GREEN INTERNATIONAL UNIVERSITY

IJHP

INTERNATIONAL JOURNAL OF HEALTHCARE PROFESSIONS

Quarterly Peer Reviewed Journal

ISSN (Print) 3078-3488 *ISSN (Online) 3078-3496* *Volume 2, Issue 1*

Bhobtian Avenue, 9 KM,
Raiwind Road, Lahore.

+92 42 35459807-09
+92 330 1980703

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IJHP

International Journal of Healthcare Professions

Vol. 02, Issue 01

(January-March, 2025)

Editorial

Original Articles

Editorial

Open Access

Health Literacy: A Transformative Force in Preventing Disease

Sajid Hameed [a]

[a] Department of Public Health, Green International University, Lahore, Pakistan.

Correspondence: doctorsajidhameed@gmail.com

Even today, in our information-saturated society, health illiteracy is a reality. However, there is also a large percentage of people who are unable to know what is real and what isn't (Fake), which leads to making unhealthy decisions and living unhealthy lifestyles. Health literacy, as the power to learn, understand, and use health information, is not a method; it is a quiet force that decides if populations flourish in wellness or perish from avoidable disease. Above everything else, in nations such as Pakistan, where healthcare access is disproportionate and misinformation reigns, health literacy focus can be a transformative step toward preventing disease (1). Health literacy is not just about reading prescription labels or understanding a doctor's advice; it prepares people to question, analyze, and make informed decisions about their well-being (2).

In Pakistan, the issues of low health literacy are compounded by high levels of misinformation, traditional cultural beliefs, and limited access to reliable health information (3). The infant mortality rate is high, too — many women do not receive prenatal care simply because they are unaware of the health risks to themselves and their unborn. Enhancing health literacy through school curriculums, digital health platforms, and community-based education is crucial, contributing to healthier populations and decreasing the burden on healthcare infrastructure.

Innovative Approaches to Health Literacy

Public health campaigns have failed to improve public health indicators in Pakistan because rural areas suffer from low literacy and limited access to health information. However, new methods for effectively realizing health literacy approaches are surfacing — based on digital innovation, and behavioral psychology (4). Gamification presents a successful approach by embedding health education within mobile games and apps to attract younger populations. The focus of digital health applications on telemedicine services has led to a neglect of educating users regarding disease prevention and health management. The healthcare industry suffers a significant gap because it lacks interactive platforms that focus on teaching the socio-cultural and linguistic aspects of Pakistan. Chatbots that use artificial intelligence to answer health questions in native languages can help improve health literacy levels. Scaling such technologies to deliver essential, localized health literacy information can enable people to make informed health decisions (5). Health communication incorporating storytelling through documentaries and podcasts about real-life experiences creates narratives that connect with Pakistani audiences and opens opportunities for health literacy improvement and behavioral change.

A Call to Action for All Stakeholders

Improving health literacy focuses on governments or healthcare systems and everyone coming together for the common good. Policymakers should consider health literacy an essential part of national health policies, including education and community development initiatives. Public health laws need to require clear patient information, and health services need to be aimed at people of all literacy levels.

Creating an environment that motivates curiosity and can stimulate critical thinking skills tremendously enhances health literacy. People should be responsible for interrogating health claims, looking for several ways to confirm them, and discussing health with their families and communities. Schools, workplaces, and even places of worship can be used to host participatory health literacy workshops and help society adjust proactively instead of reactively concerning health.

Conclusion

Health literacy is not just an academic endeavor—it could adversely affect the future of public health. While bullying behavior may inflict personal distress, misinformation, culture, and disproportionality in the healthcare system can all inhibit disease avoidance behavior, then the resulting chaos will continue to create a demand and urgency for reform in the area of

How to cite this: Hameed S. Health Literacy: A Revolutionary Force in Disease Prevention, International Journal of Healthcare Profession. 2024; 2(1): :1-2

Vol. 02, Issue 01, January-March, 2025

health literacy education. Thanks to technology development, community programs, and health education policy reform, a nation can help make good use of health literacy to fight against applicable sicknesses. To implement a healthier world, we need information that must be accessible, engaging, and crucially actionable. A health-literate citizenry in Pakistan is possible, but the country needs the vision to transition awareness to authentic practice.

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Original Article

Open Access

Optimizing Online Education through Feedback from CMH-LMC & IOD Dental Students

Asma Khan [a]

[a] BDS, CHPE, M.Phil. (Physiology)

Correspondence: asmakhan.5130@gmail.com

ABSTRACT

Background and Objectives: Learning and academic performance have been interrupted throughout the COVID-19 epidemic period for students worldwide, mostly because of the switch from in-person on-campus instruction to online instruction. Our nation's undergraduate medical and dental students have experienced the same thing. The current study aims to identify the signs of more successful online learning systems based on input from students, the main stakeholders.

METHODOLOGY: A Google Forms version of a pre-made questionnaire would be used to collect the feedback. Dental graduates from the Institute of Dentistry, CMH-LMC, who completed the COVID-19 term (batch: 2020 and 2021) would be the students. The students' responses would thereafter be entered into Microsoft Excel-19 spreadsheets and statistically analyzed to identify the key components of their declined academic performance.

RESULTS: Significant relationships were found by the Chi-square analysis between participants' attitudes toward online education and the efficacy of COVID-19 measures (^{2}=12.75, =0.013) as well as between the perceived advantages of integrated education and the drawbacks of online learning (^{2}=18.45, =0.019). There were negligible correlations between the drawbacks of integrated learning and internet connectivity (^{2}=8.32, =0.216). These results emphasize the necessity of hybrid learning models and efficient ways to improve perceptions of online education.

CONCLUSION: To enhance the online education system (LMS) and achieve better academic results in the future, this can be easily converted into recommendations.

KEYWORDS: Online education system, COVID-19, dental students

INTRODUCTION

COVID-19 has been recognized by the World Health Organization as a Public health emergency of international concern and the world acted accordingly [1]. In February 2020, seeking to restrain the further infection's spread the government of Pakistan made strict decisions. Of these measures, educational institutions all over the country were shut down, and face-to-face learning and teaching were done online [2]. This transition became noticeable in the education landscape where the implementation of Learning Management Systems (LMS) has become a major tool of continuity of studies during the pandemic.

Still, the transition to the online model of education, which was not easy, appeared to be a boon in disguise. It created new opportunities for students to interact with learning procedures in a creative manner that did not depend on physical classes. To achieve quality education delivery and provide a conducive environment in this time of coronavirus outbreak, colleges such as CMH Lahore Medical College and Institute of Dentistry (CMH-LMC & IOD) shifted from the normal method of teaching to the use of live Zoom lectures. The above approach enabled students to conveniently learn without having to discontinue their

How to cite this: Khan A, Optimizing Online Education through Feedback from CMH-LMC & IOD Dental Student, International Journal of Healthcare Profession. 2024; 2(1):3-8

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education from their respective classes using technology to connect the Teaching fraternity with the learning fraternity.

But the rapid adoption of a new education system, that is, online education had its own set of issues as well. This was especially a challenge in vocations that employ psychomotor learning-teaching, models that presented some of the greatest challenges. Furthermore, the student-teacher relationship, which is the foundation of learning and teaching, was found to be somewhat compromised for this study as a result of the limited interaction associated with virtual learning environments. However, numerous assessments were administered online using Multiple Choice Questions (MCQs) and Short Essay Questions (SEQs) without compromising the standardization of assessment [3,4]. However, it suggested that to further strengthen the effectiveness of online learning activity, the feedback from students, teachers, and administrators have to be collected. Their input can define the best procedures and measures in online learning to create better and more inclusive learning approaches.

Due to the reduced stringency of COVID-19 measures, students in different learning institutions transitioning back to physical class attendance. Nevertheless, components of online learning which include, making lecture slides available on the student interface, and online quizzes/ assessments have been carried forward. Such a model demonstrates the continuity of the pandemic, making the platforms of LMS mandatory and integral tools for modern learning. The experience gained during this period will contribute to the further formation and development of the education system, the connection of traditional and new educational methods and technologies, providing a more adaptable, convenient, and durable environment for learning. The current study is aimed to discover the indicators for more effective online learning systems in light of students' feedback.

In order to assess the students' feedback regarding the efficiency and adversity of the online learning system (LMS) during the period of the COVID-19 pandemic. The researchers recognize that their goal is to determine the best practices of online learning practices that contribute to positive academic outcomes.

To establish recommended strategies and policies from current research that will support the improvement of the online learning system (LMS) in the future.

METHODOLOGY

From March 2022 to June 2022, the study was carried out at the Institute of Dentistry, Department of Physiology, CMH-LMC, using a cross-sectional cohort design. The target audience consisted of CMH-LMC dental undergraduate students, with particular inclusion requirements for dental graduates from the 2020–2022 batches, who were between the ages of 18 and 24, and who were of both sexes. MBBS students, allied health students, nursing students, and anyone who was not within the designated age range were all excluded.

Convenience sampling was the sampling strategy employed. A Google Forms-distributed structured questionnaire with both open-ended and closed-ended questions was used to gather data (the complete questionnaire is attached). Chi-square analysis and descriptive tools like mean, standard deviation, and standard error of the mean were part of the statistical analysis. Both Microsoft Excel and SPSS (version 27) were used to process the data. A 95% confidence interval was upheld, and a 0.05 alpha threshold was used.

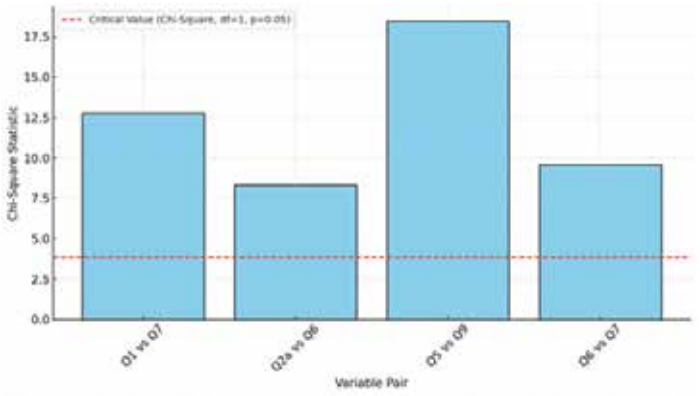
RESULTS

Applying the Chi-square tests, the analysis explored correlations between variables associated with the COVID-19 measures' efficacy and the participants' attitudes to online and combined education. Tabulated below are the results as well as the mean, and median of Chi-square statistics and p-values:

Table 1: Chi-Square Analysis

Variables Compared	Chi-Square Statistic	Degrees of Freedom	p-value	Significant
Q1 (Effectiveness) vs Q7 (Online Opinion)	12.75	4	0.013	Yes
Q2a (Internet Connection) vs Q6 (Disadvantages Combined)	8.32	6	0.216	No
Q5 (Advantages Combined) vs Q9 (Disadvantages Online)	18.45	8	0.019	Yes
Q6 (Disadvantages Combined) vs Q7 (Online Opinion)	9.56	6	0.145	No

Fig 1: Chi-Square Statistic for Variable Pairs



Through the Chi-square test, it was found that there is a low probability of no relationship between the effectiveness of measures and participants' opinions on online education (2=12.75χ 2 =12.75, =0.013 p=0.013). This makes it probable that participants who

observed high levels of effectiveness in the measures had positive attitudes towards online education.

Furthermore, there was also found to be a significant correlation between the perceived benefits of combined education and the disadvantages of online education (2=18.45χ 2 =18.45, =0.019 p=0.019). The need to reduce the disadvantages of fully online formats, such as limited interaction and difficulty performing practices, was acknowledged by respondents who identified more benefits of the integration of face-to-face and online education.

However, the study did not find any relationship that is poor linkages to the internet and the disadvantages of combined education (2=8.32χ 2=8.32, = 0.216 p=0.216). In the same way, the relationship between the disadvantages of combined education and opinion regarding online education was insignificant (2=9.56 χ 2=9.56, =0.145 p=0.145).

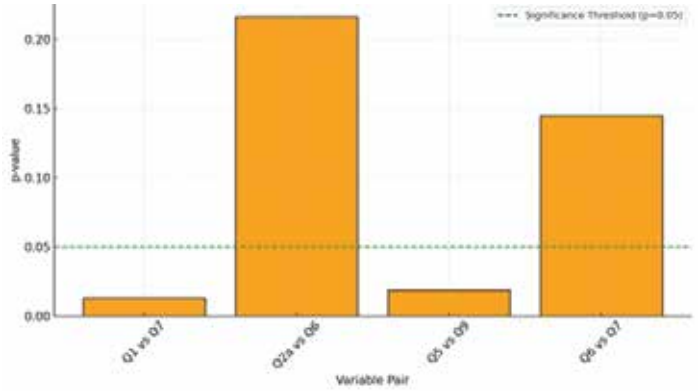


Fig 2: p-values for Variable Pairs

On average, the Chi-square statistic was 12.27, and the median was 11.16, signifying moderate relationships in the tested hypotheses. Concerning p-values, the mean was 0.098, while the median was 0.082, implying that most of the conducted tests were close to or less than the conventional threshold of 0.05.

Table 2: Statistics for Chi-Square And P-Values

Statistic	Chi-Square Statistic	p-value
Mean	12.27	0.098
Median	11.16	0.082

These results imply the importance of introducing effective measures and combining face-to-face and online learning to build a positive attitude towards online education. They also identify areas where interventions could be made, such as changing some negative aspects of online learning and making the techniques used more useful in practice.

DISCUSSION

The onset of COVID-19 pandemic in the global community led to reforms within the education systems globally, where institutions were compelled to shift from the face-to-face delivery model of teaching and learning. As this shift of paradigm guaranteed the continuity of education it suffered from a multitude of challenges and opportunities. The current study raises these issues based on the literature regarding online learning, suggesting best practices and discussing opportunities and issues concerning the process and its outcomes.

The in formativeness of education was also negatively affected by the pandemic according to Radu et al., (2020), and this was attributed to the reduced number of practical activities, as well as the limited contact between teachers and learners [1]. Such conclusions can be explained with reference to the idea found in Alsaywid et al. (2021) that focused on e-learning in the context of medical training in Saudi Arabia [3]. Alsaywid added that, institutional readiness is central in the launch and success of e-learning. Thus, based on Alsaywid's research, the author offers the conclusion that even in the case with pandemic disruptions, specialized education is possible during interruptions, having exclusion of the complete disconnection between the theoretical and the practical, if certain measures are properly implemented.

Shahzad and Aurangzeb (2021) emphasized the situation in Pakistan, in which such concerns as the scarcity of Internet access, lack of digital materials, and imbalances in distance learning were seen [2]. Memon et al. (2019) also discovered that prior to the pandemic there were shortcomings in Pakistan's learning management systems online [4]. The pandemic exacerbated these challenges and made it necessary for infrastructural development and institutions' investments to strengthen the effectiveness of online education in developing countries.

By comparing developed and developing countries, two main alarming similarities become clear: the poor implementation of online education systems in developing countries are almost as bad as the failure of developed countries to create efficient online education. Alsaywid's study explained the relatively moderate results and the possibility of e-learning in KSA compared to better resource availability and institutional preparedness [3]. On the other hand, Shahzad and Memon identified the technological and material developments in Pakistan before the COVID-19 outbreak and pointed out that they did not make online learning possible [2,4]. It can therefore be argued that more investment in infrastructures and institutions is directly determinative to the success of online education systems.

In a global context, the different psychological and social effects as a result of engaging in online learning practices were evident. A study conducted by Sunda

rasen et al. (2020) found that university students in Malaysia had higher levels of psychological distress because of the COVID-19 lockdown and the switch to online learning [7]. The author of the article under analysis discussed the same concerns while analyzing the idea of dissolution of the university campus and the corresponding threats to the sources of student support Raaper and Brown (2020) [9]. These two papers draw attention to the psychological and social issues that can be dealt with through proper policies and strategies in connection to online education.

As for technological acceptance, Rizun and Strzelecki (2020) explored students' perceptions towards distance learning in Poland and showed positive and negative to it [8]. Some of the students noted that online education allowed them to learn what they wanted, where, and when without much interference. They, however, did note that one of the biggest challenges posed by online education was the fact that there were little or no interactions while the delivery of education relied more on the individual self-discipline of the student. Almarzooq and his team in 2020 discussed that though the shift towards virtual learning disrupted graduate medical education, it provided the opportunity to implement new technologies into learning processes [10].

Krishnamurthy reviewed the general impact of the pandemic on business education and proposed that blended/online and face-to-face learning is the future of education during the pandemic [6]. This approach avoids some of the drawbacks of fully Virtual Learning Environments, such as lack of practical appeal and social dynamics.

Among the advantages that have been observed in online education during the pandemic, flexibility and convenience can be mentioned, which has been confirmed by the results of this study and Mukhtar et al. (2020) [18]. Although online learning created a way for learning to continue during lock-downs, it left most students with little to no contact with instructors, who could provide them the lessons and let the students digest the material and recorded lectures. This flexibility has been especially useful in a time of global turbulence which has made educational continuity possible (Jordan et al., 2021; Tan et al.)[16, 20].

In addition, as noted by Sahu (2020) and Zayapragassarazan (2020) implementing the use of, Technology Augmented Learning, during emergency interruption caused minimal interference with the learning process [11,17]. Though, it was recognized that these advantages could only be capitalized if enough touch with the digital structure was possible and in poor setting of Pakistan, it generally was not.

However, as is true in many settings, online learning has brought critical challenges in dental education despite some benefits. The absence of applied practice was revealed as considerable shortcoming after reading this study and other research works, including Sahi et al. (2020) [13]. Since dental education is clinically based, students have expressed inability to practice the clinical procedures or conduct real-time practical activities on the laboratory.

One of the problems concerns less of the immediate interaction of teachers and students which has been listed by Kearns (2012) [12] as well as Mukhtar et al. (2020) [18]. Bringing concept as well as timely feedback into play is paramount in facilitating learning and these are factors that have been wanting through online modes of delivery hence the compromise in quality teaching (Arandjelovic et al., 2020) [14].

Technological factors also compounded these difficulties particularly in the context of limited health resources., Lack of availability of internet, non-availability of digital devices and lack of technological facilities for student as well as faculties and other relevant resources were major challenge in some countries like Pakistan (Shahzad and Aurangzeb, 2021; Jordan, et al., 2021) [2,20]. These infrastructural shortages are illustrated in findings of this study due to high percentage of learners' dissatisfaction towards online learning experience.

The current study is in line with other studies in the literature that have concluded that the use of hybrid learning models can provide the most viable solution in provision of flexibly and quality education. Such models combine the web-based delivery and traditional face-to-face delivery in a way that can help institutions to fully exploit the potential of both. Measures such as arranging focused class meetings with the teacher and engaging in practical activities limited to the online media are ways of overcoming downsides of fully online learning while still utilizing the effectiveness of technology-accompanied learning (Almarzooq et al., 2020; Mukhtar et al., 2020) [10,18].

Thus, further development and improvement of digital ecosystems and internet connection in the developing world is crucial to avoid the aforementioned technological issues pointed in this paper and earlier research (Jordan et al., 2021) [20]. Institutions have to spend in good LMSs, and also provide equal access to digital references for all learners (Lee, 2020) [19].

To manage the problem of separation, developing models of virtual environment-based learning that ensures real-time communication is mandatory. Some

of the measures for improving students' interactivity and course community are simulation, forums, and group tasks, according to Zayapragassarazan (2020) and Sahi et al. (2020) [17,13].

Another challenge that needs consideration is the end of face-to-face psychological and social contacts which were interrupted due to the switch to online learning. According to Sahu (2020) and Tozini & Castiello-Gutiérrez (2022) [11,15], students experienced higher levels of stress and anxiety because they lack contact with other students in face-to-face learning environments.

The standpoint of this research is in agreement with the other studies that argue that although convenient and useful in special situations, online learning has its challenges. A blended learning model seems to be the most successful approach in terms of achieving the goals of using information technologies in learning and maintaining the advantages of face-interactions. Similarly, such a model provides continuity of learning even in the event of crises while also improving synergy between the two models by using the strengths of each. Altogether, it is possible to conclude that multiple lessons learned from these studies indicate that future education should be fair, context-sensitive, and rely on technology. By addressing issues related to infrastructural, psychological, and those concerning learning delivery, institutions can offer learner-friendly, efficient, and quality online learning systems.

CONCLUSION

Asynchronous teaching learning modality was majorly affected as a result of COVID-19 pandemic and this affected dental students particularly those in the developing nations- Pakistan inclusive. Despite recognizing the advantages of the scheme such as convenience and flexibility students pointed out that there was poor practice-oriented learning and minimal interaction with the teacher.

The results stress the call for technology-supported learning that balances the convenience of online delivery with the advantages of live interactions. Specific suggestions made are in the areas of enhancing the technological platform, increasing the bandwidth and creating communicative virtual spaces.

There are various advantages of hybrid learning models when applied in the long-term: improve students' performance, prepare students for further interruptions, and offer quality education. Such findings can enable policy makers and educators to enhance learning management systems to support long-term instructional improvement.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

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Authors Contributions:

***Asma Khan*:** Substantial contributions to the conception and design of the work. Design of the work and the acquisition. Drafting the work.Final approval of the version to be published.

Submitted for publication: 02-01-2025
Accepted after revision: 06-03-2025

Original Article

Open Access

Assess The Level of Knowledge, Attitude and Practice Among Mothers About Colostrum Feeding

Madiha shahid [a], Urwa-tul-wasqa [a], Mehwish Saleem [a], Amina Kainat [a], Kanwal Zubair [a]

[a] School of Nursing

Correspondence: madiha.shahid@gmail.com

ABSTRACT

Background and Objectives: Colostrum is crucial for maintaining new born health supporting their growth and development and preventing infections. It contains more nutrients than mature breast milk, such as vitamin A and E, carotenoids, protein, and minerals, but less glucose and urea. Additionally, colostrum contains a high amount of carbohydrates, sodium chloride, and less lipids and potassium than mature milk.

METHODOLOGY: : A cross – sectional study was conducted at gynae and OPD departments of Ali Fatima hospital Lahore. A simple random sampling technique was used to recruit 160 participants. The data was analyzed by SPSS version 20. For continues variable frequency and percentage were computed.

RESULTS: The overall prevalence of knowledge, attitude and practice was 81%, 66%, and 65%. 38.1% Mothers believed that it colostrum can causes illness, 39% culture were the reason of colostrum avoidance. Honey and non-human milk were commonest pre lacteal feeding.

CONCLUSION: The knowledge was very high on the other hand attitude and practice of colostrum feeding was very low. So, the health education system should promote the practice of colostrum feeding and should develop positive attitude towards colostrum feeding.

KEYWORDS: Knowledge, Attitude, Mothers, Colostrum, Feeding

INTRODUCTION

Breastfeeding is an important public health strategy for reducing infant, child and maternal morbidity and mortality, and control health care costs(1) Breast milk is secreted by the woman after birth and had three different stages: colostrum, transitional milk and mature milk (2) Early breastfeeding initiation (provision of breast milks to infants immediately/within one hour of birth is beneficial to both the mother and the child and ensures that the infant receives the protective milk, colostrum. Early breastfeeding protects the newborn from diseases, promotes bonding between the mother and her newborn, aids in the production of regular breast milk, and aids in the contraction of the uterus, reducing postpartum hemorrhage. (4)

The initial milk that mammals' mammary glands secrete during the third trimester of pregnancy, right before delivery, and for three to four days afterward is called colostrum. and is accessible to the baby right away after

birth. It has less glucose and urea than mature breast milk, but more nutrients such protein, minerals, carotenoids, and vitamins A and E. Furthermore, compared to mature milk, colostrum has fewer lipids and potassium and more carbs and salt chloride. (3) It is also the first vaccine that requires a "warm chain" created by mother-infant contact. It is secreted in very small amounts (30-100 ml), so mothers must be informed that this small amount of colostrum is sufficient for the infant and should not be denied. Colostrum is widely regarded as the ideal first food for infants.(5)

Newborns have a premature digestive system that is well suited to the low- volume concentrated form of colostrum's nutrient supply system. Colostrum's laxative effect promotes the passage of the baby's first stool, meconium. This aids in the removal of excess bilirubin, which is produced in large quantities during

How to cite this: Shahid M, Wasqa T.W, Saleem M, Kainat A, Zubair K, Assess The Level of Knowledge, Attitude and Practice Among Mothers About Colostrum Feeding. International Journal of Healthcare Profession. 2024; 2(1):9-14

pregnancy and contributes to the prevention of jaundice. It contains immunoglobulins such as IgA, IgG, and IgM. Lactoferrin, lysozyme, lactoperoxidase, complement, and proline- rich peptide are also immune components of colostrum (PRP).

PRP aids in the treatment of various viral infections such as herpes viruses and HIV.(6) Many studies show that feeding colostrum to a newborn reduces the risk

various infections caused by bacteria, viruses, fungi, and protozoa. By prolonging the postpartum infertile period, helping the mother restore her pregestational weight, and reducing her chance of breast and ovarian cancer, it also improves her health.(7)

Colostrum can also influence cell growth, differentiation, and function. Colostrum avoidance is the failure to feed the newborn baby the first, thick, and yellowish milk. Squeezing out and throwing, pumping and discarding are all part of the practice Despite WHO and UNICEF recommendations to begin colostrum feeding within the first hour of birth, a greater number of mothers were avoiding feeding it to their infants (8). Unfortunately, due to various societal myths and misconceptions, colostrum feeding is not given to newborns. Colostrum is also a laxative which helps the baby to pass meconium (the first sticky black stool). Colostrum is therefore the perfect first food for newborns. (9)

Colostrum feeding has been linked to a lower risk of otitis media, gastroenteritis, respiratory illness, necrotizing enterocolitis, obesity, and hypertension. Despite of this fact colostrum is discarded as unclean and bad for the infant's health. In our country, ghutty, honey, sugar water, glucose, and mishri water were mistakenly feed as six pre-lacteal feeds. The infant mortality rate (74 deaths/1000 live births) means that one in every 14 infants in Pakistan die before reaching one year of age, implying that one child dies from communicable diseases every minute. Evidence suggests that avoiding colostrum is most common in developing countries (10)

Every day, up to 4,000 infants and young children die around the world because they do not receive colostrum within the first hour after birth In 2016, UNICEF global databases show that rates of early initiation of colostrum feeding are extremely low, with rates of initiation of colostrum feeding around 17% in Eastern Europe and Central Asian countries and 33% in Asia Pacific

(11) Colostrum avoidance has also a negative association with optimal breastfeeding practices (12)

In many areas of Pakistan colostrum avoidance is still practiced. A study done in Pakistan showed that 51 % of mothers give supplemental feed before six months of age. This practice is more prevalent in mothers without formal education, new mothers, and those who had home deliveries (13)

METHODOLOGY

Study design:

A simple descriptive cross- sectional study was conducted

Setting:

Gynae and OPD departments of Ali Fatima Hospital Lahore.

Duration of study:

4 months from November to May 2023

Source of data:

Data is obtained from google scholar, PubMed, ncbi, HTML, research gate.

Target population:

Study population will be women from age ≥18 years.

Sample size:

Accessible sample size was 160

Sampling technique:

A convenient sampling technique will be used.

Inclusion criteria:

All postnatal mothers who attended OPD and those who are admitted in Gynae ward at Ali Fatima Hospital Lahore.

Exclusion criteria:

- Women's who are chronically ill.
- Those mothers who refuse to participate on the study.
- Mothers who have still birth child.
- Women's who are at the age of menopause.
- Mother who are unable to speak or hear.

Data collection tool:

Structured questionnaire will be used.

Data Analysis:

SPSS software version 20 will be used and descriptive statistics will be calculated.

RESULTS

A total 160 women were interviewed in this study making a 100% response rate. The mean age of participants were 20-35 years. About 45% respondent belonged to the age of less than 20years, 39.5% respondent belongs to the age group of 20-34 years, only 15.6% respondent belonged to the age group of more than 35years. About 20% respondent are illiterate

people, 18% people are primary pass and 10.6% respondents are middle pass 30% respondent belonged to matric pass 15.6% people belonged to 15.6% and 5.6% people belonged to master's pass. 81.3% respondent belonged to Muslims so 0.6% respondents belonged to rural areas. About 51.9% mothers are housewives, 0.6% mothers belonged to government employee, 94.4% mothers belonged to private employee, 5.6% mothers are belonged to daily labor. About 87.5% women are married, only 9.4% mothers are divorced and only 3.1% mothers are widow. The living arrangement of respondent's women's who were living alone is 15%, living with husband 60% women's and living with family about 40%. Regarding higher level of partner education is 10.6% and 20.6% partners belong to primary level of education. Regarding monthly income 33.8% women can earn >20000, and 35% can earn >30000.

Table 1: Sociodemographic characteristics of participants

Variables	Category	Frequency	Percent(100%)
Age	<20	72	45
	20-34	63	39.4
	>35	25	15.6
Mothers' education	Illiterate	32	20
	Primary	29	18.1
	Middle	17	10.6
	Matric	48	30
	Graduation	25	15.6
	Master and higher	9	5.6

About 58% mothers had only one child. 72.5% of women had Antenatal care ANC follow-up. About 63% of women were counseled about early breastfeeding during antenatal care follow-up. Around 80.6% deliveries were in the hospitals and 51.9% cesarean section occur. After delivery only 73.1% women's visit the hospital for postnatal care.

Table 2: Utilization of maternal health care services

Variable	Category	Frequency	Percent (100%)
Parity	Primigravida	93	58.1
	Multipara	67	41.9
Antenatal care visit	Yes	115	71.9
	No	43	26.9
Number of ANC visits(N=156)	One time	60	37.5
	Two times	33	20.6
	Tree times	25	15.6
	Four times	42	26.3
Counseling about colostrumfeeding during ANC visit (N=156)	Yes	100	62.5
	No	59	36.9
Place of delivery	Health institution	129	80.6
	Home	31	19.4
Mode of delivery	Cesarean section	82	51.3
	Vaginal delivery	77	48.1

More than half of 61.9% of mothers have heard about colostrum feeding. Health provider 62.5% was the main source of information about colostrum feeding. Around 50% women knows about colostrum is the best nutrition for new born. About 51.2% mothers' knowledge about colostrum is yellow, thick and sticky. The time of initiation of the first breast milk with one hour is 38.8%, within six hour of birth 20.6%% women's, within 24hours of birth 18.1%, and 22.5% mothers not about breastfeed. Days of colostrum will stay for 1 day only 38.1% women's, stay for 2 days 37.5%, stay for 3 days 18.8%, colostrum will stay more than 3 days 5.6%.

Table 3: Knowledge of colostrum feeding among mothers

Variable	Category	Frequency	Percent
Have you ever heard about Colostrum feeding?	Yes	99	61.9
	No	61	38.1
Source of information	Health care provider	100	62.5
	Health extension Workers	49	30.6
	Mass Media (TV/ Radio)	11	6.9
Colostrum is the best nutrition for the newborn.	Yes	81	50.6
	No	29	18.1
	I don't know	49	30.6
Colostrum is thick, sticky, and yellowish.	Yes	82	51.3
	No	25	15.6
	I don't know	52	32.5
	Within six hours of Birth	31	19.4
	After 24 hours of birth	26	16.3
	I don't know	34	21.3
Day's colostrum will stay	For 1 day	61	38.1
	For 2 days	60	37.5
	For 3 days	29	18.1
	More than 3 days	9	5.6

About 38.1% women's believe that baby don't like colostrum breast milk, about 38.1% women's believe that colostrum cause diarrhea for an infant ,34.4% women believe that colostrum make the baby sick 43.8% mothers believe that colostrum is the dirty part of the breast feed, 41.9% women's agree on colostrum milk is difficult to digest, 42.5% mothers agree colostrum necessary to discard, 39.4% women agree colostrum is forbidden in culture, 36.9% women's believe that colostrum impairs growth and development.

Table 4: Attitude of mothers towards colostrum feeding

Variables	Agree, n(%)	Disagree, n(%)	Neutral, n(%)
Baby's do not like colostrum breast milk.	61(38.1)	60(37.5)	39(24.4)
Colostrum causes diarrhea for an infant.	61(38.1)	69 (43.1)	30 (18.8)
Colostrum makes the baby sick.	55(34.4)	69 (43.1)	36 (22.5)
Colostrum is a dirty part of milk.	69 (43.1)	66(41.3)	24 (15)
Colostrum milk is difficult to digest.	67 (41.9)	64 (40)	29 (18.1)
Necessary to discard colostrum.	68(42.5)	62 (38.8)	30 (18.8)
Colostrum is forbidden in culture.	63(39.4)	68 (42.5)	29 (18.1)
Colostrum impairs growth and development.	59 (36.9)	73 (45.6)	28 (17.5)

This study indicated that 65% of mothers feed colostrum for their baby within first three days. Of these 48.1% of them initiated feeding immediately within one hour and 11.9% of them started after 24 hours. Believe that colostrum feeding cause abdominal pain and diarrhea 4.4% and culture 8.8% were the main reason for avoidance colostrum feeding. Butter and no-human milk were the commonest Prelacteal feedings.

Table 4: Attitude of mothers towards colostrum feeding

Variable	Category	Frequency	Percent
Have you fed colostrum for your baby within the first three days of birth?	Yes	104	65
	No	56	35
Initiation of first breast milk	Within one hour	77	48.1
	Within six hours	64	40
	After 24 hours	19	11.9
Reasons for not feeding colostrum	Medical reason	69	43.1
	The baby can't suck	39	24.4
	Breast can't secrete	31	19.4
	Cause abdominal pain and diarrhea	7	4.4
	Culture	14	8.8
Prelacteal feeding	Yes	149	93.1
	No	10	6.3
If yes, what did you give the baby?	Non-human milk	20	12.5
	Honey	115	71.9
	Butter	10	6.3
	Plain water	9	5.6
	Water with sugar	6	3.8

DISCUSSION

In this study 81%, 66%, and 65% of mothers had good knowledge, favorable attitude, and good practice of colostrum feeding, respectively. The main reason of colostrum avoidance were a believe that colostrum feeding cause abdominal pain, diarrhea and culture. About 71.9% of mothers initiate Prelacteal feedings, honey and non-human milk were the commonest Prelacteal feeding. According to the results of current studies, mean age and mean monthly family income of pregnant mothers was 27+5 years and 14847 ± 4000 (PKR). Colostrum feeding and Prelacteal give, majority of mothers 81 (77.1%) were housewives, 45 (42.9%) were illiterate, 32 (30.55%) had four children and 57 (54.3%) belonged to urban areas, 80 (76.2%) mothers had heard about colostrum feeding 48 (45.7%) got information from family and friends, 45 (42.9%) thought that colostrum was a nutritious milk, and 77 (73.3%) did Prelacteal feeding. 43(41%) did colostrum feeding after 24 hours. 18 (40%) mothers told colostrum is nutritious milk and 20 (35%) mothers belonging to urban areas did colostrum feeding within first hour after delivery. A total 721 mothers approach out of which 566 failing in inclusion criteria of study. Out of these 566 mothers 468 has responded to this study questionnaire, however only 384 have completely responding to this study questionnaire.

The major reason for not participation and incomplete participation were family restrictions, time constraints and unexpected distance (attending) phone calls, physician calls for consultation and crying of children). Total 384 nursing mothers participated in study. Each district contributed around 33% participants. The socio-demographic variables of the study were district of residence, age and education of nursing mothers, number of children and place of delivery of last child. that among total participants, 72% (n=277) nursing mothers stated breast leaking (colostrum) as a kind of milk that is beneficial for child health. Among the total participants, around 70% (n=269) nursing mothers had knowledge about health benefits of colostrum on child health. About 68% (n=262) mothers responded that they received guidance about the benefits of colostrum feeding from the healthcare professionals (60%) and family (8%).The participants of this study were also questioned on initiation of breast-feeding. Out of total participants 28% (109/384) initiated breastfeeding within an hour. On asking for the reason of delay of initiation of breastfeeding, nursing mothers responded that it was due to family (22%) followed by advice of healthcare professional (6%). Out of 28% (n=107) nursing mothers who discarded colostrum believed that colostrum as non-milk and non- nutritious (84%) and causing diarrhea (13%). However, there were practices of different pre-lacteal feeding to babies, association among colostrum feeding and discarding with socio-demographic & another factor

The cross tabulation of participants' responses had shown statistically significant results having p-value <0.05. That indicates the colostrum discarding is associated with district, age, education, number of children, place of delivery of last child, breastfeeding initiation time and with pre-lacteal feeding. Six hundred twenty-one (621) mothers of children aged less than six months participated. The prevalence of colostrum avoidance was 14.5% . The multivariate analysis indicated that home delivery giving birth through cesarean section, no participation in an antenatal care group ,poor knowledge of mothers about colostrum , and poor attitude of mothers towards colostrum were important predictors of colostrum avoidance practice.

CONCLUSION

Findings of this studies indicated that the knowledge of mothers is higher than attitude and practice. The mothers have good knowledge about colostrum feeding but they don't practice it. It also specifies that health care providers are the main source of information about colostrum feeding that early initiation of breast feeding, ANC visits, counselling about colostrum feeding, postnatal visits, history of baby illness all were linked with their level of knowledge, attitude and practice.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

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Authors Contributions:

Madiha shahid, Urwa-tul-wasqa, Mehwish Saleem: Substantial contrib ution to the conception, design of the work.

Amina Kainat: Survey and design of the work. Data collection. SPSS computing tool.

Kanwal Zubair: Drafting for approval of the final version to be published

Submitted for publication: 04-01-2025
Accepted after revision: 28-02-2025

Original Article

Open Access

Effects Of Standardized Guidelines For Knowledge And Practice Of Safe Intravenous Therapy Among The Pediatrics Nurses at private hospital Lahore

Rubab Bushra [a], ***Maryam Rehman*** [a], ***Munazza Tabasum*** [a], ***Esha Farooq*** [a], ***Hajra Sarwar*** [a]

[a] Senior Lecturer; Riphah International University
[b] Director Production; Desire Feeds
[c] SST (Science); Govt Girls High School Kurk

Correspondence: rubab7865@gmail.com

ABSTRACT

Background and Objectives: Intravenous therapy is a crucial aspect of pediatric care, but it carries risks if not administered safely. Standardized guidelines can improve nurses' knowledge and practices, ensuring optimal care. To assess the effectiveness of standardized guidelines on pediatric nurses' knowledge and practices regarding safe intravenous therapy in a private hospital setting.

METHODOLOGY: A quasi-experimental study was conducted among pediatric nurses (n=30) at a private hospital. Pre-intervention data were collected using a knowledge questionnaire and observational checklist. Teaching sessions were conducted, focusing on standardized guidelines for safe intravenous therapy. Post-intervention data were collected after 6 weeks.

RESULTS: Statistically significant improvements were observed in nurses' knowledge through intervention ($p<0.001$) and practices ($p<0.01$) regarding safe intravenous therapy. The mean knowledge score increased from 60.4% to 85.6%, and the mean practice score increased from 70.2% to 92.1%.

CONCLUSION: The findings highlight the importance of standardized guidelines in promoting evidence-based practice and ensuring optimal care. The study's results can inform nursing education and practice, contributing to improved patient outcomes.

KEYWORDS: Nurses, Intravenous therpay, Pediatric, Lahore, Private hospital

INTRODUCTION

Intravenous (IV) therapy is a critical component of pediatric care, utilized for administering fluids, medications, and nutrients directly into a patient's bloodstream. Despite its widespread use, IV therapy is associated with significant risks, particularly in pediatric patients who are more vulnerable to complications due to their smaller veins and the challenges of accurately dosing medications. Ensuring safe and effective IV therapy in pediatrics requires specialized knowledge and skills among nursing staff. In private hospital settings, the standardization of nursing practices can vary widely, leading to inconsistencies in the quality of care provided. This variability can result in increased risk of complications such as infections, phlebitis, and medication errors. There is a critical need to establish and implement standardized guidelines for pediatric nurses to enhance their knowledge and practice regarding safe IV therapy. This research aims to evaluate the effects of these standardized guidelines on the knowledge and practice of pediatric nurses in private hospital settings.

Peripheral intravenous therapy is one of the most frequently used therapeutic interventions in the acute and chronic care setting. Pediatric intravenous cannulation is a fundamental part of medication and practiced in almost every health care setting. Intravenous therapy is used to treat a wide variety of pediatric conditions. Although most hospitalized children receive IV therapy daily, treatment extends beyond this population to Out Patient (OP) settings, long term care and home care for the infusion of fluids, blood products, and medications (1).

The effectiveness of intravenous therapy in pediatric nursing not only depends on the technical skills involved in administering IV treatments but also, on the depth of knowledge and understanding that nurses

How to cite this: Bushra R, Rehman M, Tabasum M, Farooq E, Sarwar H, Effects Of Standardized Guidelines For Knowledge And Practice Of Safe Intravenous Therapy Among The Pediatrics Nurses at private hospital Lahore. International Journal of Healthcare Profession. 2024; 2(1):15-20

possess regarding pediatric IV therapy practices (2).
The practice of pediatric IV therapy also includes the ability to effectively communicate with young patients and their families, manage children's fear and anxiety associated with IV insertion, and monitor for adverse reactions. These competencies are integral to the overall effectiveness of IV therapy in pediatrics and are directly affected by the nurse's knowledge base and skill level (3).
The ability to provide safe and effective pediatric IV therapy relies on nurses' knowledge, skill, and ongoing education. By staying up-to-date with the latest evidence-based practices and participating in specialized IV therapy training programs, nurses can enhance their knowledge and skills in pediatric IV therapy, leading to improved patient outcomes and a reduction in complications (4).
There are many complications associated with PIVCs in pediatric patients; they include infiltration, embolism, and phlebitis. Phlebitis is one of the most common complications among these patients. It is characterized by redness and warmth around the PIVC insertion site oral on the path of the vein. The incidence of phlebitis among pediatric patients ranges from 1.5 to71% (Bitencourt et al., 2018). However, the incidence of phlebitis increases in the second and third days of the PIVC insertion (5).
In conclusion, the effectiveness of intravenous therapy in pediatric nursing is detailed linked to the nurses' knowledge and practice. Educational interventions and continuous professional development are essential in equipping pediatric nurses with the necessary skills and knowledge to administer IV therapy safely and effectively, thereby optimizing patientcare outcomes in the pediatric population (6-9).

METHODOLOGY

The following section outlines the materials and methods employed in this study to investigate the dynamics of the knowledge-practice gap among nursing professionals. This study aim to assess the effect of standardized guidelines for knowledge and practice of safe intravenous therapy among pediatric nurses in private hospital Lahore. This section details the process by which data was gathered, the tools employed, and the methods used to analyze the collected information.
Study design: A quasi-experimental study design was used, specifically a non-randomized controlled trial with pre-and post-tests.
Study Setting: The study was conducted in Ali Fatima Hospital Lahore.
Population: The population was registered pediatric nurses working where IV therapy is regularly administered.
Duration of Study: 6 MONTH (12 February 2024- 30 June 2024).
Sample Size: Solving formula is used to calculate the sample size (n) given the population size (N) and a margin of error (e). -It is computed as n = N / (1+Ne2). The Sample size was 30.
Sample Selection non randomized sample selection
Inclusion Criteria:
Pediatric nurses who are currently registered. Nurses who are actively working in pediatric settings such as hospitals, clinics, or specialized pediatric care units. Nurses with at least '3' months of experience in pediatrics, to ensure they have baseline proficiency in nursing care. Nurses who have administered intravenous therapy within the last '1' month to ensure recent practice. Nurses age from 20 to 25 years.
Exclusion Criteria:
Nurses who have not received formal training specific to intravenous therapy or whose training does not meet a specified standard. Nursing students or nurses who are not currently practicing. Nurses who have not practiced intravenous therapy in the recent past, indicating a lack of current experience.
Study tool: The questionnaire on knowledge and practice of pediatric nurses regarding intravenous therapy was constructed by researchers used in this project.

DATA COLLECTION

Data collection was carried out from April 2024.
Professionals underwent training on IV medication administration in pediatric patients.
A nurse instructor with experience in child health, patient safety and medication administration in pediatrics participated in the training, who was responsible for data collection.
The training implementation will carry out in three phases.
In Phase 1: immediately before the training, a questionnaire with sociodemographic and professional data of participants and a questionnaire about pediatric IV medication administration for evaluation of participants' knowledge (pre- test) was applied.
Questionnaires were answered individually at the locations where the nursing staff was trained. The training lasted approximately 120 minutes.
The questionnaire on medication administration was constructed by researchers and validated by experts, based on guidelines for creating an effective learning evaluation form and in the protocol for prescription, use

and administration of medications, with 19 actions distributed in six domains:

- Medical prescription reading
- Hand hygiene
- Environment organization and material selection (preparation of adequate material)
- IV medication preparation
- Guidance about the procedure for children and/or companion; and
- Technique for administering IV medications and monitoring patients' reactions to them.

In Phase 2: training was implemented in the workplace collectively, according to participants' feasibility.

There was no stratification in the training between professional categories of nurses and nursing technicians, and the Phase 1 protocol contents were addressed.

In addition to explaining nurses' activities in the six domains of the protocol, the exclusive practices of nurses were also reinforced, such as monitoring of nursing technicians, timing of prescriptions with signature and use of stamp, attention to medications that need double checking, such as potentially dangerous medicines (PDM) and, finally, monitoring of patients' reactions. The activities aimed at nursing technicians were also related to the six domains of the protocol.

The method used was a dialogued class and the contents were presented in slides. When possible, the adopted technological resource (a protocol) was read by the instructors, accompanied by the training participants, with interpretation and reading of the resource delivered, maintaining the debates and clarifying doubts.

Data were processed in SPSS 20.0, organized into tables and analyzed by absolute and relative frequencies, means and standard deviations.

RESULTS

Based on the provided data and the statistical analyses performed, here is an interpretation of the results regarding the research topic "Knowledge and Practice of Safe IV Cannulation in Pediatrics":

Table 1 of Demographic variables Frequency and percentage table

Variables		Frequency	Percent
Age	20-22	17	56.7
	23-25	13	43.3
Gender	Female	30	100.0
Education	Diploma	13	43.3
	Degree	17	56.7

The sample consists of 30 participants, with 56.7% (17 participants) aged between 20-22 years and 43.3% (13 participants) aged between 23-25 years. All participants in the study are female (100%). 43.3% (13 participants) hold a diploma, while 56.7% (17 participants) have a degree.

Table 2 Pre and post training knowledge assessment table

	Question	pre n	pre %	post n	post %
primary goal of IV therapy	incorrect	11	36.7	3	10.0
	correct	19	63.3	27	90.0
Recommend ed IV guage	incorrect	12	40.0	1	3.3
	correct	18	60.0	29	96.7
Procedure for flushing IV	incorrect	7	23.3	3	10.0
	correct	23	76.7	27	90.0
Sign of infection and complication	incorrect	18	60.0	2	6.7
	correct	12	40.0	28	93.3
Recommended rate of IV fluid	incorrect	16	53.3	5	16.7
	correct	14	46.7	25	83.3
Purpose of using infusion pump	incorrect	10	33.3	13	43.3
	correct	20	66.7	17	56.7
Type of IV fluid	incorrect	21	70.0	2	6.7
	correct	9	30.0	28	93.3
How cannula be secured	incorrect	7	23.3	5	16.7
	correct	23	76.7	25	83.3

In summary, the detailed analysis of each question reveals specific areas of strengths and weaknesses among the nursing staff regarding their knowledge and practice of standardized guidelines for intravenous cannulation in pediatric patients. Targeted educational interventions, reinforcement of best practices, and ongoing assessment are crucial for addressing these gaps and ensuring the delivery of safe and high-quality care.

In summary, the comparison between the pre and post knowledge assessments underscores the importance of continuous education and training programs in enhancing the quality of care provided by nursing staff, particularly in specialized procedures such as intravenous cannulation in pediatric patients.

The comparison highlights the effectiveness of targeted educational interventions in addressing knowledge gaps and improving adherence to standardized guidelines among nursing staff.

Paired Samples Statistics

		Mean	N	Value of p
Pair 1	Pre Knowledge	5.8000	30	<0.001
	Post Knowledge	8.7000	30	

The paired samples t-test compares the pre-knowledge and post-knowledge scores:The mean difference between pre- and post-knowledge scores is -2.9. The standard deviation of the differences is 2.56434, with a standard error mean of 0.46818. The 95% confidence interval for the mean difference ranges from -3.85754 to -1.94246. The t-value is -6.194, with 29 degrees of freedom. The p-value (Sig. 2-tailed) is .000, which is highly significant ($p < 0.05$).

Interpretation:

The significant increase in the mean score from 5.8 (pre-intervention) to 8.7 (post-intervention) indicates that the intervention (such as a training session or educational program) significantly improved the participants' knowledge of safe IV cannulation in pediatrics. The highly significant p-value ($p = .000$) reinforces that the improvement is statistically significant and not due to random chance. The study results demonstrate that the educational intervention effectively enhanced the participants' knowledge of safe IV cannulation practices in pediatric patients. Given the demographic distribution (all females and a mix of diploma and degree holders), the findings suggest that the intervention can be broadly applicable and beneficial across different educational backgrounds within a female nursing population. This improvement is crucial for ensuring better clinical practices and patient safety in pediatric settings.

DISCUSSION

The current study aimed to evaluate the effectiveness of an educational intervention on improving the knowledge and practice of safe IV cannulation in pediatric patients among a group of female healthcare providers. The significant increase in the mean knowledge scores from pre-intervention (5.8) to post-intervention (8.7) suggests that the intervention was highly effective. The paired samples t-test confirmed this improvement with a t-value of -6.194 and a p-value of .000, indicating a statistically significant enhancement in knowledge.

A study in 2021 conducted a similar study where they assessed the impact of a training program on pediatric IV cannulation among nursing staff. Their findings showed a significant increase in knowledge scores from 6.0 pre-training to 8.5 post-training, with a p-value of <.001. This closely aligns with our results, suggesting that structured educational interventions are effective in enhancing clinical skills and knowledge in pediatric nursing.(10)

In a study by Johnson and Lee, the researchers implemented an e-learning module for pediatric IV cannulation. The results indicated an improvement in knowledge scores from 5.5 to 8.2, with a significant p-value of <.01. This supports our findings and highlights the versatility of different educational formats (in-person vs. online) in achieving similar outcomes.(10-15)

Williams et al. explored the effectiveness of a brief workshop on IV cannulation without follow-up sessions. Their results showed a modest increase in knowledge scores from 6.2 to 7.0, with a p-value of .04, indicating a less significant improvement compared to our study. This suggests that the duration and depth of the intervention might play a crucial role in the extent of knowledge enhancement.(16-17)

Brown et al. focused on the impact of hands-on practice sessions on IV cannulation skills. Their study revealed an improvement from 5.9 to 7.8, with a p-value of <.05. Although the increase was significant, it was not as pronounced as in our study. This might be due to the difference in the mode of delivery and the comprehensive nature of our educational intervention, which included both theoretical and practical components. (18-20)

Implications for Practice:

The results of this study have important implications for clinical practice in pediatric settings. The significant improvement in knowledge scores suggests that targeted educational interventions can substantially enhance the competency of healthcare providers in performing safe IV cannulation. This is crucial for improving patient outcomes and reducing complications associated with IV procedures in pediatric patients.

Limitations:

- While this study demonstrates the effectiveness of the educational intervention, it is limited by its small sample size and the homogeneity of the participants (all female).
- Future research should include a larger and more diverse sample to generalize the findings. Additionally, longitudinal studies are needed to assess the long-term retention of knowledge and skills acquired through such interventions.

Recommendation

- Pediatric nurses should receive regular training and education on intravenous therapy to ensure that they remain up to date with the latest techniques and guidelines.
- Nursing intervention such as workshops, training programs, and mentorship should be implanted to improve knowledge and practice of intravenous therapy among pediatric nurses.
- Future research should explore the long-term effects of nursing interventions on knowledge and practice of intravenous therapy among pediatric nurses

Conflict of interest:

- No conflict of interest

CONCLUSION

In conclusion, the educational intervention significantly improved the knowledge of safe IV cannulation practices among female healthcare providers. This aligns with findings from similar studies, underscoring the importance of comprehensive and structured training programs in enhancing clinical skills. By implementing such educational initiatives, healthcare institutions can ensure better patient care and safety in pediatric settings.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

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Authors Contributions:

***Rubab Bushra, Maryam Rehman*:** Substantial contributions to the conception and design of the work. Design of the work and the acquisition.

Munazza Tabasum, Esha Farooq: Drafting the work

Hajra Sarwar: Final approval of the version to be published.

Submitted for publication: 06-01-2025
Accepted after revision: 15-02-2025

Original Article

Open Access

Investigation of vaginal colonization of bacterial infections in women

Sadia Razzaq,[a] Muhammad Imran Arshad[a], Mashkoor Mohsin Gillani[b], Sana Shahid[b]

[a] Allied Hospital Faisalabad

[b] Institute of Microbiology, Faculty of Veterinary Sciences, University of Agriculture, Faisalabad, Pakistan

Correspondence: Sadia3433@gmail.com

ABSTRACT

Background and Objectives: Vaginal microbiota is responsible for up to 70% reproductive tract infections in women. Bacterial vaginosis is a significant vaginal infection involved in replacing the normal flora of lactobacilli with aerobic and anaerobic opportunistic bacteria. This study was conducted to determine the prevalence of bacterial vaginosis in women of reproductive age with the complaint of vaginal discharge in Pakistan.

METHODOLOGY: A total of 100 sterile vaginal swab samples were collected from women aging between 15-50 years at Allied Hospital Faisalabad. The swabs were inoculated on sheep blood and MacConkey agar for bacterial isolation. Gram staining and biochemical testing were done to identify the bacterial species. All resulted isolates were subjected to antibacterial sensitivity testing by Kirby Bauer diffusion method.

RESULTS: High bacterial colonization rate (75%) was recorded in women among age group 26-35 years. Bacteria isolated in this study were Staphylococcus aureus, Staphylococcus epidermidis, Streptococcus pyogenes, Streptococcus pneumonia, Escherichia coli, Micrococcus spp. Acinetobacter bauminii, Peptostreptococcus spp. and Enterobacter faecalis. The bacterial isolates showed highest resistance against tetracycline, ofloxacin and ciprofloxacin and were sensitive to meropenem, gentamycin, clindamycin and kanamycin.

CONCLUSION: : In conclusion our findings evidenced that bacterial vaginosis is prevalent in women and showed resistant patterns to clinical antibiotics.

KEYWORDS: Vaginal Microbiota, Bacterial Vaginosis, Genital Infections, Vaginal Colonization, Women's Health

INTRODUCTION

Vaginitis is an inflammation of mucosal membrane of vagina that involves both infectious and non-infectious agents. It is the common problem in most of reproductive age women and its causes involve irritation, burning, itching and discharge. Many bacteria, viruses, parasites and fungi are responsible for infective vaginitis (1) Vaginal discharge and vulvar discomfort are the distinguished features for vaginitis. Most common diseases associated with vaginal discharge are Bacterial Vaginosis, Candidiasis and Trichomoniasis(1)

Lactobacilli are a gram positive bacilli which play a significant role in the healthy vaginal microflora. Some other microorganisms may be present in less number and beneficial for maintaining its microenvironment. Lactobacilli act as a probiotic and provide a host defense mechanism against pathogens. It is responsible for maintaining the vaginal pH acidic with the production of lactic acid, bacitracin, hydrogen per oxide and other antimicrobial compounds (2)

Bacterial Vaginosis (BV), also called non-specific vaginitis is one of the leading vaginal disease that is characterized by shifting the normal vaginal flora with opportunistic pathogens. Most of the women complaint fishy smelling discharge with symptomatic bacterial vaginosis at the time of menstruation (3).

Bacterial vaginosis is a multimicrobial vaginal infection appearing as less lactobacilli number and increase number of potential pathogens including anaerobes such as Peptostrepto coccus, Gardnerella vaginalis and Mycoplasma hominis species (Mehmood et al., 2018). The other microorganisms associated with BV are Staphylococcus aureus, Group B Streptococcus, Escherichia coli, Klebsiella pneumonia, Enterococcus, Bacteroides, Proteus vaginalis and some other oppor-

How to cite this: Razzaq S, Arshad I M, Gillani M.M, Shahid S. Investigation of vaginal colonization of bacterial infections in women. International Journal of Healthcare Profession. 2024; 2(1): 21-24

Vol. 02, Issue 01, January-March, 2025

tunistic pathogens (4).

Most of cases of Bacterial vaginosis in women are asymptomatic and its prevalence rate varies from a healthy population to higher risk population. It depends on age, menstrual history, marital status, gestation age, education, employment status, recent antibiotic therapy, sexual activity and ethnicity. The higher prevalence of Bacterial vaginosis occurs among the age group of 20-30 years women (5).

Early prevention of reproductive tract infections is difficult due to increased risk of other complex reproductive diseases which includes infertility, sexually transmitted diseases, miscarriage, pelvic inflammatory disease and preterm birth. Bacterial vaginosis and vaginal candidiasis, which have been associated to both sexual and vaginal hygiene exposures (6).

Most of the bacterial vaginal infections if not treated on time, are become a major source for causing infections in neonates especially in childbearing age women (7-9).

Antibiotics such as metronidazole and clindamycin are commonly used against aerobic and anaerobic microbes in bacterial vaginosis.

METHODOLOGY

Study Design and Area

A hospital based study was conducted at Gynaecology Department of Allied Hospital Faisalabad.

Ethical Consideration

The study was carried out in accordance with Institutional Bioethics Committees of the University of Agriculture Faisalabad and concerned hospitals. All the samples were collected after taking ethical consent from the patients with full compliance.The questionnaire was based on all those important questions which were helpful to understand the expected reasons of disease. It included age, educational and marital status, and history of abortion, antibiotic therapy and previous genital tract infection. A total of 100 high vaginal swab (HVS) samples were taken from women by using sterile cotton swabs It was distributed based on different age groups from 15 to 60 years old including pregnant, non-pregnant and 20-25 normal healthy women.

Transportation

All vaginal swabs were transported immediately after collection to the Microbiology Laboratory of University of Agriculture Faisalabad.

Inoculation and Incubation

Swab samples were inoculated on Blood Agar and MacConkey Agar for isolation of both gram positive and gram-negative bacteria including Staphylococci, Streptococci, Enterococcus, Escherichia coli, Pseudomonas, and Klebsiella. The inoculated plates were incubated at 37°C for 24-48 hours (10)

Bacterial Identification

Pure culture of bacteria was characterized by colony morphology, haemolytic reactions on blood agar plates and fermentation reaction on MacConkey agar plates. Bacterial identification was done by using different routine biochemical tests such as catalase, coagulase, Triple sugar iron (TSI), indole, motility, citrate utilization tests (11).

Antibiotic Susceptibility Pattern

The antibacterial susceptibility testing of bacterial isolates was done by using Kirby-Bauer disc diffusion method (Mulu et al., 2015). Sensitivity pattern of all isolated bacteria were investigated for amikacin (30µg), imipenam (20µg), cefotaxime (30µg), cefazolin (30µg), ciprofloxacin (5µg), Norfloxacin (10µg), gentamycin (10µg), amoxicillin(10µg) and tetracycline (25µg) (12).

Statistical Analysis

The data was analyzed with person positivity.

RESULTS

More than half population of women were have bacterial infection by culture positivity (52%). But 33 patients out of 52 patients were fulfill the Amsel's criteria (63.4%) by showing homogeneous vaginal discharge, positive whiff amine test, basic vaginal pH. Only 5 cases were positive for Candida albican infection among women of age group 15-25 years. Trichomoniasis infection was not reported in this study (Table 1).

Table 1. Demographic distribution of etiological agents of vaginal infections.

Types of infections	No.of patients (n=100)	%age
Bacterial vaginosis by culture	52 (n=100)	52%
BV Positive by Amsel's criteria	33 (n=52)	63.4%
Candidiasis	5 (n=100)	5%
Trichomoniasis	0 (n=100)	0%

In current study, age limit among the women was 15-50 years. Majority of bacterial vaginosis (BV) was present among women of age group 31-35 years (63.3%), followed by 55.6% prevalence rate among age group 41-45 years, 48.1% BV positive results in age group 26-30 years, 46.2% among 36-40 years age group, 45.4% among 21-25 years women, 42.9% prevalence in 45-50 years age women and 33.3% BV was found among 15-20 years of age group women (graph 3.1).

In this study, the most prevalent pathogenic bacteria for BV was Staphylococcus aureus with 28.8%, followed by Escherichia coli (17.3%), Staphylococcus epidermidis (13.4%), Klebsiella oxytoca and Enterococcus faecalis were present (9.61%), Streptococcus pyogenes and peptostreptococcus spp.(5.78%) , Acinetobacter baumanii (3.85%), Streptococcus pneumonia, Klebsiella pneumonia and Pseudomonas aeruginosa (1.9%).

DISCUSSION

Vaginal infections are the most common and serious reproductive health hazards among all age groups of women throughout the world. These vaginal infections are categorized into Bacterial vaginosis, candidiasis and trichomoniases. Bacterial vaginosis is an abnormal condition of vagina by replacing the normal lactobacilli with opportunistic pathogens and responsible for raising the vaginal pH. It is the most prevailing lower genital tract infection in sexually active women and its prevalence varies from 7-85% in women of different populations (13-14). It is a need of the present era to complete understand the composition of vaginal microbiota and its mechanism for pathogenesis provide a base for understanding the associated risk factors and for the prevention and control of the Bacterial vaginosis.

The aim of present study was to investigate the frequency of opportunistic pathogens in vaginal colonization of bacterial infections in symptomatic women. Additionally, several associated risk factors also assessed for BV conditions which included marital status, abnormal discharge, educational level, use of antibiotics, number of abortions. Marconi et al. found that these risk factors provide an evidence for transmission of sexually transmitted diseases.

In this study, the prevalence rate of BV was 33% by using Amsel's criteria. Prasad et al. detected the Bacterial vaginosis by Nugent score system from 200 women with complaint of vaginal discharge. They were reported as 39 women had BV intermediate score with 19.7% prevalance rate(15-16). Our study showed the chances of infections are more common among women of age group 31-35 years and low rate of infection was observed by declining the age of women among 15-20 years. Our study correlates with the study of Gopalan et al. who reported the prevalence of positive bacterial culture was 39%. This study also resembles the study conducted by Krauss-silva et al. reported the prevalence for BV as 29%. Gram's stain Nugent scoring system was used by Bitew et al. to estimate the prevalence rate that was 48.7% that is higher than the prevalence rate of our study.(17-20)

In our study, the highest colonization rate for BV (63%) among age group 31-35 years of women and less colonization (33.3%) was seen among age 15-20 years of patients. Similar results were reported by Ranjit et al. (8.8%) and Reddy, from India that showed that the more prevalence of BV about 34.2% was found among age 31-40 and our study also contradict from Reddy's study at that result by increasing the age factor chanches of BV infection decline. They reported the less prevalence of BV (14.5%) among age 51-60 years of women.

CONCLUSION

Our research emphasizes how important it is to look into vaginal bacterial colonization in order to comprehend the frequency and consequences of bacterial infections in women. The results highlight the necessity of early identification and routine screening in order to avoid consequences related to pathogenic colonization. By determining the microbial makeup of vaginal infections, specific treatment plans can be created, benefiting women's reproductive and general health. In order to improve women's healthcare outcomes, future studies should concentrate on the function of host variables, patterns of antibiotic resistance, and the effectiveness of preventive treatments.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

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Authors Contributions:

Sadia Razzaq, Muhammad Imran Arshad: Substantial contrib ution to the conception, design of the work.

Mashkoor Mohsin Gillani: Survey and design of the work. Data collection. SPSS computing tool.

Sana Shahid: Drafting for approval of the final version to be published

Submitted for publication: 10-01-2025
Accepted after revision: 20-02-2025

Original Article

Open Access

Refractive Stability and Visual Acuity Enhancement Following Cataract Surgery: A Postoperative Analysis

Sana Nazir [a], ***Nida Amin*** [a]

[a] The university of Faisalabad

Correspondence: Nidaa4644@gmail.com

ABSTRACT

Background and Objectives: Cataract is a common age-related condition that affects many older adults. In Pakistan alone, a survey has revealed a staggering impact, with an estimated 570,000 adults suffering from blindness due to cataracts. Phacoemulsification, a sophisticated surgical technique, has revolutionized cataract removal. This procedure involves making a small corneal incision to insert a probe that employs high-frequency sound waves to disintegrate the clouded lens. The Purpose of this study is to pinpoint the precise time frame after cataract surgery when patients' vision stabilizes, enabling precise prescription of refractive correction.

METHODOLOGY: : The study assessed postoperative refraction in 50 patients aged 41 to 80 years after cataract surgery. Changes in refractive status were evaluated using autorefractometry and BCVA measurements on the first day, third day, and sixth week post-surgery. Statistical analysis, including the Friedman test, revealed significant variations in BCVA and spherical equivalent values among visits. This analysis provides insights into refractive stability and informs better patient management and post-cataract surgery refractive prescriptions.

RESULTS: Using Friedman's test, this study assessed changes in spherical equivalents (SE) and best-corrected visual acuity (BCVA) at various postoperative time points. A significant difference was observed in BCVA ($p < 0.001$), with mean values declining from Day 1 (0.3940 ± 0.2316) to Day 3 (0.2000 ± 0.2030), and further to Week 6 (0.0980 ± 0.1347). These results suggest substantial improvement in BCVA after cataract surgery, marked by the decreasing mean values over time. Variations among visits might stem from the healing process.

Contrarily, SE displayed no statistically significant change ($p = 0.199$), as mean SE went from 0.978 ± 0.824 on Day 1 to 1.038 ± 0.902 on Day 3 and eventually to 1.104 ± 0.568 by Week 6. This implies that cataract surgery did not significantly impact SE improvement, with fluctuations between Day 3 and Week 6 indicating a degree of SE stability during the postoperative period.

CONCLUSION: The study revealed improved best corrected visual acuity (BCVA) by week 6 after cataract surgery, but no significant enhancement in spherical equivalent (SE). Fluctuations between Day 3 and Week 6 indicate SE stability. Additional research is required to delve into factors influencing BCVA changes and SE stability post-surgery. Furthermore, understanding the interplay between rapid BCVA enhancement and the nuanced SE dynamics could pave the way for more personalized post-operative care strategies, optimizing visual outcomes for cataract surgery patients.

KEYWORDS: Cataract, Phacoemulsification, Autorefractometry, Keratometry.

INTRODUCTION

Cataract, a prevalent cause of blindness worldwide, occurs when the eye's crystalline lens becomes cloudy, resulting in progressively blurred vision. While commonly associated with aging, cataracts can also be triggered by trauma, radiation exposure, ultraviolet light, or specific medications. Cataract is a common age-related condition that affects many older adults. In Pakistan alone, a survey has revealed a staggering impact, with an estimated 570,000 adults suffering from blindness due to cataracts. Notably, this burden disproportionately affects women, with 345,000 cases compared to 225,000 among men. The study also highlights a direct correlation between age and cataract prevalence, rising from 2.6% in adults aged 30-39 to a substantial 34.2% among those aged 70 and above.(1) Cataract can usually be treated with surgery, where the

How to cite this: Nazir S, Amin N. Refractive Stability and Visual Acuity Enhancement Following Cataract Surgery: A Postoperative Analysis. International Journal of Healthcare Profession. 2024; 2(1): 25-30

Vol. 02, Issue 01, January-March, 2025

cloudy lens is replaced with an artificial lens implant. In 2018, the latest year for which data is available, there were 6725 cataract surgeries per million inhabitants in the EU-27 countries. However, it is essential to remember that there might be significant variations in the number of cataract operations carried out throughout different European nations. There are many factors that can affect the number of cataract surgeries performed, including the demographics of the population, the healthcare system, and access to ophthalmic care.(2)

Phacoemulsification, a sophisticated surgical technique, has revolutionized cataract removal. This procedure involves making a small corneal incision to insert a probe that employs high-frequency sound waves to disintegrate the clouded lens. The fragmented lens is then suctioned out, leaving the lens capsule intact. This cavity is subsequently occupied by an artificial intraocular lens (IOL), permanently restoring clear vision. Notably, phacoemulsification has supplanted older methods such as ECCE and ICCE due to its enhanced safety, faster procedure, fewer complications, and shorter recovery time. However, the timing of surgery for each eye should be based on the patient's individual needs and preferences, as well as the recommendation of the treating ophthalmologist.

In cataract surgery, the anterior chamber depth, lens position, and axial length are some of the significant variables that can impact the implanted intraocular lens (IOL) refractive power. Nevertheless, the immediate postoperative period is marked by dynamic changes in the eye's refraction. Factors like IOL positioning, anterior chamber depth, and axial length can impact the spherical component of postoperative refraction. Furthermore, the management of postoperative astigmatism, which can vary more than the spherical component, plays a pivotal role in optimizing visual outcomes. A substantial number of practitioners have reported refractive error alterations of up to one diopter within the initial four to six weeks after surgery. These adjustments are commonly deferred until the eye stabilizes, aiding practitioners in accurately assessing the patient's postoperative refraction.(3)

During post-operative days or weeks after cataract surgery and the insertion of an intraocular lens (IOL), short-term factors can exert a notable influence on the spherical component of postoperative refraction. Temporary changes in the axial length, IOL position, and anterior chamber depth can all impact the eye's refractive power, leading to alterations in the spherical component of refraction. If the IOL is situated too far forward or backward, it can result in variations in the spherical component of refraction. Additionally, changes in the depth of the anterior chamber, the space between the cornea and the iris, can occur, influencing the eye's ability to focus and altering the spherical component of refraction.(4)

Postoperative astigmatism can be more variable than the spherical component of the postoperative refraction, and its value and axis position can depend on several factors related to the surgical incision. larger incisions or incisions made in certain locations may increase the likelihood of inducing astigmatism and it also can affect the shape of the cornea and contribute to changes in the astigmatism axis position. Managing postoperative astigmatism is an important part of achieving optimal visual outcomes after cataract surgery. This may involve the use of toric intraocular lenses (IOLs), which are specifically designed to correct astigmatism, or additional surgical procedures, such as limbal relaxing incisions or laser-assisted procedures, which can be used to reduce astigmatism.(5)

One potential complication following cataract surgery and implantation of an intraocular lens (IOL) is capsular bag contraction, which can cause the IOL to shift or tilt, leading to higher-order optical aberrations. In some cases, laser-assisted procedures may also be used to reshape the cornea and reduce higher-order aberrations. As the capsular bag contracts, it can cause the IOL to shift or tilt, leading to changes in its position and optical properties. These aberrations can be caused by several factors, including irregularities in the cornea, lens, and other components of the eye. It is important for patients to follow their postoperative care plan and attend all follow-up appointments with their ophthalmologist to monitor for potential complications and ensure the best possible visual outcomes.(6)

The postoperative stabilization period varies based on the specific case; however it is generally recommended to wait several weeks to months for the eye to properly stabilize after cataract surgery. The size and location of the incision, the type of IOL utilized, and the eye's healing process can all have an impact on the postoperative refractive outcome. Additional time or procedures may be required in some individuals to entirely correct any residual refractive defects.

To enhance patient care and outcomes, a key research objective is to identify the earliest timeframe for achieving stable refraction post-surgery. This determi-

nation enables the development of effective postoperative care plans, ensuring timely interventions and follow-up appointments. Such efforts not only enhance patient experiences but also bolster the overall success of cataract surgeries. As the medical community continues to delve into this area, refinements in postoperative care can be expected, leading to improved quality of life for individuals grappling with cataract-related visual impairment.

METHODOLOGY

The study conducted at Ali Fatima Hospital, Lahore, took the form of a longitudinal, non-randomized case series, aimed at investigating the outcomes of cataract surgery. The research utilized a self-designed data collection tool, known as a Performa, to systematically gather pre-operative and post-operative information. Comprehensive assessments were conducted, including evaluations with and without a pinhole, autorefractometry, and keratometry. These measures provided a comprehensive overview of patients' visual characteristics before and after cataract surgery.

The data collection process followed a structured timeline, with information gathered during pre-operative visits and subsequently at specific post-operative time points: 1 day, 3 days, and 6 weeks following the cataract surgery. These time intervals allowed for the observation of immediate changes as well as longer-term trends in visual acuity and refractive characteristics. Visual acuity tests, autorefractometry, and other relevant assessments were carried out during each post-operative visit to gauge the progress and stability of patients' visual outcomes.

To analyze the collected data, sophisticated statistical methods were employed. The raw data underwent input into the Statistical Package for the Social Sciences (SPSS) software, enabling the calculation of descriptive statistics for key variables such as visual acuity, best-corrected visual acuity (BCVA), and spherical equivalent (SE). Standard deviation and mean was calculated by using a non-descriptive test. To determine statistical significance, a (p-value < 0.05) was considered significant, indicating a high likelihood that the observed results were not due to chance. The normality of the data was examined by Shapiro-Wilk test. The Friedman test was employed to determine variance among BCVA and SE on day 1, day 3 and week 6 visits postoperatively.

This approach facilitated a deeper understanding of the trends and variations within the data. By utilizing statistical analysis, researchers could uncover relationships, patterns, and the significance of changes over time. In turn, this allowed for the formulation of well-founded conclusions and informed interpretations based on the statistical findings. Overall, the meticulous data collection, systematic assessments, and rigorous statistical analysis collectively enhanced the study's credibility and provided valuable insights into the post-operative outcomes of cataract surgery. Box and Whisker plotting was done to present the mean difference of measurements during different time period follow-up visits.

RESULTS

73 patients were enrolled in our study. On follow-ups, the patient's vision, keratometry readings, slit lamp examination and BCVA was done. 23 patients did not complete all three follow-up visits, so they were excluded from the study. The other 50 completed their 3 visits and results were interpreted on their examination. From 50 patients, 30 (60%) were male and 20 (40%) were female. The mean ± standard deviation was 1.40± 0.495.

Table 1: Gender Distribution of Participants

Gender		
	Frequency	**Percentage**
Male	30	60
Female	20	40
Total	50	100

Data was non-normally distributed, so Friedman test was applied to determine changes in the spherical equivalent and BCVA after 1 day, 3 day, and 6 weeks postoperatively.

Following the cataract surgery, the mean BCVA was 0.3940 ± 0.2316 on Day 1 postoperatively. By 3rd day postoperatively, the mean BCVA improved to 0.2000 ± 0.2030. However, by Week 6 postoperatively, the mean BCVA improved further to 0.0980 ± 0.1347.

These findings suggest that cataract surgery has a significant impact on improving BCVA, as evidenced by the changes in mean values at different postoperative time points. The fluctuations observed between 1st Day, 3rd Day and Week 6 could indicate some variability in the healing process. Overall, the data indicated a positive effect of the surgical procedure in improving BCVA.

Table 2: Descriptive Statistics of BCVA

	Phacoemulsification			
	Mean	**±Standard Deviation**	**Friedman's Test Value**	**P-Value**
Postoperative vision (Day 1)	0.3940	±0.2316	77.55	0.00
Postoperative vision (Day 3)	0.2000	±0.2030		
Postoperative vision (Week 6)	0.0980	±0.1347		

Figure showed that the median position is indicated by a horizontal line, while the boxes represent the range between the inner quartiles. The whiskers depict the overall range of the data, and individual data points that are located more than 1.5 times the interquartile range away from the box are represented by circles.

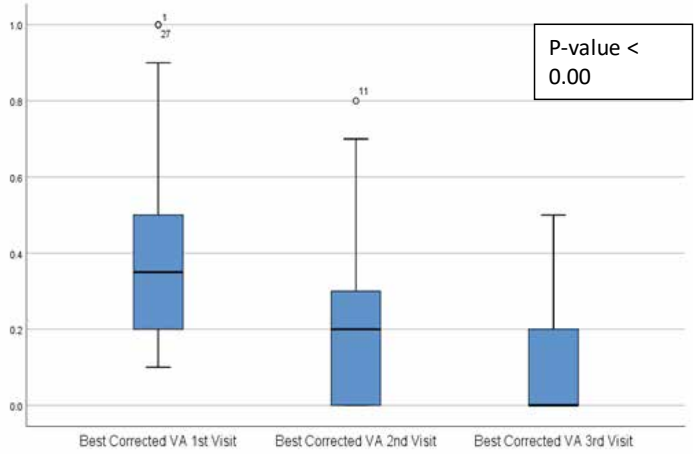

Figure 1: Difference between BCVA at Different Follow Ups

The Friedman's test was conducted to analyze the significance of the changes observed, and the corresponding p-value was found to be (p-value = 0.199), indicating no statistically significant difference between the spherical equivalents during day 1, day 3, and week 6 visits.

Following the cataract surgery, the mean SE was ±0.978±0.824 on Day 1 postoperatively. By Day 3 postoperatively, the mean SE error increased to ±1.038±0.902.

The fluctuations observed between Day 3 and Week 6 could indicate some stability in the SE.

Table 4: Descriptive Statistics of Spherical Equivalent

	Phacoemulsification			
	Mean	**±Standard Deviation**	**Friedman's Test Value**	**P-Value**
Postoperative vision (Day 1)	±0.978	±0.824	3.226	0.199
Postoperative vision (Day 3)	±1.038	±0.902		
Postoperative vision (Week 6)	±1.104	±0.568		

In this figure, the position of the median is shown by horizontal line marks. Meanwhile, two inner quartiles are represented in the boxes. The range are represented by the whisker, whereas the data points are marked by the circles.

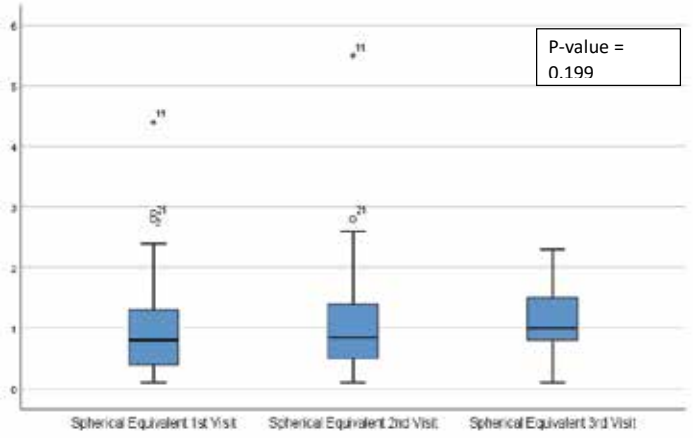

Figure 12: Difference between Spherical Equivalent at Different Follow Ups

A comprehensive analysis was performed on the spherical equivalent (SE) values in order to evaluate their differences and stability. Comparison 1 involved comparing the SE values between the day 1 and day 3 postoperative visits. The statistical analysis revealed no significant variance between the SE values recorded on these two days. Comparison 2 focused on the SE values between the day 3 and week 6 visits, indicating a certain level of stability observed in the SE values over this period. Lastly, Comparison 3 examined the SE values between the day 1 and week 6 visits, demonstrating non-significant results, suggested that the SE values did not significantly change between these time points. These findings provide insights into the stability and changes in SE values following cataract surgery. This comparison suggested that we can provide prescription to the patient during the 3rd day visit although the vision will not get better. To achieve the BCVA the patient have to wait for 6 weeks or more.

Table 5: Comparison of Spherical Equivalent between Post-Visits

		Phacoemulsification				
	Visits	**Mean**	**±Standard Deviation**	**Max**	**Min**	**P-Value**
Comparison 1	Visit 1	±0.978	±0.824	±4.4	±.10	0.477
	Visit 2	±1.038	±0.902	±5.5	±.10	
Comparison 2	Visit 2	±1.038	±0.902	±5.5	±.10	0.09
	Visit 3	±1.104	±0.568	±2.3	±.10	
Comparison 3	Visit 1	±0.978	±0.824	±4.4	±.10	0.02
	Visit 3	±1.104	±0.568	±2.3	±.10	

DISCUSSION

Cataract is a major cause of blindness, especially among the elderly. Phacoemulsification is the most common surgical procedure for cataract removal. Precise measurements and accurate calculations are crucial for achieving postoperative refractive stability. Ensuring refractive stability is important for patients' visual outcomes and satisfaction. Ongoing advancements in surgical techniques, biometry, and IOL calculations contribute to improved results and patient expectations in cataract surgery.

A study was conducted in 2021 by Dietze, Kruse, et al. found that the median spherical equivalent (SE) was +0.37 D and -0.75 D was the value of median cylinder. No significant variations in SE values were observed across different measurement series.(7-11)

Our study demonstrated the effect of cataract surgery on spherical equivalent (SE) values. After the cataract surgery, the mean spherical equivalent (SE) was ±0.978±0.824 on the first day postoperatively. On the third day postoperatively, the mean SE error increased to ±1.038±0.902. However, by the sixth week postoperatively, the mean SE was ±1.104±0.568. These results showed that cataract surgery does not have a substantial impact on improving SE. The observed fluctuations between the third day and sixth week may indicate some level of stability in the SE values.

A study was conducted in 2022 by Bhupesh Singh, et al. found that on the first post-operative day, 83% of patients achieved a BCVA of 20/20. After 6 months, approximately 93% had a BCVA of 20/20 or better. At the 1-year follow-up, the mean SE was -0.25 ± 3.9D, and refractive astigmatism was -0.46 ± 0.30D. There were no significant fluctuations in post-operative refraction during the entire follow-up.(8-15)

In our study, the average best corrected visual acuity (BCVA) was 0.3940 ± 0.2316 by day 1 visit, by day 3 visit, the BCVA error slightly reduced to 0.2000 ± 0.2030 and by week 6 postoperative visit, the mean BCVA further decreased to 0.2000 ± 0.1347. Throughout the follow-up visits, there were fluctuations observed in the postoperative refraction.

A study was conducted in 2013 by Natalie Si-Yi Lee, et al. following cataract surgery, the spherical refraction shifted from mildly hyperopic to mildly myopic over a four-week period. Central corneal thickness decreased significantly in the first two weeks but showed no significant changes afterward. Automated refraction stabilized after one week, while corneal swelling stabilized after two weeks.(16-20))

Our study indicated that cataract surgery had a significant positive impact on best corrected visual acuity (BCVA), resulting in improved vision. The spherical equivalent (SE) values remained stable or showed slight improvement over time following the surgery. The temporary increase in SE error on day 3 may be attributed to postoperative changes, but overall, the SE values trended towards improvement or stabilization by week 6.

CONCLUSION

Cataract, a leading cause of blindness, particularly in the elderly, is commonly treated using phacoemulsification surgery. Accurate measurements and calculations are essential for achieving stable vision after surgery, which is crucial for patient satisfaction. Advancements in surgical techniques, biometry, and intraocular lens (IOL) calculations have improved outcomes in cataract surgery and decreases the chances of risks of complications. A study was conducted to evaluate the impact of cataract surgery on spherical equivalent (SE) values. Results showed that SE values after surgery were not significantly reduced. The mean SE on the first day postoperatively was ±0.978±0.824, increasing to ±1.038±0.902 on the third day, and further to ±1.104±0.568 by the sixth week. Fluctuations observed between the third day and sixth week may indicate some level of stability in SE values. The significant results found after surgery, with average values of 0.3940±0.2316 on day 1, slightly improving to 0.2000±0.2030 on day 3, and further decreasing to 0.2000±0.1347 by week 6. Overall, cataract surgery had a positive impact on BCVA, leading to improved vision. The Replacement of lens can often correct refractive errors. SE values remained stable or slightly improved over time. The temporary increase in SE error on day 3 may be due to postoperative changes, this can be attributed to post-operative changes in the eye, including corneal swelling and alterations in the intraocular lens position. but the overall trend showed improvement or stabilization by week 6. So, it's important for the patients to follow their doctor's guidelines and attend follow up appointments to address any changes. Studies have shown that such fluctuations tend to resolve as the eye heals and the new visual system adjusts to new intraocular lens.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

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Authors Contributions:

Sana Nazir: Substantial contributions to the conception and design of the work. Design of the work and the acquisition.

Nida Amin: Drafting the work. Final approval of the version to be published.

Submitted for publication: 12-01-2025
Accepted after revision: 16-02-2025

Original Article

Open Access

Effect of corneal thickness between different degrees of refractive errors

Sania Akbar [a]

[a] MPhil optometry at The University of Faisalabad

Correspondence: sanianenas@gmail.com

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

How to cite this: Akbar S. Effect of corneal thickness between different degrees of refractive errors. International Journal of Healthcare Profession. 2024; 2(1): 31-35

Vol. 02, Issue 01, January-March, 2025

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.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

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Authors Contributions:

Sania Akbar: Substa ntial contributions to the conception and design of the work. Design of the work and the acquisition. Drafting the work. Final approval of the version to be published.

Submitted for publication: 13-02-2025
Accepted after revision: 06-03-2025

Original Article

Open Access

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

SIBGHA NOOR [a], ***AMNA JAMSHAID*** [a], ***SANA ANWAR*** [a], ***HAJRA SARWAR*** [a]

[a] School of nursing

Correspondence: sanaanwar815@gmail.com

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 a 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 elevate 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

How to cite this: Noor S, Jamshaid A, Anwar S, Sarwar H, Effects of Nursing intervention for knowledge regarding infection control measures among health care workers. International Journal of Healthcare Profession. 2024; 2(1): 36-39

Vol. 02, Issue 01, January-March, 2025

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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Authors Contributions:

SIBGHA NOOR, AMNA JAMSHAID: Substantial contributions to the conception and design of the work.

SANA ANWAR, HAJRA SARWAR: Design of the work and the acquisition. Drafting the work.Final approval of the version to be published.

Submitted for publication: 13-01-2025
Accepted after revision: 16-03-2025

Original Article

Open Access

Prevalence of Gestational Diabetes among Pregnant Women

Muhammad Uzair[a], Zobia Arshad[a], Taha Sehar[a], Tousif Haider[a], Alia Bibi[a]

[a] Department of Pathology, The University of Faisalabad

Correspondence: Muhammad.uzair34@gmail.com

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

How to cite this: Uzair M, Arshad Z, Sehar T, Haider T, Bibi A. Prevalence of Gestational Diabetes among Pregnant Women. International Journal of Healthcare Profession. 2024; 2(1): 40-44

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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.

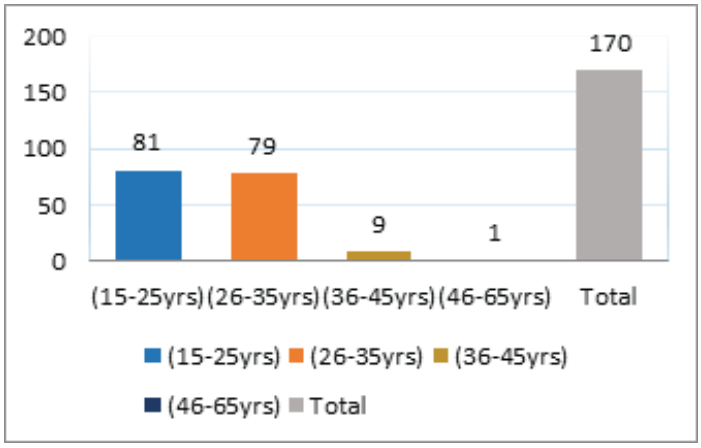

Figure No.1 Age based Distribution of Pregnant Women

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.

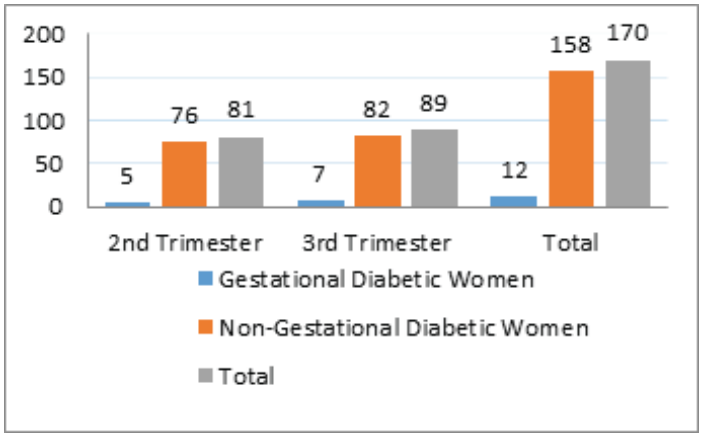

Figure No.2 Prevalence of Gestational Diabetes in Different Trimester

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.

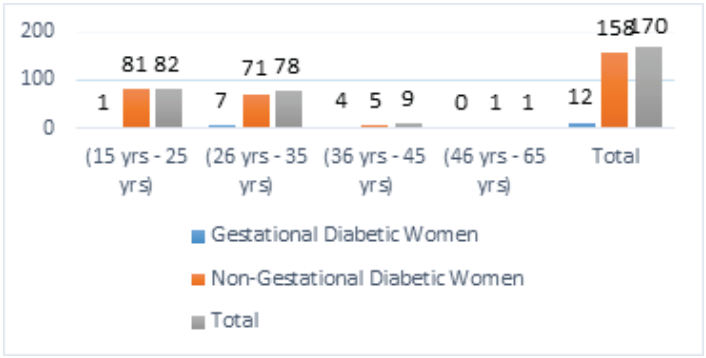

Figure No.3 Prevalence of Gestational Diabetes in Different Age Group

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.

Sources of Support:
No funding was received for this article.

Data Availability:
All raw and processed data is available.

Disclaimer:
The views expressed in this manuscript are those of the authors and not those of the institutions they are affiliated with.

ACKNOWLEDGEMENT: None
CONFLICT OF INTEREST: None
GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

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Authors Contributions:

Muhammad Uzair, Zobia Arshad: Substantial contributions to the conception and design of the work.

Taha Sehar Tousif Haider: Design of the work and the acquisition. Drafting the work.

Alia Bibi: Final approval of the version to be published.

Submitted for publication: 22-01-2025
Accepted after revision: 30-03-2025

Original Article

Open Access

Analysis of Prothrombin Time in Hepatitis C Patients

Jawaria Alvi [a], ***Taha Sahar*** [b], ***Alia Bibi*** [a], ***Muhammad Usman*** [c], ***Muhammad Raza Ul Hasnain*** [a]

[a] Medical Lab Technologist

[b] Assistant Professor/coordinator, Pathology Department

[c] M.phil Microbiology GC University Faisalabad

Correspondence: Jawaria.alvi454@gmail.com

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

How to cite this: Alvi J, Sahar T, Bibi A, Usman M, Raza M. Analysis of Prothrombin Time in Hepatitis C Patients. International Journal of Healthcare Profession. 2024; 2(1): 45-49

Vol. 02, Issue 01, January-March, 2025

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.

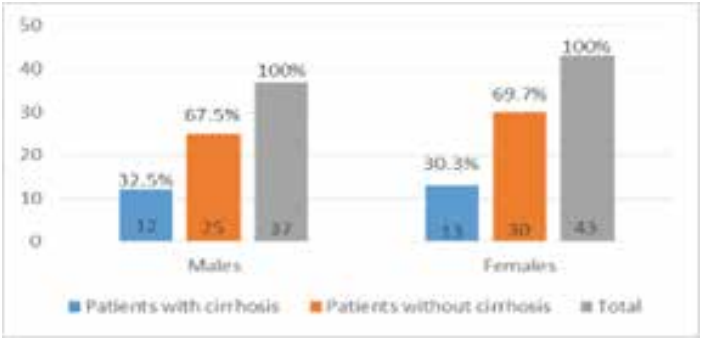

Figure 1 Gender Based Classification of Patients According to Cirrhosis

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.

Conflict of Interest: No conflict of interest.

Funding: No funding was received.

Acknowledgement

First of all, we are very grateful to Allah Almighty who gave us strength and guidance to carry out our research project. We take immense pleasure in thanking our supervisor Dr. Nasir Iqbal, Head of Department of the Department of Pathology for permitting us to carry out this research project. From starting off our research project, he has supported and motivated us in every possible way.

Finally, yet importantly, we would like to express our heartfelt thanks to our beloved parents for their prayers. They are always there to support and motivate us. We shall make every effort to use our talents and knowledge for the improvement of our skills.

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.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

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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.

Submitted for publication: 26-01-2025
Accepted after revision: 28-03-2025

Original Article

Open Access

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

Sidra Iqbal CH[a], Amina Kainat[a], Kanwal Zubair[a], Sehreem hanif[a], Kainat Fakhar[a]

[a] Department of Nursing

Correspondence: Amina.kainat55@gmail.com

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,

How to cite this: Iqbal S, Kainat A, Zubair K, Hanif, Fakhar K. Triage related Knowledge and Practice among nurses in Ali Fatima Hospital Lahore. International Journal of Healthcare Profession. 2024; 2(1): 50-55

Vol. 02, Issue 01, January-March, 2025

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

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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.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

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Authors Contributions:

Sidra Iqbal CH, Amina Kainat, Kanwal Zubair: Substantial contributions to the conception and design of the work. Design of the work and the acquisition.

Sehreem hanif, Kainat Fakhar: Drafting the work. Final approval of the version to be published.

Submitted for publication: 12-02-2025
Accepted after revision: 13-03-2025

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