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Editorial

Open Access

Advancing Global Rehabilitation: A New Era for Healthcare Professionals

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The field of rehabilitation is experiencing a profound shift as healthcare systems work to manage the growing prevalence of chronic diseases, disabilities, and age-related declines in function. Today, rehabilitation is acknowledged as an essential pillar of healthcare and a major factor influencing long-term independence and quality of life (1). This evolution reflects a broader change in how communities perceive health, participation, and overall well-being.

Much of this progress is being propelled by rapid technological advancement. Tools such as artificial intelligence, robotic rehabilitation systems, wearable biosensors, and immersive virtual reality are redefining how clinicians evaluate and treat patients. These innovations support more personalized, data-informed, and contextually appropriate interventions (2). As a result, rehabilitation practitioners must now develop new skill sets, including competence in digital technologies, collaborative clinical reasoning, and critical evaluation of emerging evidence.

Global health data further emphasizes the need to strengthen rehabilitation services. The Global Burden of Disease Study 2019 reports that 2.41 billion individuals are living with conditions that would benefit from rehabilitation — a 63% rise since 1990 (3). Musculoskeletal disorders continue to be the most significant contributors to disability, with low back pain remaining the top cause of years lived with disability worldwide (4). With populations aging, the incidence of neurological, cardiovascular, and functional decline is expected to escalate, making it crucial to expand the rehabilitation workforce, enhance standardized training, and promote high-quality research that supports sustainable service development.

This journal remains dedicated to supporting these global priorities by disseminating rigorous research, innovative clinical approaches, and forward-thinking educational models. Our vision is to strengthen the global rehabilitation community and foster a healthcare environment where practice is evidence-driven, digitally supported, and centered on patient needs. Ultimately, the future of rehabilitation extends beyond restoring abilities — it is about unlocking human capacity and contributing to a more inclusive and healthier world.

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Original Article

Open Access

Effect of corneal thickness between different degrees of refractive errors

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ABSTRACT

Background and Objectives: Eyes are the most important organ of human body which is responsible for the vision. enable individual to see, the ability to perceive image which provides information about vision, and enables many photo response functions that are not dependent on vision. The aim of this study is to compare the effect of central corneal thickness on myopic, hyperopic, astigmatic and emmetropes of different age groups. The study involves 60 subjects i.e myopia more than (<-8.0 D), hyperopia more than (< +4.0 D), and astigmatism more than (<-3 D).

METHODOLOGY: TThe central corneal thickness was measured with pachymeter and keratometer than all the data entered in Microsoft excel for statistical analysis. Study design will be descriptive cross sectional study design and use proposive sampling technique. Age group will be taken between 15 to 30 years. Exclusion criteria are keratoconus,mentally retared patients, nystagmus, corneal wrapage and wrinkling. Duration of study includes Oct 2020 to May 2021.This study is conducted in Madinah teaching Hospital and Allied Hospital FSD.

RESULTS: There was no significant difference between the myopic and hyperopic and emmetropic eyes of different age groups.

CONCLUSION: We assume that there is no correlation was found of central corneal thickness on different types of refractive error.

KEYWORDS: Degrees of astigmatism, LASIK and LASEK surgery, Refractive errors,

INTRODUCTION

The corneal refractive index approximately 1.376 D. Light of rays coming from cornea in the water like substance aqueous humor that has an refractive index of almost 1.336 D, so refracting process take place at level of interface of cornea and air(1).

The cells of the retina are works in the sunlight vision that enable an individual to see color in day time. The three different types of cones, each responding on different wavelength of light: blue, red, green. The cone enables the images in color and detail. Rods are the cells of retina which are responsible for the vision at night time. Retina is very light sensitive but does not show any sensitivity to color. The cones not perform their function in darkness at all. The lens is a clear just light mirror and biconvex part that enables the light converge on retina. It helps in elasticity of lens structure and contains two groups of muscles like sphincter and dilated muscles known as ciliary muscle. These muscles change the shape of lens and enable an individual to converge on different target positioned at various distances. (2) The converging power of lens is uncontrolled reflexive response which is not control by brain of human body. Focused image that is formed on retina, which converts light into nerve impulses. Through the optic nerve cells, nerve impulses may transmit this picture information to the brain (3).

Cornea is main refractive part of eye it provides about 2/3rd of refraction. In normal cornea, CCT varies. An average central corneal thickness is between 540 micro meter and 560 micro meter. Cornea is made of different kind of layers. They contribute in the thickness of cornea. Corneal epithelium total thickness measures about 50 to 60 µm. Bowman's layer measures about 8 to 12 µm in thickness. Stroma comprises most of the part of cornea.(4) Decrement's membrane measures about 10µm in thickness. A very thick

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cornea is 565 µm or greater, with thickercornea's higher than 600 µm. Corneal thickness increases with time because both the degree, symmetry and enantiomorphism automatically decreases. Corneal topography: A technique to monitor and determine the change that occurs to shape and structure of cornea of eye. (5)

Corneal thickness of 485 may beconsidered as normal, which was earlier thought to be a cut off for LASIK, you will be considered suitable for LASIK only in the absence of keratoconus, skew deviation, or readings of keratometer higher than 47.00 Diopters.

People with thin corneas, or those whose corneas are not shaped normally, are not good LASIK candidates. The same holds true for anyone with an especially strong eyeglass or contact lens prescription. That is because the LASIK procedure would remove too much of the cornea's thickness for vision correction (6-10).

The corneal consist of five layers, each layer of has important functions. Following layers are:

Topography can assist and recognize patients with irregular corneal surface related to ocular disease. Corneal topography provides a detailed, visual description and knowledge of the structure and power of the cornea. This type of information helps practioner with very minor details regarding the the corneal surface condition. These minor/fine details are useful to diagnose, monitor, and treat various eye conditions like corneal thinning, wrapage. Corneal topography is known a sphotokeratoscopy or videokeratography, is non-invasive painless imaging technique for plotting the anterior curvature of the cornea, the outer structure of the eye. This device will not touch your eye during the measurement. The practice of graphic delineation in detail usually on maps of natural and man-made features of a place or region especially in a way to show their relative positions and elevation

There are mainly two kinds of keratometers which is known as single position Helmholtz keratometers, which is more common and is able to adjust image size; and Javal-Schiotzkeratometers, two-position machines that able to adjust size of an object (11-14).

METHODOLOGY

Complete history of patients was taken like which type of refractive error patient have such as near sightedness or far sightedness, than clinically examine the patient with auto-refractometer and assess the degree of refractive errors they have like mild, moderate severe. Than readings were recorded on self structured performa, after note down the readings topography was performed. Procedure of topography involves the is patient to sit on the stool in front of the lighted bowl so topography can be performed .This lighted bowl contains the pattern of rings and rest patients head against the bar. During topography ask the patient to focus and place the chin on the chin rest and forehead against the forehead rest. Adjust the knob that is located on the topographic machine. Assure that patient open his eyes adequately. The video camera is hooked up to a computer that generates a topographic map of corneal curvature based on the measure distance between the rings reflected from the cornea. The accuracy of corneal curvature data processing depends a lot on the software editing features.Corneal topography utilizes 31 projected rings providing 7000 data points. The cornea coverge is 0.02-11.00mm with an accuracy of 0.10 Diopters .A 3-D corneal topography with enhanced resolution is formed.

Corneal topography provides intuitive maps and numerical data for the corneal surface and provides neural network assisted detection of corneal thickness and pathology. After analysis, the graphic picture of patient's topography is displayed in various forms. A series of points was collected and a color coded image of corneal shape was generated on computer screen Colour coded counter maps of the cornea are the most useful and most commonly used display formation. While interpreting colour coded counter maps of the cornea following points should be considerd.

The steep parts of the cornea are represented by hot colours such as red and its many tints. The flat parts of the cornea are represented by cool colours such as blue and its many tints. As a result, the colours red, orange, yellow, green, purple, and blue signify decreasing refractive power. The colour intensity is relative, which means that a 45 D region is less red than a 46 D area. it is very important to know about the scale which is used in corneal topography before interpreting a color coded map. The normal cornea flattened progressively from center to periphery by 2-4 diopters with the nasal area flattening more than the temporal area. The topographic pattern of the two corneas of an individual often shows mirror image symmetry, and small variations in pattern are unique for the individual. After comparing or analyzing both corneal pictures assess the central and peripheral corneal thickness Readings was recorded and then analyzed the thickness of cornea in different degrees of myopia, hypermetropia and astigmatism.

This cross sectional descriptive is carried out in Madinah Teaching Hospital Faisalabad. Patient with different refractive errors (Mild moderate severe) was

analyzed.

60 sample size was selected. Purposive sampling technique is used. Patient with nystagmus and kertoconus were excluded.

RESULTS

Total sample of 120 eyes were taken having different degrees of refractive errors at Madinah Teaching hospital Faisalabad. Refractive errors divided into three categories such as myopia,hypermetropia and astigmatism. Each refractive error is further divided into mild, moderate and severe.

Table 1:Distribution of central corneal thickness in myopes.

Corneal thickness of myopia		central corneal thickness			Total
		450-500	500-550	550-600	
degree of myopia	Mild (2-4)	12	10	0	22
	Moderate (4-8)	0	1	10	11
	Severe (<8)	0	0	7	7
Total		12	11	17	40

Table 2: Distribution of peripheral corneal thickness in myopes.

Peripheral corneal thickness myopia		periphral corneal thickness				Total
		550-600	600-650	650-700	< 700	
degree of myopia	Mild (2-4)	13	1	0	8	22
	Moderate (4-8)	0	1	3	7	11
	Severe (<8)	0	0	4	3	7
Total		13	2	7	18	40

Table 3:Distribution of central corneal thickness in hyperopes.

central corneal thickness of hyperopia		central corneal thickness			Total
		450-500	500-550	550-600	
degree of hyper-metropia	Mild (<2D)	9	6	3	18
	Moderate (2.25-5.00)	0	6	4	10
	Severe (<5.50)	0	5	7	12
Total		9	17	14	40

Table 4: Distribution of peripheral corneal thickness in hyperopes.

Peripheral corneal thickness of hypermetropia		periphral corneal thickness				Total
		550-600	600-650	650-700	above 700	
degree of hyper metropia	Mild (<2D)	9	6	3	0	18
	Moderate (2.25-5.00)	0	0	4	6	10
	Severe (<5.50)	0	3	2	7	12
Total		9	9	9	13	40

Table 5: Distribution of central corneal thickness

Central corneal thickness of astigmatism		central corneal thickness			Total
		450-500	500-550	550-600	
degree of astigmatism	Mild (0.6-2)	2	9	3	14
	Moderate (2-4)	0	2	10	12
	Severe (<4)	0	4	10	14
Total		2	15	23	40

Table 6: Distribution of peripheral corneal thickness.

Peripheral corneal thickness of astigmatism		peripheral corneal thickness				Total
		550-600	600-650	650-700	above 700	
degree of astigmatism	Mild (0.6-2)	0	2	3	9	14
	Moderate (2-4)	5	2	0	5	12
	severe(<4)	0	0	4	10	14
Total		5	4	7	24	40

DISCUSSION

The cornea is the most important refractive component of the eye, accounting for around two-thirds of optical refraction. The Central Corneal Thickness (CCT) of a healthy cornea ranges from 0.49 mm to 0.57 mm. In glaucoma, CCT plays a critical function.The real Intraocular Pressure (IOP) is underestimated when the average CCT is thin, while the true IOP is overestimated when the average CCT is thick. Patients with uneven corneal shape due to ocular surface disease might benefit from topography. Corneal topography creates a precise visual representation of the cornea's shape and power. This form of examination gives practitioners with extremely precise details on the state of the cornea

l surface. These details are utilised to diagnose, track, and treat a variety of eye diseases such as corneal thinning, wrapage, and so on. During the measurement, this gadget will not come into contact with your eye. The art or practise of graphically delineating natural and man-made features of a location or region in detail, generally on maps or charts, in order to indicate their relative positions and height (15)

The corneal topography apparatus comprises of a computer connected to an illuminated bowl with a ring pattern. The patient sits in front of the bowl with his or her head placed against a bar as a series of data points are collected during a diagnostic test.

Corneal topography generates understandable maps and numerical data for the corneal surface, as well as neural network-assisted thickness and disease identification. The graphic representation of the patient's topography is shown in several formats after analysis. (16-17) On a computer screen, a colour coded picture of corneal form was created from a sequence of points. The thickness of the cornea in myopia, hypermetropia, and astigmatism was meas At Ibn Al-Haitham Teaching Eye Hospital a cross sectional study was carried. A total of 418 eyes out of 209 healthy persons among the age range from 20 - 75 years were considered. Ultrasound pachymeter were used to measure CCT. Refraction was measured using an auto-refractor and confirmed by trial lenses and retinoscopy to calculate the spherical equivalent. An auto-refractokeratometer used to measure corneal curvature to calculate the average corneal curvature (AVK).The patients were divided into five age groups (10 years interval). The patients were classified according to refraction into three major groups: emmetropia (SE +0.25D to −0.25D), myopia (SE <−0.25D), and hypermetropia (SE >+0.25D). Then further sub classification of myopia into three groups: mild myopia (myopia <−3D), moderate myopia (myopia from −3D to <−6D), and severe myopia (myopia = or >−6D). Hypermetropia sub classified into two groups: mild–moderate hypermetropia (<+3D) and moderate–severe hypermetropia (≥ +3D).And mean CCT was 543.95±32.58 micrometer was the result of this study with a range from 422 to 636 micrometer. CCT was not affected by gender. CCT significantly negatively correlated with age and AVK. CCT significantly positively correlated with the spherical equivalence.Statistical analysis was performed using SPSS version 20. Discrete variables presented as numbers and percentages and continuous variables presented as mean ± standard deviation. Pearson's correlation coefficient was used to test the correlations. Independent sample t-test was used to test the mean difference between two independent samples, and analysis of variance test with post hoc Tukey's test for >2 independent samples; P-value of <0.05 was considered statistically significant (18).

Same relationship reported by francis who discovered that CCT has relation with refractive error and myopes have the thinnest CCT (449.65±39.27 micrometer), followed by emmetropes (542.66±46.35 micrometer) and hyperopes (557.67±41.83 micrometer). This is compatible with the findings of Nemesure et al who discovered that CCT was direct in relation with refractive error. No significant difference in the mean CCT was found in this study when the myopia subclassifications were compared (18-20).

Other studies have opposite results. Price et al found no relation between CCT and refraction. Similarly, Ortiz et al, in 175 myopic eyes found the relationship between the CCT and the degree of myopia. Among the myopic groups in their study, they did not find statistically important differences in CCT. In contact no wearers and wearers, Liu and Pflugfelder found no relationship between CCT and the degree of myopia in corneal thickness. Among emmetropes and myopes, Pederson et al come to an end that there was no statistical difference in CCT (21-22).

CONCLUSION

The result of this research shows that is strong relation between different degree of refractive errors such as myopia hypermetropia and astigmatism and it is necessary to check the effect of corneal thickness before prior to any kind of refractive surgery such as LASIK and LASE K because it involves corneal ablation which ultimately leads to changes in corneal thickness.

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Original Article

Open Access

Effect of Nursing Intervention for knowledge regarding infection control measures among health care workers

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ABSTRACT

Background and Objectives: This study investigates the impact of educational interventions on nurses' knowledge concerning the infection control measures. The aim was to evaluate whether structured educational session could enhance the awareness levels among health care worker, thereby improving infection control measures.

METHODOLOGY: A quasi-experimental design was employed, involving 40 health care workers from one hospital the group received a comprehensive program that included simulation-based training adherence to safety protocol, encompassed various strategies such as hand hygiene promotion and proper use of personnel protective equipment's and post sessional data were collected through surveys over a four months period.

RESULTS: The result shows a significant improvement in compliance with infection control measures ($p<0.001$). knowledge score about infection control measures improved markedly ($p<0.001$) among healthcare worker who received an intervention. The mean pre knowledge score (47.80) is significantly lower than the mean post knowledge score (65.30) after the post intervention the healthcare workers knowledge lied in good category which was 60% to 75%.

CONCLUSION: The educational intervention significantly enhanced the knowledge among health care workers regarding the infection control measures. Pre intervention awareness was relatively low but the structure education session effectively elevates the healthcare workers understanding and satisfaction. The study methodology and results highlight the effectiveness of targeted educational programs in healthcare settings, suggesting that similar interventions could be beneficial in other medical domains to improve professional competency and patient outcomes' regarding infection control measures.

KEYWORDS: Educational intervention, infection control measures, healthcare workers, knowledge improvement, hand hygiene promotion, personal protective equipment.

INTRODUCTION

Healthcare-acquired infection (HAI) control techniques and treatments are increasingly necessary for a growing population. Thus, there is an urgent need to implement procedures to assess the quality of care in this territory. Infection control and prevention in hospital settings are the main goals of infection prevention care, aiming to minimize the harm caused by HAI and ensure patient safety.

The World Health Organization (WHO) has developed a framework for infection prevention and control (IPC). This framework is critical as it addresses the prevention of pathogen transmission and ensures safety within healthcare facilities. Healthcare-associated infections can develop in patients during treatment in hospitals or other healthcare institutions, becoming apparent 48 hours or more after admission or within 30 days post-treatment.

The global rate of HAIs has increased, posing significant public health hazards. Numerous studies highlight the need for healthcare workers (HCWs) to adhere to standard precautions to prevent the spread of infectious diseases. These precautions include hand hygiene, environmental cleansing, disinfection, proper use of personal protective equipment (PPE), medical waste management, safe injection techniques, and respiratory hygiene.

The practice of nursing education, accessible and affordable IPC interventions, and capacity develop

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ment through teaching healthcare workers about IPC fundamentals can prevent HAIs. However, adherence to IPC practices among HCWs remains suboptimal due to knowledge deficits, lack of training, and attitudinal barriers. This study evaluates the effects of structured nursing interventions on HCWs' knowledge and adherence to infection control measures, aiming to improve patient outcomes by reducing HAIs.

Literature Review

Previous Studies and Findings:

1. Al-Faouri, Okour et al. (2021):
- Majority of participants from governmental hospitals.
- Moderate positive correlation between knowledge level, years of experience, and standard precautions compliance.

2. Senbato, Wolde et al. (2024):
- Training, awareness of standard precautions, hospital enforcement mechanisms, and availability of cleaning chemicals significantly associated with compliance.

3. Blomgren, Swenne et al. (2024):
- Moderate to good knowledge levels among first-semester students, last-semester students, and registered nurses.

4. Saqlain, Munir et al. (2020):
- Good knowledge, positive attitude, and good practice towards COVID-19 among HCWs.

5. Modi, Nair et al. (2020):
- Adequate awareness of infection control measures, but gaps in understanding of specific procedures like correct sequence for mask application and preferred hand hygiene methods.

Overall, HCWs generally have adequate knowledge of IPC measures, but gaps remain in specific areas such as occupational vaccinations and transmission modes of infectious diseases. Improving adherence to IPC guidelines through targeted educational programs is crucial.

OBJECTIVES

- To assess the effect of nursing intervention on knowledge regarding infection control measures among healthcare workers.

METHODOLOGY

A quasi-experimental study was conducted at Ali Fatima Hospital involving 40 healthcare workers. Purposive sampling was used to select the sample size. Data were collected through self-administered questionnaires before and after the intervention. The intervention included a one-day educational session based on NICE guidance, using methods such as role demonstrations, hands-on training, and visual aids. Participants' consent was obtained, and data privacy was ensured. The study complied with ethical codes and standards. Data were analyzed using SPSS version 26.0 and MS Excel. Descriptive and inferential statistics were used, including paired t-tests to determine the significance of the results.

RESULTS

In this chapter data analysis and data interpretation was discussed by the tables and graps.a table shows that the demographics, independent and dependent variables frequencies along with t.test analysis.

Table 1: Percentage and frequency of demographic variables.

Age and year			
		Frequency	Percent
	18-21	9	22.5
	21-24	19	47.5
	24-27	12	30.0
	Total	40	100.0
Gender			
		Frequency	Percent
	Female	40	100.0
Education			
		Frequency	Percent
	Matric	8	20.0
	Bachelor	17	42.5
	Master	15	37.5
	Total	40	100.0

The sample consist of 40 participants ,with 22.5 % (9 participant) aged between 18-21 years , 47.5% (19 participants) aged between 21-24 years and 30%(12 participants) aged between 24- 27 years .All participants in this study are emale 100%.20%(8 participants) hold a matric degree,42.5% (17 participants) hold bachelor degree , while 37.5 % (15 participants) have master degree.

Table 2: T-Test (Paired sample test)

Paired Samples Statistics				
		Mean	N	Value of p
Pair 1	Pre knowledge	47.80	40	<0-001
	Post knowledge	65.30	40	

The mean difference between pre- and post-seminar knowledge scores is -17.500.The standard deviation of the differences is 11.919, with a standard error mean of 1.884. The 95% confidence interval for the mean difference ranges from -21.312 to -13.688. The t-value is -9.286, with 39 degrees of freedom. The p-value (Sig. 2-tailed) is .000, indicating a statistically significant improvement.

The significant increase in knowledge scores from

pre-seminar (mean = 47.80) to post- seminar (mean = 65.30) demonstrates the effectiveness of the nursing seminar in enhancing nurses' knowledge about infection control measures. The highly significant p-value of .000 indicates that the improvement in knowledge scores is not due to chance but is a result of the seminar intervention. The negative mean difference (-17.500) indicates a considerable increase in knowledge following the seminar. This suggests that the seminar successfully addressed knowledge gaps and improved nurses' understanding of infection control measures. The 95% confidence interval for the mean difference does not include zero, indicating that the improvement in knowledge is statistically significant.

The findings suggest that the nursing seminar had a significant positive effect on nurses' knowledge about infection control. By increasing awareness and understanding of these important topics, the seminar likely contributes to better patient education and improved health outcomes related to hospital acquired infection. Participants showed considerable variability in responses across different questions, indicating diverse opinions and attitudes. The paired t-test results confirmed a significant increase in knowledge scores post-intervention.

DISCUSSION

A study by (Al-Faouri, Okour et al. 2021) revealed that the 53% of the participants were from governmental hospitals and 57.1% were females. The age median of them was 30 years (IQR = 28–32). The majority of the participants were medical/surgical RNs (33.1%) while only

8.3% of them were from the pediatric/gynecology departments. The overall knowledge score was

16.27 (SD = 3.15), and the total compliance score was

49.15 (SD = 12.36). Besides, the study showed a moderate positive correlation between the level of knowledge, experience in years, and the standard precautions compliance (r = 0.387, p = 0.01), (r = 0.341, p = 0.01), respectively.

While our study contrast represent the positive correlation, the negative mean difference (17.500) indicates a considerable increase in knowledge following the seminar. This suggests that the seminar successfully addressed knowledge gaps and improved nurses' understanding of infection control measures. The 95% confidence interval for the mean difference does not include zero, indicating that the improvement in knowledge is statistically significant. The findings suggest that the nursing seminar had a significant positive effect on nurses' knowledge about infection control. By increasing awareness and understanding of these important topics, the seminar likely contributes to better patient education and improved health outcomes related to hospital acquired infection.

CONCLUSION

The educational intervention significantly improved the knowledge of healthcare workers regarding infection control measures. Pre-intervention awareness was low, but the structured educational session effectively enhanced understanding and satisfaction. This study underscores the effectiveness of targeted educational programs in healthcare settings, suggesting their potential benefit in other medical domains to improve professional competency and patient outcomes concerning infection control measures.

RECOMMENDATION

- Moving forward, several areas warrant attention to further enhance the efficacy of nursing interventions for infection control measures among health care workers.
- Nursing intervention should focus on building resilience, capacity, and response mechanism to mitigate the spread of infectious disease.

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Original Article

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Prevalence of Gestational Diabetes among Pregnant Women

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ABSTRACT

Background and Objectives: Diabetes that is initially identified during pregnancy is known as Gestational Diabetes. An increased incidence of Type 2 diabetes in mothers and their offspring is associated with gestational diabetes, a condition that poses a significant risk to both parties. To determine the prevalence of Gestational Diabetes among Pregnant Women, frequency of Gestational Diabetes in Pregnant Women on the Basis of Age and frequency of Gestational Diabetes in Pregnant Women on the Base of Trimester.

METHODOLOGY: A retrospective study was conducted in the Gynecology Department of Ali Fatima Hospital Lahore, Punjab. The study was conducted during the 3 months from May to July, 2024. We examined 170 expectant mothers aged between 26 to 45 years. We compared 12 pregnant women diagnosed with diabetes (7.1%) with 158 pregnant women who were not diagnosed (92.9%). A self-designed Performa was used to collect the patient data. Data were entered and analyzed by using excel and displayed by using Tables and Bar Charts.

RESULTS: We utilized the oral glucose tolerance test (OGTT) to determine the prevalence of gestational diabetes. Among the 158 pregnant women without diabetes, 12 (7.1%) were found to have gestational diabetes. The age range of pregnant women diagnosed with gestational diabetes varied from 15 to 45 years. Most instances of gestational diabetes are detected in the second and third trimesters of pregnancy.

CONCLUSION: The conclusion of this study is that the frequency of gestational diabetes is significantly influenced by age. Therefore, it is recommended that expectant mothers undergo an oral glucose tolerance test (OGTT) during the latter part of pregnancy to screen for gestational diabetes.

KEYWORDS: Gestational diabetes, Oral glucose tolerance test (OGTT), Gynecology, Trimester.

INTRODUCTION

The pancreas releases the hormone insulin, which is used by the body to metabolize blood sugar. Insulin is released when blood glucose levels are high, facilitating the body's utilization of glucose. Different types of diabetes are studied over period of time which include diabetes insipidus, diabetes mellitus type 1, diabetes mellitus type 2 and gestational diabetes(1). Gestational diabetes refers to a situation where women who haven't been determined to have of gestational diabetes, contributing to the development of subsequent medical knowledge in this area diabetes before pregnancy experience irregular blood sugar levels during their pregnancy. Gestational diabetes mellitus (GDM) was first portrayed in 1823 by the German doctor Heinrich Bennewitz, who depicted thirst and polyuria in a pregnant lady. He thought about that diabetes really was a side effect of the pregnancy, since the side effects and the glycosuria vanished after pregnancy. Bennewitz noted a correlation between these symptoms and the delivery of a large stillborn baby. His findings marked a pivotal moment in understanding the signs, symptoms, and consequences(2). Gestational diabetes mellitus (GDM) can characterize as A1 Gestational Diabetes Mellitus (A1GDM) and A2 Gestational Diabetes Mellitus (A2GDM). Gestational diabetes oversaw without prescription and receptive to wholesome treatment is diet-controlled gestational diabetes (GDM) or A1GDM. On the opposite side, gestational diabetes dealt with medicine to accomplish sufficient glycemic control is A2GDM(3). Insulin resistance can be brought on by things like weight gain, hormone changes, and molecules the placenta releases that disrupt the way insulin works(4). Ladies with gestational diabetes mellitus (GDM) have just

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somewhat raised glucose levels, others might encounter essentially undeniable levels. Women with unmanaged gestational diabetes are at a more serious gamble of encountering unfavorable pregnancy results, and both mother and infant are at expanded chance of creating type 2 diabetes later in life(5).

Gestational diabetes is a state that is caused by a variability of circumstances. Macrosomia, polycystic ovarian syndrome, hypertension, either essential or related to pregnancy, a history of spontaneous abortions or inexplicable stillbirths, a family background of diabetes, obesity, age greater than 25, persevering glucosuria, and a previous instance of GDM in an earlier pregnancy are approximately of the most common(6). Gestational diabetes usually doesn't cause any perceptible signs. If blood sugar levels rise significantly, it may lead to problems such as fatigue, real weakness, or polydipsia, which are common in various forms of diabetes. Furthermore, older women are at a higher risk of developing gestational diabetes(7). Oral glucose tolerance test (OGTT), fasting blood sugar (FBS), and random blood sugar (RBS) are the three methods used to detect gestational diabetes mellitus (GDM). Normal values of these parameters are <140 mg/dl, <100 mg/dl, <110 mg/dl respectively(8). In 2021, According to the International Association of Diabetes and Pregnancy Study Groups (IADPSG), the prevalence of Gestational diabetes mellitus (GDM) was reported to be 14.7% globally(9). According to previous studies in Pakistan, the prevalence percentage of Gestational Diabetes diverse from 4.41% to 57.90% and increased day by day(10).

Pregnancy is the physiological condition in which a female mammal carries a developing embryo or fetus within her uterus. In human pregnancy, it typically lasts about 40 weeks from the last menstrual period (LMP) to childbirth. The phases of a human pregnancy are commonly divided into three segments by obstetricians and patients referred to as "trimesters." This system seems to stem from the division of the "9 months of pregnancy" into three-month intervals(11). During pregnancy, various hormonal and physical changes occur in the mother's body to assist the fetus's growth and development. These changes comprise but are not deficient to increase in weight, changes in hormone levels, enlargement of the uterus, and development of the placenta to provide oxygen and nutrients to the fetus(12). Women who have never had diabetes before may develop gestational diabetes mellitus (GDM) during pregnancy, marked by higher blood sugar levels. In a typical pregnancy, hormones like human placental lactogen and prolactin prompt the growth of pancreatic B-cells, leading to increased insulin production. However, insulin resistance is induced by the production of several hormones from the placenta, including progesterone, growth hormone, corticotropin-releasing hormone, and placental lactogen. Despite the increased insulin production from B-cell growth, Gestational Diabetes arises when the body struggles to overcome this insulin resistance brought on by pregnancy(13).

METHODOLOGY

It was a retrospective study. Data was collected from the Gynecology Department of Ali Fatima Hospital Lahore, Punjab. Total 170 samples of pregnant women were collected from the Gynecology Department of Ali Fatima Hospital Lahore, Punjab. Pregnant Women were included. A Performa were used to collect patient data of diabetes mellitus type 1 patients. Aseptic phlebotomy procedures were used to obtain intravenous blood samples from diabetes type 1 patients. The examination of glucose levels and Oral Glucose Tolerance Test (OGTT) were performed using different methods. The methods and instruments we used for analysis were Microlab 300 and Cobas C 311.

Microlab 300 uses the concepts of photometry and spectrophotometry to measure a sample's absorbance of light at a particular wavelength. Absorbance is proportional to the concentration of the analyte. Cobas C 311 works on the principles of spectrophotometry, particularly the Beer-Lambert Law. As stated by this law, the level of light absorbed by a sample corresponds directly to the concentration of the substance it contains. In addition to spectrophotometry, Cobas C 311 also follows the principles of potentiometry and ion selective electrode (ISE).

Data were entered and analyzed by using excel for statistical analysis. Tables and Bar charts were used to display the data.

RESULTS

The research was carried out in the Ali Fatima Hospital, Lahore, Punjab. A group of 170 individuals, including 81 from 2nd trimester (47.6%) and 89 from 3rd trimester (52.4%), were examined to detect the existence of Gestational Diabetes.

Table 1 Trimester based Distribution of Pregnant Women

2nd Trimester	3rd Trimester	Total
81 (47.6%)	89 (52.4%)	170 (100%)

Among the group of 170 pregnant women, total of 81 pregnant women (47.6%) were between the ages of 15-25 years. Furthermore, within the study, 79 pregnant women (46.4%) fell into the 26-35 Years age range. Additionally, there was 9 pregnant women (5.2%) who belonged to the 36-45 Years age group and 1 pregnant woman (0.5%) from 46-65 age group.

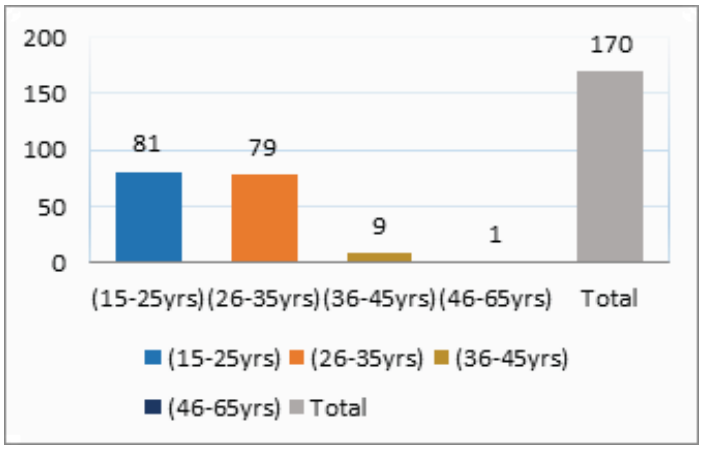

Figure No.1 Age based Distribution of Pregnant Women

A group of 170 individuals, including 12 Gestational Diabetic women (7.1%) and 158 Non¬-Gestational Diabetic women (92.9%), were examined to detect the existence of gestational diabetes.

Table No.2 Prevalence of Gestational Diabetes

Total	Gestational Diabetic Women	Non-Gestational Diabetic Women
170	12 (7.1%)	158 (92.9%)

Among the group of 170 pregnant women, a total of 81 pregnant women (47.6%) belonged to the 2nd trimester, comprising 5 Gestational Diabetic and 76 Non¬-Gestational Diabetic pregnant women. Furthermore, within the study, 89 pregnant women (52.4%) fell into the 3rd trimester, consisting of 7 Gestational Diabetic and 82 Non¬-Gestational Diabetic pregnant women.

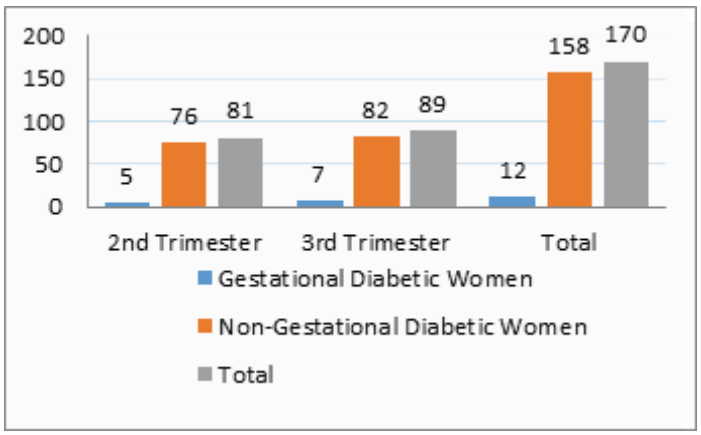

Figure No.2 Prevalence of Gestational Diabetes in Different Trimester

Among the group of 170 pregnant women, a total of 82 (48.2%) pregnant women with 1 Gestational Diabetic and 81 Non-Gestational Diabetic pregnant women were between the ages of 15-25 years. Furthermore, within the study, 78 (45.9%) pregnant women comprising 7 Gestational Diabetic and 71 Non-Gestational Diabetic pregnant women were between 26-35 years of age. Additionally, there were 9 (5.3%) pregnant women with 4 Gestational Diabetic and 5 Non-Gestational Diabetic pregnant women who belonged to the 36-45 years age group, and 1 (0.6%) pregnant woman was Non-Gestational Diabetic between 46-65 years of age group.

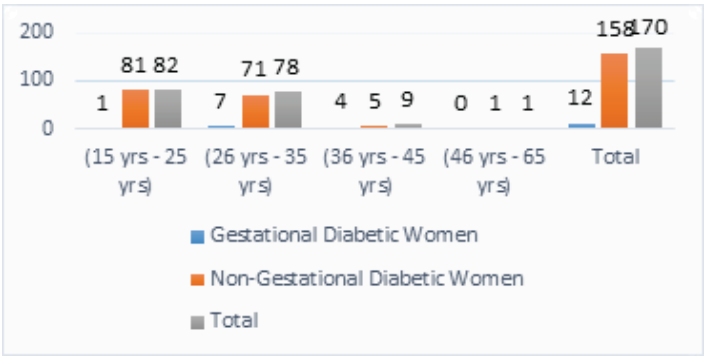

Figure No.3 Prevalence of Gestational Diabetes in Different Age Group

DISCUSSION

Pregnant women who do not have a prior history of diabetes may develop gestational diabetes. A metabolic condition characterized by newly onset hyperglycemia that typically resolves after childbirth. This condition arises because the mother's pancreas cannot meet the increased insulin requirements during pregnancy. During pregnancy, the body becomes less responsive to insulin, prompting the pancreatic beta cells to produce more of it. Insulin plays a crucial role in aiding glucose absorption by peripheral tissues, reducing glucose construction in the liver, and controlling the release of fat from adipose tissue.

Aditi Chakraborty et al. in 2024, the incidence of gestational diabetes between women in India rose from 0.53% in 2015-2016 to 0.80% in 2019-2020. This increase was noted in most regions, with a few exceptions. The occurrence of gestational diabetes varies with age, showing lower frequencies in women aged 15-19 and 25-29 years, and the highest frequencies in those aged 40-44 years(14). Sumi Singh et al. in 2022, among 3034 women treated at the tertiary hospital, the frequency of gestational diabetes was initiate to be 104 (3.42%) (with a confidence interval of 2.57-4.26 at nearly 100% certainty). The majority of these women were over the age of 30, comprising 69 (66.34%) of the cases. Out of these, 48 (46.15%) women had a history

of diabetes mellitus in their families(15). Tahziba Hussain et al. in 2020, diabetes was more frequent among younger, sedentary, overweight pregnant women residing in slum areas. Many pregnant women from slums and rural regions visit government hospitals because they are part of the State government's Mamata initiative. Out of 1557 expectant mothers, 154 were diagnosed with diabetes, indicating a prevalence of 9.89%. Compared to studies presented in other areas of the country, this occurrence is relatively modest(16).

Nuriye Buyukkayaci Duman et al. in 2015, a study investigated gestational diabetes in a cohort of 650 expectant mothers, identifying that 45 of them (6.9%) were diagnosed with gestational diabetes. The researchers established a statistically significant link between gestational diabetes and factors like older maternal age, family medical history, and body mass index (BMI). However, they did not find any notable connections with pregnancy frequency, gravidity, parity, or the count of live births(17). Rajesh Rajput et al. in 2013, a study focused on how common gestational diabetes mellitus (GDM) is and the factors that might cause it, like being overweight or obese, having had GDM in a previous pregnancy, and not being physically active. A total of 607 women took part in the study. GDM was found in 43 (7.1%) women's using ADA standards. The rate of GDM was higher in women aged 26-30 and over 30 years compared to those aged 16-20 and 21-25 years(18).

V Seshiah et al. in 2004, the study focused on the causes of Gestational Diabetes. A total of 1251 pregnant women underwent an initial 50 gm-1 hr test. Among them, 669 (53.5%) tested positive. Later, 891 (71.2%) women proceeded to the follow-up 75 gm-2 hr test. Among those who tested positive initially, 548 (81.9%) underwent the follow-up test, whereas among those who tested negative initially, 343 (58.9%) underwent the follow-up test. The strong correlation between testing positive on the initial 50 gm-1 hr test and undergoing the consequent 75 gm-2 hr test was quantifiably important (Mantel-Haenszel odds ratio after adjustment for age: 3.14, $\chi 2$ (df=1) = 78.067)(19). Ardawi MS et al. in 2000, a total of 289 female participants had plasma glucose levels higher than 7.2 mmol/L after completing the 50-g glucose challenge test. Following the Public Diabetes Information Gathering symptomatic guidelines, 102 of the 289 female participants selected for the 100-gram oral glucose resistance test had positive test results, indicating gestational diabetes mellitus, and 187 were deemed to have negative test results. Because of this, gestational diabetes mellitus affects 12.5% of women(20).

Our study is similar to these studies because our findings revealed that 7.1% of the 170 pregnant women tested positive for gestational diabetes. The age range of pregnant women diagnosed with gestational diabetes varied from 15 to 45 years. Most instances of gestational diabetes are detected in the second and third trimesters of pregnancy.

CONCLUSION

Women who do not manage their gestational diabetes effectively are more likely to have problems during their pregnancy, and both the mother and the child have a higher chance of developing type 2 diabetes later in life. Hence, early detection and diagnosis are crucial, pregnant people and healthcare practitioners need to be aware of and comprehend the available effective management and preventative techniques.

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Original Article

Open Access

Analysis of Prothrombin Time in Hepatitis C Patients

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ABSTRACT

Background and Objectives: Various clotting proteins are synthesized in the liver and any impairment in the liver results in multiple coagulation abnormalities. To determine the prevalence of increased level of Prothrombin Time (PT) in patients with cirrhosis and to compare the levels of Prothrombin Time along with International Normalized Ratio (INR) in patients of Hepatitis C with and without Liver Cirrhosis.

METHODOLOGY: A retrospective study was conducted in Sheikh Zaid Hospital, Lahore in the Gastroenterology department. The study was conducted during the 3 months from May to July, 2023. The study involved 80 patients, out of which 43 were females and 37 were males with multiple age groups ranging from 30 to 85 years. These patients were further divided into 55 patients with Hepatitis C without liver cirrhosis and 25 patients with Hepatitis C with liver Cirrhosis. Immuno-Assay Special Chemistry Analyzer (Access 2) and Sysmex CS-1600 were used to detect the HCV positive patients and to analyze the coagulation profile. A self-designed Performa was used to collect the patient data. Data were entered and analyzed by using excel and displayed by using Tables and Bar Charts.

RESULTS: The results indicated that out of 80 patients Prothrombin Time (PT) was normal in 26 patients of Hepatitis C without Cirrhosis, high in 34 patients of Hepatitis C with and without Cirrhosis, and extremely high in 10 patients of Hepatitis C with Cirrhosis. Similarly, International Normalized Ratio (INR) was normal in 14 patients of Hepatitis C without Cirrhosis, high in 59 patients of Hepatitis C with and without Cirrhosis, and abnormally high in 7 patients of Hepatitis C with Cirrhosis.

CONCLUSION: The conclusion of this study is the abnormalities in the coagulation parameter like Prothrombin Time (PT) depend on the severity and intensity of liver disease.

KEYWORDS: Prothrombin Time (PT), International Normalized Ratio (INR), Hepatitis, Cirrhosis, Coagulation Profile.

INTRODUCTION

Hepatitis, a common liver disease, is caused by Hepatitis A, B, and C viruses. In Pakistan, the prevalence of Hepatitis C and B is particularly high, contributing to the overall incidence of the disease. About 10 million population of Pakistan is infected with Hepatitis C carries(1). The Hepatitis C Virus (HCV), which belongs to the Flaviviridae family and has six genotypes, is responsible for causing Hepatitis C. HCV is an enveloped RNA virus with a single-stranded positive polarity(2). Hepatitis C Virus (HCV) affects the liver by destroying the hepatocytes. It is also known as the "Insidious virus" or "silent killer" because the disease usually remains asymptomatic and symptoms appear after 10-15 years of the onset of the disease. It is a "blood borne virus" and can be transmitted through used syringes, unsafe injection practices, piercing, unscreened blood transfusion and sexual contacts. It usually causes chronic illness which leads to Hepatocellular Carcinoma and Liver Cirrhosis(3). The incidence of HCV in the pediatric population is 0.13%(4). In Pakistan, around 6% of the population is infected with HCV, with the predominant genotypes being 3a (58.16%), and 3b (9.05%), followed by un-typable genotypes(5).

When Hepatitis is not treated or prevented the liver becomes damaged and does not come back to its

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normal structure and can lead to Cirrhosis. When normal cells are placed with the scarred tissues (fibrotic tissue and regenerative nodules) then this is called Liver Cirrhosis(18). The chronic phase after Hepatitis is Liver Cirrhosis. Cirrhosis is also caused by high alcohol consumption, non-alcoholic fatty liver disease, autoimmune disorders, obesity, and iron and copper overload(6). Hepatitis C patients are at threat of thrombotic complications, they have high abnormalities in routine tests of coagulation like prolonged Prothrombin Time (PT), International Normalized Ratio (INR) and aPTT along with a mild decrease in platelet count. The severity of coagulation disorder is estimated by Prothrombin Time (PT)(7).

Prothrombin is a protein formed in the liver. The high value of Prothrombin Time (PT) indicates that our liver is not making the right number of clotting proteins, that's why it takes longer for a blood clot. It means that there is serious liver damage(8). Prolonged prothrombin time usually indicates chronic illness of the liver such as advanced liver Cirrhosis and Hepatitis(9). International Normalized Ratio (INR) ensures that your Prothrombin Time (PT) results are standardized or not (20). It is a ratio derived from prothrombin time that can be calculated as the ratio of patient Prothrombin Time (PT) to control Prothrombin Time (PT).(19) The patients with liver failure or injury have elevated International Normalized Ratio (INR). International Normalized Ratio (INR) could reflect the degree of liver dysfunction and predict the mortality of acute and chronic liver disease(10).

METHODOLOGY

It was a retrospective study. Data was collected from Gastroenterology department of Sheikh Zaid Hospital Lahore, Punjab. Total 80 samples of Hepatitis C were collected from Sheikh Zaid Hospital. Patients of Hepatitis C with and without Cirrhosis was included. Intravenous blood samples were collected from the patients of Hepatitis C by using aseptic phlebotomy techniques. A Performa were used to collect patient data of Hepatitis C patients. Different methods were used for detection of HCV positive patients and for the analysis of coagulation profile. The methods and instruments, we used for analysis, were Immuno-Assay Special Chemistry Analyzer (Access 2) and Sysmex CS-1600.

Beckman Coulter Access 2 is an automated immuno-assay system. It works on the principle of enzyme-mediated chemiluminescence. The Sysmex CS-1600 is an automated coagulation analyzer used to perform variety of coagulation tests like Prothrombin Time (PT), aPTT, fibrinogen, D-Dimer. It processes up to 180 samples per hour and has sample capacity of 50 tubes. The principle is based on photo-optical detection and clotting time determination. Data were entered and analyzed by using excel for statistical analysis. Tables and Bar charts were used to display the data.

The study does not include the patients of Hepatitis B and other diseases of liver except Hepatitis C and Liver Cirrhosis. Except Prothrombin Time (PT) and International Normalized Ratio (INR) the other coagulation parameters (aPTT, D-Dimer, fibrinogen, anti-thrombin) are not included in the study.

RESULTS

This study was conducted on patients of Hepatitis C from Gastro-Enterology department of Sheikh Zaid Hospital.Total 80 patients were included in this study. Out of which 43(54%) were females and 37 (46%) were males with multiple age groups. These 80 patients were further divided into two groups: Hepatitis C positive patients without Liver Cirrhosis having 55 patients with 25(45%) males and 30(55%) females and Hepatitis C positive patients with Liver Cirrhosis having 25 patients with 12(48%) males and 13(52%) females.

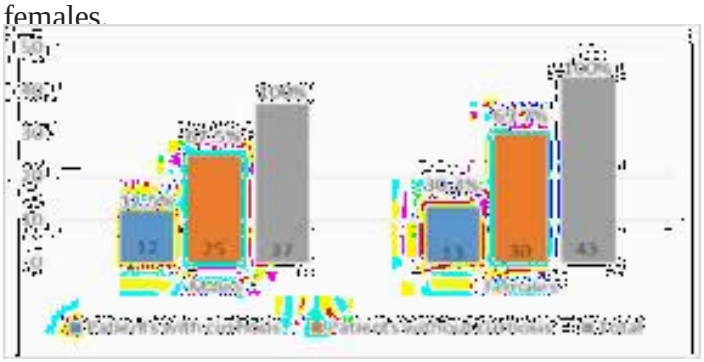

Figure 1 Gender Based Classification of Patients According to Cirrhosis

Out of 80 patients the Prothrombin Time (PT) was normal in 32.5% of patients (without Cirrhosis with range of 10-15 seconds, high in 55% of patients of Hepatitis C with and without Cirrhosis having range of 16-25seaconds and extremely high in 12.5% of patients having range 26-35 seconds with liver Cirrhosis. Prothrombin Time (PT) is affected more in patients with Cirrhosis than without Cirrhosis.

Table 1 Prothrombin Time (PT) range in Hepatitis C patients

PT ranges (seconds)	No. of Patients (Without Cirrhosis)	No. of Patients (With Cirrhosis)	Percentage%
26-35	0	10	12.5%
10-15	26	0	32.5%
16-25	29	15	55%

The results showed that out of total 80 patients International Normalized Ratio (INR) was normal in 18% patients without Cirrhosis (having ratio of 0.8-1.0), high in 73% patients with and without Cirrhosis (having ratio of 1.1-2.0) whereas extremely high in 9% patients with Cirrhosis (having ratio of 2.1-3.0). According to results International Normalized Ratio (INR) was significantly higher in patients with Cirrhosis than in patients without Cirrhosis.

Table No.2 International Normalized Ratio (INR) range in Hepatitis C patients

INR Ratio Range	No. of Patients (Without Cirrhosis)	No. of Patients (With Cirrhosis)	Percentage%
2.1-3.0	0	7	9%
0.8-1.0	14	0	18%
1.1-2.0	41	18	73%

DISCUSSION

Various diseases which effect the liver are Hepatitis, Cirrhosis, non-alcoholic fatty liver disease and liver failure. The most common disease of liver is Hepatitis B; Hepatitis C whose chronic stage is liver Cirrhosis if these left untreated severity level increases. In the mid-20th century, the Prothrombin Time (PT) and International Normalized Ratio (INR) are used for the prognosis and progression of liver disease. The liver synthesis almost all clotting factors and their inhibitors and the disease is characterized by reduced production of pro-coagulants and anti-coagulants proteins. The deficiency in these proteins or coagulants affects the coagulation parameters like Prothrombin Time (PT), International Normalized Ratio (INR) and to a lesser extent aPTT. The patients of Hepatitis C and Cirrhosis indicates the prolonged Prothrombin Time (PT), International Normalized Ratio (INR) with mild decrease in platelets.

The study in 2013 conducted by Sura O. Al-Dewanchi and colleagues had revealed that there was a significant increase in the coagulation parameters of liver diseases. He took 50 patients with 38 of Cirrhosis and 12 of chronic Hepatitis. The results showed Prothrombin Time (PT), and International Normalized Ratio (INR) was high in patients of Hepatitis and Cirrhosis up to 3 folds. And the fibrinogen level reduced in patients with chronic liver diseases(11). The previous studies revealed significant prolongation of Prothrombin Time (PT), and increasing International Normalized Ratio (INR) in patients with chronic liver disease. These findings are similar with other medical researches(12, 13). Ratika Pramod et al. in 2020 conducted study on 102 patients with liver disease. The study assessed Prothrombin Time (PT), D-Dimer levels, and platelet count. The results revealed abnormal PT values in the patients. It was observed that PT levels and positive plasma D-Dimer levels significantly increased with the severity of liver disease(14).

Another similar study conducted in 2019 by Tarun Kotadiya et al. concluded that out of 100 patients of various liver disease (40 with Cirrhosis, 40 with Hepatitis and 20 with obstructive jaundice) 75% of patients had prolonged Prothrombin Time (PT)(15). Faut H. Saner and Carmen Kirchner both studied on monitoring and treating coagulation disorder in End Stage Liver Disease in 2016. Patients with ESLD (end stage liver disease) were subjected to perform their standard lab tests. Pathological values of these test indicating high risk of bleeding in these patients. Results showed that there was 1.5-fold increase in INR, PT, aPTT and platelets was <50/nl(16).

Ozlem kandemir et al. in 2009 studied the role of AST level, prothrombin time and platelet count in Hepatitis C patients with liver fibrosis. Over-all 68 patients are included in this study. All cases had increased ALT and AST level, platelet count was found to be significantly lower which means increased in degree of fibrosis of liver and prolonged PT in chronic Hepatitis C patients(17).

Our study is comparable to these studies as our results indicated that out of 80 patient's PT was normal in 26 patients of Hepatitis C without Cirrhosis, high in 34 patients of Hepatitis C with and without Cirrhosis and extremely high in 10 patients of Hepatitis C with Cirrhosis. Similarly, International Normalized Ratio (INR) was normal in 14 patients of Hepatitis C without Cirrhosis, high in 59 patients of Hepatitis C with and without Cirrhosis and abnormally high in 7 patients of Hepatitis C with Cirrhosis.

CONCLUSION

The conclusion of this study reveals that Prothrombin Time (PT) and International Normalized Ratio (INR) are severely affected and prolonged in chronic liver diseases (Hepatitis C, Cirrhosis). The range of coagulation abnormalities depends on the severity of liver disease. The raised levels of coagulation parameters indicate that our liver is not working properly, there is severe damage to liver cells, it means that liver is not making the right amount of clotting proteins so that's why it takes longer for blood to clot.

Recommendations

Patients should be provided with proper precautions and awareness of Hepatitis C and its chronic phases so that it will helpful in overcome disease. Routine monitoring of coagulation parameters of Hepatitis C

patients is necessary for diagnosis of liver function and stage of disease. Follow up should be needed and well explained for early diagnosis and proper treatment of disease. Future researches can be conducted on different types of liver diseases correlated with Coagulation parameters and on liver diseases that can further lead to other body organ disorders.

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Authors Contribution

Taha Sahar was involved in study design and conception. Jawaria Alvi and Muhammad Raza both were involved in study design, conception, literature search, data collection, data analysis and interpretation. Alia Bibi and Muhammad Kamran were involved in literature search, data analysis, and generation of figures and writing of menuscript. Final draft was approved by Taha Sahar.

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Authors Contributions:

Jawaria Alvi, Taha Sahar, Alia Bibi: Substantial contributions to the conception and design of the work.

Muhammad Usman , Muhammad Raza Ul Hasnain: Design of the work and the acquisition. Drafting the work. Final approval of the version to be published.

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Original Article

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Triage related Knowledge and Practice among nurses in Ali Fatima Hospital Lahore.

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ABSTRACT

Background and Objectives: Triage is a solution to the issue of overcrowding, and the effectiveness of the judgements made by the triage unit influences how well nurses perform in the long run. Triage can significantly lower the mortality rate. The use of a rapid triage system is necessary to guarantee that patients receive the best care possible in emergency situations. Our study's objective is to evaluate the triage nurses' knowledge and proficiency.

METHODOLOGY: A simple descriptive correlational study was conducted at the Ali Fatima Hospital to determine nurses' knowledge and skills regarding triage.

RESULTS: There is no statistically significant relationship between knowledge and skills. Results show the low percentage of knowledge was (53.3%), moderate percentage of knowledge was (12%), high percentage of knowledge was (14.1%) and very high percentage of knowledge was (20.7%). The respondents with less than one year of experience have a high level of knowledge with p-value (0.004). The participants with bachelor's degree found out to have poor knowledge with p-value (0.000). Therefore, Experience and education have association with knowledge. Conversely, the results indicate that the low level of competence was (<60%) where the mean score was 2.77 (SD=0.799), the intermediate level of skill was (60-80%) where the mean score was 0.130 (SD=0.49), and the high level of ability was (80%) where the mean score was 0.0109 (SD=0.104).

CONCLUSION: The findings indicate that Ali Fatima Hospital's triage nurses lack sufficient knowledge. It was discovered that both the triage knowledge and the triage skill were at low levels. The majority of our study's findings were negative. The semiprivate hospital provided the data. It is recommended that nursing personnel receive training that includes information on how to grasp triage in their departments.

KEYWORDS: Triage, practice and knowledge , Nurses, Skills

INTRODUCTION

The ER is the place where the caregiver can be sent to the most suitable evaluation and receive the greatest care. The patient must be put in the right place at the right time in order to receive the right kind of care and the right resources to meet their medical needs. (1) Prioritizing patients with life-threatening issues such cardiac arrest, airway blockage, and shock is necessary to reduce adverse effects and mortality. (2) In all areas of Pakistan, emergency room overcrowding is viewed as a severe issue. Patients occasionally have to wait longer than 60 minutes, and this is especially crucial when service is delayed and patients become frustrated. The effectiveness of triage nurses is improved by formal training, and with increased confidence, they are more equipped to function.(2,3)

Triage consists of two decisions primary decision and secondary decision. The main choice has to do with how to evaluate and choose which patients will receive the best care. While the secondary choice has to do with starting nursing treatments and giving patients comfort putting patients in the appropriate location at the right time to receive the correct care Understanding triage helps decision-makers decide whether a patient requires immediate assistance or not while paying attention to possible complications that arise after triage is carried out (3)It is highly important to expand nurses' knowledge and practices, thus efforts should be geared on improving nurses' inventiveness,

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access to updated information, and continuous educational opportunities (4)

Triage is a critical activity that solves numerous difficulties in emergency services and improves the quality of health outcomes in a cost-effective manner. Rising health-care expenses, poor health-care quality, and patient discontent are all visible in areas where emergency departments do not use triage. As a result, triage must be implemented in all emergency departments (6). Several factors contribute to the lack of use of nursing knowledge and skills in practice. These include barriers that prohibit nurses from implementing knowledge and competence in the areas of acute care and emergency nursing. This includes a failure to recognize emergency nursing as a specialty care, a lack of clinical competency standards, and a lack of defined tools and indicators for assessing nurses' skill in emergency rooms.(7)

Triage nurses must have appropriate training and experience in emergency nursing triage, decision making and emergency nursing cares. (8)

Therefore, employing experienced and skilled nurses for the emergency department, and teaching them how to properly perform triage can prevent many deaths, disabilities, and additional costs of treatment. Thus, formal triage training improves triage nurses' efficacy and confidence in their ability to operate more effectively(7-9)

Scales make up the triage system. Those scales have appropriate waiting times ranging from seconds to hours depending on the circumstances (10-13)

METHODOLOGY

Research Design

A simple descriptive correlational study was conducted.

Study Area

Study area included Ali Fatima Hospital Lahore.

Duration of research

Four months from February to May, 2023

Source of data

Data was obtained from Google Scholar and PubMed.

Target population

Study population was the nurses working in Ali Fatima Hospital.

Sampling Selection:

Inclusion criteria: This study included all the staff nurses of the above selected hospital.

Exclusion criteria: This study excluded all the student nurses

Research Instrument:

A self-administered questionnaire that consisted of 11 questions was used to assess knowledge Emergency department nurses' knowledge regarding triage.

Triage knowledge and skills among nurses in emergency units of Specialized Hospital in Hawassa, Ethiopia: cross sectional study. BMC research notes, This questionnaire was which consists of 37 questions with three dimensions, including rapid assessment, patient categorization, and patient allocation

Sampling Technique:

This study was quantitative study so we used non-probability observational study.

Sample Selection:

A convenience sampling technique was used.

Sampling size

The total sample size was 92 nurses.

Sample size was calculated by Slovin's formula.

Data Analysis Procedure:

SPSS software version 20 was used and descriptive statistics was calculated.

Data Collection Procedure:

A structured questionnaire to assess the knowledge and practice was distributed among the nurses with informed consent form.

RESULTS

Table no: 1 shows the socio-demographic characteristics of the nurses. It shows educational level which indicates that most of the nurses were with Bachelor's degree (59.8%) where as the nurses with technical diploma in nursing were constituted (39.1%).The highest percentage(94.6%) shows that most of the nurses were with less than 25 years of age .Nurses with less than1year of working experience shows highest percentage(55.4%).Most of the nurses had attended prior triage training with percentage(53.3%).Percentage(67.4%) shows that most of the nurses did not have additional emergencey nursing training courses. Most of the nurses were working in medical department shows highest percentage(28.3%).

Table 1: distribution of emergency department nurses according to their socio-demographic characteristics & work related data.

Demographics	Frequency	Percentage
Age in years.		
<25	87	94.6
26-30	5	5.4
31-35	0	0
	0	0
Years of Experience		
0>1	51	55.4
2-3	37	40.2
>4	4	4.3
Educational attainment		
Diploma	36	39.1
Bachelor's degree	55	59.8
Post graduate degree	1	1.1
Prior Triage Training		
Yes	49	53.3
No	43	46.7

Additional emergency nursing training or courses		
None	62	67.4
In-service course in triage	12	13.0
Emergency nursing certificate	11	12.0
Others	7	7.6
h Working department		
Medical ward	26	28.3
Surgical ward	12	13.0
Nursery	7	7.6
Emergency ward	16	17.4
OBS and Gynae	10	10.9
Nephrology ward	10	10.9
Urology Ward	1	1.1
Dialysis	5	5.4
Intensive care unit	5	5.4

Table no: 1 shows the socio-demographic characteristics of the nurses. It shows educational level which indicates that most of the nurses were with Bachelor's degree (59.8%) where as the nurses with technical diploma in nursing were constituted (39.1%).The highest percentage(94.6%) shows that most of the nurses were with less than 25 years of age .Nurses with less than1year of working experience shows highest percentage(55.4%).Most of the nurses had attended prior triage training with percentage(53.3%).Percentage(67.4%) shows that most of the nurses did not have additional emergencey nursing training courses. Most of the nurses were working in medical department shows highest percentage(28.3%).

provided correct answers. The third time limit provided with (29.3%) of correct answers .In forth time limit nurses provided correct answers with percentage (53.3%).In relation to Knowledge about the stages of triage process, it illustrates low level of knowledge among the nurses with (47.8%) of correct answers. . Regarding to the visual assessment category for the management of triage nurses demonstrate a low level of knowledge (53.3%).In relation to the fifth category," the triage helps the nurses on their work", it also shows a low level of knowledge among the nurses 58.7% respectively.

Table 2: Percentage distribution of correct answers responded by the emergency department nurses regarding knowledge of factor affecting triage.

Category	Correct answers	(n=92)	
		N	%
6.Factor affecting triage	a.. The characteristic of the patient.	7	7.6
	b. The triage decision -maker.	11	12.0
	c. The health care sitting.	10	10.9
	d. All the above.	64	69.6

In relation to knowledge about factors affecting triage.It illustrates moderate level of knowledge among nurses with (69.6%) of correct answers by the nurses.

Table (3): Percentage distribution of correct answers responded by the emergency department nurses regarding knowledge of triage goal.

7.Goal of triage	To identify patients with urgent, life threatening condition	40	43.5
	To decrease congestion in emergency treatment areas.	6	6.5
	To reduce the admission rate.	6	6.5
	All the above.	40	43.5

In relation to knowledge about factors affecting triage.It illustrates moderate level of knowledge among nurses with (69.6%) of correct answers by the nurses.

Table (4): Percentage distribution of correct answers responded by the emergency department nurses regarding knowledge of characteristic of an efficient triage nurse.

Characteristic of an efficient triage nurse	Able to make quick decision.	11	12.0
	has high level of listing and communication skill	14	15.2
	has extensive knowledge of warning sign & symptoms	8	8.7
	All the above.	59	64.1

Table (4) shows percentage distribution (64.1%) of correct answers responded by nurses regarding knowledge of characteristic of an efficient triage nurses.

Table (5): Percentage distribution of correct answers responded by the emergency department nurses regarding knowledge of persons performing triage

triage	The nurse only (Correct answer).	8	8.7
	The doctors only	6	6.5
	The registration personal only	10	10.9
	All the above.	68	73.9

Table (5) shows percentage distribution (8.7%) of correct answers responded by nurses regarding knowledge of Person performing Triage.

Table 6: Percentage distribution of the emergency department nurses regarding knowledge of the nurses' role in triaging patient.

Nurses role	Visual assessment	34	37.0
	Vital signs	16	17.4
	Perform differential diagnosis	10	10.9
	Categorize patients based on Severity	14	15.2
	Blood test	4	4.3
	Nursing intervention	8	8.7
	A brief assessment & preoperative diagnosis is documented in patients" medical record before surgery for those emergency patients requiring surgery	0	0
	Documents limited relevant history	2	2.2
	Documents initial triage category Allocated	4	4.3
	Triage nurse will accompany and endorsed the patient to the specific area in emergency	0	0

Factor Association with Knowledge:

Variable	Test	Association	
		Working experience	Education level
Triage knowledge	Chi – square	19.276	28.883
	p-value	0.004	.000

The study revealed working experience of study participant with less than one year have higher knowledge and educational level of study participant with bechol-

ar's degree have low level of knowledge. Therefore, the working experience with p-value 0.004 and education level with p-value 0.000 both are associated with triage knowledge.

Results of triage skills:

Data was compiled, entered and analyzed using SPSS version 22. Percentages and frequency was calculated. The study findings show that nurses had poor triage skills score. Finally, data was presented by using numbers, frequencies, tables, charts and figures.

92.4% of the respondents had low triage skill scores with the mean score being 2.7717 (SD=0.79977).

6.5% nurses had moderate level of skills with the mean score being 0.1304 (SD=0.49652).

1.1% participants had high level of skills with the mean score being 0.0109 (SD=0.10426).

DISCUSSION

Similar to our studies high number of the nurses attained a poor score on the triage knowledge based questionnaire according to the data analysis. Sixty nine percent nurses were found with poor knowledge of triage according to their scores. This answered the first research question that nurses do not have sufficient knowledge about triage in Pakistan. The overall correct response to the questionnaire was 43.22%. (14)

These findings are supported by earlier studies that produced the same outcomes. According to a study provided by only 39.94% of the nurses' answers to the study's knowledge level questions regarding hospital triage were accurate. They concluded from their investigation that Iranian hospitals do not have nurses who are trained in triage (14).

Another study results shows Less than half of the nurses in the study had satisfactory knowledge of triage, according to the current study's findings, while more than half had unsatisfactory knowledge. These findings may be attributed to the lack of triage training programmes in nursing schools, nursing faculties, and hospitals. This is in line with (!5), who indicated that the study sample lacked adequate understanding of triage, and who also claimed that emergency room nurses lacked adequate knowledge of triage.

Similar to our study revealed that 53.3%of triage nurses were found with poor knowledge of triage and 42.45%of study participants perceived they as inadequately prepared for triage skill. This result is comparable to the study conducted Tanzania, Indonesia, Gutamala, South Africa and other countries . The reason might be due to the majority nurses who are working in emergency department didn't attend training course special to triage knowledge and work experience of nurses might contribute to their knowledge .

Another study conducted showed a little high score of knowledge about triage among nurses in Indonesia as compared to the present study. They reported that more than half of their study subjects (58%) had low triage knowledge scores. Based on the referenced criterion, the percentages were interpreted as follows: < 60% = low level of triage skill, 60 – 80% = moderate level of triage skill, and > 80% = high level of triage skill. They concluded that the participants required continuing education and training courses related to triage to improve their knowledge and skill to increase patient safety.(16)

The current study findings of low and poor level of triage knowledge among nurses reflect and justify the second assumption that there is a lack of proper training and edifying programs in Pakistan. Nursing curriculum for different nursing programs has not sufficient content of triage process to prepare nurses for this system in emergency units

Another study was conducted reveals that frequency distribution of Level of Knowledge on triage system in pre test and post test. In the pre test, majority of the staff had inadequate knowledge regarding triage system (100%) and in the post test, majority of the staff had moderate knowledge regarding triage system (60%).Over all 60%of the samples had adequate knowledge in the post test.(17-23)

Our study was in contrast with findings reported by Elbashir H and colleagues in Sudan, who found that, nurses represented (84%) knowledge Knowledge regarding purpose of triage system is imminently lifesaving. This study revealed that greater than fifty percent of the participant had a good level of knowledge of purpose of triage. In contrast our study result is better compared to our study stated that the respondents had no knowledge about triaged categories.

CONCLUSION

The level of knowledge of the nurses based on our study findings it is concluded that there was very low level of knowledge and skill regarding triage among nurses. The study illustrates that there was also association between factors education and experience with knowledge. It is concluded that there is an immediate need to reconsider nurses triage education and improve the triage knowledge and skills among nurses. Nurses of the various hospitals should be encouraged to undergo training in emergency, critical care and trauma nursing, as this will go further to

enhance their knowledge and skill on triage which will further reduce mortalities in there department.

Limitations:

The paper based nature of written case scenarios does not provide an ideal simulation of real cases and students may make better decisions in real situations. Providing cases with multimedia objects in computer-based scenarios is recommended for future studies. Due to limited resources of power we were not able to conduct study in multiple government sectors.

Recommendations:

It is recommended that increasing the educational programmes for the nursing staff and a motivation guide to increase acceptance to work smoothly to prevent deaths due to overcrowding. It is also recommended that there should be proper training centers for nursing and seminars should be conducted to increase their knowledge.

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