IJHP

INTERNATIONAL JOURNAL OF HEALTHCARE PROFESSIONS

ISSN (Print) 3078-3488 *ISSN (Online) 3078-3496* *Volume 1, Issue 4*

Bhobtian Avenue, 9 KM,
Raiwind Road, Lahore.

+92 42 35459807-09
+92 330 1980703

Follow Us:

www.giu.edu.pk

Quarterly Peer Reviewed Journal

IJHP

International Journal of Healthcare Professions

Vol. 01, Issue 04

(October-December, 2024)

Editorial

Original Articles

Editorial

Open Access

The Immunization Dilemma: Confronting Vaccine Hesitancy for better coverage

Sajid Hameed [a]

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

Correspondence: doctorsajidhameed@gmail.com

Vaccine hesitancy, defined as "a denial, delay, or reluctance to get vaccinated even when effective vaccines are available", is ranked by the World Health Organization [WHO] among the top ten global health threats.with factors like personal beliefs, concerns related to safety and efficacy, social influences, religious factors and the spread of false information contributing to it[1].In Muslim-majority countries like Malaysia, Pakistan, Afghanistan, etc., religious beliefs significantly contribute to vaccine hesitancy[2]. The incidence of outbreaks of vaccine-preventable diseases is proof of outright rejection of vaccines, thus making it crucial for researchers to address religious factors to mitigate problems of this nature. Digital literacy, known as having the ability to use electronic devices correctly to understand, access, evaluate and apply information related to health to improve a health outcome, is considered the most critical factor that plays a role in vaccine hesitancy [3]. Given the ease of access to the internet, ensuring the quality and reliability of health information has become a significant problem in the modern era. Most of the information being provided is either misleading or inaccurate. A key contributor to building public trust in healthcare systems is public health communication, with trust being built effortlessly through effective communication with laymen regarding the safety of vaccines [4]. The Strategic Advisory Group of Experts on Immunization (SAGE) states poor communication hinders vaccine acceptance in any setting. In 2023, a staggering 14.5 million children were missing out on a vaccination dose, according to WHO [5]. A survey conducted in Pakistan in June 2021 shows a 38% polio vaccine hesitancy rate in low and middle-income communities resulting from fear of vaccine side effects [6].

Vaccine hesitancy claims a spot among the list of public health issues that are critical and prevalent globally, with varied prevalence across different populations and regions. While vaccines are widely recognized as safe and efficient, the coverage is insufficient to achieve herd immunity, with vaccine hesitancy being the root cause [8]. The main reasons for vaccine hesitancy include reliance on alternative medicine, fear of side effects and distrust in medical institutions and services. Betrayal aversion or inability to trust institutions due to fear that they may harm you also significantly contributes to this issue [9]. Conspiracy theories paired with inconsistent and deceptive messages which spread through social media add fuel to the fire by claiming vaccine drives are population control measures or tools for the medical industry to make a profit. Migrant communities show significant barriers to accessing and accepting vaccines. These factors can be addressed through tailored public health strategies and interventions to improve the vaccination acceptance.

REFERENCES

1. Garett R, Young SD. Online misinformation and vaccine hesitancy. Translational Behavioral Medicine [Internet]. 2021 Sep 16;11(12):2194–9. Available from: https://pubmed.ncbi.nlm.nih.gov/34529080/

2. Alsuwaidi AR, Hammad HAAK, Elbarazi I, Sheek-Hussein M. Vaccine hesitancy within the Muslim community: Islamic faith and public health perspectives. Human Vaccines & Immunotherapeutics [Internet]. 2023 Jan 2;19(1). Available from: https://-pubmed.ncbi.nlm.nih.gov/36914409/

3. Marzo RR, Su TT, Ismail R, Htay MNN, Essar MY, Chauhan S, et al. Digital health literacy for COVID-19 vaccination and intention to be immunized: A cross sectional multi-country study among the general adult population. Frontiers in Public Health. 2022 Sep 16;10

4. Goldstein S, MacDonald NE, Guirguis S. Health communication and vaccine hesitancy. Vaccine [Internet]. 2015 Apr 18;33(34):4212–4. Available from: https://pubmed.ncbi.nlm.nih.gov/25896382/

5. Adnan Ahmad Khan, Abdullah M, Razia Aliani, Amal Fatima Mohiuddin, Sultan F. COVID-19 vaccine hesitancy and attitudes in Pakistan: a

How to cite this: Hameed S. The Immunization Dilemma: Confronting Vaccine Hesitancy for better coverage, International Journal of Healthcare Profession. 2024; 1(4):1-2

Vol. 01, Issue 04, October-December, 2024

cross-sectional phone survey of major urban cities. BMC Public Health. 2023 Jun 9;23(1).
6. Shoaib N, Muhammad Atif Qureshi, Muhammad Zahid Latif. Covid-19 Vaccine Hesitancy: Frequency and causes among Population of Lahore. 2023 Feb 28;17(2):139–41. Available from: https://pjmhsonline.com/index.php/pjmhs/article/view/4080
7. Jerković H, Šitum M. VACCINE HESITANCY – FROM PARENTAL DISTRUST TO COVID-19 CONSPIRACIES. PSYCHIATRIA DANUBINA [Internet]. 2023 Jul 13;35(2):226–31. Available from: https://www.psychiatria-danubina.com/UserDocsImages/pdf/dnb_vol35_no2/dnb_vol35_no2_226.pdf
8. Alsharawy A, Dwibedi E, Aimone J, Ball S. Vaccine Hesitancy and Betrayal Aversion. Annals of Biomedical Engineering. 2022 May 17;50(7):794–804.
9. Tankwanchi AS, Bowman B, Garrison M, Larson H, Wiysonge CS. Vaccine hesitancy in migrant communities: a rapid review of latest evidence. Current Opinion in Immunology [Internet]. 2021 Aug;71:62–8. Available from: https://www.sciencedirect.com/science/article/pii/S0952791521000674

Original Article

Open Access

Association Between Vitamin D Status And Prognosis Of Patient After Osteoporotic Fracture

Ali Murtaza [a]

[a] Bachelor of Science In Operation Theater Technology at the University Of Lahore

Correspondence: ali.murtaza88@gmail.com

ABSTRACT

Background and Objectives: Background: Deficiency of Vitamin D is very common in orthopaedic patients and leads to decreased Bone mineral density, slow healing of Fractures and higher surgical site infection rates. the effects of vitamin D supplementation on the correction of deficiency and recovery time as well as minimizing complications following orthopaedic procedures involving fractures are explored.

METHODOLOGY: A cross-sectional descriptive study was planned at T.H.Q. Hospital Arifwala and 144 patients from this age group were included. Survey questions and chart information were used to obtain data, primarily concerning patient vitamin D intake before and after operations. The study therefore compared maintenance regimens and dosing frequencies this being daily and high doses to sample vitamin D sufficiency.

RESULTS: It has been established that preoperative vitamin D levels were extremely low in all groups, with as few as 3 ng/ml Besides, post-operative replenishment has shown noteworthy changes with some age groups achieving levels up to 93.56 ng/ml. A high dose of vitamin D supplementation is more effective as compared to the low dose group as far as the recovery period is concerned and low incidence of nonunion, reoperations, infection and implant failures.

CONCLUSION: Clinicians should use the information reported here to modify vitamin D supplementation schedules for patients; moreover, multidisciplinary approaches, including environmental and dietary recommendations as well as vitamin D supplementation, should be used in the management of vitamin D deficiency.

KEYWORDS: Vitamin D deficiency, bone health, fracture healing, orthopaedic surgery, supplementation regimens, osteoporosis, postoperative recovery, Wilcoxon Signed Ranks Test.

INTRODUCTION

Vitamin D plays an important role as it is needed for calcium absorption, maintaining the bone's strength, and for skeletal structure. The lack of it is an issue of concern among such populations as those with osteoporosis, fracture healing, and orthopaedic surgical patients (1). Low vitamin D levels are related to poor bone mineral density, slower bone healing increased risk of fractures and poor fracture healing, which remains a problem for both patients and clinicians. Considering the part played by vitamin D in bone metabolism and the results it originated from both surgical and non-surgical, it is imperative to understand it to enhance treatment strategies as well as patients' healing process (2).

This paper aims to assess the effect of vitamin D deficiency on osteoporosis and bone healing with specific reference to its function in supporting bone health and recovery after for instance a fracture or operation (3). Analyzing a range of supplementation protocols, the research assesses the impacts of supplementation on deficiencies and result situations (4). Particular emphasis is placed on the analysis of high dose and daily vitamin D interventions as preoperative approaches to identify possible regimens ensuring

How to cite this: Murtaza A, Association Between Vitamin D Status and Prognosis Of Patient After Osteoporotic Fracture, International Journal of Healthcare Profession. 2024; 1(4):3-7

Vol. 01, Issue 04, October-December, 2024

patient-selected vitamin D levels before knee arthroplasty, hip fracture, and ankle fusion surgery. The work also analyses the correlation between the Vitamin D level about other issues which include nonunion, reoperation, and postoperative infection (5).

In addition to supplementation, the role of genetics including the VDR gene polymorphisms and lifestyle and physical activity on bone health is also discussed (6). Scientific studies show that adding Vitamin D to exercise can help increase bone mineral density and minimize the onset of osteoporosis (5). However, the researchers stress that it is the calcium-protein partnership with vitamin D that should be a focus of attention, not the vitamin itself (7). In addressing these diverse components, this research seeks to offer practice-related recommendations for osteoporosis prevention and the prevention of complications following fractures (8).

Objectives:

- To determine the levels of vitamin D deficiency among orthopaedic patients and its implication on bone density.
- To examine the performance of various vitamin D supplementation schedules in the treatment of deficiency states.
- To assess the impact of vitamin D on the success of surgery and the prevention of various complications, including nonunion, reoperations, or infections.
- To evaluate the effects of genes, specifically the VDR gene regarding vitamin D pathways and bone density.

To find out how Vitamin D supplement with physical activity can help in improving bone mineral density and preventing osteoporosis.

Rationale:

A deficiency of vitamin D is a common problem observed in orthopaedic patients since it leads to decreased bone mineral density, decreased rate of bone union, and increased risk of fractures and postoperative complications (9). Although its efficacy is acknowledged, the method matters for the best supplementation still poses questions, especially when done preoperatively or postoperatively (10). This paper discusses the importance of vitamin D in controlling bone metabolism in the human body, factors that determine its responsivity to supplements, and the synergistic effects of supplementation on lifestyle changes (11). This research can help fill these gaps by ascertaining optimal dosing schedules for vitamin D and demonstrating the generalisable concerns for addressing osteoporosis and enhancing post-surgical outcomes (12).

METHODOLOGY

Study Design: A cross-section descriptive study was used for this Research.

Settings: Data is Collected from T.H.Q. Hospital Arifwala.

Study Duration: After the approval of synopsis the study is collected in 04 months.

Sample Size: The sample size is 144.

It was calculated by the Formula $n = (Z2 \times p \times (1 - p))/e2$

Z = Value from standard normal distribution corresponding to desired confidence level (Z=1.96 for 95% CI)

P is expected true proportions.

e = desired precision (half desired CI width)

Sampling Technique: A purposive sampling technique is used.

Sample Selection:

- Inclusion Criteria: All patients presenting with Vitamin D deficiency with Fracture.
- Patient with an age limit of 20-90 years.
- Exclusion Criteria: vitamin deficiency with No Fracture.

Equipment(s): Questionnaire.

Ethical Considerations

- After the approval Data is collected from T.H.Q. Hospital Arifwala.
- The rules and regulations set by the ethical committee of the Hospital were followed while conducting the research.
- All information and data collection was kept confidential.
- The subjects were informed that there were no disadvantages or risks in the procedure of the study (13).
- They were also informed that they would be free to withdraw at any time during the process of the study (14).

Data Collection Procedure

The relevant hospital's MS signed the data collection letter. Data will be gathered using a questionnaire that includes questions on demography, history, test reports, surgery name, Lab reports and Complications. Following consent including name, age, gender, reports, history, complications and other patient personal information will be taken from patient files To a cross-sectional survey (15).

Data Analysis Procedure

- Data was analyzed using SPSS version 22.
- Data was analyzed using statistical techniques and the required result will be obtained in the form of tables.
- Each question and demographic information of participants was kept simple and confidential.

RESULTS

The findings of this research indicate that there was a substantial increase in the concentration of vitamin D among all ages after surgery and administration of vitamin D supplements. Each patient's vitamin D level before surgery revealed low levels of this vitamin across the board, with patients having critical levels. Post-surgical, both groups had significantly higher levels than the pre-supplementation levels, emphasising the effectiveness of the vitamin D regimens given (16).

This was supported by a statistically significant improvement in all three domains on the Wilcoxon Signed Ranks Test ($p < 0.001$). No negative ranks or ties were suggesting the overall post-operative vitamin D level of every patient was higher than the pre-operative level. These studies confirm that vitamin D levels should be optimised preoperatively to enhance the general postoperative outcomes (17).

Table 1: Comparison of Vitamin D Levels Before and After Surgery Across Age Groups

Age Group (Years)	Pre-Surgery Vitamin D Levels (ng/ml)	Post-Surgery Vitamin D Levels (ng/ml)
21-30	6 - 26	16.50 - 80.75
31-40	6 - 29	18 – 65
41-50	3 - 26	15.35 - 66
51-60	3 - 28	13.73 - 93.56
61-70	11 - 29	15.20 - 70.15
71-80	6 - 24	24 - 65.34
81-90	6 - 19	32 - 51.57

Table 2: Wilcoxon Signed Ranks Test Results

Ranks	N	Mean Rank	Sum of Ranks
Negative Ranks (Post < Pre)	0	0.00	0.00
Positive Ranks (Post > Pre)	144	72.50	10440.00
Ties (Post = Pre)	0	-	-
Total	144	-	-

Wilcoxon Signed Ranks test was performed to validate the statistical difference of Change in vitamin D status pre and post-surgery as depicted in Table 2. The test was significant because the mean of all cases increased significantly ($p < .001$) after the surgery when compared with the pre-surgery level. This corroborates the effectiveness of the supplementation protocols that were administered in this work (18).

DISCUSSION

The last research shows that clinical fractures were sustained by 205 patients in the included cases. Among them, new osteoporotic fractures were sustained by 139 patients (63 vertebral fractures and 76 non-vertebral fractures) (17).

(2) A database (Explorys), a mixture of digital health files from 26 incorporated United States healthcare structures, became queried. A cohort of patients with a Systematized Nomenclature of Medicine—Clinical Terms diagnosis of AP between 2014 and 2019, except for patients with decided on scientific conditions and medicines which can be associated with negative bone health, become recognized. The incidence of recent diagnoses of nutrition D deficiency (VDD), osteoporosis, and fractures in the have a look at cohort was evaluated. Age-, race-, and sex-primarily based distributions and risk elements had been determined through univariate and multivariate analyses (19).

The mean age of a hundred and five postmenopausal girls was sixty-seven with a minimum of 33 and a maximum of 84 years. Mean general 25(OH)-Vit D changed into 27.Five (range11.7–fifty-two. Five ng/mL). 25(OH)-Vit D tiers had been good enough in best 36.2% (95p.CCI: 27–forty-five), forty four% had insufficient stages and deficiency changed into the present in 19% (ninety fivep. CCI: 12–27) of postmenopausal women. Among overall observed contributors 20% had been vegetarian, 53, 76.2 and 64.8 were eating milk, fish and egg respectively and 71 were.

Four stated ok stage of sun exposure (> 30 min/day). Commonly stated diet D deficiency signs encompass paraesthesia (57.1%), bone ache (55.2%), easy fatigability (54.3%), malaise (51.4%), muscle cramps (43.8%) and proximal myopathy (40.0%) (20). Nevertheless, a comparison of musculoskeletal signs and symptoms between organizations with sufficient stage and institutions with insufficient and poor degrees showed no huge distinction (P > zero.05). Among seventy-one individuals (66.7%) who completed bone density evaluation, 38% (95p.CCI: 27–49) confirmed osteoporosis. Vertebral Z score confirmed a tremendous correlation with 25(OH)-Vit D level (r-0.252, P-zero.03) (18).

Current Research.

According to current research, the study shows that 144 total patients 41 of them (28.5%)are hip fractures, 25 of them (17.4%) are ankle fractures, 14 of them (9.7%) are knee fractures, 18 of them (12.5%) are femoral fractures, 14 of them (9.7%) are tibia fractures, 19 of them (13.2%) are radius fractures, 08 of them (5.6%) are humeral fractures and 05 of them (3.5%) are spine fractures. 65 patients (45.1%) are male and 79 patients (54.9%) are females. (56.9%) have dietary issues, (61.1%) have less sunlight exposure (51.4%) have obesity, (47.2%) have digestion problems, all patients in that research take vitamin D supplements Dosage 5000 IU per day, (36.1%) of them take 50000 IU, (22.9%) take 100000 IU per month and (77.1%) of them take 200000 IU per month 10.4%) having bleeding problem in complications.

92.4%) have pain, Stiffness and cramps. 2.8%) of patients have cases of mal union and 5.6%) have non-union. 82.6%) have swelling, 4.2%) have implant failure, 31.3%) have a fever and 19.4%) have infection problems.91%) of patients are Discharged. And 9%) are shifted to ICU (2).

CONCLUSION

It is evident from this study that postoperative and similar supplementation has led to increased vitamin D levels in the various age groups as opposed to the preoperative minimum values. The mean vitamin D level before surgery was very low in most patients with some extreme values as low as 3 ng/ml Vitamin D deficiency was found to be more severe in the elderly patient population. The serum 25(OH)D concentrations significantly elevated postoperatively with using the supplementation protocols and reached 93.56 ng/ml in certain age groups. The Wilcoxon Signed Ranks Test also supported such changes were statisti cally significant (p < 0. 001) with no negative ranks or ties and this indicated all patients recorded increased vitamin D levels post-surgery. From these findings, adequate pre-operative vitamin D is very important for bone health and surgery.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

REFERENCES

1. 1. Wang N, Chen Y, Ji J, Chang J, Yu S, Yu B. The relationship between serum vitamin D and fracture risk in the elderly: a meta-analysis. Journal of Orthopaedic Surgery and Research. 2020;15:1-10.
2. Suganthan N, Kumanan T, Kesavan V, Aravinthan M, Rajeshkannan N. Vitamin D status among postmenopausal osteoporotic women: a hospital based cross-sectional study from Northern Sri Lanka. BMC nutrition. 2020;6:1-8.
3. Ingstad F, Solberg LB, Nordsletten L, Thorsby PM, Hestnes I, Frihagen F. Vitamin D status and complications, readmissions, and mortality after hip fracture. Osteoporosis International. 2021;32:873-81.
4. Ko S, Jun C, Nam J. Effects of vitamin D supplementation on the functional outcome in patients with osteoporotic vertebral compression fracture and vitamin D deficiency. Journal of Orthopaedic Surgery and Research. 2021;16:1-7.
5. De Sire A, Ferrillo M, Gennari A, Cisari C, Pasqua S, Foglio Bonda P, et al. Bone health, vitamin D status and oral hygiene screening in breast cancer women before starting osteoporosis treatment: A cross-sectional study. J Biol Regul Homeost Agents. 2021;35(1):397-402.
6. Chevalley T, Brandi ML, Cavalier E, Harvey N, Iolascon G, Cooper C, et al. How can the orthopedic surgeon ensure optimal vitamin D status in patients operated for an osteoporotic fracture? Osteoporosis International. 2021:1-15.
7. Kupisz-Urbańska M, Płudowski P, Marcinowska-Suchowierska E. Vitamin D deficiency in older patients—problems of sarcopenia, drug interactions, management in deficiency. Nutrients. 2021;13(4):1247.
8. De Martinis M, Allegra A, Sirufo MM, Tonacci A, Pioggia G, Raggiunti M, et al. Vitamin D deficiency, osteoporosis and effect on autoimmune diseases and hematopoiesis: a review. International

journal of molecular sciences. 2021;22(16):8855.
9. Nakayama M, Furuya T, Inoue E, Tanaka E, Ikari K, Yamanaka H, et al. Vitamin D deficiency is a risk factor for new fractures in Japanese postmenopausal women with rheumatoid arthritis: results from the IORRA cohort study. Archives of Osteoporosis. 2021;16(1):119.
10. Dauny V, Thietart S, Cohen-Bittan J, Riou B, Khiami F, Meziere A, et al. Association between vitamin D deficiency and prognosis after hip fracture surgery in older patients in a dedicated orthogeriatric care pathway. The Journal of nutrition, health and aging. 2022;26(4):324-31.
11. Bertoldo F, Cianferotti L, Di Monaco M, Falchetti A, Fassio A, Gatti D, et al. Definition, assessment, and management of vitamin D inadequacy: suggestions, recommendations, and warnings from the Italian Society for Osteoporosis, Mineral
6. Metabolism and Bone Diseases (SIOMMMS). Nutrients. 2022;14(19):4148.
12. De Sire A, Gallelli L, Marotta N, Lippi L, Fusco N, Calafiore D, et al. Vitamin D deficiency in women with breast cancer: A correlation with osteoporosis? A machine learning approach with multiple factor analysis. Nutrients. 2022;14(8):1586.
13. Bellavia D, Costa V, De Luca A, Maglio M, Pagani S, Fini M, et al. Vitamin D level between calcium-phosphorus homeostasis and immune system: new perspective in osteoporosis. Current osteoporosis reports. 2024;22(6):599-610.
14. Han A, Park Y, Lee Y-K, Park SY, Park CY. Position statement: vitamin D intake to prevent osteoporosis and fracture in adults. Journal of Bone Metabolism. 2022;29(4):205.
15. Harvey NC, Ward KA, Agnusdei D, Binkley N, Biver E, Campusano C, et al. Optimisation of vitamin D status in global populations. Osteoporosis International. 2024;35(8):1313-22.
16. Li W-j, Wang X-l, Chu Y-r, Wang J-x, Xu S-q. Association of sarcopenia and vitamin D deficiency with glucocorticoid-induced osteoporosis in Chinese patients with rheumatoid arthritis. Clinical Rheumatology. 2024;43(1):15-22.
17. Fu G, Wu R, Zhang R, Chen D, Li H, Zheng Q, et al. Preoperative vitamin D deficiency is associated with increased one-year mortality in Chinese geriatric hip fracture patients–a propensity score matching study. Clinical Interventions in Aging. 2023:263-72.
18. Pludowski P. Supplementing vitamin D in different patient groups to reduce deficiency. Nutrients. 2023;15(17):3725.
19. Pludowski P, Takacs I, Boyanov M, Belaya Z, Diaconu CC, Mokhort T, et al. Clinical practice in the prevention, diagnosis and treatment of vitamin D deficiency: a central and eastern European expert consensus statement. Nutrients. 2022;14(7):1483.
20. Barichella M, Garrì F, Caronni S, Bolliri C, Zocchi L, Macchione MC, et al. Vitamin D status and Parkinson's disease. Brain Sciences. 2022;12(6):790.

Authors Contributions:

***Ali Murtaza*:** 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: 03-10-2024
Accepted after revision: 08-12-2024

Original Article

Open Access

An Approach towards inclusive eye health tailored screening to compare the frequency of ocular problems of people living in residential colonies and homeless communities in Lahore

Tayyaba Burhan [a], ***Muhammad Nasir*** [b]

[a] Orthoptist COAVS KEMU LAHORE

[b] Optometrist COAVS ,KEMU LHR

Correspondence: Tayyababurhan928@gmail.com

ABSTRACT

Background and Objectives: Despite being a vital part of general health, eye health is frequently disregarded, especially among underprivileged groups. Millions of people are suffering around the world from impairments of vision that dramatically lower the quality of their lives and heavily curtail the capacity to take part fully in social and economic activities. To find the prevalence of the most common eye problem in homeless communities and people living in their own houses.

METHODOLOGY: : Cross-Sectional study was conducted after the approval of the ethical review board of the College of Ophthalmology and Allied Vision Sciences (COAVS) Lahore. The study took place in Lahore. The study's sample size was 290. Individuals that were included experiencing homelessness, as defined by the study's operational definition, include those lacking a stable nighttime residence and residing in shelters, on the streets, or in temporary accommodations. Individuals who were excluded who are unable to be examined (i.e. with severe trauma or injury) and with some seductive drugs and who are not considered homeless according to the study's operational definition. Personal data was kept private. Data were collected using a self-designed proforma and entered SPSS version 26 for analysis. p-value under 0.05 was considered significant.

RESULTS: The study examined 289 participants, including 139 homeless individuals and 150 residential colony residents, with an average age of 23.62 years (SD = 18.843. A significant association was found between living conditions and ocular problems ($\chi^2(11, N = 289) = 80.709$, $p < .001$).

CONCLUSION: The study emphasizes the need for targeted interventions and inclusive policies to address disparities in eye health among homeless individuals and residential colonies in Lahore.

KEYWORDS: Refractive error, Cataract, Community health services, Homeless persons, vision Defects.

INTRODUCTION

WHO estimates indicate that over 2.2 billion persons are afflicted with some form of visual impairment and interventions made in time would have prevented or treated more than half of them. This is the crux of why an efficient, all-inclusive, and customer-centric approach to eye health matters.1

This condition is prevalent in Pakistan, and the eye among other eye diseases suffers from cataracts and glaucoma, refractive errors, and diabetic retinopathy. The reasons for it to happen are multiple; main causes are differences in socioeconomies, lack of knowledge, and lesser provision of health services.2 Socio-economic status plays an important role in health care, more particularly in the case of eye care. The service for a screening program, awareness campaign, and medical facilities is generally good in the urban residential colonies. As such, the major issues of the homeless population are poverty, ignorance, and lack of health care. These differences in the downtrodden may contribute to a higher rate of undiagnosed and untreated ocular diseases.3

Equal opportunity is given to everyone irrespective of social class through inclusive eye health practice. Specific targeted screening programs in such cases would be necessary, especially when there is a health-care gap. Some of the advantages these carry include reduction in the burden of avoidable blindness apart from early detection of problems.4 Improved alert

How to cite this: Burhan T, Nasir M. An Approach towards inclusive eye health tailored screening to compare the frequency of ocular problems of people living in residential colonies and homeless communities in Lahore. International Journal of Healthcare Profession. 2024; 1(4):8-13

ness, access to healthcare facilities, and education will be beneficial to residents in housing colonies, but there are very critical imbalances that cannot be ignored since their poorer brethren and those whose health literacy is very low may suffer harmful effects from reduced access to eye care. 5

The housing colony residents will benefit from improved alertness along with better access to health care facilities and education but cannot deny extremely critical imbalances since their poorer brethren, and those whose health literacy is very low, may feel harmful effects from reduced access to eye care.6nThe prevalence of eye problems should be compared among residents in the residential colonies of Lahore, compared to homeless populations, as this should be carried out in tailoring an appropriate and inclusive approach for implementation with specific needs and the challenge faced by each entity, better guiding fair plans for the distribution of care given within metropolitan environments.7

Effective health interventions rely on tailored screening programs that consider the socioeconomic and cultural conditions of target communities. For example, culturally appropriate education campaigns, community outreach activities, and mobile eye care units can significantly enhance access to eye care services among underserved populations.8 This study supports the more general public health objectives, namely, the objectives announced by the Universal Eye Health program of WHO in regard to equitable access to good quality eye care services. This contributed to the global campaign to eliminate avoidable blindness and low vision by addressing the ocular health inequities in Lahore.9 This study will apply comparative methodology in determining differences between the eye health of residential and homeless populations in Lahore. It will be focused on raising awareness among the respective populations about incidents and types of eye problems through the use of extensive and tailored screening methods. The information derived from this study will be highly essential to legislators and doctors who will use it in developing more efficient and equitable eye health programs.

METHODOLOGY

Cross-Sectional study was conducted after the approval of the ethical review board of the College of Ophthalmology and Allied Vision Sciences (COAVS) Lahore. The study took place in COAVS/Mayo Hospital, Lahore. The study's sample size was 289 Homeless individuals' people in Lahore and calculated by formula

$$n = \frac{Z^2_{1-\alpha/\varsigma} P(1-P)}{d^2}$$

having confidence level 95% and was taken from a study in which ocular screening program provides a viable option for screening in a pandemic.11 Individuals that were included experiencing homelessness, as defined by the study's operational definition, include those lacking a stable nighttime residence and residing in shelters, on the streets, or in temporary accommodations. Individuals who were excluded who are unable to be examined (i.e. with severe trauma or injury) and with some seductive drugs and who are not considered homeless according to the study's operational definition. All participants gave their informed consent after being fully told about the study's protocol and made aware of their right to discontinue participation at any moment. Personal data was kept private. It was found that the most common eye problems among homeless people and people living in their own houses. complete eye examinations along with visual acuity and pen torch examination, etc. The Mann-Whitney U tests were conducted to compare the severity of ocular problems among both groups, chi-square tests for analyzing the association of living environments with ocular difficulties, and descriptive statistics were applied to determine the prevalence of different ocular disorders. Data were collected using a self-designed proforma and entered into SPSS version 26 for analysis.

RESULTS

The goal was to document the incidence of eye disease in two relatively contrasting populations: homeless people dwelling in Lahore and the residents of residential colonies. 289 such persons were enrolled in the study, with an age range of 2 to 75 years. The age prevalence in the two groups was widely disparate since the age averages of homeless persons were on an older side at 28.16 as compared to that of the residential colony group whose average age was 19.08 years. Refractive error was the most prevalent ocular condition seen in both groups, involving 34.6% of all participants. It was more common in residential colonies (46%) than among the homeless (22.3%). Compared to the residential colony group (2% and 0.7%, respectively), the homeless group had a considerably higher prevalence of cataracts and lens alterations (21.6% and 16.5%, respectively).

Additionally, the survey discovered that a higher percentage of people living in residential colonies (42%) than those experiencing homelessness (24.5%) reported having no eye issues. The prevalence of ocular issues was significantly correlated with living conditions, according to statistical analyses employing the chi-square test ($\chi^2(11, N = 289) = 80.709$, $p < .001$). The trustworthiness of the test results may be limited, nevertheless, as 66.7% of the cells in the chi-square test had predicted counts of less than 5. The results may be confirmed by other investigations employing different techniques.

To evaluate the degree of ocular issues in the two groups, a Mann-Whitney U test was also performed. The findings showed a significant difference ($U = 8855.500$, $p = .021$) between the homeless and residential colony members, with the former having more severe eye problems. The descriptive study, which demonstrated that the total burden of eye problems was higher among homeless people, is supported by this. The results show how the two communities' eye health differs, and they imply that homeless people could need more specialized and easily available eye health care.

1. Descriptive Statistics:
2. Groups * Ocular Problems Crosstabulation:
3. Mann-Whitney Test Results:

Test Statistics

These tables summarize the key data and results of the study, offering insight into the prevalence of ocular problems among different living conditions in Lahore.

DESCRIPTIVE ANALYSIS:

Table 1 showed Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
age of patients	289	2	75	23.62	18.843
Valid N (listwise)	289				

The study included 289 participants, with ages extending from 2 to 75 years. The typical age was 23.62 years, but there was significant variability in age (SD = 18.843). Further analysis discovered a statistically weighty difference in mean age between the homeless individuals (mean = 28.16 years, SD = 19.86) and those living in residential colonies (mean = 19.08 years, SD = 17.08). The median age for the homeless group was 25, while the median age for the residential group was 17. Both distributions exhibited a slight right skew, with a higher concentration of younger individuals observed in the residential colonies group. The most frequent ocular problem observed among all participants was refractive error, found in 100 individuals (34.6%).

Table 2 Groups * Ocular problems Crosstabulation

Groups * Ocular problems Crosstabulation				
Count				
		Groups		
		Home Residents	Homeless	Total
Ocular problems	Cataract	3	30	33
	glaucoma	4	3	7
	Refractive error	69	31	100
	Conjunctivitis	1	5	6
	Squint	7	1	8
	Corneal opacity	1	3	4
	Blepharitis	0	3	3
	Stye/Chalazion	1	2	3
	Lens changes	1	23	24
	Pterygium	0	2	2
	DR	0	2	2
	no ocular problem	63	34	97
Total		150	139	289

This was followed by cataracts, identified in 33 individuals (11.4%), and lens changes, present in 24 individuals (8.3%). Notably, the prevalence of cataracts was considerably higher among homeless individuals (30 out of 139; 21.6%) compared to those residing in residential colonies (3 out of 150; 2%). A similar trend was observed for lens changes, with a higher proportion seen in the homeless group (23 out of 139; 16.5%) than in the residential group (1 out of 150; 0.7%). Other ocular problems, such as glaucoma, conjunctivitis, squint, corneal opacity, blepharitis, stye/chalazion, pterygium, and diabetic retinopathy, were observed at lower frequencies in both groups. Interestingly, a greater proportion of individuals in the residential colonies group (63 out of 150; 42%) had no ocular problems compared to the homeless group (34 out of 139; 24.5%).

Table 3 showed Chi-Square Tests

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	80.709[a]	11	.000
Likelihood Ratio	93.000	11	.000
Linear-by-Linear Association	1.801	1	.180
N of Valid Cases	289		
a. 16 cells (66.7%) have an expected count of less than 5. The minimum expected count is .96.			

A chi-square test of unconventionality was executed to scrutinize the association between living situations (homeless vs. residential colonies) and the presence of ocular problems. The results showed a statistically significant connotation between the two variables ($\chi^2(11, N = 289) = 80.709$, $p < .001$). This suggests that the prevalence of ocular problems differs significantly between homeless individuals and those living in residential colonies. However, it is important to note that a large percentage of cells (66.7%) had anticipated counts less than 5, which may affect the dependability of the chi-square test. Further analysis using alternative methods may be warranted to confirm these findings.

Table 4 showed Test Statistics

Test Statistics	
	Ocular problems
Mann -Whitney U	8855.500
Wilcoxon W	18585.500
Z	-2.307
Asymp. Sig. (2-tailed)	.021
a. Grouping Variable: Groups	

To further investigate the difference in ocular problems between homeless individuals and residents of residential colonies, a Mann-Whitney U test was conducted. This non-parametric test equivalences the ranks of the data rather than the raw values, making it suitable for data that may not be normally distributed. The test discovered a statistically momentous difference between the two groups (U = 8855.500, p = .021), indicating that the severity of ocular problems is higher among homeless individuals. This finding supports the observation from the descriptive analysis that homeless individuals experience a greater burden of eye conditions compared to those living in residential colonies.

DISCUSSION

This study found a significantly higher prevalence of cataracts (21.6% vs 2%) and lens changes (16.5% vs 0.7%) among homeless individuals this study parallels with previous research highlighting the increased risk of ocular morbidity in these two group population populations. In research (2022)11 Emphasized the role of social factors of health, such as access to care and socioeconomic status, in contributing to these disparities. Similarly, In Jadoon12 Research article (2024) demonstrated the importance of community eye health programs in reaching underserved populations and reducing the burden of avoidable blindness, particularly from conditions like cataracts. Our findings reinforce the need for such programs to specifically target homeless individuals and address the unique barriers they face in accessing eye care. This may involve implementing mobile eye clinics, providing free or subsidized eye examinations and treatments, and integrating eye care services into existing homeless support programs.

The significant incidence of refractive problems in both groups (34.6% total) highlights the significance of providing accessible vision repair services to all people, regardless of housing situation. The prevalence of refractive errors was higher among the residents of residential colonies than in slum dwellers, 46% vs 22.3%. However, this might be because of better access to diagnostic services and not an actual difference in need, as noted by research done by Noel in 2015.13 Uncorrected refractive defects have huge impacts on the quality of life as well as on opportunities and economic potential, especially for vulnerable populations such as the homeless. Plans going forward therefore must be aimed at enhancing access to cheap spectacles and optometry for the group. This would involve collaborating with optical companies and suppliers in a bid to facilitate provision of discount spectacles or free glasses while at the same time enhancing vision screening as well as referrals through the homeless shelters among other interventions.14

The data paint quite a stark picture of inequity, with homeless people facing a considerably higher rate of eye illness. Homeless people had tenfold frequencies of cataracts compared with members of residential colonies 21.6 vs 2%. Lens changes occurred considerably more than 20 fold among the homeless group (16.5% vs. 0.7%).15 This must be multilayered once again, a result of the complicated game of financial disadvantages, limited health care, and street life realities.

The most striking finding was the cataract incidence. While 2% of sheltered colony residents suffered from cataracts, 21.6% of homeless people suffered from this disease that can cause blindness. Several factors may explain such a stark contrast. Exposure to prolonged UV radiation, for instance, is common among homeless people since they do not have shelters.16 Furthermore, poor nutrition and higher rates of smoking, often associated with homelessness, can also contribute to cataract formation.17

Similarly, lens changes, another age-related eye condition, were significantly more prevalent among the homeless (16.5%) compared to those in residential colonies (0.7%). This difference aligns with the observed disparity in age between the two groups, with the homeless population having a higher mean age (28.16 years) than residents of residential colonies (19.08 years). Age is a known risk factor for lens changes, leading to decreased visual acuity and potentially impacting daily activities. 18

While refractive errors were the most common ocular problem overall (34.6%), their distribution also differed between the groups. Residents of residential colonies exhibited a higher prevalence of refractive errors (46%) compared to the homeless (22.3%). This finding might reflect better access to eye care and awareness of refractive errors among those with stable housing, leading to earlier diagnosis and correction. However, it also underscores the need for accessible

and affordable vision correction services for homeless individuals, as uncorrected refractive errors can hinder education, employment, and overall quality of life.19

The chi-square test of independence confirmed a statistically significant association between living situations and ocular problems ($\chi^2(11, N = 289) = 80.709$, $p < .001$). This result strongly suggests that homelessness is a significant risk factor for ocular morbidity. The Mann-Whitney U test further corroborated this finding, revealing that homeless individuals experience not only a higher prevalence but also a higher severity of ocular problems ($U = 8855.500$, $p = .021$). This emphasizes the critical need for customized solutions to alleviate the health inequality. The chi-square and Mann-Whitney U tests reveal that homeless people have a much higher burden of ocular issues, comprising a higher incidence of particular diseases such as cataracts and lens alterations, as well as a higher overall seriousness of eye illness.20

This should once again be multilayered, product of the complex game of financial disadvantages, limited health care, and street life realities.The most dramatic finding was the incidence of cataracts. As many as 2% of sheltered colony residents were reported to have cataracts, whereas 21.6% of homeless people suffered from this disease, which can lead to blindness. Several factors could account for such a difference. Among other things, exposure to extended periods of UV radiation is routine for homeless people because they lack shelters.21 Outreach beyond the awareness of eye health can also be done by coordinating with shelters and community organizations. Additionally, strategies on the elimination of homelessness such as affordable housing, among others, and poverty eradication are part of its processes which can help in identifying the real causes for this health gap.22 Through health's societal drivers, we can build a more just society where everyone, without any respect to the status of his or her residence, has the opportunity to attain optimal eye health.23

Figure 1 presents a bar chart comparing the prevalence of various ocular problems between homeless individuals and residents of residential colonies in Lahore. Refractive error was the most common condition in both groups, affecting 69 individuals (23.88%) in residential colonies and 31 individuals (10.73%) among the homeless. A striking difference was observed in the prevalence of cataracts, with a much higher proportion among the homeless (30 individuals, 11.76%) compared to residents of residential colonies (3 individuals, 1.04%). Similarly, lens changes were more common in the homeless group (23 individuals, 7.96%) than in the residential group (1 individual, 0.35%). While other conditions like glaucoma, conjunctivitis, and squint were present, their prevalence was relatively low in both groups. Notably, a larger proportion of individuals in residential colonies (63 individuals, 21.80%) reported no ocular problems compared to the homeless group (34 individuals, 11.76%).

CONCLUSION

As mentioned in the report, the eye health of homeless persons is significantly different from that of people residing in residential colonies in Lahore, Pakistan. For example, there is ten-fold increased risk of cataract and more than 20 fold increased recurrence of lens change among various eye conditions and conjunctivitis that homeless persons have. Conversely, squinting and refractive problems are common among the residents of residential colonies. Poor nutrition, restricted access to health facilities, increased exposure to environmental hazards, and the social challenges associated with homelessness all contribute to this disease's high prevalence among homeless populations. This is alarming because homeless populations are highly susceptible to diseases like cataract that cause blindness.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

REFERENCES

1. Burton MJ, Ramke J, Marques AP, Bourne RR, Congdon N, Jones I, et al. The lancet global health commission on global eye health: vision beyond 2020. The Lancet Global Health. 2021;9(4):e489-e551.
2. Malik M, Strang N, Campbell P, Jonuscheit S. Exploring eye care pathways, patient priorities and economics in Pakistan: A scoping review and expert consultation study with thematic analysis. Ophthalmic and Physiological Optics. 2022;42(4):694-716.
3. Gai MJ, Reddy V, Xu V, Noori NH, Beckler MD. Illuminating Perspectives: Navigating Eye Care Access in Sub-Saharan Africa Through the Social Determinants of Health. Cureus. 2024;16(6):e61841.
4. Solomon SD, Shoge RY, Ervin AM, Contreras M, Harewood J, Aguwa UT, et al. Improving access to eye care: a systematic review of the literature. Ophthalmology. 2022;129(10):e114-e26.
5. Noor-ur-Rehman HS. Awareness Regarding Primary Eye Care Among Primary Healthcare Workers of Pakistan: a Way to Revitalize Health

for All! Pak J Ophthalmol. 2021;37(2):161-7.
6. Hasan S. Sustainable urbanisation in Pakistan and Lahore: Challenges and way forward. Livable Cities for Sustainable Future. 2021:1-16.
7. Jiang S, Mikhail M, Slomovic J, Pereira A, Lebovic G, Noel C, et al. Prevalence and impact of eye disease in an urban homeless and marginally housed population. Canadian Journal of Ophthalmology. 2020;55(1):76-81.
8. Haldane V, Chuah FL, Srivastava A, Singh SR, Koh GC, Seng CK, et al. Community participation in health services development, implementation, and evaluation: A systematic review of empowerment, health, community, and process outcomes. PloS one. 2019;14(5):e0216112.
9. Talpur KI, Gillani SM. Inclusive Eye Health-A Milestone Towards Achieving Universal Health Coverage in Pakistan. 2023. p. 833-5.
10. Shah TH, Butt H. Sleep comes all the way: a study of homeless people in Lahore, Pakistan. Academic Research International. 2011;1(3):207.
11. Solomon SD, Shoge RY, Ervin AM, Contreras M, Harewood J, Aguwa UT, et al. Improving Access to Eye Care: A Systematic Review of the Literature. Ophthalmology. 2022;129(10):e114-e26.
12. Jadoon MZ, Awan Z, Moin M, Younas R, Latorre-Arteaga S, Watts E, et al. Assessment of eye health programme reach by comparison with rapid assessment of avoidable blindness (RAAB) survey data, Talagang, Pakistan. BMC primary care. 2024;25(1):250.
13. Noel CW, Fung H, Srivastava R, Lebovic G, Hwang SW, Berger A, et al. Visual impairment and unmet eye care needs among homeless adults in a Canadian city. JAMA Ophthalmol. 2015;133(4):455-60.
14. Ahluwalia A, Morcos D, Koulen P. The impact of having a free community eye clinic located inside a homeless shelter: a retrospective analysis of patient demographics. Front Public Health. 2023;11:1284748.
15. Sayal AP, Slomovic J, Bhambra NS, Popovic MM, Lichter M. Visual impairment and the prevalence of ocular pathology in homeless children and adults globally: a systematic review. Can J Ophthalmol. 2021;56(3):158-65.
16. Roberts JE. Ultraviolet radiation as a risk factor for cataract and macular degeneration. Eye Contact Lens. 2011;37(4):246-9.
17. Singh S, Pardhan S, Kulothungan V, Swaminathan G, Ravichandran JS, Ganesan S, et al. The prevalence and risk factors for cataract in rural and urban India. Indian J Ophthalmol. 2019;67(4):477-83.
18. Varma R, Sun J, Torres M, Wu S, Hsu C, Azen SP, et al. Prevalence of Lens Opacities in Adult Chinese Americans: The Chinese American Eye Study (CHES). Invest Ophthalmol Vis Sci. 2016;57(15):6692-9.
19. Khoshhal F, Hashemi H, Hooshmand E, Saatchi M, Yekta A, Aghamirsalim M, et al. The prevalence of refractive errors in the Middle East: a systematic review and meta-analysis. International Ophthalmology. 2020;40:1571-86.
20. Yelle B, Beaulieu K, Etty M-C, Michaelsen S, Druetz T, Samaha D, et al. The prevalence and causes of visual impairment among the male homeless population of Montreal, Canada. Clinical and Experimental Optometry. 2023;106(4):431-5.
21. Williams AM, Botsford B, Mortensen P, Park D, Waxman EL. Delivering mobile eye care to underserved communities while providing training in ophthalmology to medical students: experience of the Guerrilla Eye Service. Clin Ophthalmol. 2019;13:337-46.
22. D'Souza MS, Mirza NA. Towards Equitable Health Care Access: Community Participatory Research Exploring Unmet Health Care Needs of Homeless Individuals. Can J Nurs Res. 2022;54(4):451-63.
23. Bedmar MA, Bennasar-Veny M, Artigas-Lelong B, Salvà-Mut F, Pou J, Capitán-Moyano L, et al. Health and access to healthcare in homeless people: Protocol for a mixed-methods study. Medicine (Baltimore). 2022;101(7):e28816.

Authors Contributions:

Tayyaba Burhan: Substantial contrib ution to the conception, design of the work.

Muhammad Nasir: Survey and design of the work. Data collection. SPSS computing tool and drafting for approval of the final version to be published

Submitted for publication: 01-10-2024
Accepted after revision: 08-11-2024

Original Article

Open Access

Effect of Supplementing Xylanase, Manase and Proteases Combination in Corn Based Diets on Growth Performances, Carcass Characteristics and Nutrient Digestibility Broiler Chicken

***Muhammad Asfar Zaman*[a], *Nimra Fatima*[b], *Umme Farwa*[c]**

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

Correspondence: nimra.fatima@riphah.edu.pk

ABSTRACT

Background and Objectives: The study aimed to assess the effects of supplementing a combination of xylanase, mannanase, and proteases in corn-based diets on the growth performance, carcass characteristics, and nutrient digestibility of broiler chickens. These enzymes were supplemented at different levels of nutrient density during the starter and finisher phases of broiler growth. The objective was to determine whether supplementing a combination of xylanase, mannanase, and proteases would improve growth performance, carcass traits, and nutrient digestibility in broiler chickens.

METHODOLOGY: Six diets were formulated with three nutrient density levels (high density [HD], medium density [MD], and low density [LD]) and two enzyme supplementation levels using Winzyme MXP® (0.01%) containing xylanase, mannanase, and proteases. Diets were fed during the starter phase (days 1–21) and finisher phase (days 22–35) to five replicates of 10 birds each. Parameters measured included feed intake, weight gain, feed conversion ratio, carcass characteristics, organ weights, and nutrient digestibility.

RESULTS: Feed intake was similar across all diets ($P>0.05$). Weight gain was unaffected during the starter phase ($P>0.05$) but was higher in the finisher phase for the high-density diet (HD) and enzyme-supplemented diets ($P<0.05$). Feed conversion ratio (FCR) improved during the finisher phase and overall in HD and enzyme-supplemented diets ($P<0.05$). Carcass and organ weights showed no significant differences except for the highest gizzard weight and abdominal fat percentage in the medium-density diet (MD) ($P<0.05$).Crude protein digestibility was highest in the HD diet ($P<0.05$), while crude fat digestibility was highest in diets without enzymes ($P<0.05$). An interaction effect was observed for crude protein digestibility ($P<0.05$), but not for crude fat digestibility ($P>0.05$).

CONCLUSION: Enzyme supplementation positively influenced growth performance, particularly during the finisher phase of the study. However, the interaction between diet density and enzyme supplementation did not significantly affect the overall growth performance or other measured parameters.

KEYWORDS: Xylanase, mannanase, proteases, broiler chickens, nutrient digestibility, growth performance, carcass characteristics, feed conversion ratio, enzyme supplementation.

INTRODUCTION

In commercial poultry diets, mostly vegetable source of ingredients like cereals, legumes and oil seeds (and their by-products) are basic broiler feed ingredients. Plant cell walls and associated structures are fibrous and rich in non-starch polysaccharides (NSPs) (1) and certain anti-nutritional factors (ANFs) (2). Protease inhibitors, gossypols, phytates, lectins, saponins, tannins, oligosaccharides and NSPs are major contributors of ANFs, (3). Among vegetable sources, maize and soybean meal (SBM) are extensively used in broiler's diet because of their high nutritional value (4); however, these ingredients also contains ANFs. For example, SBM contains 29 and corn contains 9% NSPs, respectively (5). Diets high in NSPs can lead to increased intestinal viscosity (6) leading to reduction in nutrient digestibility (7) and ultimately a reduction in growth performance (8).

Chicken lack digestive capacity to fully utilize the nutritive value of cereal grains because of gastrointestinal limitations and minimal endogenous enzyme

How to cite this: Zaman A.F, Fatima N, Farwa U. Effect of Supplementing Xylanase, Manase and Proteases Combination in Corn Based Diets on Growth Performances, Carcass Characteristics and Nutrient Digestibility Broiler Chicken. International Journal of Healthcare Profession. 2024; 1(4):14-18

Vol. 01, Issue 04, October-December, 2024

production (9). The intact NSPs in broiler gut can hamper digestion and consequently disrupt the intestinal balance, leading to low productivity of birds (Dierick, et al., 1995). The most important effects are associated with the NSP's molecular structure and complexity, which is generally classified as "soluble" or "insoluble". More than 20 years ago, development of highly efficacious enzymes that act on both soluble and insoluble NSP were considered the future challenge for sustainable agriculture (Choct, 1997). Soluble NSPs have a molecular structure that facilitates interactions with environment (10). In gut, NSP-water interactions increases the viscosity of the digesta (11), which hinders proper nutrient digestion and absorption, prolongs the retention time of the intestinal contents and alters fore- and hind-gut microbial populations (12).

To counter this problem and to increase NSPs digestibility, exogenous enzymes are widely used in poultry industry. Supplementation of exogenous enzyme in corn-based diets is becoming more prevalent due to variable ingredient quality and increased use of high fiber diet. Exogenous enzyme supplementation not only improves the bird's` performance but also plays a crucial role in reduction of feed cost (13). Enzymes like xylanases, proteases, beta mannanases, amylases, cellulases and phytases are frequently used in animal feed (14). Basically exogenous enzymes are used to fill the gap of endogenous enzymes by increasing the digestibility of feed (15).

Multi-enzyme activity products have been used commercially in broiler diets for over two decades (16). Żyla, LEDOUX (17) reported that multi enzymes synergize the effect of enzymes than if used separately. Tang, Hao (18) reported that adding proteases and xylanases simultaneously has a positive effect on energy utilization and nutrient digestibility. Likewise combination of NSPase and β-mannanase enzyme supplementation in a low energy diet improves bird's performance (19).

The purpose of this study was to evaluate the efficacy of commercial enzyme cocktail Winzyme MXP® in corn based diet and its effects on growth performance, carcass characteristics and nutrient digestibility in broilers chickens.

METHODOLOGY

Experiment was conducted at a poultry farm in Faisalabad.

House cleaning and preparation

- Shed cleaned, disinfected, fumigated, and ventilated before chick arrival.
- 2-inch sawdust bedding with chick paper for the first week.
- Drinkers and feeders sanitized and sun-dried.
- Temperature pre-set for uniform brooding conditions.
- Biosecurity: Daily drinker cleaning, limestone at entrance, formalin spray around shed.

Experimental Design

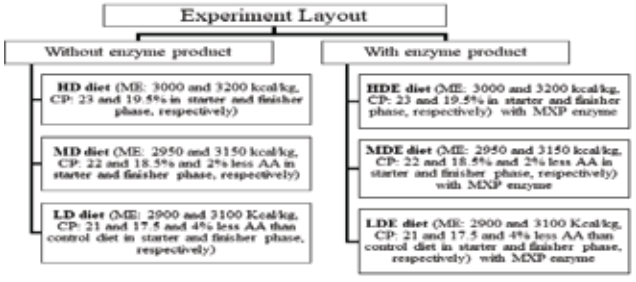
- Birds: 300 Ross-308 broiler chicks, divided into 30 replicates (10 chicks each).
- Diets: Six treatments with three nutrient density levels (HD, MD, LD) and enzyme supplementation (HDE, MDE, LDE).
- Enzyme: Winzyme MXP® @0.01% (Endo-1,4-D-xylanase, β-mannanase, proteases).
- Phases: Starter (Day 1–21) & Finisher (Day 22–35).

Lighting, Temperature & Vaccination

- Ross Broiler Handbook guidelines followed.
- Initial temp: 95°F, reduced weekly to 75°F by Week 5.
- Vaccination: Newcastle Disease (ND) & Infectious Bursal Disease (IBD).
- Vitamin supplementation to reduce stress.

Parameters Studied

- Growth Performance:
  - Feed Intake = Feed Offered – Feed Refused
  - Body Weight Gain = Final Weight – Initial Weight
  - Feed Conversion Ratio (FCR) = Feed Consumed / Weight Gain
- Carcass Characteristics:
  - Dressing % = (Carcass Weight / Live Weight) × 100
  - Breast % = (Breast Weight / Carcass Weight) × 100
  - Thigh % = (Thigh Weight / Carcass Weight) × 100
  - Internal Organ Weights (Gizzard, Liver, Heart)
- Nutrient Digestibility:
  - Proximate analysis of feed & feces (Dry Matter, CP, Fat, Fiber, Ash).
  - Acid Insoluble Ash (AIA) used as marker.
  - Digestibility coefficient calculated using marker ratios.



Statistical Analysis

Data were analyzed under completely randomized design with factorial treatment arrangement using General Linear Model of Minitab Statistical Software 17 (Minitab Inc. 2010). Means were compared using Tukey's Test.

RESULTS

- Feed Intake
  - o No significant effect of energy density or enzyme supplementation on feed intake during both starter (7-21 days) and finisher (22-35 days) phases ($P>0.05$).
  - o No interaction between energy density and enzyme level on feed intake ($P>0.05$).
- Weight Gain
  - o No effect of energy density or enzyme supplementation on weight gain during the starter phase ($P>0.05$).
  - o During the finisher phase, weight gain was higher in high-density (HD) diets compared to low-density (LD) diets ($P<0.05$), but not significantly different from medium-density (MD) diets.
  - o Birds fed enzyme-supplemented diets had higher weight gain compared to those without enzymes during the finisher phase and overall period ($P<0.05$).
- Feed Conversion Ratio (FCR)
  - o No effect of energy density or enzyme supplementation on FCR during the starter phase ($P>0.05$).
  - o In the finisher phase, FCR was better in HD diets than LD diets ($P<0.05$), but not significantly different from MD diets.
  - o Enzyme supplementation had no significant effect on FCR ($P>0.05$).

Supplementing xylanase, mannanase, and proteases in corn-based diets improved weight gain during the finisher phase but did not significantly affect feed intake or FCR. High-energy diets were more effective in enhancing growth performance compared to low-energy diets.

DISCUSSION

In the present study, dietary HE level improved BWG and FCR compare with the LE diets. This is consistent with the previous studies(20), in which high energy improved FCR in broilers. In addition, these results were in line with those of Saleh, Watkins (21) and Cho and Kim (22) who have shown that BW and feed conversion were significantly improved by increasing dietary nutrient density. Similarly, Barbour, Farran (22) reported that broilers fed high ME increased BWG and FCR more than low ME treatment without any difference in FI among treatments. Richards (23) also reported that modern broilers selected for rapid growth do not regulate voluntary FI according to different ME level. The high and low ME level treatments did not impact FI, which may explain the improvement of BWG and FCR observed in our study

Feed intake was also unchanged by enzyme both in starter and finisher phase, which agrees with the results reported by previous researchers (16,17) and disagrees the results reported by in which they reported that feed intake affected by the addition of enzymes in diets. Waheed (2001) reported that feed intake and growth rate were not significantly ($P>0.05$) affected by the supplementation of multi-enzyme in both grower and finisher diets also revealed that feed intake was not effected significantly ($P>0.05$) for different groups. Dhakal, Sah (30) reported that enzyme supplementation had no effect on feed intake, whereas Bekta, Fabijanska (28) examined the effect of dietary inclusion of enzyme on growth performance of broilers. They reported that, feed intake was increased significantly by 9% respectively for the birds fed on diets supplemented with enzyme. No difference was observed with enzymes supplementation on growth performance for starter phase. Many studies in which researchers reported that enzyme addition in diets resulted into improved weight gain. There are studies which second the results in present study that enzymes are more effective in older age than later, contrary Olukosi, Cowieson (4) concluded that the chicks benefited more from enzyme addition at a younger age and that the contribution of the enzymes to nutrient retention decreased with age in chickens.

Feed conversion ratio was unchanged with enzyme supplementation in this study which are in line with the findings of whereas disagrees with the findings of where they reported that enzyme supplementation improved FCR similarly Ohtani and Yayota (29) reported significantly increased FCR were showed by those birds fed on enzyme supplemented diets when compared to those birds fed on non-enzyme supplemented diets (control diets).

No difference of experimental diets on weight gain for starter phase but it was significantly improved for high density diets in finisher phase and during overall period of experimental trial. Furthermore, enzyme addition also improved weight gain during finisher phase and during overall trial period, which agrees with the findings of previous studies by (16) whereas results reported by were contrary to present findings (26). There was no a treatment effect of a cocktail or density on carcass

quality in the present experiment. Consistent with our results, Kidd, Morgan who found that carcass yields and internal organs were not affected due to enzyme addition. Researchers also reported that the inclusion of the enzyme did not affect the meat quality and carcass characteristics, whereas some researchers also reported that enzyme supplementation improved meat quality (Abudabos, 2012; Cho and Kim, 2013; El-Masry, et al., 2017; Law, et al., 2018). However, the results are not always consistent. Experimental animal fed the diets with xylanase significantly reduced meat quality. The reason for the difference is unknown, Some of them showed that meat quality is affected by lots of factors, including nutrition, husbandry conditions, breed, and handling before and after slaughter. However, it could be assumed that the possible reason for the different results could be due to the different inclusion levels and types of enzyme, age of animals, and different composition of diet.

CONCLUSION

Based on the findings, enzyme supplementation can improve growth performance, particularly during the finisher phase. It is recommended that future studies explore varying enzyme concentrations or combinations to determine the optimal dose for better performance outcomes. Further research should also investigate how diet formulation can enhance protein utilization, as crude protein digestibility was highest in the high-density diet. Although the results showed limited effects on carcass and organ weights, more targeted research into how dietary enzyme interactions influence body composition could provide insights for improving overall health and production. Additionally, conducting longer-term studies would help determine the long-term effects of enzyme supplementation and varying nutrient densities.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

REFERENCES

1. Choct M. Feed non-starch polysaccharides: chemical structures and nutritional significance. Feed milling international. 1997;191(June issue):13-26.
2. Sánchez-Muros M-J, Barroso FG, Manzano-Agugliaro F. Insect meal as renewable source of food for animal feeding: a review. J Clean Prod. 2014;65:16-27.
3. Francis G, Makkar HP, Becker K. Antinutritional factors present in plant-derived alternate fish feed ingredients and their effects in fish. Aquac. 2001;199(3-4):197-227.
4. Olukosi O, Cowieson A, Adeola O. Age-related influence of a cocktail of xylanase, amylase, and protease or phytase individually or in combination in broilers. Poult Sci. 2007;86(1):77.
5. Malathi V, Devegowda G. In vitro evaluation of nonstarch polysaccharide digestibility of feed ingredients by enzymes. Poult Sci. 2001;80(3):302-5.
6. Bedford M, Morgan A. The use of enzymes in poultry diets. Worlds Poult Sci J. 1996;52(1):61-8.
7. Lázaro R, Garcia M, Medel P, Mateos G. Influence of enzymes on performance and digestive parameters of broilers fed rye-based diets. Poult Sci. 2003;82(1):132-40.
8. Choct M, Hughes R, Bedford M. Effects of a xylanase on individual bird variation, starch digestion throughout the intestine, and ileal and caecal volatile fatty acid production in chickens fed wheat. Br Poult Sci. 1999;40(3):419-22.
9. Flores C, Williams M, Smith K, Pieniazek J, Latham R, Wang J, et al. Evaluation of a thermotolerant xylanase on broiler growth performance and dietary ileal digestible energy value. J Appl Poult Res. 2017;26(1):60-71.
10. Chesson A. Non-starch polysaccharide degrading enzymes in poultry diets: influence of ingredients on the selection of activities. World's Poultry Science Journal. 2001;57(3):251-63.
11. Bedford MR, Classen HL. Reduction of intestinal viscosity through manipulation of dietary rye and pentosanase concentration is effected through changes in the carbohydrate composition of the intestinal aqueous phase and results in improved growth rate and food conversion efficiency of broiler chicks. The Journal of nutrition. 1992;122(3):560-9.
12. Molist F, de Segura AG, Gasa J, Hermes R, Manzanilla E, Anguita M, et al. Effects of the insoluble and soluble dietary fibre on the physicochemical properties of digesta and the microbial activity in early weaned piglets. Animal Feed Science and Technology. 2009;149(3-4):346-53.
13. Nguyen D, Tran H, Yun H-M, Kim I. Influence of a cocktail of protease and xylanase in different energy densities of corn-and soybean-meal-based diet on growth performance, nutrient digestibility, carcass quality, and gas emission in broilers. Can J Anim Sci. 2017;98(2):271-8.
14. Ramesha K. Impact of Dietary Enzymes on Performance, Intestinal Viscosity, Gut Bacterial Load and Optimization of Nutritional Matrix of Broilers Fed Corn-Soy Diets: Karnataka Veterinary

Animal and Fisheries Sciences University, Bidar; 2005.
15. Govil K, Nayak S, Baghel R, Patil A, Malapure C, Thakur D. Performance of broiler chicken fed multicarbohydrases supplemented low energy diet. Vet World. 2017;10(7):727.
16. Amerah A, Romero L, Awati A, Ravindran V. Effect of exogenous xylanase, amylase, and protease as single or combined activities on nutrient digestibility and growth performance of broilers fed corn/soy diets. Poult Sci. 2016;96(4):807-16.
17. Żyla K, LEDOUX DR, KUJAWSKI M, VEUM TL. The efficacy of an enzymic cocktail and a fungal mycelium in dephosphorylating corn-soybean meal-based feeds fed to growing turkeys. Poult Sci. 1996;75(3):381-7.
18. Tang D, Hao S, Liu G, Nian F, Ru Y. Effects of maize source and complex enzymes on performance and nutrient utilization of broilers. Asian-Australas J Anim Sci. 2014;27(12):1755.
19. Klein J, Williams M, Brown B, Rao S, Lee J. Effects of dietary inclusion of a cocktail NSPase and β-mannanase separately and in combination in low energy diets on broiler performance and processing parameters. J Appl Poult Res. 2015;24(4):489-501.
20. Yuan L, Wang M, Zhang X, Wang Z. Effects of protease and non-starch polysaccharide enzyme on performance, digestive function, activity and gene expression of endogenous enzyme of broilers. PloS one. 2017;12(3):e0173941.
21. Mathlouthi N, Lalles J, Lepercq P, Juste C, Larbier M. Xylanase and β-glucanase supplementation improve conjugated bile acid fraction in intestinal contents and increase villus size of small intestine wall in broiler chickens fed a rye-based diet. Journal of Animal Science. 2002;80(11):2773-9.
22. El-Sanhoury M, Ahmed A. Broiler performance, enzymes activity and histological observations affected by multi enzymes complex (ZADO®). Egypt J Nutr Feed. 2017;20(2):251-62.
23. Saleh F, Tahir M, Ohtsuka A, Hayashi K. A mixture of pure cellulase, hemicellulase and pectinase improves broiler performance. Br Poult Sci.2005;46(5):602-6.
24. Cowieson A, Ravindran V. Effect of exogenous enzymes in maize-based diets varying in nutrient density for young broilers: growth performance and digestibility of energy, minerals and amino acids. British poultry science. 2008;49(1):37-44.
25. Kalmendal R, Tauson R. Effects of a xylanase and protease, individually or in combination, and an ionophore coccidiostat on performance, nutrient utilization, and intestinal morphology in broiler chickens fed a wheat-soybean meal-based diet. Poult Sci. 2012;91(6):1387-93.
26. Kocher A, Choct M, Ross G, Broz J, Chung T. Effects of enzyme combinations on apparent metabolizable energy of corn-soybean meal-based diets in broilers. Journal of Applied Poultry Research. 2003;12(3):275-83.
27. Zanella I, Sakomura N, Silversides F, Fiqueirdo A, Pack M. Effect of enzyme supplementation of broiler diets based on corn and soybeans. Poultry science. 1999;78(4):561-8.
28. Oliveira M, Rodrigues E, Marques R, Gravena R, Guandolini G, Moraes V. Performance and morphology of intestinal mucosa of broilers fed mannan-oligosaccharides and enzymes. Arquivo Brasileiro de Medicina Veterinária e Zootecnia. 2008;60(2):442-8.
29. Olukosi OA, Cowieson AJ, Adeola O. Energy utilization and growth performance of broilers receiving diets supplemented with enzymes containing carbohydrase or phytase activity individually or in combination. British Journal of Nutrition. 2008;99(3):682-90.
30. Kamel N, Ragaa M, El-Banna R, Mohamed F. Effects of a monocomponent protease on performance parameters and protein digestibility in broiler chickens. Agriculture and Agricultural Science Procedia. 2015;6:216-25.

Authors Contributions:

Muhammad Asfar Zaman: Substantial contrib utions to the conception and design of the work.

Nimra Fatima: Design of the work and the acquisition. Drafting the work.

Umme Farwa: Final approval of the version to be published.

Submitted for publication: 10-11-2024
Accepted after revision: 08-12-2024

Original Article

Open Access

Prevalence of Urinary Tract Infections in Diabetic and Diabetic Ketoacidosis Patients

Hina Sabbir [a], ***Iqra Farooque*** [a]

[a] MBBS, FCPS(Pediatrics), Faisalabad Medical University

Correspondence: nidaa4644@gmail.com

ABSTRACT

Background and Objectives: Diabetes mellitus has long been considered to be a predisposing factor for urinary tract infection (UTI) because of sugar in the urine, which serves as media for the growth of bacteria. The colonized urinary tract can also accelerate the prolonged release of bacteria with an increased risk of complications of the urinary system, ranging from dysuria (pain or burning sensation during urination) to organ damage and sometimes even death. To determine the frequency of urinary tract infections in diabetic ketoacidosis patients.

METHODOLOGY: A total of 116 diabetic patients presenting with diabetic ketoacidosis aged 1 to 15 years of either gender were included. Patients with a history of antibiotic therapy taken within the last two weeks, renal stones and urinary tract anomalies were excluded. After this, clean-catch midstream urine was collected from each patient into a sterile universal container and sent to the institutional pathology laboratory for microscopic examination and the presence or absence of UTI was noted.

RESULTS: The age range in this study was from 5 to 14 years with a mean age of 8.75 ± 2.44 years. The majority of the patients 61 (52.59%) were from 9-15 years of age. Out of 116 patients, 69 (59.48%) were males and 47 (40.52%) were females with male to female ratio of 1.5:1. This study has shown the frequency of urinary tract infections in diabetic ketoacidosis patients as 42 (36.21%).

CONCLUSION: This study has shown that the frequency of urinary tract infections in diabetic ketoacidosis patients is quite high.

KEYWORDS: urinary tract infections, diabetic ketoacidosis, treatment.

INTRODUCTION

Diabetes mellitus or DM is a disease type that affects the metabolism of carbohydrates, lipids, and proteins and is characterized by high blood glucose levels due to insulin dysfunction or resistance to its effects. The incidence of DM on a global scale has increased over the years with over 366 million people affected globally and this is expected to rise to 552 million by 2030 (1). This indicates that the high incidence of DM is a growing concern to the healthcare systems of most countries within both developed and developing worlds. For example, in sub-Saharan Africa, communities, it was pointed out that about 10.8 million people had DM in 2006, and should increase to 18.7 million by 2025 (2). The absolute worst-case consequence of DM is diabetic ketoacidosis (DKA), an aerobic, acute metabolic genital condition that results from insulin shortage. It is accompanied by high mortality relating to 5% in cases even if the patient is at a healthcare centre with professional staff. Untreated DKA can be potentially fatal as it is complicated by acute kidney failure, CVD, or respiratory failure (3).

Urinary tract infections (UTIs) are part of bacterial infections which rank second after respiratory tract infections and are especially dangerous in some people, such as children and diabetic patients (4). It has also been found that UTIs can cause severe and irreversible renal damage, especially in children therefore calling for early diagnosis and treatment of UTIs. UTIs are more frequent in awareness with cumulative incidence rates of 7% in girls and 2% in boys by the end of the first six years of life (5). In the general population, UTIs contribute to about 1. 5 million to 1.75 million visits to a doctor (5). Antibiotic resistance has become another evolving issue, and therefore, there is

How to cite this: Farooque I, Shabbir H , Amin N Prevalence of Urinary Tract Infections in Diabetic and Diabetic Ketoacidosis Patients. International Journal of Healthcare Profession. 2024; 1(4):19-23

Vol. 01, Issue 04, October-December, 2024

a need to identify the trends in resistance to inform empirical antibiotic management. Poor empirical therapy is associated with greater morbidity, longer duration of treatment, multiple sickness visits, and increased costs of care (6).

For a long time, diabetes has become a risk factor for UTIs because sugar is present in the urine, and bacteria grow on this substrate (7). Such conditions make the patient a candidate for urinary tract colonization, and hence a high tendency of getting an infection or complications thereof. The symptoms might be mild including dy-reased pain while urinating – or even go up to involving major organs and in exterse circumstances, organ failure and death. It has been shown in several works that diabetic patients have a greater risk of developing a UTI (8). For example, studies have shown that the prevalence in diabetic patients may be as low as 15% and as high as 35% in another study and 50.7%in still another study. Specific UTIs in patients with DKA have also been described, with some studies points to as high as 73.68%. HAK now recognizes that early diagnosis of UTIs in diabetics can be the key to avoiding pyelonephritis and other complications (9). Nevertheless, the prophylactic examination of people with diabetes and UTIs is neglected, particularly in developing countries, where microscopic analysis of urine for bacterial density is not carried out daily (8). This study seeks to contribute towards such evidence by underlining the need for more regularmscrobic urinal appreciation in diabetes management the local populations especially in the screen areas(10).

The objective of the study was:

"To determine the frequency of urinary tract infections in diabetic ketoacidosis patients."

METHODOLOGY

Study Design: Descriptive, Cross-sectional study.

Setting: Department of Pediatric Medicine, Allied Hospital, Faisalabad.

Duration Of Study: 5th March 2020 to 4th September 2020.

Sample Size: The calculated sample size was 116 with 95% confidence level, 8% margin of error and taking percentage of urinary tract infections in diabetic ketoacidosis patients as 26.0% (11).

Sample Technique: Non-probability, consecutive sampling.

Sample Selection:

a. Inclusion Criteria:

a. All diabetic patients presenting as diabetic ketoacidosis (as per operational definition).

b. Age 1-15 years.

c. Both genders.

b. Exclusion Criteria:

a. History of antibiotic therapy taken within last two weeks.

b. H/o renal stones and urinary tract anomalies (assessed on USG).

Data Collection Procedure:

After permission from the institutional ethical review committee, total number of 116 patients presenting to inpatient Department of Pediatric Medicine, Allied Hospital, Faisalabad, fulfilling the Inclusion criteria were selected (6). After this, clean-catch midstream urine was collected from each patient into a sterile universal container and sent to the institutional pathology laboratory for microscopic examination and presence or absence of UTI (as mentioned in operational definition) was noted by the researcher herself. This all data (age, gender, duration of DM, place of living (rural/urban), weight of patient, taking treatment (yes/no) and urinary tract infection (present/absent)) was recorded on a specially designed proforma (12).

Data Analysis Procedure:

Statistical analysis was performed using SPSS version 25.0. Results were presented as mean and standard deviation for age. Frequency and percentage were calculated for gender, taking treatment (yes/no) and urinary tract infection (present/absent). Effect modifiers like age, gender and taking treatment (yes/no) were controlled through stratifications. Post-stratification chi square was applied to see their effect on frequency of urinary tract infection and p-value ≤ 0.05 was considered as significant.

RESULTS

Age range in this study was from 5 to 14 years with mean age of 8.75 ± 2.44 years. Majority of the patients 61 (52.59%) were from 9-15 years of age as shown in Table VII.

Out of 116 patients, 69 (59.48%) were males and 47 (40.52%) were females with male to female ratio of 1.5:1 (Figure I). Distribution of patients according to taking treatment is shown in Table VIII (11).

This study has shown the frequency of urinary tract infections in diabetic ketoacidosis patients as 42 (36.21%) as shown in Figure II (11).

Stratification of urinary tract infection with respect to age groups and gender is shown in Table IX & X respectively. Stratification of urinary tract infection concerning taking treatment is shown in Table XI(13).

Table-VII: Distribution of patients according to Age (n=116).

Table 1. Distribution of patients according to Age (n=116).

Age (in years)	No. of Patients	%age
1-8	55	47.41
9-15	61	52.59
Total	**116**	**100.0**

Mean ± SD = 8.75 ± 2.44 years

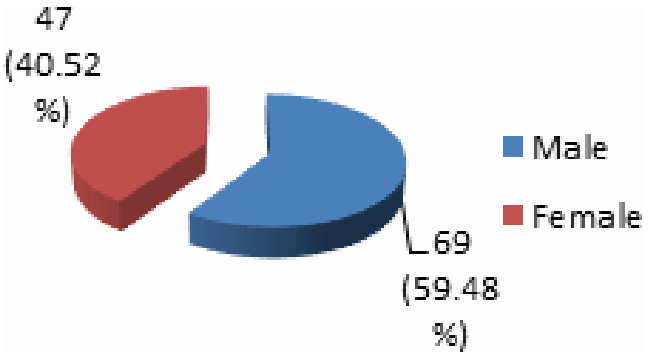


Figure 1: Distribution of patients according to gender (n=116).

Table-2: Distribution of patients according to taking treatment (n=116).

Taking treatment	urinary tract infection		p-value
	Present	Absent	
Yes	27	44	**0.608**
No	15	30	

Gender	urinary tract infection		p-value
	Present	Absent	
Male	26	43	**0.689**
Female	16	31	

Taking treatment	No. of Patients	%age
Yes	71	61.21
No	45	38.79
Total	116	100.0

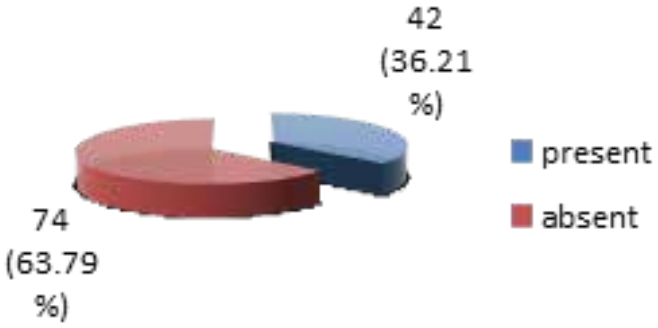


Figure 2: Frequency of urinary tract infections in diabetic ketoacidosis patients

Table 3: Stratification of urinary tract infection concerning age groups.

Age (years)	urinary tract infection		p-value
	Present	Absent	
1-8	23	32	**0.232**
9-15	19	42	

DISCUSSION

The immune function of diabetic patients is compromised, and they produce high glucose content in urine which in turn enhances the possibility of developing UTIs due to autonomic neuropathy(14). Immunity level in diabetic patient is weak they have poor neutrophil functioning, polymorphonuclear leukocytes (PMNs) which are essential for combating procacious bacteria. From animal and human diabetics, PMNs exhibit decreased in adhesion, phagocytosis, and also in chemotactic activities that are important for immune protection (3). This dysfunction intensifies at a condition of acidosis, meanwhile, the poor antioxidant capacity futilities the bactericidal ability and the body's capacity to fight against the infective agent is also hampered. These immune deficiencies joined by the high blood glucose levels put diabetic patients at higher risk for infections for example UTIs which stands for urinary tract infections are the common bacterial infection prevalent among diabetic patients (15).

Numerous researchers have indicated that the preva-

lence of UTIs in diabetic patients is much higher than that observed in non-diabetic patients. For instance some studies revealed that 9.6% of the Type 1 diabetics and 6.9% of Type 2 diabetics had UTIs. UTI prevalence can range between 41 and 73.68% in DKA patients(16). The high glucose concentration in urine creates a good culture medium that allows easy colonization of urine by bacteria hence causing urinary infections. Further, diabetic autonomic neuropathy results in poor bladder emptying predisposing the patient to bladder infections (17).

Several authors establish that diabetics are more prone to UTIs, as supported by evidence from various research. The same authors established that diabetics are five times more likely to suffer from UTIs other than non-diabetic patients and this is more compounded with poorly controlled glycemia. Also, severe UTI has negative effects on patients with diabetes and may cause pyelonephritis and renal impairment (18). Thus, it is important to keep blood glucose low, perform the screenings for UTIs and, likewise, treat them on time to address problems that diabetic patients can have (19).

CONCLUSION

This study has shown the frequency of urinary tract infections in diabetic ketoacidosis patients is quite high. So, we recommend that there should be routine screening of urinary tract infections in diabetic patients for taking proper and timely treatment in order to decrease the complications as well as morbidity of patients (20).

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

REFRENCES

1. Almazrouei R, Afandi B, AlKindi F, Govender R, Al-Shamsi S. Clinical characteristics and outcomes of diabetic ketoacidosis in patients with type 2 diabetes using SGLT2 inhibitors. Clinical Medicine Insights: Endocrinology and Diabetes. 2023;16:11795514231153717.
2. Blanchard F, Charbit J, Van der Meersch G, Popoff B, Picod A, Cohen R, et al. Early sepsis markers in patients admitted to intensive care unit with moderate-to-severe diabetic ketoacidosis. Annals of intensive care. 2020;10:1-10.
3. Zewdu B, Belachew T, Ahmed K, Tilahun L, Dagnaw K. Incidence and determinants of diabetic ketoacidosis among people with diabetes in Woldiya comprehensive specialized hospital, Ethiopia: a retrospective cohort study. BMC Endocrine Disorders. 2024;24(1):34.
4. Deng X-y, Yi M, Li W-g, Ye H-y, Chen Z-s, Zhang X-d. The prevalence, hospitalization outcomes and risk factors of euthyroid sick syndrome in patients with diabetic ketosis/ketoacidosis. BMC Endocrine Disorders. 2023;23(1):195.
5. Ebrahimi F, Kutz A, Christ ER, Szinnai G. Lifetime risk and health-care burden of diabetic ketoacidosis: a population-based study. Frontiers in Endocrinology. 2022;13:940990.
6. Kaur P, Sachan RSK, Karnwal A, Devgon I. A Review on Clinical Manifestation and Treatment Regimens of UTI in Diabetic Patients. Iranian Journal of Medical Microbiology. 2022;16(2):98-115.
7. Kidie AA, Lakew AM, Ayele T. Frequency of diabetic ketoacidosis and its determinants among pediatric diabetes mellitus patients in northwest Ethiopia. Diabetes, Metabolic Syndrome and Obesity. 2021:4819-27.
8. Katsuhara Y, Ogawa T. Acute renal failure, ketoacidosis, and urogenital tract infections with SGLT2 inhibitors: signal detection using a Japanese spontaneous reporting database. Clinical Drug Investigation. 2020;40:645-52.
9. Huang B, Yang S, Ye S. Systemic infection predictive value of procalcitonin to lactic acid ratio in diabetes ketoacidosis patients. Diabetes, metabolic syndrome and obesity: targets and therapy. 2022:2127-33.
10. Dhatariya KK, Glaser NS, Codner E, Umpierrez GE. Diabetic ketoacidosis. Nature Reviews Disease Primers. 2020;6(1):40.
11. Mekonnen GA, Gelaye KA, Gebreyohannes EA, Abegaz TM. Treatment outcomes of diabetic ketoacidosis among diabetes patients in Ethiopia. Hospital-based study. PloS one. 2022;17(4):e0264626.
12. Muppidi V, Meegada S, Challa T, Siddamreddy S, Samal S. Euglycemic diabetic ketoacidosis in a young pregnant woman precipitated by urinary tract infection. Cureus. 2020;12(3).
13. Nasa P, Chaudhary S, Shrivastava PK, Singh A. Euglycemic diabetic ketoacidosis: A missed diagnosis. World journal of diabetes. 2021;12(5):514.
14. Özer Ö, Efe FB, Başdoğan B, Akalın A, Kebapçı N, Yorulmaz G. Hospitalization of Diabetic Patients: Characteristics, Reasons for Admission: A Retrospective Study in a Tertiary University

Hospital. Türkiye Diyabet ve Obezite Dergisi. 2021;5(1):33-42.

15. Wang X, Wang Y, Luo L, Tan L, Cai W, Chen L, et al. Prevalence and associated factors of urinary tract infection in patients with diabetic neuropathy: a Hospital-Based Cross-Sectional Study. Diabetes, Metabolic Syndrome and Obesity. 2023:1261-70.
16. Patlolla SR, Devara J, Ameer MA, Patlolla PR, Ponnala M. Euglycemic Diabetic Ketoacidosis in a Patient With Urinary Tract Infection. Cureus. 2023;15(7).
17. Virdi N, Poon Y, Abaniel R, Bergenstal RM. Prevalence, cost, and burden of diabetic ketoacidosis. Diabetes Technology & Therapeutics. 2023;25(S3):S-75-S-84.
18. Shahid W, Khan F, Makda A, Kumar V, Memon S, Rizwan A. Diabetic ketoacidosis: clinical characteristics and precipitating factors. Cureus. 2020;12(10).
19. Song Y, Shen X. Diabetic ketoacidosis complicated by emphysematous pyelonephritis: a case report and literature review. BMC urology. 2020;20:1-6.
20. Schwarzfuchs D, Rabaev E, Sagy I, Zimhony-Nissim N, Lipnitzki I, Musa H, et al. Clinical and epidemiological characteristics of diabetic ketoacidosis in older adults. Journal of the American Geriatrics Society. 2020;68(6):1256-61.

Authors Contributions:

Hina Sabbir: Substantial contributions to the conception.

Iqra Farooque: Design of the work and the acquisition. Drafting the work. Final approval of the version to be published.

Submitted for publication: 11-10-2024
Accepted after revision: 09-11-2024

Original Article

Open Access

Contemporary trends in diabetic retinopathy and its complications among type 2 diabetes mellitus patients visiting a tertiary care hospital in Lahore

Muhammad Iqbal Javaid [a], ***Tahira Ashraf*** [b], ***Ahsan Iqbal*** [c]

[a] Senior Optometrist, Gulab Devi Educational Complex Lahore

[b] Assistant Professor University Institute of Public Health The University of Lahore

[b] PhD Department of Food Science and Technology, The University of Lahore

Correspondence: iqbaljaved_opt@yahoo.com

ABSTRACT

Background and Objectives: Diabetes mellitus is a chronic or long-term disorder with comorbidities like hypertension nephropathy, stroke, ischemic heart disease, and retinopathy. Diabetic retinopathy is a serious complication of the retina and a cause of the long-term existing condition of diabetes mellitus. Diabetic retinopathy is a threatening condition of blindness. It contributes 2.6% and 1.9% of visual impairment globally by 2010 and is expected to increase over time. To find out the frequency of diabetic retinopathy among patients with known diabetes mellitus type-2.

METHODOLOGY: A cross-sectional study of 09 months duration was carried out with 375 participants after the IRB approval. The sampling technique was a non-probability convenient sampling technique. Data was received on a self-structured questionnaire and analyzed by the software SPSS 26 and the results were presented in figures.

RESULTS: A total of 375 participants including 164 (43.7%) males and 213 (56.13%) females were assessed with the mean age group of 53 with a standard deviation of 9.22. Co-morbid conditions like hypertension were noticed in 244 (65.1%), dyslipidemia in 155 (41.3%), obesity in 109 (29.1%), and Ischemic heart disease in 123 (32.8%) participants. A higher incidence was noted in participants with Diabetes Mellitus present for more than 5 years. Results also showed that 244 (65.1%) participants were on oral treatment. 97 (25.9%) visited regularly to a general physician and 48 (12.8%) visited an ophthalmologist regularly. Diabetic retinopathy was noted in 321 (43%) participants in both eyes, Mild non-proliferative diabetic retinopathy was found in both eyes in 108 (28.8%) participants, moderate in 148 (39.4%) participants, and severe in 64 (8.2%) participants. Proliferative diabetic retinopathy was found in 105 (28%), while macular edema was found in 116 (30.85%) participants.

CONCLUSION: Diabetic retinopathy is a global public health issue that leads to blindness with a marked prevalence. Awareness may resolve the condition for preventing and controlling blindness caused by diabetes mellitus.

KEYWORDS: Diabetes mellitus, Diabetic retinopathy, Visual impairments, Retinal Complications. Awareness

INTRODUCTION

Diabetes is a chronic condition that can affect various body systems, including the eyes. Elevated blood sugar levels associated with diabetes can cause damage to the blood vessels in the retina, the light-sensitive tissue at the back of the eye. This damage can lead to vision loss in people with diabetes.1 Diabetes is a serious disease and causes many retinal complications like diabetic retinopathy resulting in many factors which are age, hypertension, high lipid profile, duration of uncontrolled diabetes, and general behavior to consult a general physician and ophthalmologist to control diabetes and prevent retinopathies. Hard exudates are also commonly seen in moderate and severe non-proliferative diabetic retinopathy. Diabetic retinopathy lesions, micro-aneurysms, and hemorrhages are a cause of non-proliferative diabetic retinopathy (NPDR), early signs of retinal complications caused by DM. 2

Diabetic retinopathy remains the most common cause of vision loss in the general diabetic population. This occurs when high blood sugar levels damage the blood vessels in the retina. The damaged blood vessels can leak fluid or blood into the retina, which can blur or distort vision. 3

Proliferative diabetic retinopathy is a more advanced category of DR with neovascularization on the retina.

How to cite this: Javaid I,M. Ashraf T, Iqbal A. Contemporary trends In Diabetic Retinopathy and its complications among Type 2 Diabetes mellitus Patients visiting a tertiary care hospital in Lahore. International Journal of Healthcare Profession. 2024; 1(4): 24-30

Vol. 01, Issue 04, October-December, 2024

Traction of fibrovascular leads to fractional retinal detachment a cause of severe vision loss and ultimately blindness.4

Diabetic macular edema occurs when fluid builds up in the central part of the retina (the macula) and causes it to swell. This can cause vision loss or vision changes. 5

Both diabetic retinopathy and diabetic macular edema may be treated with medications, laser therapy, or surgery. However, early detection and treatment are important to prevent or minimize vision loss. People with diabetes should have regular ophthalmic examinations to check for these conditions. 6

Other potential causes of vision loss in people with diabetes include cataracts (clouding of the lens of the eye) and glaucoma (increased pressure in the eye). Both of these conditions can be treated with surgery or medications. 7

The term 'Diabetes' was first introduced by Aretaeus of Cappadocia, a famous physician, residing in Alexandria and Rome during the 2nd century AD. He used the Greek word ―diabaino‖ giving meaning, to pass through and showing the condition where a large quantity of urine passes through the kidneys. 13 Ancient Indians mentioned the disease as ―Madhumeha‖ corresponds to the modern term ―Diabetes Mellitus. It was also thought that this disease was present in India as a most common disease but with unknown prevalence.8

Diabetes Mellitus has been a common disease since the 2nd century A.D. and the link with ophthalmological pathology was unknown before the middle of the 19th century. In 1846, French ophthalmologist Apollinaire Bouchard (1806-1886) stated the development of visual loss in the absence of cataracts in diabetes. Edward Jaguar (1818-1884) first observed diabetic macular changes in 1855. 9 Anemia is the long-term complication of DM and leads to the development, progression, and proliferation of diabetic retinopathy and other co-morbidities associated with diabetes mellitus. The intensity of the retinopathy issue is inversely associated with the hematocrit values.10

According to Report 22 of the Early Treatment Diabetic Retinopathy Study (ETDRS), the serum lipid profile measured in the 2709 patients enrolled showed that patients with high-level of total serum cholesterol or serum low-density lipoprotein cholesterol levels at baseline were twice as likely to have retinal hard exudates as patients with normal levels. There was a high risk of developing hard exudate during the study in patients. The risk of reduced visual acuity was associated with the extent of hard exudate even after adjusting for the extent of macular edema.11

Klein et al assessed the serum lipid levels in the subjects who participated in the Wisconsin Epidemiologic Study of Diabetic Retinopathy. There was a significant trend for increasing severity of diabetic retinopathy and of retinal hard exudates with increasing cholesterol levels were not associated with the severity of other ocular condition in patients of older age group.12 In another study done by Raza A, khan at KPK, Peshawar Pakistan, a total of 351 patients were examined (65.2 % were male and 84.8 were female), 76% had a family history of DM, 66 % had DM from the last 10 years 87.2 % knew that diabetes can cause diabetic retinopathy and knowledge significantly associated with education level. 80.9 % agreed with the fact that diabetic retinopathy is preventable if controlled at an early stage and after an early diagnosis of diabetes. Awareness at a mass level as a campaign in the general population at the primary level is needed.13 A cross-sectional study conducted by Sami H Alzahrani et al stated that 82.6 % of people have the awareness that DM can harm their eyes and also clear that the source of information was radio, TV, internet, newspaper, and friends, but only 7 % patients were diagnosed DR by an ophthalmologist, while 37 % were diagnosed by physicians. According to the facts discussed in the study more than 58 % were never diagnosed with DR and about 35% did not go for their eye checkups 59 % had awareness regarding DR and knew that it can be a cause of vision loss and even blindness.14

In a cohort study carried out by Adil et al stated suboptimal diabetes control, only 48 % stated that their healthcare worker advised them for a routine yearly eye examination and detailed the need for fundus evaluation, while 62 % of the cohort had decreased visual acuity and 52% did not receive the eye examination. The majority of the respondents were unaware of the diabetic ophthalmic retinal complications and finally not received any management plan. In the study, it is suggested to educate the population about the complications of diabetes and sustainable, patient-centered development of education models to increase eye and general literacy and awareness to improve the eye and general health within the community.15

METHODOLOGY

A total of 375 participants were included in this cross-sectional study with a non-probability sampling technique, among the participants, visiting the ophthalmology department of Gulab Devi Teaching Hospital Lahore with known diabetes mellitus. Data was collected using a self-structured ques Sample size

for this study was calculated by using the appropriate sample size calculation formula, used for a cross-sectional study.16 The sample size was estimated using the prevalence of diabetic retinopathy in patients having diabetes mellitus type 2, using the following formula:

$$n = \frac{z^2_{1-\frac{\alpha}{2}} p(1-p)}{d^2}$$

The sample size (n) calculated was 375 patients
While each participant was examined under influence of dilating drops and signs of diabetic retinopathy were noted. Before dilatation, participants have undergone the process of refraction and visual acuity was recorded. Refraction was performed following retinoscopy and prescribed glasses for any refractive error anomaly. Data were analyzed by SPSS 25 and presented by graphs, charts, and figures accordingly.

RESULTS

This normal curve in the histogram shows that in all 375 (n=375) participants examined during the study, the mean age was 53.03 with a standard deviation of 9.22. The Minimum age was 29 and the maximum age of 78 was recorded. The highest frequency was recorded between the ages of 55 and 57 (number of participants 29). The lowest frequency was in the ages of 53 years (n=26) and in the ages 29, 30, 37,52,74,78 years (n=29) among a total number of participants.

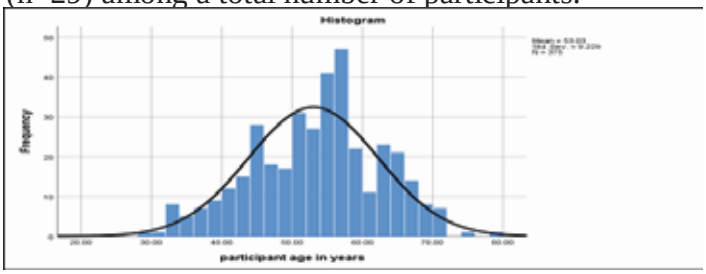


Figure 1: Information about the age of participants (in years)

This figure shows the results regarding control of diabetes mellitus patients including 5 males and 11 females total of 16 individuals presented with very strict control of diabetes. 129 Individuals including 49 males and 80 females had strict control of diabetes mellitus. 230 individuals 110 males and 120 females were presented with diabetes control not strictly.

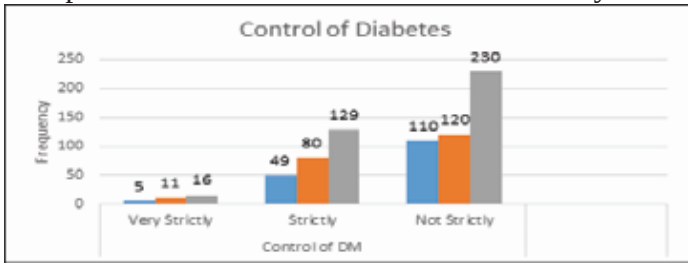


Figure 2: Control Diabetes Mellitus

34 males and 63 females of a total of 164 (43.73%) reported regular visits to a general physician for diabetic control. Individuals 125 males and 142 females of total 211(56.26%) reported visits to a general physician not regularly. In 5 males and 6 females, a total of 11 (2.93%) reported no visit to a general physician for advice on diabetes.

Of individuals 15 males and 33 females, a total of 48 (12.8%) reported regular visits to an ophthalmologist for advice on diabetic retinopathy. Individuals 89 males and 99 females of a total, of 188 (50.13%) regular visits to an ophthalmologist. Of individuals, 60 males and 79 females, a total, of 139 (37.06%) reported never visiting an ophthalmologist for treatment or advice on diabetic retinopathy.

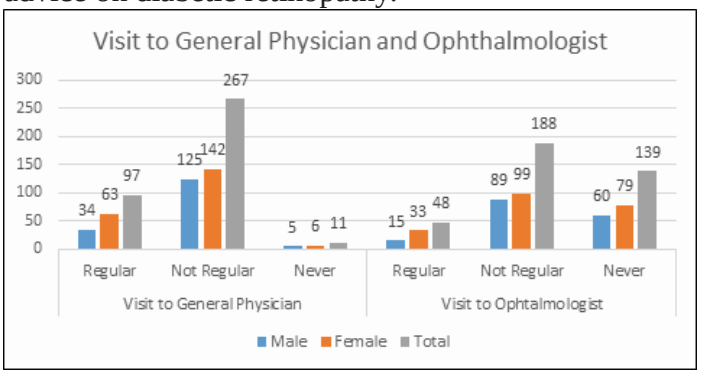


Figure 3: Visit to the general physician

As shown in the figure the complications of diabetic retinopathy were recorded in 79 males and 93 females, of 172 total with 45.866%. Nephropathy was recorded in 59 males and 65 females, 124 total with 33.06%. Neuropathy was recorded in 24 males, and 17 females, of 41 total with 10.93%. Stroke was recorded in 15 males, and 17 females, of 26 total with 6.93%.

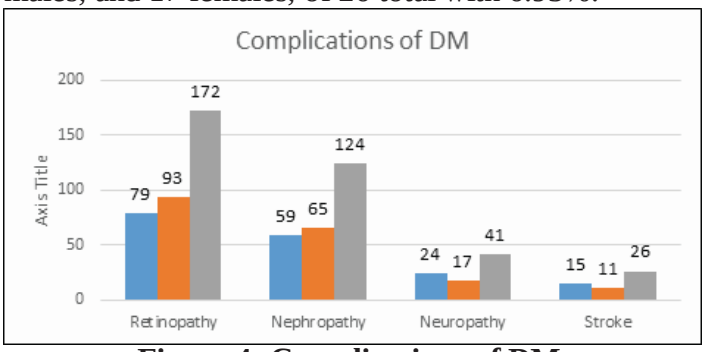


Figure 4: Complications of DM

Diabetic retinopathy was present in 74 males, and 87 females, of 161 (42.93%) while in other individuals 90 males, and 124 females, a total of 214 (57.06%) were found without DR changes in the right eye.

Diabetic retinopathy was present in 73 males, and 87 females, of a total of 160 (42.66%) while in other individuals 91 males, and 124 females, a total of 215 were found without DR changes in the left eye.

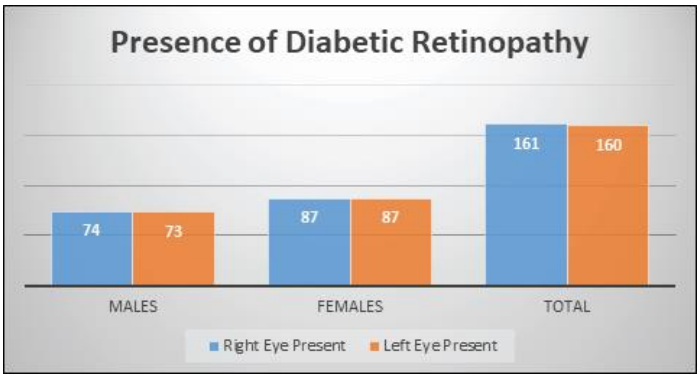


Figure 5: Diabetic retinopathy in right and left eye.

Mild non-proliferative diabetic retinopathy was found in individuals 180 males, and 34 females, of the total of 52 participants (13.86%) in the right eye while individuals 20 males, and 34 females 56 participants (14.93%) were found to have non-proliferative diabetic retinopathy in the left eye.

Moderate non-proliferative diabetic retinopathy was found in individuals 41 males, and 35 females of the total of 76 participants (20.26%) in the right eye while moderate diabetic retinopathy was found in individuals 40 males and 32 females of a total of 72 participants (19.2%) in the left eye.

Severe non-proliferative diabetic retinopathy was found in 15 males, and 17 females of a total of 32 participants (8.53%) in the right eye while severe non-proliferative diabetic retinopathy was found in 14 males and 18 females of a total of 32 participants (8.53%) in the left eye.

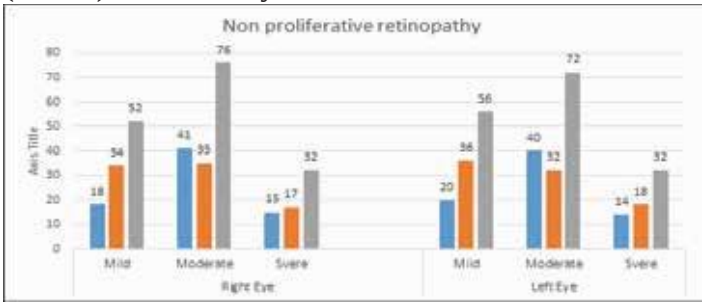


Figure 6: Non-proliferative diabetic retinopathy in right and left eye.

Proliferative diabetic retinopathy was found in individuals 27 males, and 22 females with a total of 49 participants (13.06%) in the right eye while proliferative diabetic retinopathy was found in individuals 28 males and 28 females of a total of 65 (17.33%) in the left eye.

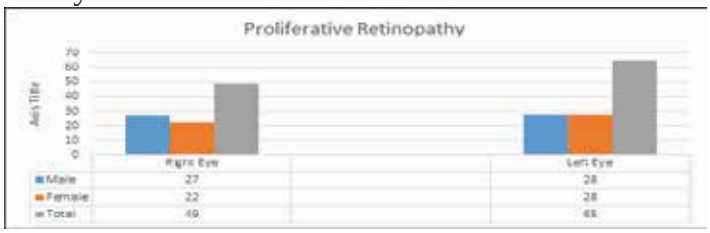


Figure 7: Proliferative diabetic retinopathy

Macular edema was found in individuals 25 males, and 33 females of a total of 57 participants (15.2%) in the right eye while macular edema was found in individuals 30 males and 29 females of a total of 59 participants (15.73%) in the left eye.

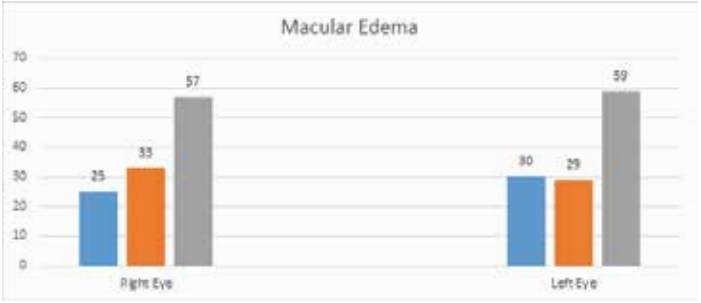


Figure 8: Macular Edema in right and left eye

DISCUSSION

This study was carried out in the ophthalmology outpatient department of a tertiary care hospital in Lahore. Risk factors including heart diseases, nephropathy, neuropathy, and retinopathy associated with diabetes mellitus type-2 in other studies are the same as in this study. Elevation of blood sugar levels in the human body is strongly associated with retinopathy but strict control of blood sugar levels decreases its incidence. Hypertension is the major risk factor for DM type 2 in many studies, tight control of DM and hypertension lowers the risks of developing retinopathy. This study also confirms it. 17

Duration of diabetes is an important predictor of retinopathy along with associated hyperglycemia. The present study explained that duration was the main factor in diabetic retinopathy. Control of Diabetes Mellitus using pills remains the favorite mode of treatment in many studies. Studies also showed that the group of patients taking pills for the treatment of DM was dominant in number as compared with the group of patients taking insulin for treatment. 18.

A review of many studies suggested that consultation with physicians and ophthalmologists to control DM and retinopathy was the best approach to cope with diabetic complications including diabetic retinopathy. Patient attitude needs to be changed regarding DM control with the patient-doctor consultation approach. Currently, as the present study suggested, we lack this approach. As a result, patients do not consult physicians or Ophthalmologists and remain without treatment for a long 19.

In the study conducted in Northwest Ethiopia, there was a high prevalence was found due to a longer duration of DM, poor control, hypertension, and obesity. In another study done in Nigeria among 214 patients with DM, retinopathy was 36% and cataract was found in

2.6% of patients. A screening program was also suggested in that study for individuals with DM 20 . In a study done in a tertiary care hospital in North-West Ethiopia, the prevalence was high in context with poor control, long duration, and lack of awareness regarding diabetes and associated eye diseases caused by DM. Early screening of diabetes-related retinal complications was also suggested in the study.21 In the present study, the prevalence of NPDR was 42.66%, a result confirmed by many studies with little or no difference. The same results were in cases of PDR, which is a vision-threatening complication of the retina. Another study stated that (42.2%) had DR and was significantly associated with the form of therapy. Proliferative DR was found at 5.7%. DME was seen in 3.6% of the patients. Vision-threatening DR was seen in 10.7% of patients DR was found in 28%, NPDR 27%, and PDR was found in 6% of type 2 diabetic patients. This study suggests that DR screening and management in patients with diabetes should focus more attention on interventions to prevent the progression of the disease. A population-based study conducted in Sudan on 316 individuals showed that DR was 82.6%, NPDR prevalence was 42.7%, and PDR was 39.9%. Similarly, the duration of DM was 72.2% in individuals who had DM for more than 10 years. In our study, the results are almost the same as in many studies regarding the prevalence of DM and associated retinal complications DM was present among (43.7%) of males, and (56.13%) of females were included with the mean age group of 53. Co-morbid conditions like hypertension were noticed in (65.1%), dyslipidemia in (41.3%), obesity in (29.1%), and Ischemic heart disease in (32.8%) of participants. A higher incidence was noted in participants with Diabetes Mellitus present for more than 5 years. Results also showed that (65.1%) of participants were on oral treatment. (25.9%) visited regularly to a general physician and (12.8%) visited an ophthalmologist regularly. Diabetic retinopathy was noted in (43%) of participants in both eyes. Mild non-proliferative diabetic retinopathy was found in both eyes in (28.8%) of participants, moderate in (39.4%) of participants, and severe in (8.2%) of participants. Proliferative diabetic retinopathy was found in (28%) of participants, while macular edema was found in (30.85%) of participants.

Studies also showed that the attitude toward treatment to control DM was not specifically appreciated regarding medication in our study only 15% of individuals had a practice of controlling DM very strictly and 61% of individuals had not bothered to control the disease properly. This attitude may be improved by counseling the patients regarding the control and prevent DM by any means like oral medication, insulin, or a combination of both as advised by a health professional. 22 Many studies showed the results regarding consultation with general physicians and ophthalmologists to control and prevent complications of diabetes, the attitude seems good as patients who had the attitude of consulting doctors had results of remarkable value. Our study also had significant results as 44% of individuals consulted a general physician to control the DM, regularly while 56% reported irregular visits. Eye examination and 23 %referral to ophthalmologists by the general physician were reported in the study conducted in Indiana.23, 24

In our study, the opinion of general physicians and ophthalmologists also with limitations associated with a lack of awareness, and a majority of the sample population did not consult ophthalmologists for the prevention of DR.

CONCLUSION

Diabetic retinopathy, caused by uncontrolled diabetes mellitus is a public health issue and is a global threat. The disease is mainly caused by high blood sugar levels and the fact that most people do not visit general physicians and ophthalmologists for an opinion about the control of diabetes and its complications.

Recommendations

Awareness campaigns through eye health screening at the community level may help to prevent vision loss and blindness.

A multidisciplinary approach may contribute greatly to preventing, retinal complications.

Screening for early detection of retinal changes in patients is a priority, especially for patients of 40 years of age, as a routine eye examination. Non-mydriatic fundus cameras may be beneficial for screening purposes and also save time. The private sector may be encouraged to use the same criteria and to establish an effective referral chain for detailed retinal examination. As a support, eye health professionals like optometrists, ophthalmic nurses, and specially trained staff may be helpful in screening, early detection, and managing the patient for further clinical proceedings.

Proper counseling about strict diabetic control to prevent complications. Effective working relationships between general practitioners and eye health professionals may save the vision of patients suffering from diabetes. Conflict of Interest: There is no conflict of interest in this study.

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

REFRENCES

1. American Diabetes Association (2021). 2. Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes-2021. Diabetes care, 44(Suppl 1), S15–S33. https://-doi.org/10.2337/dc21-S002
2. Putra, R. E., Tjandrasa, H., Suciati, N., & Wicaksono, A. Y. (2020, October). Non-proliferative diabetic retinopathy classification based on hard exudates using a combination, and morphology. In 2020 Third International Conference on Vocational Education and Electrical Engineering (ICVEE) (pp. 1-6). IEEE.
R. E. Putra, H. Tjandrasa, N. Suciati, and A. Y. Wicaksono, "Non-Proliferative Diabetic Retinopathy Classification Based on Hard Exudates Using Combination of FRCNN, Morphology, and ANFIS," 2020 Third International Conference on Vocational Education and Electrical Engineering (ICVEE), Surabaya, Indonesia, 2020, pp. 1-6.
3. Smith-Morris, C., Bresnick, G. H., Cuadros, J., Bouskill, K. E., & Pedersen, E. R. (2020). Diabetic Retinopathy and the Cascade into Vision Loss. Medical anthropology, 39(2), 109–122. https://-doi.org/10.1080/01459740.2018.1425839
4. Martins, B., Amorim, M., Reis, F., Ambrósio, A. F., & Fernandes, R. (2020). Extracellular Vesicles and MicroRNA: Putative Role in Diagnosis and Treatment of Diabetic Retinopathy. Antioxidants (Basel, Switzerland), 9(8), 705. https://-doi.org/10.3390/antiox9080705
5. Yuno, A., Ikota, A., Koizumi, S., Mashio, Y., Imaizumi, H., Sawamura, Y., & Shimatsu, A. (2022). Advanced proliferative diabetic retinopathy and macular edema in acromegaly: a case report and literature review. Diabetology International, 13(3), 575–579. https://-doi.org/10.1007/s13340-022-00571-4
6. Zhu, Y., Li, J., Yu, S., Mao, B., & Ying, J. (2022). Clinical Comparative Study of Intravitreal Injection of Triamcinolone Acetonide and Aflibercept in the Treatment of Diabetic Retinopathy Cystoid Macular Edema. Emergency Medicine International, 2022, 1348855. https://-doi.org/10.1155/2022/1348855 (Retraction published Emerg Med Int. 2024 Jan 24;2024:9787343.
7. Agarwal, D., Udeh, B., Campbell, J., Bena, J., & Rachitskaya, A. (2021). Follow-Up Appointment Delay in Diabetic Macular Edema Patients. Ophthalmic surgery, lasers & imaging retina, 52(4), 200–206. https://-doi.org/10.3928/23258160-20210330-04
8. McGill, J. B., & Bell, D. S. (2006). Anemia and the role of erythropoietin in diabetes. Journal of diabetes and its complications, 20(4), 262–272. https://doi.org/10.1016/j.jdiacomp.2005.08.001
9. Rani, P. K., Raman, R., Rachapalli, S. R., Kulothungan, V., Kumaramanickavel, G., & Sharma, T. (2010). Prevalence of refractive errors and associated risk factors in subjects with type 2 diabetes mellitus SN-DREAMS, report 18. Ophthalmology, 117(6), 1155–1162. https://-doi.org/10.1016/j.ophtha.2009.10.025
10. Al Busaidi, N., Shanmugam, P., & Manoharan, D. (2019). Diabetes in the Middle East: Government Health Care Policies and Strategies that Address the Growing Diabetes Prevalence in the Middle East. Current diabetes reports, 19(2), 8. https://-doi.org/10.1007/s11892-019-1125-6
11. Chew EY, Benson WE, Remaley NA, Lindley AA, Burton TC, Csaky K, Williams GA, Ferris FL 3rd. Results after lens extraction in patients with diabetic retinopathy: early treatment diabetic retinopathy study report number 25. Arch Ophthalmol. 1999 Dec;117(12):1600-6. https://-doi.org/10.1001/archopht.117.12.1600
12. Klein BE, Moss SE, Klein R, Surawicz TS. The Wisconsin Epidemiologic Study of Diabetic Retinopathy. XIII. Relationship of serum cholesterol to retinopathy and hard exudate. Ophthalmology. 1991 Aug;98(8):1261-5. https://-doi.org/10.1016/s0161-6420(91)32145-6
13. Raza, A., Khan, I., Sami, H., Ejaz, A., & Ahmed, Z. (2019). "Diabetic retinopathy–knowledge, attitude and practices (KAP) in diabetic patients admitted in Tertiary Care Centers of Pesha- war–Khyber Pakhtunkhwa". The Professional Medical Journal, 26(08), 1370-1376. https://-doi.org/10.29309/TPMJ/2019.26.08.3805
14. Alzahrani, S. H., Bakarman, M. A., Alqahtani, S. M., Alqahtani, M. S., Butt, N. S., Salawati, E. M., ... & Saad, K. (2018). Awareness of diabetic retinopathy among people with diabetes in Jeddah, Saudi Arabia. Therapeutic advances in endocrinology and metabolism, 9(4), 103-112. https://-doi.org/10.1177/2042018818758621
15. Adil, M., Siddiqui, S., Waghdhare, S., Bhargava, A., & Jha, S. (2017). Awareness of retinal

screening in patients with Type 2 diabetes mellitus: Are we meeting standards of care?. Asian Journal of Medical Sciences, 8(6), 9-12. https://-doi.org/10.3126/ajms.v8i6.18058

16. Ejigu, T., & Tsegaw, A. (2021). Prevalence of diabetic retinopathy and risk factors among diabetic patients at university of Gondar tertiary eye care and training center, North-West Ethiopia. Middle East African journal of ophthalmology, 28(2), 71-80. DOI: 10.4103/meajo.meajo_24_21
17. Jiraporncharoen, W., Pinyopornpanish, K., Junjom, Exploring perceptions, attitudes and beliefs of Thai patients with type 2 diabetes mellitus as they relate to medication adherence at an out-patient primary care clinic in Chiang Mai, Thailand. BMC Fam Pract 21, 173 (2020). https://doi.org/10.1186/s12875-020-01233-7
18. M. Sue Kirkman, Susanna R. Williams, Helena H. Caffrey, David G. Marrero; Impact of a Program to Improve Adherence to Diabetes Guidelines by Primary Care Physicians . Diabetes Care 1 November 2002; 25 (11): 1946–1951. https://-doi.org/10.2337/diacare.25.11.1946
19. Hainsworth DP, Bebu I, Aiello LP, Sivitz W, Gubitosi-Klug R, Malone J, White NH, Danis R, Wallia A, Gao X, Barkmeier AJ. Risk factors for retinopathy in type 1 diabetes: the DCCT/EDIC study. Diabetes Care. 2019 May 1;42(5):875-82. https://doi.org/10.2337/dc18-2308
20. Song, K. H., Jeong, J. S., Kim, M. K., Kwon, H. S., Baek, K. H., Ko, S. H., & Ahn, Y. B. (2019). Discordance in risk factors for the progression of diabetic retinopathy and diabetic nephropathy in patients with type 2 diabetes mellitus. Journal of diabetes investigation, 10(3), 745–752. https://-doi.org/10.1111/jdi.12953
21. Ding, K., Reynolds, C. M., Driscoll, K. A., & Janicke, D. M. (2021). The Relationship Between Executive Functioning, Type 1 Diabetes Self-Management Behaviors, and Glycemic Control in Adolescents and Young Adults. Current diabetes reports, 21(3), 10. https://-doi.org/10.1007/s11892-021-01379-3
22. Njikam, E. J., Kariuki, M. M., Kollmann, M. K., Wilhelm, F., & Nentwich, M. M. (2016). The magnitude and pattern of diabetic retinopathy in Yaoundé, Cameroon - a cross-sectional hospital-based study. Acta ophthalmologica, 94(2), e156–e157. https://doi.org/10.1111/aos.12747
23. Yang, Q. H., Zhang, Y., Zhang, X. M., & Li, X. R. (2019). Prevalence of diabetic retinopathy, proliferative diabetic retinopathy and non-proliferative diabetic retinopathy in Asian T2DM patients: a systematic review and Meta-analysis. International journal of ophthalmology, 12(2), 302–311. https://doi.org/10.18240/ijo.2019.02.19
24. Anderson RM, Donnelly MB, Dedrick RF. Measuring the attitudes of patients towards diabetes and its treatment. Patient Education and Counseling. 1990 Dec 1;16(3):231-45. https://-doi.org/10.1016/0738-3991(90)90072-S

Authors Contributions:

Muhammad Iqbal Javaid: Substantial contributions to the conception and design of the work. Design of the work and the acquisition.

Tahira Ashraf and Ahsan Iqbal: Drafting the work. Final approval of the version to be published.

Submitted for publication: 16-11-2024
Accepted after revision: 19-12-2024

Original Article

Open Access

Spectrum of Interstitial Lung Disease at Tertiary Care Hospital in Lahore

Muhammad Saad Siddique [a], ***Muhammad Shaheryar*** [a], ***Iqra Ramzan*** [b], ***Sadia Yaseen*** [b], ***Muskan Yaseen*** [b], ***Hamza Azam*** [b]

[a] University Institute of Radiological Sciences And Medical Imaging Technology

[b] Faculty of Allied Health Sciences The University of Lahore

Correspondence: Saad.siddqiue@gmail.com

ABSTRACT

Background and Objectives: Interstitial lung disease (ILD) is a family of lung diseases characterized by inflammation and scarring of the lung tissue, alveolar walls, alveolar ducts, and bronchioles. The nature of such diseases is rather diverse, and they can be caused by any number of factors of manifest different progression patterns; thus, correct diagnosis is crucial here. To compare the range of ILDs among patients admitted to a tertiary care hospital in Lahore.

METHODOLOGY: This cross-sectional study recruited 149 patients (121 male and 30 female) with suspected ILD using a convenient sampling technique from General Hospital Lahore. These symptoms were cough in 99 patients, shortness of breath in 112 patients and smoking in 97 patients. The diagnosis was done using HRCT through a Toshiba Aquiline 64 Slice CT scanner.

RESULTS: Out of the 149 patients, 99 had cough, 112 had short breath, and 97 were smokers. The HRCT results showed that the middle right lung lobe was involved in 44%, the upper lung zone in 52% and the lower lung zone in 53% of smokers. There was a slight increase in Septal thickening (33%) and focal to moderate honeycombing (35%) in the upper left lobe. The ages ranged from 48 to 73 years.

CONCLUSION: The findings of this study show that ILDs are more prevalent in females as compared to males. The common symptoms of ILDs are similar to tuberculosis, which suggests that the disease remains grossly unrecognized and underdiagnosed. Some drugs, including chemotherapeutic agents and anti-inflammatory drugs, have been found to induce the formation of ILD.

KEYWORDS: ILDs, HRCT

INTRODUCTION

There is no consistent definition of ILD but it is generally described as a generic term for a group of more than 200 lung disorders that mainly affect the lung parenchyma and are inflammatory and fibrotic (1). The general disease can be idiopathic, pulmonary fibrosis (IPF), idiopathic non-specific interstitial pneumonitis (INSIP), hypersensitivity pneumonitis (HP) and diseases associated with connective tissue disorders (CTD). Research shows that more than half of the ILDs are of undetermined aetiology except for IPF and INSIP, which are the most frequent forms. The various ILDs have been reported in different parts of the world with little research done especially in the developing world (2).

ILD can be diagnosed clinically, by high-resolution computed tomography, lung function tests and very rarely – biopsy. HRCT scan is invaluable in the diagnosis of ILD and in staging the extent of lung disease. ILD patients may present with changes such as traction bronchiectasis, honeycombing, ground glass opacity and reticular pattern. Alerts such as these help in distinguishing ILD from a number of pulmonary diseases (3).

Tertiary care hospitals in Lahore, Pakistan and their role in diagnosing and managing ILDs: The availability of advanced diagnostic facilities. Local research indicates that 30-40% of all ILD patients in Pakistan have IPF (4). However, ILD has remained difficult to diagnose since it is very diverse and is often confused with other lung diseases such as tuberculosis. This perhaps brings a sense of even more emphasis to early detection and more enlightenment to professionals in

How to cite this: Siddique S M, Shaheryar M, Ramzan I, Yaseen S, Yaseen S, Azam H. Spectrum of Interstitial Lung Disease at Tertiary Care Hospital in Lahore. International Journal of Healthcare Profession. 2024; 1(4): 31-35

Vol. 01, Issue 04, October-December, 2024

the field of medicine (5).

The risk associated with developing ILD includes smoking, age, and environmental or occupational exposure. Moreover, it can cause several complications such as; gastroesophageal reflux, depression, pulmonary hypertension, and sleep-disordered breathing, which makes the condition of the patient worse. In most cases, ILD is associated with chronic lung diseases like COPD, bronchiectasis and cystic fibrosis complicating the management with such conditions as osteoporosis (6).

ILD typically progresses to respiratory failure, which is manifested by shortness of breath, and cough. It can be a nonprogressive disease in some patients and can be progressive and permanently disabling at other times. The disease if left undiagnosed or diagnosed late usually requires the intervention of several forms of care and multiple professionals. Appreciation of the clinical distribution of ILDs in tertiary care centres is important in fine-tuning diagnostic approaches and therapeutic management (4).

Hence, ILD is a chronic ongoing health issue, and ailments need a coordinated, interprofessional approach to diagnosis and treatment. Enhanced awareness of such disorders, besides improved diagnostic services in medical facilities, is likely to be of great significance in facing a better result for patients of ILDs (7).

Objective: To find out the spectrum of interstitial lung disease at a tertiary care hospital in Lahore

METHODOLOGY

Study Design: Cross-sectional Descriptive

Settings: The study was conducted at the Department of Radiology Lahore General Hospital, Lahore (5).

Duration of Study: 4 months

Sample Size: All the patients coming within 4 months of study duration with ILD were included.

Sampling Technique: Convenient sampling technique

Sample section

Inclusion Criteria:

All of the patients visiting the radiology department for HRCT chest with a clinical diagnosis of interstitial lung disease.

Exclusion Criteria:

- Uncooperative Patient
- Pregnancy

Equipment: Siemens- 64 slices Multidetector Computed Tomography

Ethical Considerations

The study is conducted in accordance with the ethical standards established by the ethical committee of the University of Lahore, and participant rights are upheld.

- Written informed consent (attached) was taken from all the participants.
- All information and data collection are kept private.
- The study's participants maintained their anonymity at all times.
- They were informed that they were free to withdraw at any time during the process of the study.
- If there were any known risks associated with this research.
- Known Risks: Radiation exposure, Contrast agent reaction, Misinterpretation of results.
- Benefits: Improved Diagnosis, Increased Knowledge, Cost-effectiveness.
- We have done everything we can to protect privacy. Identity was not revealed in any publication resulting from this study.

Their participation in this research study is voluntary. They choose not to participate and may withdraw their consent to participate at any time. They will not be penalized in any way should they decide not you participate or to withdraw from this study.

Data Collection Procedure

- Data was collected by data collection sheets (8).
- Data was collected after taking informed consent forms from all patients.
- Data was collected according to age, gender Smoking status, cough, shortness of breath, reticular pattern and nodular pattern will be recorded on the datasheet.
- All data was stored in a Microsoft Excel sheet and SPSS (9).
- Patient was made to lie supine on the couch and raised arms over the head for CT examination.
- Collimation was from the clavicle to the diaphragm.
- Lung window was used.
- Breath holds technique was described to the patient (10).
- All the examination was well explained to the patient
- Thin sections defined as <1.5 mm (the original HRCT technique performed in first- and second-generation scanners, due to hardware limitations, had a thicker definition of thin slices defined as <3.0 mm)

Data Analysis Procedure

Data was evaluated and analyzed using Statistical

Software for Social Sciences (SPSS version 24.0), and Microsoft Excel 201. Frequency distribution tables and graphs were made (11).

RESULTS

In this study, 149 patients visited the radiology department due to cough, smoking, and shortness of breath There were 121 males and 30 were females (12). Out of 151 patients, 99 patients had complained of cough, 112 patients had shortness of breath, and 97 were smokers. In HRCT Findings smoking was found middle right lung lobe involvement in 44% of HRCT Findings upper lung zone. There were 73 males and 76 females. Out of 149 patients, 78 patients had complained of cough, 75 patients had shortness of breath, and 97 were smokers. 32 had Left lobe involvement 44 patients and Out of 149 patients, 33 patients had wheezing in the left lobe of the lung (13). Out of 149 patients, 62 patients were smokers and their upper left lobe lung was involved. In HRCT Findings septal thickening was 33%middle right lobe of the lung, In HRCT Findings upper lung zone involvement was 52%, the lower zone was 53% central distribution was 65.6%, In HRCT Findings honeycombing was found upper left lobe lung involved 35% The minimum age was 48 years and the maximum was 73 years. In HRCT Findings of Right lung lobe involvement out of 149 patients, 73 were Middle (11).

Table 1: Frequency distribution of Gender

Gender M/F	Frequency/Percentage total (149)
cough	Yes 78 (52.2%) No 71 (47.7%)
Wheezing	Yes 73 (49.9%) No 76 (51.0%)
Smokers	Yes 81 (54.4%) No 68 (45.8%)

Table: 1 Out of 149 patients, 78 patients had complained of cough Out of 149 patients, 73 patients had complained of wheezing Out of 149 patients 81 were smokers.

Table 2: Crosstabulation between Status of left lung lobe involvement

Smoking Years (Yes/No)	LUNG LOBE INVOLVEMENT	Lower Count	Lower %
No	Count	2	10%
	% within LUNG LOBE	42%	24%
Yes	Count	2	
	% within LUNG LOBE	28%	78%
Total	Count	2	
	% within LUNG LOBE	00.0%	00.0%

Table 3: Chi-Square Tests

Test	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.0978	2	0.078
Likelihood Ratio	5.232	2	0.073
N of Valid Cases	149		

DISCUSSION

In this study, 149 patients with interstitial lung disease (ILD) were evaluated, most of them presented with dyspnoea, cough, and wheezing. Out of the two cultural groups, there were 76 females and 73 males. Of these, 97 were smokers, 78 patients said that they coughed frequently, and 75 said they felt breathless most of the time (14). All 149 patients were with confirmed centrilobular emphysema and 32 with left lung lobe involvement, of which 33 complained of left lung lobe wheezing. All together there were 62 smokers with lung involvement detected in the upper left lobe. Findings of the examination by the HRCT scans were middle right lung lob dilation is 33%, while the upper and lower lung zones were involved in 52% and 53% respectively, in the septal thickening. The central distribution was at 65.6 per cent (7)

In the the clinical and radiological characteristics of ILD, a study conducted by Ali Sarwar Zubairy, Khumbsawad et al looked at a study of 537 patients where all the patients were above the age of sixteen years with confirmed ILD diagnosis. Of the patients, 324 (60.3%) were female: the average age of the population was 60.5 ± 14.9 years. Co-morbid conditions were DM II at 13.4%, IHD at 3.9% and hypertension at 8.9%. Among them, idiopathic pulmonary fibrosis (IPF) was more common than other ILDs, in which it comprised 40.4%. Other diagnoses were sarcoidosis 15.%.3, idiopathic nonspecific interstitial pneumonia 19.%.7 and ILD associated with connective tissue disease 10% (15).

Hypersensitivity pneumonitis (HP) was found as the second most prevalent ILD in this study and occurred with higher prevalence than in the prior decade. However, HP was reported more frequently in the Indian registry (47.3%) as well as in the Japanese survey (60.4%). Out of 52 patients with HP, 79.5% were exposed to avian and 45.3% were housewives who were positive for avian antigens suggesting a high prevalence of avian antigens in a home environment. This can be aligned with the regional data in particular identifying the growing awareness of chronic fibrosing HP that is typically mistaken for IPF (16).

In the study done by Sheetu Singh his patients' enrollment total was 1,084 For HP, a diagnosis was made in 47.3%, for CTD-ILD in 13.9% and for IPF in 13.7%. The main drawback of the data collected through the

ILD registry is that these data have been collected mostly from large urban populations of Pakistan, and therefore they may not be quite representative of overall Pakistani rural populations (14). Furthermore, the absence of elaborate checklists to elicit the exposure history and failure to use serum precipitins to diagnose environmental allergens could have resulted in the underreporting of HP (11).

A collaboration of these studies focuses on the diversification and sophistication, which makes ILDs need precise diagnosis and identification of future trends, including the rise in HP. Recognition and adequate treatment are exceptional for enhancing the patient's condition, increasingly when environmental and occupational hazards are easily found in a specific area. Appreciation of the range of clinical, imaging, and functional profiles of ILa is informative to clinicians keen on improving the approach to individual patients (13-21)

CONCLUSION

In this study, we concluded that females were more likely to develop pulmonary disease ILDs than males. ILDs are still frequently misdiagnosed as TB, and increased awareness, education and diagnostic facilities are required to diagnose ILDs at an early stage. Certain medications, such as chemotherapy drugs, antibiotics, and anti-inflammatory agents, can cause lung damage and ILD.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

REFERENCES

1. Sula I, Alreshidi MA, Alnasr N, Hassaneen AM, Saquib N. Urinary tract infections in the Kingdom of Saudi Arabia, a review. Microorganisms. 2023;11(4):952.
2. Lindén M, Rosenblad T, Rosenborg K, Hansson S, Brandström P. Infant urinary tract infection in Sweden—A national study of current diagnostic procedures, imaging and treatment. Pediatric Nephrology. 2024;39(11):3251-62.
3. Alsaywid BS, Alyami FA, Alqarni N, Neel KF, Almaddah TO, Abdulhaq NM, et al. Urinary tract infection in children: A narrative review of clinical practice guidelines. Urology Annals. 2023;15(2):113-32.
4. Saddari A, Benhamza N, Dalli M, Ezrari S, Benaissa E, Lahlou YB, et al. Urinary tract infections older adults at Mohammed VI University Hospital of Oujda: case series. Annals of Medicine and Surgery. 2023;85(5):1408-12.
5. Harb A, Yassine V, Ghssein G, Salami A, Fakih H. Prevalence and clinical significance of urinary tract infection among neonates presenting with unexplained hyperbilirubinemia in Lebanon: A retrospective study. Infection & Chemotherapy. 2023;55(2):194.
6. Huang L, Huang C, Yan Y, Sun L, Li H. Urinary tract infection etiological profiles and antibiotic resistance patterns varied among different age categories: a retrospective study from a tertiary general hospital during 12 years. Frontiers in microbiology. 2022;12:813145.
7. Komagamine J, Yabuki T, Noritomi D, Okabe T. Prevalence of and factors associated with atypical presentation in bacteremic urinary tract infection. Scientific reports. 2022;12(1):5197.
8. Gozdzikiewicz N. Zwoli nska, D.; Polak-Jonkisz, D. The Use of Artificial Intelligence Algorithms in the Diagnosis of Urinary Tract Infections—A Literature Review. Pediatric and Adolescent Nephrology Facing the Future. 2022;11:265.
9. Shaki D, Hodik G, Elamour S, Nassar R, Kristal E, Leibovitz R, et al. Urinary tract infections in children< 2 years of age hospitalized in a tertiary medical centre in Southern Israel: epidemiologic, imaging, and microbiologic characteristics of the first episode in life. European Journal of Clinical Microbiology & Infectious Diseases. 2020;39:955-63.
10. Isert S, Müller D, Thumfart J. Factors associated with the development of chronic kidney disease in children with congenital anomalies of the kidney and urinary tract. Frontiers in Pediatrics. 2020;8:298.
11. Amoori P, Valavi E, Fathi M, Sharhani A, Izadi F. Comparison of Serum Zinc Levels Between Children With Febrile Urinary Tract Infection and Healthy Children. Jundishapur Journal of Health Sciences. 2021;13(3).
12. Suresh J, Krishnamurthy S, Mandal J, Mondal N, Sivamurukan P. Diagnostic accuracy of point-of-care nitrite and leukocyte esterase dipstick test for the screening of pediatric urinary tract infections. Saudi Journal of Kidney Diseases and Transplantation. 2021;32(3):703-10.
13. Swamy SNN, Jakanur RK, Sangeetha SR. Significance of C-reactive protein levels in categorizing upper and lower urinary tract infection in adult patients. Cureus. 2022;14(6).
14. Esposito S, Maglietta G, Di Costanzo M, Ceccoli M, Vergine G, La Scola C, et al. Retrospective 8-year study on the antibiotic resistance of

uropathogens in children hospitalised for urinary tract infection in the Emilia-Romagna Region, Italy. Antibiotics. 2021;10(10):1207.

15. Vachvanichsanong P, McNeil E, Dissaneewate P. Extended-spectrum beta-lactamase Escherichia coli and Klebsiella pneumoniae urinary tract infections. Epidemiology & Infection. 2021;149:e12.
16. Kamei J, Yamamoto S. Complicated urinary tract infections with diabetes mellitus. Journal of Infection and Chemotherapy. 2021;27(8):1131-6.
17. Raghu, G., Remy-Jardin, M., Myers, J.L., Richeldi, L., Cottin, V., Danoff, S.K., Morell, F., Flaherty, K.R., Brown, K.K., Wells, A.U. and Devaraj, A., 2020. Diagnosis of idiopathic pulmonary fibrosis. An official ATS/ERS/JRS/ALAT clinical practice guideline. American Journal of Respiratory and Critical Care Medicine, 198(5), pp.e44-e68.
18. Mukhtar, M., Anwar, M.M., Adnan, M., Aziz, S. and Hafeez, S., 2019. Clinical and radiological spectrum of interstitial lung diseases at a tertiary care hospital in Pakistan. Pakistan Journal of Medical Sciences, 35(2), pp.412-417.
19. Fischer, A. and Distler, J., 2019. Progressive fibrosing interstitial lung disease associated with systemic autoimmune diseases. Clinical Rheumatology, 38(10), pp.2673-2681.
20. Mahmood, K., Ahmed, M., Arshad, A., Hussain, S. and Saeed, F., 2021. High-resolution computed tomography patterns in interstitial lung disease: Experience from a tertiary care hospital in Lahore. Journal of the College of Physicians and Surgeons Pakistan, 31(8), pp.918-922.
21. Wells, A.U., Brown, K.K., Flaherty, K.R., Kolb, M. and Thannickal, V.J., 2018. What's in a name? That which we call IPF, by any other name would act the same. The European Respiratory Journal, 51(1), p.1800692.

Authors Contributions:

Muhammad Saad Siddique and Muhammad Shaheryar: Substa ntial contributions to the conception and design of the work.

Iqra Ramzan and Sadia Yaseen: Design of the work and the acquisition.

Muskan Yaseen and Hamza Azam: Drafting the work. Final approval of the version to be published.

Submitted for publication: 20-11-2024
Accepted after revision: 16-12-2024

Original Article

Open Access

Effect of type & size of fibroid on Uterine Artery Doppler Indices

SAIF ULLAH KHAN [a], ***MUHAMMAD UZAIR*** [a], ***ZAIN UL HASSAN*** [a], ***AYESHA NASIR*** [a], ***RAMSHA BATOOL*** [a], ***SUMIYA AMJAD*** [a], ***SAMIA NAWAZ*** [a], ***PAKEEZA ASGHAR*** [a], ***SUNILA AZHAR*** [a],

[a] University Ultrasound Clinic, Green Town Lahore, Pakistan.

Correspondence: Safie.mayo22@gmail.com

ABSTRACT

Background and Objectives: Fibroids are a common occurrence in women of reproductive age, with significant prevalence in the population studied. These benign tumors can impact various aspects of reproductive health, including fertility and blood flow to the uterus. Uterine artery Doppler indices are a reliable measure of blood flow and can provide valuable information for the management of fibroids. By investigating the effect of size and type of fibroids on uterine artery Doppler indices, this study expands the existing knowledge and contributes to improved care for women with fibroids.

METHODOLOGY: A descriptive study was conducted in Gilani ultrasound center for the duration of 7 months to find the effect of type and size of fibroid on uterine artery Doppler indices. With Toshiba Xario Prime with convex probe frequency of 3.5MHz.A sample of 68 patients with different types and size of fibroid on uterine artery. The statistical programed for social sciences (SPSS) version 25.0 was used to analyze the data.

RESULTS: 68 patients were enrolled for this study Mean age of women was 37.39. Out of a total of 68 patients, 24 (35.3%) had intramural fibroid, +24 (35.3%) had submucosal fibroid and twenty patients had sub serosal fibroid 20 (29.4%) of them. The relationship between Fibroid size and Right uterine artery with a significance level (P) 0.64 indicates a non-significant association. The relationship between Fibroid size and left uterine artery with significance level (P) 0.549 indicates a non-significant association. Relationship between Fibroid type and right uterine artery with a significance level (P) 0.47 indicates a non-significant association. Relationship between Fibroid type and left uterine artery with a significance level (P) 0.667 indicates a non-significance association.

CONCLUSION: Study concluded that no association found between the size and type of fibroid.

KEYWORDS: Uterine fibroid, Ultrasound, Myoma, pregnancy rate

INTRODUCTION

One of the most important public health issues on the planet is myomas.1 Fibroid tumors or myomas, also known as endometrial leiomyomas, are rather frequent.2 An essential reproductive organ is the uterus. The embryo is put into this hollow, pear-shaped structure, which has muscular boundaries, and it develops there until the infant is born. Myomas are the most prevalent benign genital tumors throughout the reproductive period, despite being a key organ in human reproduction. Uterine myomas, frequently referred to as "fibroids" as well as "leiomyomas," are endometrial tumors made up of cells of smooth muscle and fibroblasts that are rich in extracellular matrix. These neoplasms have the ability to significantly impair its function, causing it to stop reproducing. As women get older and more regularly use assisted reproductive technologies, myomas in pregnancy are becoming more prevalent. Myomas are documented to affect 10.7% of pregnant women during the first trimester. 3

On how quickly they develop, progesterone, growth hormone, and oestrogen all have an effect. Uterine fibroid tumors appear during the reproductive years, grow throughout pregnancy, and then go away after menopause while having no recognized aetiology. Oestrogen agonist use has been associated with a higher risk of fibroid tumours.4Fertility may suffer as a result of fibroids. These detrimental effects include

How to cite this: Khan U.S, Uzair M, Hassan U.Z, Nasir A, Batool A, Amjad S, Nawaz S, Asghar P, Azhar S. Effect Of Type and size of Fibroid on Uterine Artery Doppler Indices. International Journal of Healthcare Profession. 2024; 1(4): 1(4):36-41

Vol. 01, Issue 04, October-December, 2024

lowered fertility and an increased risk of problems in the first trimester.5 Fibroids can induce premature labour and birth, placenta previa, intrauterine growth retardation, an increase in caesarean delivery, and postpartum hemorrhage.6 The most common benign gynecological lesion in females, fibroid tumors, may have a variable impact on infertility and reproductive health. 7

The most common symptoms that a uterine myoma will present with are bleeding, secondary anemia brought on by menometrorrhagia, metrorrhagia, or irregular menstrual hemorrhage, discomfort, mass indications, sexual dysfunction, and infertility. Approximately 62% of affected women experience multiple symptoms. Unusual signs may also develop. Complications of myomas include intra-abdominal blood loss, excessive vaginal discharge, uterine inversion as well as flexure, hydroureters and/or fluid accumulation, urinary incontinence, kidney problems, deep vein thrombosis, necrosis as well as disease, mesenteric vein thrombus formation, intestinal sepsis, and malignant alteration. 8

Depending on where they are found, fibroids might be submucosal, intramuscular, or subserosal.9 Submucosal fibroids denature the uterine cavity, although they can be divided into three types: type I, which are unicellular myomas with less than 50% intramural outgrowth, type II, which are motile myomas with more than 50% intramural extension. 10Intramural fibroids have little effect on the endometrium and grow into the uterine submucosa with approximately half their greatest width. 11 However, more than half of sub-serosal tumors spread outside the uterine serosal surface, and unlike intramural fibroids, they do not cause uterine injury. It is possible to have unicellular or pedunculated sub serosal fibroids. 12 This category includes any fibroid greater than 4 cm in diameter that does not harm the endometrium and is found all across the thickness of the myometrium. 13

The physical exam is important because it might reveal the position, size, and movement of the fibroids and uterus. There are several scanning methods available, each with its own set of advantages and disadvantages. Ultrasound imaging is the mainstay of diagnosis. There are two types of ultrasound imaging procedures: transvaginal and abdominal. Other ultrasound versions include two-dimensional (2D) and three-dimensional (3D) ultrasound, saline-infused sonography (SIS), and sonohysterograms (HSN). The relative benefits of ultrasonography are its broad availability, simplicity of use, and low cost. Because ultrasound is based on sound, the wave's closeness to its target is critical. The transvaginal operation has a significant benefit over the abdominal method because of its close proximity to the tumor site. It increases the resolution and characterization of the pelvic organs.14The two most used techniques for assessing the impact of fibroid on the uterine cavity are hysterosalpingograms and color Doppler ultrasonography. Hysterosalpingograms may only be 50% and 20% sensitive and specific for detecting intrauterine lesions, respectively. 15 The color transvaginally flowing the investigation of uterine fluxes and fibroid vascular supplies was done using the Doppler method. 16

Doppler studies of arteries may not show genuine blood circulation to the endometrium since the inner layer is the central aspect of the womb and there is branch flow between the uterus and ovarian veins. As a result, using 3D ultrasound with a power Doppler to accurately quantify endometrial blood flow makes more sense. 17

Women of reproductive age frequently experience fibroids, which can result in a number of problems. In order to create an effective treatment strategy for fibroid patients, this study compares the uterine artery velocity of fibroid patients and healthy individuals.

METHODOLOGY

It was a descriptive study performed to find out the effect of type and size of fibroid on uterine artery Doppler indices. Sample size was 68 patients. The duration of study was 7 months and data were collected from Gilani ultrasound center Lahore Pakistan. The inclusion criteria were women with uterine fibroid. The exclusion criteria were patients who had any history of previous uterine surgery and women who were any anomaly other than fibroid. Toshiba Xario Prime with convex probe frequency of 3.5MHz was used. The statistical programed for social sciences (SPSS) version 25.0 was used to analyze the data.

RESULTS

Of the 68 patients aged 28 to 50 aged were sent to the ultrasound department, 24 (35.3%) had intramural fibroid, 24 (35.3%) had submucosal fibroid and twenty of the sub serosal 20 (29.4%) fibroids were found.

Table 1: Correlation shows that the relationship between fibroid size and left uterine artery peak systolic velocity (PSV), with a P value of 0.54 indicating a non-significant association.

Variable Y	Velocity_PSV_cm_sec_L _Velocity_PSV_cm_sec_L
Variable X	size
Sample size	68
Correlation coefficient r	0.2608
Significance level	P=0.549
95% Confidence interval for r	0.02387 to 0.4700

Table 2: Correlation shows that the relationship between fibroid size and right uterine artery peak systolic velocity (PSV) is shown in this table, with a P value of 0.64 suggesting a non-significant association.

Variable Y	Velocity_PSV_cm_sec_R _Velocity_PSV_cm_sec_R
Variable X	Size
Sample size	68
Correlation coefficient r	0.05765
Significance level	P=0.6405
95% Confidence interval for r	-0.1833 to 0.2921

Table 3: Kruskal-Wallis test shows that the relationship between fibroid type and the right uterine artery pulsatility index (PI), with a P value of 0.47 indicating a non-significant association.

Data	Pulsatility_index_PI_R Pulsatility index (PI) R
Factor codes	Types
Sample size	68

Descriptive statistics

Factor	n	Minimum	25th percentile	Median	75th percentile	Maximum
Intramural	24	0.3000	0.835	1.120	1.995	10.070
Submucosal	24	0.4200	0.785	1.455	2.305	99.000
Sub serosal	20	0.4800	1.015	1.760	2.390	5.100

Kruskal-Wallis test

Test statistics	1.4836	
Corrected for ties HT	1.4843	
Degrees of Freedom (DF)	2	
Significance level	P = 0.476097	
Factor	n	Average rank
(1) Intramural	24	31.21
(2) Submucosal	24	34.46
(3) Sub serosal	20	38.50

Descriptive study show intramural fibroid average rank was 31.21 and median rank was 1.120, submucosal fibroid average rank was 34.46 and median rank was 1.455, sub serosal fibroid average rank was 38.50 and median rank was 1.760. And the significance level (P) was 0.47.

Table 4: Kruskal-Wallis test shows that the relationship between fibroid types and left uterine artery peak systolic velocity (PSV), with a P value of 0.66 indicating a non-significant association.

Data	Pulsatility_index_PI_L Pulsatility index (PI) L
Factor codes	Types
Sample size	68

Descriptive statistics

Factor	n	Minimum	25th percentile	Median	75th percentile	Maximum
Intramural	24	-15.4000	20.915	28.585	37.225	93.300
Submucosal	24	7.1000	21.935	30.750	47.750	93.300
Sub serosal	20	6.1800	24.220	30.930	51.270	80.300

Kruskal-Wallis test

Test statistics	0.8073
Corrected for ties HT	0.8075
Degrees of Freedom (DF)	2
Significance level	P = 0.667821

Factor	n	Average rank
(1) Intramural	24	32.19
(2) Submucosal	24	34.27
(3) Sub serosal	20	37.55

Descriptive study show intramural fibroid average rank was 32,19 and median rank was 28.585, submucosal fibroid average rank was 34.27 and median rank was 30.750, sub serosal fibroid average rank was 37.55 and median rank was 30.930. And the significance level (P) was 0.667.

DISCUSSION

The "Effect of fibroid type and size on the uterine artery Doppler index" was the subject of a brief study. This study's main goal was to use ultrasound imaging to find extra menstrual irregularities, pain, and uterine fibroids, all of which are detrimental to fertility and pregnancy. Although ultrasound results were nearly identical at the time, ultrasonography has now surpassed speed and emerged as the most effective way to find uterine fibroids and associated illnesses. The aim of this study is to collect information on the effect of fibroid type and size on the Doppler index of the uterine artery. They want to make a believable connection between the sizes and varieties of fibroid tumors using ultrasound imaging. Despite its importance, most of these research focus on different imaging techniques, even if ultrasonography is better for fibroid imaging. By employing ultrasonic imaging, they hope to establish a fair association between the sizes and varieties of fibroid tumors. Despite its significance, ultrasonography has received the most attention among the other imaging modalities since it is more effective at detecting fibroids.

According to our records, 68 people between the ages of 28 and 50 were referred to the ultrasonography department. The size of fibroids and the PI of both the left and right uterine arteries were found to be related in our study, with a P value of 0.51 for the left uterine artery and a P value of 0.45 for the right uterine artery. The link between fibroid size and PI of both the right and left uterine arteries is non-significant.

Uterine artery blood circulation in myomatous uteri was the subject of a research study published in 2012 by Fatmeh Ghaterh Samani et al. PSV and uterine volume do not significantly correlate in the control group ($p = 0.5$). PSV and uterine volume have a significant relationship in the case group ($R = 0.36$, $P = 0.01$). The relationship between PI and womb volume in the control group is very weak and non-significant ($P > 0.05$, $R > 0.033$). In the case group, PI and uterine volume have a substantial inverse relationship ($P = 0.01$; $R = -0.461$). Uterine volume and the prevalence of myomas was not

significantly correlated in the control group (P > 0.05, R = 0.106). Only 14 cases (32% of the total) of visible arteries of myomas were found when the color Doppler of the fibroids was analyzed, and the mean RI in the fibroid artery was 0.570 and 18.18

According to our statistics, 68 individuals ages 28 to 50 went to the ultrasound department. We discovered a link between the size of fibroids and the resistive indices of a left uterine artery in our study, with a P-value of 0.93 for left uterine arteries and a P-value of 0.82 for right uterine arteries. The link between fibroid size and the resistance index of the right and left uterine arteries is non-significant.

Szabo et al. reported their study in 2002 on the use of color Doppler ultrasound to distinguish uterine leiomyomas from problems of the connective tissue of the uterus. The intra-tumoral peaked systolic velocity (PSV) was much higher in patients with sarcomas than in those with womb myomas, despite the fact that the mean tumoral resistive index (RI) and pulsatility index (PI) were significantly lower in those with sarcomas. There was a substantial decrease in RI and PI and an increase in PSV in 14 of the leiomyoma cases with large size and/or neoplastic, degenerative, and inflammatory changes. The detection performance for uterine cancer was 67% when a RI split value of 0.5 was utilised, with an untrue rate of 11.8%. 19

According to our statistics, 68 people ages 28 to 50 went to the radiology department. In our studies, the PSV of a left uterus artery shows a significant correlation, whereas the PSV of a right uterus artery indicates a non-significant connection.

A article titled " effect of subserosal, intramural, and submucosal fibroids on the outcome of assisted reproductive technology (ART) treatment" was published in 1998 by Talia Eldar-Geva et al. Findings on transvaginal uterine ultrasonography performed before the initiation of treatment

and pregnancy and implantation rates. he pregnancy rates per transfer were 34.1%, 16.4%, 10%, and 30.1% in the patients with subserosal fibroids,intramural fibroids, submucosal fibroids and no fibroids, respectively. The implantation rates were 15.1%, 6.4%, 4.3%, and 15.7%, respectively. Both rates were significantly lower in patients with intramural fibroids than in those with subserosal fibroids or no fibroids Pregnancy and implantation rates were significantly lower in the groups of patients with intramural and submucosal fibroids, even when there was no deformation of the uterine cavity. Pregnancy and implantation rates were not influenced by the presence of subserosal fibroids. Surgical or medical treatment should be considered in infertile patients who have intramural and/or submucosal fibroids before resorting to ART treatment.20

According to our statistics, 68 individuals, ranging in age from 28 to 50, were referred to the radiology department. We discovered a link between the types of fibroid and the pulsatility indices of the left and right uterus arteries in our studies, with 0.18 P-values for the left endometrial artery and 0.47 P-values for the right artery. This correlation between fibroids' types and the PI of left and right endometrial arteries is non-significant.

Asim Kurjak and colleagues published "The Assessment of benign uterine tumor vascularization by transvaginal color doppler"in 1992 year.Transvaginai color flow Doppler was used to study uterine flow and fibroid arterial supply. These studies were carried out in 101 patients with palpable uterine fibroids and 60 women attending the clinic for annual checkups. Blood flow impedance expressed as resistance index (RI), pulsatility index (PI), and blood velocity are calculated from the 5th to the 8th day of the menstrual calendar. Increased blood velocity and decreased RI and PI in both uterine arteries occurred in patients with uterine fibroids. The same technique was also used to study blood flow in the main arteries supplying identifiable fibroid. Diastolic flow in these arteries was always present and increased in comparison with uterine artery blood flow. The difference in uterine artery blood flow between patients with fibroids and healthy volunteers is statistically significant and may have predictable value in growth rate evaluation of the benign uterine mass.21

Our records show that 68 people between the ages of 28 and 50 visited the ultrasonography department. With a 0.66 P value for the left uterine artery and a 0.95 P value for the right uterine artery, we were able to link the different fibroid types to the peak systolic velocities of the left and right endometrial arteries in our study. There is no statistically significant correlation between different fibroid types and the PSV of the left and right uterine arteries.

Povilas Sladkeviciu wrote a paper entitled"Transvaginal Doppler Examination of Uteri with Myomas"in 1996.The uterine arteries and arteries in the wall and core of myomas were examined with transvaginal color and spectral Doppler ultrasound in 28 premenopausal and 17 postmenopausal women with uterine myomas. Eighteen premenopausal women and 100 postmenopausal women without myomas served as the controls for uterine artery Doppler measurements. The respective median time-averaged maximum velocity and pulsatility index (PI) values for the left uterine artery were 36.1 cds anci 1.36 in premenopausal women with

myomas vs. 17.6 cds and 2.58 in controls; p = 0.0001. The corresponding values in postmenopausal women were 13.9 cm/s and 1.93 vs. 11.0 cm/s and 2.33; p < 0.05. PI values < 1.0 were recorded from 92% (24/26) of the myomas in premenopausal women and from 69% (11/16) of those in postmenopausal women. We conclude that uterine myomas substantially affect blood flow velocity in the uterine arteries, and that PI values < 1.0 are common in uterine myomas and do not indicate malignancy.22

CONCLUSION

Study concludes that, there was no association found between size and type of fibroid with Doppler indices.

Fig-1 In above image the sub mucosal fibroid was present. Along with effect of fibroid on left and right uterine artery stated below.

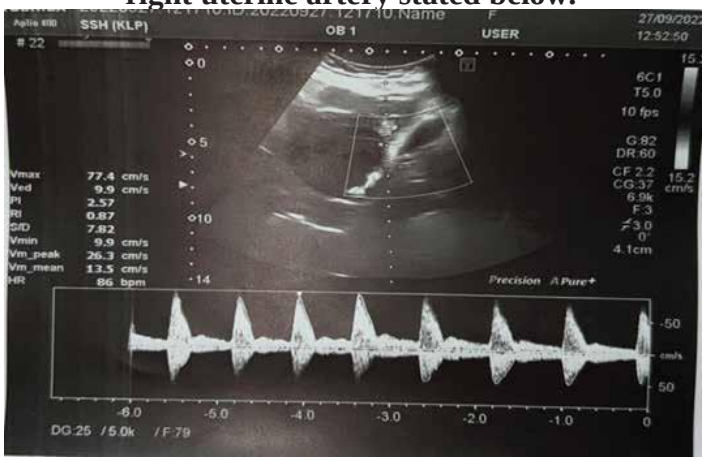


Fig-2 Effect of sub mucosal fibroid on left uterine artery. Left uterine artery shows pulsatility index (2.57), Resistive index (0.87) and peak systolic velocity (77.4 cm/s).

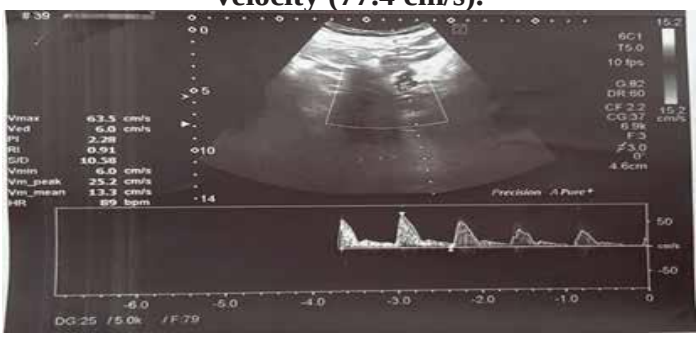


Fig-3 Effect of sub mucosal fibroid on right uterine artery.

Right uterine artery shows pulsatility index (2.28), Resistive index (0.91) and peak systolic velocity (63.5 cm/s).

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

REFERENCES

1. Primers for Nat Rev Dis Fibroids in the Uterus: EA Stewart, SK Laughlin-Tommaso, WH Catherino, S Lalitkumar, D Gupta, and B Vollenhoven 2016;2:16043.
2. Uterine leiomyomas are prevalent, according to Cramer and Patel. Am. J. Clin. Pathol., 435–438 (Sparic R. Pregnancy, birth, and puerperium uterine myomas. 2014, Srp Arh Celok Lek;142(12):118-24. 1990).
3. S.R. Chaudhry and K. Chaudhry [Internet]. StatPearls. StatPearls Publishing; Treasure Island (FL): July 25, 2022. abdomen and pelvis, as well as the uterine round ligament.
4. Fertility and Sterility, 89, 1–16. Taylor, E., and V. Gomel: Fertility and the Uterus (2008)
5. Obstetrics & Gynecology, 109, 410–414; Vergani P, Locatelli A, Ghidini A, et al. (2007)
6. (Curr Obstet Gynecol Rep, 2016). (Curr Obstet Gynecol Rep, 2016) 5:81–88.
7. JH Segars, EC Parrott, JD Nagel, Guo XC, Gao X, Birnbaum LS, and colleagues Human Reprod Update, 2014, 20(3), 309-33. The Third National Institutes of Health International Congress on Advances in Uterine Leiomyoma Research: a Comprehensive Review, Conference Report, and Future Recommendations
8. Fibroids, infertility, and pregnancy waste, according to Bajekal and Li, Update on Human Development 6, 614-620 (2000).
9. "Transcervical hysteroscopic excision of submucous fibroids for abnormal uterine bleeding: intramural extension outcomes," Wamsteker K, Emanuel MH, and de Kruif JH. Obstetrics and Gynecology 82:736-740 (1993).
10. Uterine Fibroids: Diagnosis, Imaging, and Anatomical Classification, McLucas B. 627–642 in Best Practice Research and Clinical Obstetrics and Gynecology (2008)
11. M. Ezzati, J. M. Norian, and J. H. Segars Management of uterine fibroids in patients using assisted reproductive technologies Women's Health (Lond) 5(4):413-421, 2009.
12. Obstet. Gynecol., 77, 747-748. Transvaginal ultrasonography vs hysteroscopy in the detection

of uterine submucous myomas. Fedele L, Bianchi S, Dorta M, et al. (1991). According to Indman PD, Journal of Reproductive Medicine, 40, 545–548 (1995), vaginal probe ultrasound accura- cy is poor in predicting incorrect hysteroscopic outcomes.

13. FIGO classification of causes of irregular uterine bleeding during pregnancy, Critchley HO, Fraser IS, Munro MG Fertility and Sterility, 95, 2204-2208.17 (2011).
14. Obstetric and Gynecological Sonography, 35(2), 233-237, 2010. Cil, A.P., Tulunay, M.F. Kose, and Haberal Myometrium Lesions and Serosal Fibroid Doppler Characteristics in Women with Known Non-Palpable Lesions: A Preliminary Epidemiological Study.
15. Kurjak, S. Kupesic-Urek, and D. Miric transvaginal colour Doppler examination of vascularization in a benign uterine tumour. 1992, Ultrasound Medical Biol., 18(6-7), 645-9.
16. A critical evaluation of the efficacy of ultrasonography in determining uterine receptivity following assisted reproductive therapy, S. Friedler, J.G. Schenker, A. Herman, and A. Lewin (1996) Update 2 on Human Reprod (323-335).
17. Illustrated Treatise of Ultrasounds in Obstetrics and Gynecology, J. MITSUNAO KOBAYASHI, B. Lippincott Co., 1974.
18. W. B. Saunders Company, Philadelphia, 2000; 829–835. 829-835 in W. B. Saunders Organization's Ultrasound Imaging in Obstetrics and Gynecology, 4th Edition, Philadelphia, 2000.
19. Blood flow in the uterine artery in women with intrauterine fibroids, JL Alcazar, M Griffioen, and M Jurade 5:165-9, European Journal of Radiology, 1997. McLucas, B., Perrella, R., Goodwin, S., Adler, L., and Dalrymple, J. The importance of Doppler flow in fibroid embolization in the uterine artery J Ultrasound Med. 2002;21(2):113-20, with a test on pages 122-23.
20. El-Badawy E, Ghanem A, Abdel Fattah A, Abdel Rahman H. Evaluation of endometrial pattern and uterine blood flow before and after myomectomy by transvaginal ultrasound. [abstract FC506.2]. Proceedings of the XV FIGO World Congress of Gynecology and Obstetrics,August 3–7, 1997, Copenhagen, Denmark.This article is being published without the benefit of the authors' review of the proofs, which was not available at press time.FERTILITY & STERILITYt 691.
21. Kurjak, A.; Kupesic-Urek, S. Infertility. In: Kurjak, A., ed. Transvaginal color Doppler. Carnforth, UK: Parthenon Publishing; 1991:33-41.
22. Bourne TH, Campbell S, Steer CV, et al: Detection of endometrial cancer by transvaginal ultrasonography with color flow imaging and blood flow analysis: a preliminary report. Gynecol Oncol 40:253- 259, 1991

Authors Contributions:

SAIF ULLAH KHAN, MUHAMMAD UZAIR, ZAIN UL HASSAN, AYESHA NASIR and RAMSHA BATOOL: Substantial contributions to the conception and design of the work.

SUMIYA AMJAD, SAMIA NAWAZ, PAKEEZA ASGHAR and SUNILA AZHAR: Design of the work and the acquisition. Drafting the work.Final approval of the version to be published.

Submitted for publication: 25-10-2024
Accepted after revision: 16-11-2024

Original Article

Open Access

Analysis of Optometry students responses towards ethical dilemmas in eye out door patients

Tayyaba Burhan[a]

[a] Orthoptist COAVS/ Mayo Hospital Lahore

Correspondence: Tayyababurhan928@gmail.com

ABSTRACT

Background and Objectives: Ethical dilemmas have been explored in various areas of healthcare, they have not been as extensively addressed within the field of optometry. Addressing these dilemmas is essential to ensure ethical decision-making and enhance patient care in optometry. To evaluate differences in responses between academic levels regarding ethical dilemmas among optometry students in their practice, and to report the frequency at which they encountered some common potential ethical dilemmas.

METHODOLOGY: The research protocols were approved by Ethical Review Board of College of Ophthalmology and Allied Vision Sciences, Lahore. A performa based cross-sectional study was conducted in College of ophthalmology Allied Vision Science, Mayo Hospital Lahore from March 2024 to August 2024. Cross sectional study design was employed and a total of 95 optometry students participated in this study. Informed consent was taken and a structured questionnaire was developed to evaluate optometry students' responses to Ethical dilemmas in eye patient outdoor and to report the frequency at which they encountered some common potential ethical dilemmas. Sample was collected by using Non probability convenience sampling. Frequencies and percentages were calculated for each question. All the data had been entered and analyzed using statistical package for social science (SPSS Version 25.00). In this study, qualitative variables had been analyzed by applying chi square test P- Value of ≤ 0.05 was considered significant.

RESULTS: Optometry students across academic levels exhibited similar responses to ethical dilemmas, with no significant differences based on academic year. Given the p-values for each ethical dilemma, analysis reveals that issues such as Conflict of opinion with hostile, aggressive patients) and Termination of the relationship with patients having behavioral problems (show significant p-values (p value < 0.05 i.e. 0.03 and 0.02, respectively), indicating significant relationships, while other issues shows statistically insignificant (P-values > 0.05), regardless of the academic year variable applied.

CONCLUSION: Comprehensive ethics education ensures consistent ethical competence among optometry students across academic years, strengthened by clinical practice integration.

KEYWORDS: Ethics, Optometry, moral obligation, confidentiality, Informed consent, beneficence, Ethnicity, minor

INTRODUCTION

Ethics is an integral and fundamental part of medical practice as the physician has a moral obligation (i) to promote the patient's wellbeing, (ii) to prevent or reduce potential harm, and to (iii) honor the values and preferences of the patient.1 The ethical principles originated in 400 B.C. in ancient Greece, attributed to Hippocrates of Kos.2. The four principles of medical ethics are autonomy—respecting patient rights; beneficence—the commitment to doing good; non-maleficence—the obligation to avoid harm; and justice—ensuring fair and equal treatment for all individuals.3 Informed consent ensures patients have a voice in their healthcare by respecting their autonomy and encouraging open discussions with their providers. It's about understanding and making choices together. 4Other related principles include being Confidentiality pertains to limiting access to personal data from unauthorized individuals5 ,Fidelity ensures patients receive

How to cite this: Burhan T, Analysis of optometry Students responses towards ethical dilemmas in eye outdoor patients. International Journal of Healthcare Profession. 2024; 1(4):42-47

Vol. 01, Issue 04, October-December, 2024

the right care, delivered correctly and timely, tailored to their needs.6 and Veracity in healthcare means sharing clear, accurate information to support patients' understanding and informed decisions.7 Healthcare professionals face ethical dilemmas when decisions place patient care in conflict with ethical principles, requiring choices that may compromise values and impact outcomes.8 The primary ethical dilemmas faced by medical staff in healthcare management. are of four types i.e. -Patient-related dilemmas in healthcare involve balancing confidentiality with team collaboration, ensuring informed consent by respecting patient autonomy, and managing end-of-life care by aligning patient preferences, family input, and ethical principles like beneficence and Nonmaleficence.9, Provider-related dilemmas in healthcare revolve around maintaining ethical conduct, navigating conflicts of interest, and ensuring transparency in communication.10, 11 , Organizational dilemmas in healthcare involve balancing ethical resource allocation, patient safety, and addressing internal misconduct.12 and Societal dilemmas in healthcare involve addressing disparities in access and quality while balancing individual rights with collective well-being.13.

This study aims to evaluate differences in responses between academic levels regarding ethical dilemmas among optometry students in their optometric practice, and to report the frequency at which they encountered some common potential ethical dilemmas in eye patient outdoor.

METHODOLOGY

The research protocols were approved by Ethical Review Board of College of Ophthalmology and Allied Vision Sciences, Lahore. A performa based cross-sectional study was conducted in College of ophthalmology Allied Vision Science, Mayo Hospital Lahore from March 2024 to August 2024. The sample size was calculated from the formula with the confidence level a = confidence level = 95%, taken from the study with anticipated population proportion, p= 0.446 with absolute precision required is 0.10.14 Sample was collected by using Non probability convenience sampling technique. The inclusion criteria for this study are undergraduate optometry students of fourth year and third year, both male and female. Ophthalmologists, practicing optometrists, faculty, paramedic staff were excluded from this study. Informed consent was taken from each participant. Cross sectional study design was employed and a total of 95 optometry students participated in this study. A structured questionnaire was developed to perform this study. It included questions including students profile and questions assessing response to ethical dilemmas and to explore ethical issues frequency with respect to their encounter in eye outdoor patient. Only fourth-year students have received ethical education prior submitting their response via an online survey. All the data had been entered and analyzed using statistical package for social science (SPSS Version 25.00). In this study, qualitative variables (Frequencies and Percentages) was analyzed by applying chi square test and Quantitative data (Mean and Standard deviation) was analyzed by Descriptive Analysis. P- Value of ≤ 0.05 was considered significant.

RESULTS

Responses were received from 95 optometry students. Most of the surveys collected were received from third year optometry students (55.8 %), followed by fourth year students (44.2 %). Of the 95 respondents, 30.5 % were male and 69.5 % were female. The mean age of participants was 22.02 years, indicating the average age within the study group.

Table 1 -Demographics

Demographic Variable	Category	Total	Percentage
Total participants		95	100
Gender	Male	29	30.5 %
	Female	66	69.5 %
Year of study	3rd year	52	55.8 %
	4th year	43	44.2 %

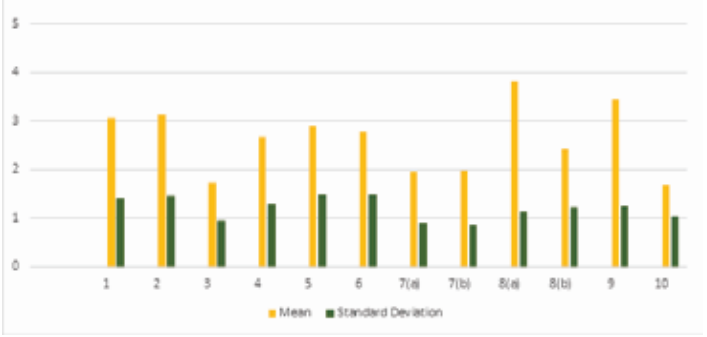


Figure 1. Mean responses to each survey question given by Optometry students.

The analysis reveals that issues such as Conflict of opinion with hostile, aggressive patients) and Termination of the relationship with patients having behavioral problems (show significant P-values (P VALUE < 0.05 i.e. 0.03 and 0.02, respectively), indicating significant relationships, while other issues (e.g., trust, adherence, ethnicity, and sexual advances) shows statistically insignificant (P-values > 0.05), regardless of the academic year variable applied.

Table 3 Ethical Dilemmas Related to the Student-Patient Relationship Chi-Square Analysis

Variable	Sometimes	Frequent	Never	P- Value
a) Conflict of opinion with a patient				
Lack of trust toward the optometrist	70.5%	16.8%	12.6%	0.525
Lack of adherence or refusal of tests	47.4%	28.4%	24.2%	0.235
Hostile, aggressive patient	52.6%	36.8%	10.5%	0.03
Recommendations for contact lenses	60.0%	22.1%	17.9%	0.240
Patient with a problematic personality	63.2%	27.4%	9.5%	0.231
Poor relationship with patient	63.2%	17.9%	18.9%	0.177
b) Termination of the relationship				
Dissatisfied patient, lack of a trust relationship	55.8%	14.7%	29.5%	0.458
Poor attitude with the staff	53.7%	30.5%	15.8%	0.345
Hostile, aggressive patient	68.4%	22.1%	9.5%	0.350
Behavioral problems	67.4%	24.2%	8.4%	0.02
c) Ethnicity, culture, religious/ spiritual beliefs				
Beliefs about glasses	48.4%	40.0%	11.6%	0.803
Religion, Optical services and the Islamic veil	42.1%	26.3%	31.6%	0.877
Ethnicity	50.5%	25.3%	24.2%	0.372
Gender	45.3%	27.4%	27.4%	0.096
Dress code	41.1%	22.1%	36.8%	0.402
Language barrier	53.7%	43.2%	3.2%	0.07
d) Sexual or seductive advances such as				
Inappropriate Comments	34.7%	5.3%	60.0%	0.358
Inappropriate Action	25.3%	14.7%	60.0%	0.691
Contact via Internet or telephone after the exam	21.1%	12.6%	66.3%	0.457
Unnecessary communication without maintaining Distance	35.8%	13.7%	50.5%	0.988

Table 4_ Ethical dilemmas Related to Conflicting Relationships Chi-Square Analysis

Variable	Sometimes	Frequent	Never	P -value
e) Conflict of opinion with an optician colleague				
Poor collaboration in relation to the optometrist's recommendations	61.10%	16.80%	22.10%	0..799
Pressure to sell glasses	32.60%	15.80%	51.60%	53.90%
Schedule management	44.2%	31.6%	24.2%	0.799
Comments demeaning the optometry practice	47.4%	23.2%	29.5%	0.41
f) Other dilemma pertaining to conflicting relationships				
Support staff	50.5%	32.6%	16.8%	0.293
Physician, emergency staff	45.3%	32.6%	22.1%	0.25

The table shows the how often students encounter ethical dilemmas related to Conflicting relationships. Given the p-values for each Ethical Dilemma frequency none of them are less than 0.05, suggesting that there is no significant difference in responses based on the academic year.

Table 5_Ethical dilemmas involving Confidentiality of Patient Chi-Square Analysis

Variable	Sometimes	Frequent	Never	P - value
g) Parental consent/disclosure of information about a infants/Toddlers				
Separated parents	38.9%	16.9%	44.2%	0.777
Minor capable of giving consent to care	52.6%	22.1%	25.3%	0.516
Parental consent contrary to the child's welfare	44.2%	29.5%	26.3%	0.881
Parental neglect	46.3%	28.4%	25.3%	0.667
h) Precarious family situation/ abuse such as ;				
Physical or mental abuse by the parent	43.2%	16.8%	40%	0.517
Parental neglect	46.3%	28.4%	25.3%	0.987
i) Compromised safety or danger to the safety of others				
Thoughts of self-harm	24.2%	13.7%	62.1%	0.987
Depression, precarious psychological state Aggressive, threatening patient	44.2%	21.1%	34.7%	0.349
j) Other Confidentiality related dilemma such as				
Sharing confidential information with the family	41.1%	26.3%	32.6%	0.602
Unlawful conduct (fraud, crime)	22.1%	15.8%	62.1%	0.974
Image taking policy	36.8%	9.5%	53.7%	0.303

DISCUSSION

Healthcare management entails a broad spectrum of responsibilities, including strategic resource allocation, policy formulation, and ensuring excellence in patient care delivery.15, 16 The complex interplay between healthcare professionals, patients, regulatory authorities, and organizational frameworks forms a dynamic environment where ethical challenges are inherent. The historical evolution of healthcare management highlights the shifting nature of these challenges, shaped by societal transformations, technological advancements, and evolving healthcare policies.17 Applying the Chi-square test given the p-values for each ethical scenario response, none of them are less than 0.05, suggesting that there is no significant difference in responses for ethical scenarios based on the academic year. Figure 1 shows Mean responses for each scenarios indicating that Questions 3 and 10 (mean values near 1.7) show strong agreement. Questions 1, 2, 4, 5, and 6 have mean values around the "Agree" and "Unsure" range (2.66 to 3.14) Questions 8(a) and 9 show a tendency to "Disagree," with more varied opinions showing mixed or uncertain responses from students mean value (3.46-3.82). Questions 7(a) and 7(b) reflect strong agreement with less variation in responses. In the study Ethics in Optometry" by Andrus and Dorius (2002), the scenario addressing an issue of driving requirements shows significant differences between those who had an ethics course and those who did not. Respondents with previous ethical training had a mean of 4.415 and those without had a mean of 4.274 the p-value is 0.03 indicating a statistically significant difference in responses based on ethics course participation.18. Table 3,4,5 shows Distribution of responses to the frequency of encounter to ethical dilemmas related to the Student-Patient Relationship, Conflicting Relationships and ethical dilemma involving Confidentiality are given. In Ethical Dilemmas Related to the student Patient Relationship "Conflict of opinion with a Hostile, aggressive patient" (p=0.03) and "behavioral problems leading to relationship termination" show significant P value (p=0.02). Ethical dilemmas related to confidentiality, such as sharing information or

addressing unlawful conduct, were generally marked by high "Never" responses ranging from (32.6% to 62.1%).

(Faucher, Rezk, and Verni -2022) conducted a study The Challenge of Ethical Dilemmas in Optometry part 3 indicate that 44.6% of participants reported experiencing conflicts of opinion with a patient, while 48.8% didn't acknowledged this issue. A smaller group, 6.7%, did not provide a response. 35.4% of participants reported experiencing termination of the patient relationship, with 56.3% didn't acknowledged this issue, while 8.3% did not respond. Ethnicity, culture, and religious or spiritual beliefs were the source of ethical dilemmas for 14% of participants. Female face sexual or seductive advances from patients significantly more often than male (41.7% vs. 12.5%), with this difference being highly statistically significant ($p < 0.001$).14

(Faucher, Rezk, and Verni -2022) conducted a study The Challenge of Ethical Dilemmas in Optometry part 2 shows that about 20% of participants reported feeling pressured to sell products like glasses and contact lenses, with this being more common among women (24%) compared to men (10%; $p = 0.034$) highlighting gender disparities in commercial pressures within the profession. 19

Confidentiality in clinical settings faces challenges such as data breaches, cultural sensitivities, and legal dilemmas, particularly in public health or abuse cases. 20(Faucher, Rezk, and Verni -2022) study The Challenge of Ethical Dilemmas in Optometry part 1 shows that 15.4% of participants reported encountering parental consent/disclosure of information about a minor patient, while 81.3% % stated they had not faced such issues, and 3.3% % did not provide a response. Parental consent can sometimes harm a child's well-being, such as when treatment like cycloplegia or glasses is denied, or when appointments are missed. Similar issues arise with patients unable to safely drive, or those showing signs of depression, aggression, or suicidal thoughts.21.

The study "Ethics in Optometry: An Educational Intervention" by Hart KM and Connor HRM indicates that no significant difference in baseline confidence was found between students with or without prior experience in tertiary education ($p = 0.261$), healthcare ($p = 0.337$), or eyecare ($p = 0.397$) while a significant rise in students' confidence was observed after the ethics workshop, from 53% to 82% ($p = 0.011$)highlighting the workshop's effectiveness in improving ethical reasoning skills.22

No significant difference was observed for responses towards ethical dilemmas suggesting optometry students' consistent exposure to patients in eye outdoor patient providing them with regular opportunities to face and manage various ethical dilemmas. Similarly no significant difference was observed for frequency of encountering ethical dilemmas in eye outdoor patient except Conflict of opinion with hostile, aggressive patient and "behavioral problems leading to relationship termination" shows significant difference in responses indicating that 3rd year students might lack clinical experience and confidence in handling hostile patients, while 4th year students, having more advanced training and exposure, may have better conflict resolution skills.

The study emphasizes that while ethical education provides a solid theoretical foundation, practical clinical experience is essential for developing students' ethical decision-making skills. By engaging with real-world patient scenarios, students learn to balance ethical considerations and address diverse patient needs, ensuring they are prepared to navigate ethical challenges with professionalism and integrity in their future practice.

CONCLUSION

The results highlight that while ethical education provides a strong foundation, clinical experience is key to developing effective ethical decision-making. Differences between 3rd and 4th-year students in handling challenges like hostile patients and behavioral issues suggest that real-world exposure is crucial for refining these skills. Ultimately, combining theoretical knowledge with practical experience equips students to navigate ethical dilemmas with confidence and professionalism in their future practice.

Limitations and Recommendations

Ethical decision-making is influenced by various factors, such as culture and clinical exposure, making it difficult to isolate the effect of the curriculum alone in critical ethical developing. Additionally, there was no pre- and post-course comparison to assess changes in students' ethical attitudes suggesting Pre- and Post-Assessment would be helpful to assess students' ethical attitudes before and after their coursework to see how much it influences their thinking towards dealing ethical dilemma in their practice and Future surveys would control for other factors in addition to the curriculum such as cultural background, prior clinical experience, personal beliefs, and mentorship significantly influence students' ethical decision-making.

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

REFERENCES

1. Varkey B. Principles of clinical ethics and their application to practice. Med Princ Pract 2021;30(1):17-28 https://-doi.org/10.1159/000509119.
2. Da Prato EB, Cartier H, Margara A, Molina B, Tateo A, Grimolizzi F, et al. The ethical foundations of patient-centered care in aesthetic medicine. PEHM. 2024;19(1):1 https://-doi.org/10.1186/s13010-024-00151-1.
3. Shetty N. Medical Ethics and Law. Indian J Orthop. 2023;57(11):1744-7 DOI-10.007/s43465-023-00972-w.
4. Ng IK. Informed consent in clinical practice: Old problems, new challenges. J R Coll Physicians Edinb. 2024;54(2):153-8DOI: 10.1177/14782715241247087.
5. Štarchoň P, Pikulík T. GDPR principles in data protection encourage pseudonymization through most popular and full-personalized devices-mobile phones. Procedia Comput Sci. 2019;151:303-12 https://doi.org/10.1016/j.procs.2019.04.043.
6. Woolf SH, Johnson RE. The break-even point: when medical advances are less important than improving the fidelity with which they are delivered. Ann Fam Med. 2022: 222-36 https://-doi.org/10.1370/afm.406.
7. Amer AB. The ethics of veracity and it is importance in the medical ethics. Open J Nurs. 2019;9(2):194-8 https://doi.org/10.4236/o-jn.2019.92019.
8. Pierscionek BK. Law and Ethics for the Eye Care Professional E-Book: Elsevier; 2008. Available from: http://hdl.handle.net/10822/959659.
9. Haahr A, Norlyk A, Martinsen B, Dreyer P. Nurses experiences of ethical dilemmas: A review. Nurs Ethics. 2020;27(1):258-72 https://doi.org/10.1177/0969733019832941.
10. Martani A, Geneviève LD, Poppe C, Casonato C, Wangmo T. Digital pills: a scoping review of the empirical literature and analysis of the ethical aspects. BMC Med Ethic. 2020;21:1-13 https://-doi.org/0.1186/s12910-019-0443-1.
11. Cobianchi L, Verde JM, Loftus TJ, Piccolo D, Dal Mas F, Mascagni P, et al. Artificial intelligence and surgery: ethical dilemmas and open issues. JACS 2022;235(2):268-75
12. Chukwu E, Adu-Baah A, Niaz M, Nwagwu U, Chukwu MU. Navigating ethical supply chains: the intersection of diplomatic management and theological ethics. IJMDSA. 2023;2(1):127-39 https://doi.org/10.47709/ijmdsa.v2i1.2874.
13. Ilori O, Kolawole T, Olaboye J. Ethical dilemmas in healthcare management: A comprehensive review. Int J Res Med Sci. 2024;4:703-25 http://dx.doi.org/10.51594/imsrj.v4i6.1251.
14. Faucher C, Rezk M, Verni A. The Inevitable Challenge of Ethical Dilemmas in Optometry, Part 3: The Optometrist, their Patient and their Fees, a Ménage à Trois. CJO. 2022;84(3):https://-doi.org/10.15353/cjo.v84i3.5039.
15. Farrell TW, Ferrante LE, Brown T, Francis L, Widera E, Rhodes R, et al. AGS position statement: resource allocation strategies and age-related considerations in the COVID-19 era and beyond. JAGS. 2020;68(6):1136-42 https://-doi.org/10.11/jgs.16537.
16. Pu L. Fairness of the distribution of public medical and health resources. Front Public Health. 2021;9:768728 https://doi.org/10.3389/f-pubh.2021.
17. Nurmeksela A, Zedreck Gonzalez JF, Kinnunen J, Kvist T. Components of the Magnet® model provide structure for the future vision of nurse managers' work: A qualitative perspective of nurse managers. J Nurs Manag. 2021;29(7):2028-36 https://doi.org/10.1111/-jonm.13337.
18. Andrus C, Dorius M. Ethics in optometry: Optometrist and student perspectives on ethical dilemmas2002:[2 p.]. Available from: https://commons.pacificu.edu/work/sc/3dfb-fb1a-de77-4209-ade4-f68575670011.
19. Faucher C, Verni A, Rezk M. The Inevitable Challenge of Ethical Dilemmas in Optometry, Part 2: Professional Relationships and Practices in the Spotlight. CJO. 2022;84(2):7-12 https://-doi.org/0.15353/cjo.v84i2.4973.
20. Noroozi M, Zahedi L, Bathaei FS, Salari P. Challenges of confidentiality in clinical settings: compilation of an ethical guideline. Iran J Public Health. 2018;47(6):875 PMCID: PMC6077627.
21. Faucher C, Rezk M, Verni A. The Inevitable

Challenge of Ethical Dilemmas in Optometry, Part 1: When Confidentiality is Tested. CJO. 2022;84(1):17-23 https://doi.org/10.15353/cjo.v84i1.4392.

22. Hart K, Connor H. Ethics in optometry: an educational intervention. Clin Exp Optom. 2024:https://doi.org/10.1080/08164622.2024.2421439.
23. Shah P, Thornton I, Turrin D, Kopitnik NL, Hipskind JE. Informed Consent. Treasure Island (FL): © 2024, StatPearls Publishing LLC 2024.

Authors Contributions:

Tayyaba Burhan: 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: 16-11-2024
Accepted after revision: 19-12-2024

GREEN INTERNATIONAL UNIVERSITY

#GROW WITH #GREEN

APPLY NOW!

www.giu.edu.pk

+92 330 1980703
+92 42 35459807-09
Bhobtian Avenue, 9 KM, Raiwind Road, Lahore