit artery. Among 98 patients included in their study, they found with ECG and angiography a positive and negative predictive value for the prediction of LCx or RCA as an IRA of 75% and 94%, 92% and 75% respectively.

Kanei et al, with the main aim to review all algorithms and compare them to ST depression in the lead aVR to predict the culprit artery in an I-AMI found the sensitivity and specificity of ST segment depression in lead aVR to predict the LCx as a culprit artery were 53% and 83% respectively. RCA as the culprit artery, the sensitivity and specificity were, 86% and 55%, respectively.²⁴

Nair and Glancy²⁵ found that quantifying ST depression in lead aVR distinguished a culprit LCx (≥ 1 mm) from a culprit RCA (< 1 mm or no depression), in a small retrospective analysis. However, Baptista et al.²⁵ found that lead aVR ST depression showed limited use in differentiation between the RCA and the LCX. Sensitivity and specificity to predict the infarct related artery were 33% and 71%, respectively.

Gupta et al.²⁶ conducted a similar study and found 69% sensitivity, 85% specificity of ST segment depression in determining LCx involvement in patients of acute inferior wall myocardial infarction. The negative predictive value was 87% and positive predictive value was 66%.

CONCLUSION

ST depression in lead aVR has a good sensitivity and specificity (91.8% and 89.4% respectively) in determining the left circumflex artery (LCx) artery involvement in patients of acute inferior wall myocardial infarction.

Author's Contribution:

Concept & Design of Study:	Abubakr Ali Saad
Drafting:	Tariq Abbas
Data Analysis:	Saadat Hussain Khan Khakwani
Revisiting Critically:	Abubakr Ali Saad, Muhammad Amin
Final Approval of version:	Tariq Abbas

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Prevalence of Depression in Earthquake 2005 Affected Areas of Muzaffarabad City (Azad Kashmir)

Shakeel Asif¹, Nisar Ahmed Khan² and Farooq Ahmed Noor²

ABSTRACT

Objective: The present study sought to assess prevalence of depression among earthquake survivors, to evaluate its severity and impact on life of survivals, and to identify and suggest future interventions and long term psychological rehabilitation services in the aftermath of disasters.

Study Design: Descriptive / cross-sectional study

Place and Duration of Study: This study was conducted in the most damaged area of Muzaffarabad city, ward 12, with a population of 3,020 people of more than 18 years of age. The total number of subjects was 430 and the study period was from 4th February 2012 till 4th October 2012.

Materials and Methods: Data was collected by cluster sampling using the systematic random sampling technique. ICD-10 Criteria for Depressive Illness was applied the participants for diagnosing Depression. The patients diagnosed as suffering from depressive illness were then assessed for the severity of depression using the Urdu translation of Beck Depression Inventory. Data was then analyzed using SPSS 10.0.

Results: Study findings revealed that among participants (n=430), mean age was 36 years (SD=12.44); males were 61.2%, females were 38.8%. Findings showed that frequency of depression was 32 % (mild-11.2%, moderate-11.6%, severe-8.8%) after using the BDI scale.

Conclusion: The survivors of 2005 earthquake suffer from depression three times higher than the normal population. These findings lend further support in order to facilitate in planning long term in terms of psychological rehabilitation services and other interventions for the affected population improving their quality of life.

Key Words: Depression, Earthquake, AJK

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INTRODUCTION

Natural disasters adversely affect the lives of large populations, while disrupting their social network, which results in an enormous economic burden; consequently, they constitute a major traumatic experience with evolving traumatic psychopathology. Disasters are traumatic, sudden, dangerous and life threatening events, these are overwhelming because these test the capability of the community and individuals to cope with a massive disruption. Survivors of natural disasters, and those of acts of rape, violence, war and terrorism always have enormous experience with some psychological damage to individuals and small or even large groups of human beings. Natural disasters, catastrophes, floods, and acts of terrorism

result in psychological consequences, such as post-traumatic stress disorder, depression, anxiety, and chronic physical disorders.¹ The physical injuries exhibit their effects immediately after the event, but the effects of psychological trauma may persist longer after the event.

Indian population faced major life threatening events in the last few decades, for example Bhopal gas tragedy in 1984, Uttar-Kashi earthquake in 1991, Latur earthquake in 1993, 2001 in Gujarat, 2004 the great Tsunami, and the Kashmir earthquake in 2005.²

In Marmara earthquake in Turkey after three and half year following percentage of psychiatric consequences were observed including 22.2% PTSD and 30.8% depression diagnoses in adolescent population.⁴ In October 29, 1999 a super-cyclone with speed of 260 to 300 Km/hr hit Orissa, India that continued for 72 hours from. Over 15 million people were affected; casualties were round about 10,000 persons; with massive loss to properties and livelihood.^{3, 4, 5}

Increases in depressive symptoms as a consequence of a disaster, greater impacts were observed among the population with the lowest incomes and among residents living in small rural areas.⁶ Acute disaster stress (physical injury, life threatening situations, property damage, loss of loved ones) may produce prolonged psychological distress (PTSD, depression,

¹. Department of Psychiatry / Community Medicine², Mohtarma Benazir Bhutto Shaheed Medical College, Mirpur AJ&K.

Correspondence: Dr. Shakeel Asif, Assistant Professor of Psychiatry, Mohtarma Benazir Bhutto Shaheed Medical College, Mirpur AJ&K.

Contact No: 0345-8480099

Email: dr_nisar58@hayoo.com

anxiety, anger, fear, phobia, somatization and hostility). The main effects of loss, though limited in strength, were completely explained by victim's higher financial, marital, filial, and physical stress.⁷

Unfortunately, societies are subjected to various disasters, events such as volcanic eruptions, hurricanes and floods, landslides, earthquakes, due to the failure of engineering structures, social unrest, national and global economic downturns, regional power blackouts, diseases and epidemics, etc.⁸

Hence there is a growing and urgent need to grasp the intermittent dynamics of disasters in order to improve our understanding of the negative effects imposed by such occurrences. Keeping in view this background and the paucity of research in this area, the current study was designed to determine the frequency of depression in Earthquake 2005 affected areas of Muzaffarabad Azad Kashmir, 7 years after the earthquake, in order to evaluate the long term psychological burden on the affected population.

MATERIALS AND METHODS

This was a descriptive, cross-sectional study, which was carried out for a period of 8 months from 4th February 2012 till 4th October 2012, in the most damaged area of Muzaffarabad city, ward 12, with population of 3020 people of more than 18 years of age. The total sample size was 430 subjects. Data was collected by cluster sampling using the systematic random sampling technique, applying the formula $K=N/n$ where N =total population and n =sample size, hence for the current study, $k=3020/430=7.023$ which was rounded off to 7, so after randomly selecting one subject every 7th individual following that was selected.

Those subjects were selected who fulfilled the inclusion criterion, survivors of 2005 Earthquake aged 18 to 70 years, excluding those who refused to give informed consent and those with severe cognitive impairment.

Written permission from local administration Deputy Commissioner Office Muzaffarabad city was taken. Data collection was done in most damaged areas of Muzaffarabad city. For the conduction of study by a group of researchers including myself, a psychologist, nursing assistant, social worker and NGO staff, from Muzaffarabad city who were trained prior to study for data collection. Informed written consent was taken from all the participants who met the selection criteria. Proforma was administered to the study participants ($n=430$) and all the relevant socio-demographic details such as age, gender, educational status were obtained. ICD-10 criteria for Depressive illness was applied to the participants for diagnosing Depression. The patients suffering from depressive illness then were assessed for the severity of depression using the Urdu translation of Beck Depressive Inventory. Scores above 9 were considered significant. Confidentiality of the

participant's identity and personal information was maintained throughout the study. All the collected data was entered in the computer and analyzed in the statistical package for social sciences (SPSS version 10.0) and results interpreted accordingly.

RESULTS

The mean age of the participants was 36 years ($S.D\pm12.44$), with an age range of 18-69 years. The gender distribution revealed that 263 (61.2%) were males whereas 167 (38.8%) were females. Among the participants, depression was present in 137(32%), with 48(11.2%) having mild depression, 50(11.6%) moderate depression and 38(8.8%) severe depression. These frequency of Depression has been illustrated in Table 1, while the frequencies of different grades of severity of depression in Figure 1, as shown below:

Table No.1: Showing the frequency of depression amongst the participants

Presence of depression	Frequency	Percentage
Depression	137	32%
No Depression	293	68%

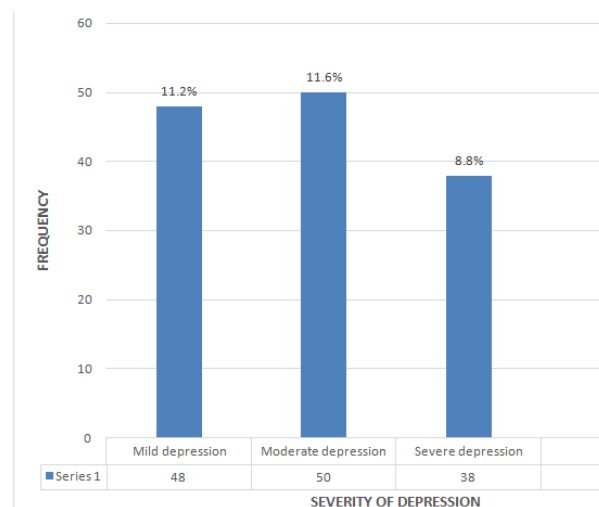


Figure No.1: Showing The Different Grades Of Severity Of Depression

DISCUSSION

This study found frequency of depression among 430 participants with significant numbers of 137 had depression which makes percentage of 32% while 293 participants had no depression constitute 68% of total participants. Similarly depression was also gauged in terms of severity mild, moderate, and severe form, the results revealed 48 participants had mild depression (11.2%), 50 had moderate depression (11.6%) and 38 participants had severe form of depression (8.8%).

This study finding correlates well with other published national and international studies. A study done by Rakesh Kumar Chadda² in occupied Kashmir the

affected patients were evaluated 5–6 weeks after major earthquake. Prevalence of depressive disorders was 21.8% high as compared to PTSD 3.3% seen in patients. High prevalence of depression in males could be related to the life burden, material responsibilities, and planning rehabilitation, which traditionally is within male's responsibility in a typical Asian society. In 1988 earthquake in Armenia,⁹ states that depression is a major public health problem with other manifestations of psychiatric morbidity, including PTSD. When adult participants were studied half of them were identified as fulfilling the criteria for major depression in the 2 years following the disaster. This observation concluded that the risk of depression is proportional to the amount of loss that the person has sustained during a life threatening event, is an important finding that could be incorporated in the development of any effective preventive strategy. The more severe the condition—the stronger was the relationship of depression with loss. Persons with higher levels of loss should be specially targeted for remedial and preventive action. The study findings that the risk of depression was higher in loss of family members as well as materialistic loss.

A study in Greece 50 years after the earthquake¹⁰ in this study individuals with age (17–25 years) came out as the most vulnerable group for the development of psychiatric morbidity. As passing through there transitional period of there life which is important for their carrier and professional life, which the earthquake probably overturned. In addition, in most cases they faced the major depression and PTSD especially female population. Lower educational status and lower socio-economic status were found to have high prevalence of PTSD and depression among earthquake survivors, while lower education and loss of family members tend to have high prevalence of depression. Suicidal ideations and self harm ideas were present in 21.3% , where 34.5% population have co-morbid diagnosis of depression and PTSD..

The present study provides basic research tools to study traumatized persons. It will also help in raising awareness about the needs of traumatized persons who may continue having problems years after exposure to trauma. PTSD, depression, stress and anxiety are debilitating disorders the studies like the present one may urge a society think of policies and plans and evolve strategies to beef up their mental health services. Scientific research like the present one is imperative for effective intervention and rehabilitative measures for individuals who are victims of disasters or have been traumatized as a result of grief, violence or some kind of abuse and a natural disaster.

CONCLUSION

In conclusion the findings from this study indicate that the survivors of 2005 earthquake suffer from psychological distress including depression three times higher than the normal population. The catastrophic

earthquakes of the kind that occurred in Muzaffarabad city, AJK, have long-term psychological consequences, particularly in survivors with high levels of trauma exposure. These findings lend further support in order to facilitate in planning long term psychological rehabilitation services, post disaster mental health services and other interventions for the affected population in terms of improving their quality of life.

Limitations:

1. As sample (N=430) taken only from ward 12 of Muzaffarabad city having population of (103,487) thus creating a sample bias, which partly compromises the generalizability of study findings. Future studies should include larger sample sizes and more powerful designs.
2. The findings of the present study are based on those who continued living in the earthquake affected areas and not on those, who moved out of the area after the earthquake.
3. Past psychiatric illness or disorders of the participants not explored properly.
4. Risk factors, personality traits, post-disaster experiences, and social support could not be explored.
5. 7 years have elapsed since the earthquake. Some memories of the event may have been distorted and several other important traumatic life events could have happened that may have contributed to psychopathology

Author's Contribution:

Concept & Design of Study:	Shakeel Asif
Drafting:	Nisar Ahmed Khan
Data Analysis:	Farooq Ahmed Noor
Revisiting Critically:	Shakeel Asif, Nisar Ahmed Khan
Final Approval of version:	Shakeel Asif

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Analytical Study of Acute Poisoning Cases Admitted in Lahore General Hospital, Lahore, Pakistan

Pervaiz Zarif, Syed Zia Uddin and Naghmana Bashir

ABSTRACT

Objective: To analyze the cases of poisoning presenting in Accident & Emergency Department, Lahore General Hospital, Lahore according to their nature, outcome and treatment methodology adopted.

Study Design: Descriptive / cross-sectional study.

Place and Duration of Study: This study was conducted at the Department of Forensic Medicine & Toxicology, PGMI/AMC in 1st Jan – 31st Dec 2015.

Materials and Methods: This research included all the poisoning cases reported to Pediatric and Medical Emergency of Lahore General Hospital, Lahore. Clinical record of poisoning cases was analyzed. A structured questionnaire was used to collect the data from the respondents. During this period 685 cases reported in both Medical and Pediatric emergency for alleged poisoning. Questionnaire was filled with the help of relatives or person himself and some interviews also be done.

Results: Acute poisoning patients consisted 685 (6.6%) of the total 10353 patients admitted in the pediatric and medical emergency, Lahore General Hospital, Lahore. 398 (59%) out 685 patients were children upto 15 years old and the remaining were above the age of 15 years. Most of the poisoning cases reported to LGH, Lahore were medicine related which were 287 (41%) and after that household products 148(21.61%). The positive outcomes were obtained in 65% (443) and the negative outcomes resulting as death were 4% (29) cases and about 84 (12%) were left against medical advice (LAMA) during their medication from the hospital. Some cases were transferred to the other wards after giving proper medication which were 129 (19%) for their further treatment.

Conclusion: Acute poisoning has got a significant share among all the admissions in the Lahore General Hospital, Lahore. The extensive care is provided to the poisoned patients in reasonable short span of time. Limited no. of recourses provided to the poisoned patients in emergency made it difficult for the doctors to handle these cases

Key Words: Acute Poisoning, LAMA (Left against medical advice), PGMI, AMC, Pediatrics emergency, Lahore General Hospital, Lahore.

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INTRODUCTION

Acute poisoning is defined as those cases which took some type of poisonous medicinal products by himself or by anyone else or widely by any mean in last 6-12 hours and symptoms and signs appear in this duration. These are usually reported to accident and emergency department for immediate treatment and need very special care as the main cause of a major share of admissions in the hospitals is acute poisoning to the medical emergency services¹. Proper diagnosis with prompt initial care are the main factors for better management of poisoned patient², and sympathetic

treatment is primary and always be kept on top priority³. Mortality and morbidity is mostly caused by poisoning and the toxicology plays vital role in the medical emergency⁴. In Taiwan, mortality rate is 4%⁵. The acute poisoning shared 5% of the total cases reported in the pediatric and medical emergency of LGH, Lahore, Pakistan. According to the previous researches, most of the poisoned cases were treated in the medical emergency and intensive care unit⁶. It is not possible in Lahore to set objective and take complete picture of the acute poisoning at the time of admission in emergency services and also prohibited to determine extent of quality care and there is also no poisons and toxicology unit. That's why the researcher decided to investigate and analyze the descriptive characteristics of acute poisoning cases reported in the LGH, Lahore.

The rate of children's acute toxicity, the nature of the accident and the responsible substances remains extremely high⁷. The most encountered mode of poisoning was pharmaceuticals and household goods⁸. In many developing countries, especially Burkina Faso, Barbados self-treatment using traditional medicine, systematic, and often experience become⁹. This health

Department of Forensic Medicine & Toxicology, Postgraduate Medical Institute/ AMC, Lahore.

Correspondence: Dr. Pervaiz Zarif, Assistant Professor of Forensic Medicine & Toxicology, Postgraduate Medical Institute/ AMC, Lahore.

Contact No: 0300-9438313

Email: pervaizarif@gmail.com

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centres street drugs, or for use in our society, cultural and social beliefs, but because of the people in poverty is either. Everyday life is the use of oil-based household products and plant mass could be any other explanation. Some studies have shown that children, household items showed that it is responsible for over 65% of acute poisoning¹⁰. The pharmacological and in particular, the toxicological properties of several herbs are not known. It is therefore necessary to examine his clinical pharmacology and toxicology.

MATERIALS AND METHODS

Two departments (Pediatric and Medical emergency wards of LGH, Lahore) were included to conduct this prospective study. Inclusion criteria consisting of the patients admitted in these two emergency wards in which acute poisoning was diagnosed, and providing a written consent form to patients' parents/attendants for receiving the formal approval. A formal survey was conducted by the researchers in which the researchers asked questions to the patients at the time of admission and medical staff members for investigating about the medical history of the patients. A structured questionnaire was used to collect data. It has two sections. First section was used to collect data from patients and second one was used to collect data from medical staff (pediatricians, emergency physicians, pharmacists, general physicians and hospitals doctors) of the hospital. Reason of admission, circumstances of poisoning, difficulties faced in the hospital and care provided in the hospital by the hospital staff is the characteristics variables of the study. After collecting data from the respondents, it was organized in the SPSS version 22 for further analysis.

RESULTS

685 cases reported in medical and pediatrics emergencies in LGH, Lahore which is 7% of total 10353 admitted cases in the year of 2015. The share of pediatrics emergency in acute poisoning cases is 398 which were 59% of the total admissions. The most of the patients of acute poisoning are of the age of 1-6 years. Females are 33.87% and 66.13% are male patients. The major victims of the acute poisoning cases are students and pupils which was 27 of the total cases. The nature of the poison was determined in 93% of the patients. Medicines are the main reason of poisoning which was 35.91%, poisoning with household products is 21.61%, food is 14.74% and narcotics are 14.16% as showcase in the Table No. 1.

In medicine related poisoning cases, most of the patients took medicine from pharmacies without physician prescription which is 53%. Patients took drugs from home and its percentage is 24 and 23% took other traditional products. Paracetamol and BDPs are most commonly used drugs in the medicinal drugs (20%) which are shown in Table No. 2. From

household products, caustic substances including soaps are the main reason of poisoning (43%), pesticide (29%) and petroleum products (26%) are the most consumed ones (Table No. 3).

Table No. 1: Distribution of cases according to responsible poison in Medical and Pediatric Emergencies

Poison	Pediatric Emergency	Medical Emergency	Total	%age
Food	53	48	101	14.74
Medicine	178	68	246	35.91
Narcotics	10	87	97	14.16
Household Products	118	30	148	21.61
Animal Venom	18	39	57	8.32
Traditional Medicine	21	15	36	5.26
Total	398	287	685	100.0

Table No. 2: poisonous Medicine distribution according to the admitted wards

Poison	Pediatric Emergency	Medical Emergency	Total	%age
Antibiotics	21	9	30	12.20
Anti-emetics	23	8	31	12.60
Malaria Drugs	23	10	33	13.41
Analgesics	22	9	31	12.60
Hypnotics / sedatives	29	11	40	16.26
Traditional Medicines	15	7	22	8.94
Combination of Medicines	19	6	25	10.16
Not Specified	26	8	34	13.82
Total	178	68	246	100.00

Table No. 3: Poisonous Household Products Distribution According to the Admitted Wards

Poison	Pediatric Emergency	Medical Emergency	Total	%age
Petroleum by-products	31	3	34	22.97
Pesticides	24	8	32	21.62
Caustic substances	37	7	44	29.73
Carbon monoxide	26	12	38	25.68
Total	118	30	148	100.00

Table No. 4: Venom Poisonous Distribution According to the Admitted Wards

Poison	Pediatric Emergency	Medical Emergency	Total	%age
Snake	9	15	24	42.11
Scorpion	1	4	5	8.77
Hymenopteran	0	9	9	15.79
Not specified	8	11	19	33.33
Total	18	39	57	100.00

The circumstances of poisoning cases are 70% accidental and 30 suicidal attempts. The conscious patients were 64% and about 76% were transferred to LGH within 1-5 hours after ingesting poisons. 67% cases were brought from city and other center. Private vehicles were the major transport to bring these cases which are 50% and 21% were on ambulance (mainly Rescue 1122).

Lahore general hospital has 40% interns/Postgraduate Trainees, 25% physicians and 35% are the nurses of the total. Poisoned patients (68%) were treated. Gastric lavage, symptomatic treatment and antidote treatments were used in 22%, 37% and 1% respectively. The foundation of the medical treatment was signs, history of the patients and physical examination. As there was no toxicology unit that's why toxicological analysis was not done to check the poisoning. Mortality rate was 4%. Mortality rate (15%) was observed in pediatric emergency. The major cause of death (42%) was wheat pill poisoning which is list down in Table No. 4. Unidentified nature of medicines was 35%.

DISCUSSION

This prospective study was conducted to analyze the cases of acute poisoning which were admitted in Pediatrics Emergency, Lahore General Hospital in Lahore. We collected data by studying medical record, by interviews the patients, their attendants and medical staff. This allowed to reduce the probability of errors and to get comprehension of data.

In this study, poisoning and its connection with the distribution of age, gender, and hospital emergency services show the importance of the finding. Therefore, children (under 15 years), high comply most effected group¹¹. Poisoning was mainly due to accidental poisoning cases, 65% of the cases. Acute poisoning in children under the age of 12 has very rare chance for suicide attempts with other instances of this literature.

With regard to care provided to poisoned patients, the use of emergency medical care is a systematic approach when our populations are at risk. In fact, some health centers now have quick help to bring their patients to a more complete center. Providing care to the emergency services does not respond to the patient's life-saving. After the entry of toxic patients, some activities are done depending on the poison (stomach injury, drug transfer and symptomatic treatment). On the other hand, cure is not used because the diagnosis is based on clinical signs, history and physical examination. Anti-doping therapies based on toxicological analysis are unlikely to be caused by a lack of toxicological laboratories¹². Acute poisoning results are in most cases positive, despite the difficulties associated with the lack of standardized procedures that need to be followed in the treatment of various types of poisoning, poisoning, specific treatment problems and inadequate training of personnel in clinical toxicology. In fact, most cases of

acute poisoning do not show any signs of seriousness. However, snake bites are the most serious and deadly thing, as the transfer to the LGH is delayed.

CONCLUSION

Acute poisoning has got a significant share among all the admissions in the Lahore General Hospital, Lahore. In children, acute poisoning can be expected by traditional medicine, self-medication and a large use of household products. The extensive care is provided to the poisoned patients in reasonable short span of time. The unavailability of appropriate equipment provided to the poisoned patients in emergency made it difficult for the doctors to handle these cases. It is recommended that a state of the art toxicology unit should be available and a formal training should be arranged for the medical staff of the hospital which ultimately will improve the care provided to the poisoning patients.

Recommendations: Medicine should be kept in a safe place to avoid accidental poisoning. Extensive care at the emergency should be state of the art to save the life. Antidote should be available at hand in emergencies. Poisons centers should be established in all big hospitals. Staff should be specially trained for handling such cases. Psychological rehabilitation centers should be established for patients attempting suicide.

Author's Contribution:

Concept & Design of Study:	Pervaiz Zarif
Drafting:	Syed Zia Uddin
Data Analysis:	Naghmana Bashir
Revisiting Critically:	Pervaiz Zarif, Syed Zia Uddin
Final Approval of version:	Pervaiz Zarif

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Effects of Waiting Time for Definitive Restorations After Completion of Root Canal Treatment (RCT)

Waiting Time for Restorations After Completion of RCT

Muhammad Zubair Ahmad and Durr-e-Sadaf

ABSTRACT

Objective: To evaluate the effects of different placement timings of definitive coronal restorations on endodontically treated teeth (ETT) and analysis of other factors resulting in extraction of such teeth.

Study Design: Retrospective study.

Place and Duration of Study: This study was conducted at the College of Dentistry, Qassim University, Saudi Arabia from May 2012 to January 2018.

Materials and Methods: Data of 4,012 patients who received endodontic treatment and final coronal restorations were gathered from dental records. Reasons and time of extraction of ETT were noted.

Results: significant association was found between extraction of ETT and female gender ($p < 0.00$) and 60+ days waiting time of final coronal restoration ($p < 0.00$). Year of dental students and number of visits of RCT did not have significant association with extraction of ETT ($p = .366$ and $.654$ respectively).

Conclusion: Final coronal restorations should be placed within first two weeks after completion of RCT. This reduces the risk of extraction of ETT.

Key Words: Crown, root canal treatment, tooth extraction, resin composite, buildup

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INTRODUCTION

The survival and functionality of root treated teeth are emerging aspects of endodontic treatment outcome, rather than periapical healing alone^{1,2}. Untoward events, like extraction, retreatment and apical surgeries occur within first three years of root canal treatment³. There are only few studies in literature that have analyzed the survival of endodontically treated teeth (ETT) and reasons of extraction of such teeth⁴. In a recently done systematic review Zhu, have reported the protective role of post placement when restoring ETT with mutilated coronal structure⁵. Because endodontic treatment and crown placement procedures are primarily performed to restore functionality and to prevent tooth extraction, it is important to analyze the relationship of survival of endodontically treated tooth with the waiting time of crown placement.

The objectives of the present retrospective study, involving Saudi adults, were to investigate the distribution of reasons for extraction of ETT, time delay

between endodontic treatment and placement of final coronal restoration and influence of time delay and other factors (patient's gender, location of tooth in the arch, type of tooth and year of dental student providing treatment) on the extraction of ETT.

MATERIALS AND METHODS

After getting ethical approval, data were collected from 4,012 patients who received endodontic treatment and final coronal restoration from May 2012 to January 2018 at College of dentistry, Qassim University, Saudi Arabia.

The authors considered the reason mentioned in the patient's file as the main reason for extraction. The reason was confirmed by again examining the tooth's periapical radiograph from the patient's database by checking the reason that was noted in the clinics procedure list on the day of extraction of ETT. If more than one reasons were found, the more untreatable condition was chosen (e.g. root fracture over recurrent caries).

Patient's gender, age, type of tooth (molar, premolar or anterior), location of tooth in dental arch (maxillary and mandibular), year of treating dental student (4th year and 5th year), quality of root canal treatment (length of obturation, presence or absence of voids), type of final coronal restoration (core buildup or crown), type of crown (PFM or all ceramic), presence or absence of opposing dentition, waiting time of crown placement after completion of root canal treatment (0-14 days, 15-

Department of Dentistry, Qassim University, Saudi Arabia.

Correspondence: Muhammad Zubair Ahmad, Assistant Professor, Alrass Dental College, Qassim University, Saudi Arabia.

Contact No: +966582527047

Email: m.muhammad@qu.edu.sa ,

Muhammad.ahmad@kellogg.ox.ac.uk

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59 days and 60+ days), date of extraction and presence or absence of post were obtained from patient's file. Data were pooled and analyzed by SPSS 25 (SPSS, Chicago, IL). The association between extraction reasons (crown fracture, prosthetic reasons and endodontic reasons) and patients characteristics (male, female), tooth characteristics (maxillary vs mandibular, location of tooth and type of tooth) or restoration characteristics were examined using a Chi Square tests and Z-tests. A value of $P < .05$ was considered to be statistically significant at 95% confidence interval.

RESULTS

The mean age of the patients was 37.27 (range 11-85) years. The gender distribution of the patients was 1305 (32.5%) males versus 2707 (67.5%) females. The distribution of analyzed teeth is presented in Fig. 1. The most commonly extracted teeth were molars ($n=1087$; 27%) followed by premolars ($n=1015$; 25.3%). Anterior teeth were least commonly extracted ($n=698$; 17.4%). 2319 (84.6%) extracted teeth had crown present and 431 (15.4%) extracted teeth had composite restoration/build up present. 794 (28.4%) of extracted teeth had post present and 2006 (71.6%) of teeth had post absent. The reasons for which decisions of extraction of teeth were made are presented in Fig. 2.

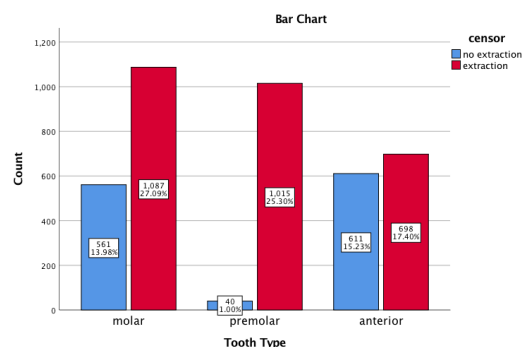


Figure No. 1: Distribution of 4,012 studied ETT. 27% extracted teeth were molars.

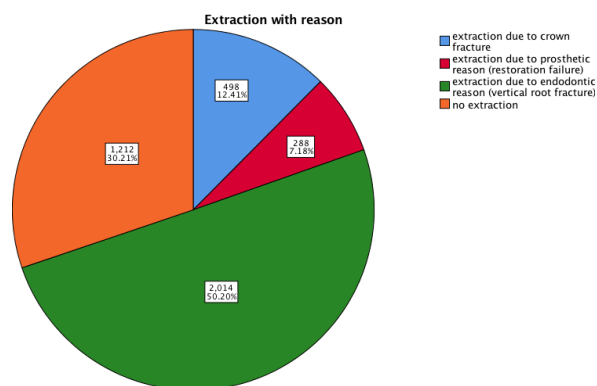


Figure No. 2: Reasons for extraction of 2,800 ETT.

Endodontic reasons (vertical root fractures) were the most common reasons ($n=2014$; 50.2%), followed by

crown fractures ($n=498$; 12.4%). Prosthetic reasons or restoration failures were the least common reasons for extraction of ETT ($n=288$; 7.2%).

A Chi square test was applied to see the association of extraction of ETT with various variables (Table 1). Female gender, multivisit RCT's, permanent coronal restorations done after more than 60 days, absence of post have highly significant association with extraction of ETT ($P < 0.00$). Year of dental student was not associated significantly with extraction of ETT ($p = .366$).

Table No.1: Association of various factors with extraction of ETT (Level of significance $P < 0.05$; 95% CI)

Variables	N (%)	Chi square; p
Gender		
• Male	750 (26.8%)	< 0.00
• Female	2050 (73.2%)	
Year of dental student		
• 4 th year	823 (29.4%)	.366
• 5 th year	1977 (70.6%)	
Quality of root canal treatment		
• Overobturation	428 (15.3%)	< 0.00
• Obturation within 2mm of apex	2204 (78.7%)	
• Short obturation	168 (6%)	
No of visits of RCT		
• Single visit	652 (23.3%)	.654
• Multivisit	2148 (76.6%)	
Time of placement of coronal restoration		
• 0-14 days	1062 (37.9%)	< 0.00
• 15-59 days	439 (15.7%)	
• 60+ days	1299 (69.8%)	
Post		
• Present	794 (28.4%)	< 0.00
• Absent	2006 (71.6%)	

DISCUSSION

The present study was done at a government undergraduate dental college. Study is retrospective and all procedures were performed by 4th and 5th year dental students. This is therefore a limitation of the study.

Despite the limitations, this study shows an interesting picture of endodontic treatment outcome. The vast majority of ETT were extracted due to endodontic reasons and root fractures (50.20%). Other reasons were less common.

The present results are in agreement with Yoshino et al., who reported that very high prevalence of ETT (93.6%) were extracted due to endodontic related reasons e.g. vertical root fracture (VRF) and higher percentage of extraction of ETT (34.7%) in females⁶. Similarly Sjogren et al reported higher prevalence of VRF (31%) among extracted ETT⁷.

This results of this study are in contrast with Fuss et al., who reported that 63% of ETT were extracted due to gross caries or cusp breakage: 44% were extracted entirely because of their unrestorability or restorative reasons, and 19% were extracted because of a combination of restorative considerations and endodontic failures⁸. Similarly, in Vire's study, 59% of ETT were extracted for restorative reasons, 9% for endodontic failures, and 13% of ETT were extracted because of VRF⁹.

The aim of the present study was, beyond this cited literature, to study the possible influence of patient gender, tooth type, coronal restoration on the distribution of the reasons for extractions and the influence of any delay in placement of final coronal restoration on the extraction of ETT.

Significant association of female gender with extraction of ETT is in agreement with studies done previously when overall tooth loss is observed, patient's gender was reported as influencing factor^{10,11}.

There is highly significant association ($p < 0.00$) of extraction of ETT with delay of more than 60 days of placement of final coronal restoration after completion of RCT in this study. This study is in agreement with Pratt et al., who studied critical time lapse between placement of coronal restoration and RCT completion and concluded that this delay influence the survival rate of ETT negatively⁴. Our findings are also in agreement with several other studies who have studied the survival of ETT after completion of root canal treatment^{12,16}.

When we compared the reasons for extractions of molars and those of other teeth, the only significant difference was a higher prevalence of molars (55.9%) than premolars (48.9%) and anterior teeth (44%). This finding is similar to Tamse et al., who concluded higher prevalence of molars than other teeth¹⁷. The increased prevalence of VRF is reported to be due to presence of intracanal post (18). Our study is in disagreement with these findings. There is significant association of absence of post with extraction of ETT ($p < 0.00$).

Previous literature has concluded that final coronal restoration after completion of RCT affected the survival of these teeth^{3,19}. Such studies have reported that ETT without full coverage cast restorations were lost at a rate of 5-6-fold higher than fully covered teeth^{3,19,22}. In the present study marginally, significant association was found between presence of full coverage cast restoration (70.5%) when compared to composite restoration/ buildups (66.3%) ($p = .04$). This may be attributed to a higher sample size of our study as compared to other previous studies.

CONCLUSION

Endodontically treated teeth are prone to extraction mainly due to endodontic reasons and vertical root fractures when done by undergraduate students and to a lesser extent due to prosthetic related reasons, such as

restoration failure or fracture of coronal restorations. It is in patient's best interest to place the definitive coronal restoration as soon as possible after completion of RCT.

Author's Contribution:

Concept & Design of Study:	Muhammad Zubair Ahmad
Drafting:	Durr-e-Sadaf
Data Analysis:	Durr-e-Sadaf
Revisiting Critically:	Muhammad Zubair Ahmad
Final Approval of version:	Muhammad Zubair Ahmad

Conflict of Interest: The study has no conflict of interest to declare by any author.

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ACKNOWLEDGMENTS

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

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