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Editorial

Original Article

Case Report

Editorial

IMPACT OF OVER THE COUNTER ANTIBIOTICS PURCHASE ON EMERGING ANTIBIOTIC RESISTANCE IN PAKISTAN

Maryam Rashid[1], Shameen Hashmi[2]

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Pakistan is currently the third largest consumer of antibiotics in lower middle-income countries (LMICs) after China and India. Alongside this antimicrobial resistance (AMR) is currently the third leading cause of death in Pakistan, accounting for approximately 700,000 deaths annually with a projected increase to 10 million by 2050 worldwide with chances of high emergence of multi-drug-resistant pathogens.[1] It is a huge challenge we are facing when it comes to AMR. This rising trend in antimicrobial resistance (AMR) will make it difficult and expensive to treat serious infections. Patient load in hospitals will increase with serious resistant infections leading to extended sickness or ineffective therapy. Unsupervised polypharmacy can result in adverse drug reactions eventually leading to higher death rates due to prolonged/ineffective antimicrobial therapy. In LMICs low literacy rate, lack of awareness, and believing that antibiotics can cure all fevers are the contributing factors towards increasing rates of AMR.[2] According to the data available, more than 60% Pakistani population practice self-medication with antibiotics without a physician's prescription at least once in a year. The practice of self-medication increases with age; it was significantly higher among individuals over 40 years old (64.7%) compared to those under 20 years old (53.6%). The most common reasons for self-medication with previously prescribed antibiotics included using antibiotics that had been stored at home, having previously used the antibiotic for the same symptoms (33.9%), not having enough time to visit a physician (32.6%), believing that their condition was not serious (26.0%), and the convenience of purchasing antibiotics at a retail pharmacy.[3] In Pakistan, we have lived through it between year 2016 and 2021, when an outbreak of extensively drug resistant (XDR) typhoid affected thousands, especially in Sindh. That outbreak was a warning, but one we seem to be ignoring. A common man expects antibiotics to "work instantly" or imagine them as "magic bullets" leading to blaming the drug or the doctor. Many factors contribute to the worsening of antibiotic resistance, including human misuse of antibiotics. For the treatment of infections, when the drug of choice does not show its effect, the quacks are prescribing on their own that is extremely dangerous for human health. A patient walks into the pharmacy with only fever or flu, but on his way back, he is loaded with a broad-spectrum antibiotic. Neither the patient asks any relevant questions nor is the pharmacist trained, and the drug is sold. Adding more to it, within clinics and hospitals, physicians are often pressurized by patient's expectations of long list of fancy medicines on the prescriptions and they prescribe multiple antibiotics even for a viral illness or a mild bacterial infection that does not at all require antibiotics unlike practices in west where culture reports are awaited except for cases where empirical therapy is required.[4] Well, it is believed that there is a well-established link between the sale and purchase of antibiotics without a physician's prescription

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and rise of antibiotic resistance. The battle against AMR is not only fought in hospitals but also in pharmacies, clinics and even in street markets. Over-the-counter access and misuse of antibiotics contribute significantly to the development and spread of resistant bacteria in communities as well as health care settings. This misuse accelerates the selection of resistant strains making infections difficult to treat, thus leading to increased risk of complications. Longer hospital stays and higher mortality rates. Many studies emphasize that restricting OTC sales and enforcing prescription only policies are crucial steps in fighting resistance.[5] In a 2024 report, the World Health Organization listed Pakistan among countries with high levels of unregulated antibiotic use and escalating rates of resistance trend. A 2021 WHO-supported study noted that 60–70% of antibiotics are dispensed OTC in community pharmacies, despite being Schedule G (prescription-only) drugs.[6] Recently, the Punjab Health Care Commission (PHCC) organized a meeting, a "consultative meeting to discuss the issue of hypersensitivity testing practices prior to beta-lactam antibiotic administration and anti-microbial resistance". There is a need to urge both the public and policy makers to take AMR seriously and support "4Rs" slogan regarding the rationale of the drug: "To have the Right drug, for the Right Person, over the Right time, for the Right disease" Pakistan's Drug Sale Rules, though well-defined on paper, are rarely followed in reality. Pharmacies across the country frequently dispense antibiotics like candy, no prescription needed, no guidance offered. Despite being classified as prescription-only drugs, antibiotics are sold by unlicensed personnel, often without even asking about symptoms. Antibiotic and antimicrobial stewardship is indispensable for combating antibiotic resistance. Netherlands and Sweden, where antibiotic stewardship has been applied in the outpatient setting, are the countries that have the lowest rates of antibiotic resistance in Europe. There is dire need to cope up with this emerging AMR in our country. Government of Pakistan should take this into consideration, work on healthcare infrastructure and raise awareness programs in hospitals using social media platforms to avoid antimicrobial resistance against common pathogens which are mainstay in saving lives of millions. To conclude, integrating education on the rationale of antibiotic use, resistance patterns, and procurement policies into the curriculum promotes awareness among future clinicians.

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Original Article

COMPARISON OF POSTOPERATIVE HEMORRHAGE IN STAPLED HEMORRHOIDOPEXY VERSUS MILLIGAN MORGAN HEMORRHOIDECTOMY.

Zulfiqar Ahmad[1], Omer Bin Abdul Aziz[2], Meezan Jalil[3], Muhammad Awais Mughal[4], Bilal Ahmad[5], Naif Ali Rasheed Al-Thobaiti[6]

ABSTRACT

Background: The objective of the study was to compare Milligan Morgan hemorrhidectomy with Stapled Hemorrhoidopexy in terms of frequency of moderate to severe post operative hemorrhage.

Materials and Methods: This Retrospective Comparative study was done from January 2024 to November 2024. Hospital records were checked for patients undergoing Miligan Morgan Haemorrhoidectomy (MMH) and Stapled Hemorrhoidopexy (SH) from January 2024 to November 2024. A total of 91 patients were found to undergo surgery for hemorrhoids who developed post operative hemorrhage. They were divided in to two groups Group A had undergone standard MMH with electrocautery and consisted of 52 patients. The remaining 39 patients were found to undergo SH by using PPH03 circular stapling gun and thus were included in Group B. Both groups were compared for moderate to severe post operative bleeding.

Results: Although a higher frequency of moderate to severe post operative hemorrhage was observed in SH Group (25.6%) as compared to MMH Group (17.3%), However, the difference was not statistically significant between MMH and SH in terms of bleeding post operatively (p=0.339).

Conclusion: SH and MMH are not superior to each other in terms of moderate to severe post-operative hemorrhage. Both procedures can be performed as per the surgeon's preference or patient's choice.

Key Words: Post operative Hemorrhage, Milligan Morgan Hemorroidectomy (MMH), Stapled Hemorrhoidopexy (SH).

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INTRODUCTION

Hemorrhoids or Piles constitute a major chunk of the surgical workload.[1] Surgery for hemorrhoids is done usually after the failure of conservative management.[2] The MMH is considered as the gold standard in the surgical management of haemorrhoids and continues to be the most commonly practiced surgical procedure in this regard. However, certain complications are usually reported with MMH such as post operative hemorrhage, Post operative pain and local discharge.[3] Stapled Hemorrhoidopexy (SH) is not a new but a relatively newer procedure. Because of shorter post operative hospital stays and lesser post operative pain, it has gained acceptance as a viable option over the course of time.[4] One of the common complications associated with both procedures is post operative hemorrhage. It is however, sometimes of such severity that the patients need transfusion, readmission and

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sometimes re-intervention. Across many studies, the post operative hemorrhage frequency is found to be 4.93%, 5.1%, 5.7 % or 14.7% in study population who underwent SH.[5,6,7,8] Post operative hemorrhage in MMH also has a range of reported frequencies in different studies. It is reported as low as 0.6-10% to as high as 46.6%.[2,8] Both procedures have been compared with each other all over the world in different Randomized control trials. There are varied results with some studies reporting no statistically significant difference in terms of post operative bleeding.[9, 10, 11,12] However, some studies have contradicting results reporting SH to be superior to MMH in terms of complications and post operative bleeding.[13,14] This study aimed to find out the better surgical procedure for management of hemorrhoids in our set up that has significantly lower frequency of post operative hemorrhage thus saving the meager financial and medical resources in a country with limited medical resources.

MATERIALS AND METHODS

This retrospective comparative study was done for a period ranging from January 2024 to November 2024 in a secondary care hospital after seeking approval from the Ethical Review Board of the hospital IRB No. 21 dated 10 November 2024. Since this was a retrospective study, consent from the patients for this particular study was not possible to get. However, a general consent for the use of their data was already sought as part of procedural consent for surgery. Patients with age ranging from 20 to 70 years of both genders who had undergone elective surgery for hemorrohoids for third- and fourth-degree hemorrhoids and were presented with post operative hemorrohoids were included. Exclusion criteria included Co-morbidity (Ischemic Heart disease, Diabetes mellitus, hypertension) Bleeding disorders Co existing disease such as thrombosed hemorrhoids, fistula in ano, ano-rectal mass and fissuresa nd with history of use of anticoagulation / antiplatelet drugs. The final study population consisted of 91 patients meeting inclusion and exclusion criteria who underwent haemorrhoid surgery in our hospital from January 2024 to November 2024 and had documented post operative hemorrhage. The hospital record was thoroughly searched for all eligible patients' demographic record such as name, age, address, hospital number; phone number and gender etc were noted. The study population was divided into two groups namely Group A and Group B. Patients in Group A had undergone MMH using electrocautery while Group B had undergone SH using PPH03 circular stapling gun. After going through all of the operation and admission notes, it was found out that all procedures were performed under spinal (n=81) or general (n=10) anesthesia. All the surgeries were performed by consultant surgeons of a single surgical team. Stool softeners were given to all patients in order to make stools soft. A 2% lidocaine gel was also prescribed to all patients to make defecation relatively pain free. Sixty-Seven (73.62%) patients were discharged within 48 hours of surgery. As per the patient's hospital papers and post operative notes, post operative hemorrhage was divided into 3 categories namely (a) Spotting, (b) Minor bleeding (Partial soakage of dressing), (c) Severe bleeding (Soakage of dressing). Within the first 48 hours post operatively, hemorrhage was considered to be only fresh bleeding from the surgical site. Patients with severe hemorrhage were taken to the operation room for control of hemorrhage accordingly. Minor bleeding and spotting as mentioned in patient's notes were dealt with conservatively. A specially designed performa was used to record all the information which included demographic data of patients, group allotted, degree of hemorrhoids and bleeding as per the category. Statistical Package for the Social Sciences Statistics for Windows (version 21.0; Armonk, NY: IBM Corp., USA) was used to analyze all the data. Quantitative variables were analyzed using Means and Standard Deviation (SD) such as age. Frequencies and percentages were used for qualitative variables such as gender and post operative bleeding. Severity of hemorrhage data was stratified for

age and gender. Keeping p-value significant at <0.05, both the groups were compared in terms of frequency of post operative hemorrhage using Chi square test.

RESULTS

The study population comprised of 91 patients, with 3rd and 4th degree haemorrhoids, who were divided in to two groups A and B. Group A consisted of 52 patients whereas Group B had 39 patients. Group A included patients who had undergone MMH and group B included patients who had undergone SH using PPH03 stapling gun. The age distribution ranged from 20-70 years. In Group A, the mean age was 38.0 ±10.129 years. In group B, the mean age was found to be 41.54 ±11.718 years. There were 84.6% (n=44) males and 15.4% (n=8) females in Group A whereas group B was found to have 87.2% (n=34) males and 12.8% (n=5) females. With respect to age and gender, both groups were found comparable with a p-value 0.127 for age and p-value 0.733 for gender as seen in Table 1.

Table 1: Comparison of two groups for in terms of Gender and Mean Age

Gender	Group A (n=52)	Group B (n=39)	P Value
Male	44 (84.6%)	34 (87.2%)	p=0.733
Female	8 (15.4%)	5 (12.8%)	
Mean Age in Years	38.0 ±10.129	41.54 ±11.718	p=0.127

Out of total 91 patients, 61 (67%) had had spotting, 11 (12%) had minor bleeding and 19 (20.87%) had severe bleeding. Out of these 19 patients, 17 had complete soakage of dressing whereas 2 had soakage of clothes as well. A total of 9 patients (17.3%) developed severe post operative hemorrhage in Group A. Out of remaining 43 patients in Group A, 36 (83.73%) had only spotting whereas 7 (16.27%) had minor post operative hemorrhage. On the other hand, 10 (25.6%) patients developed severe post operative hemorrhage in Group B. Twenty five (64.1%) patients had only spotting and four (10.25%) patients had minor post operative hemorrhage depicted in Figure 1.

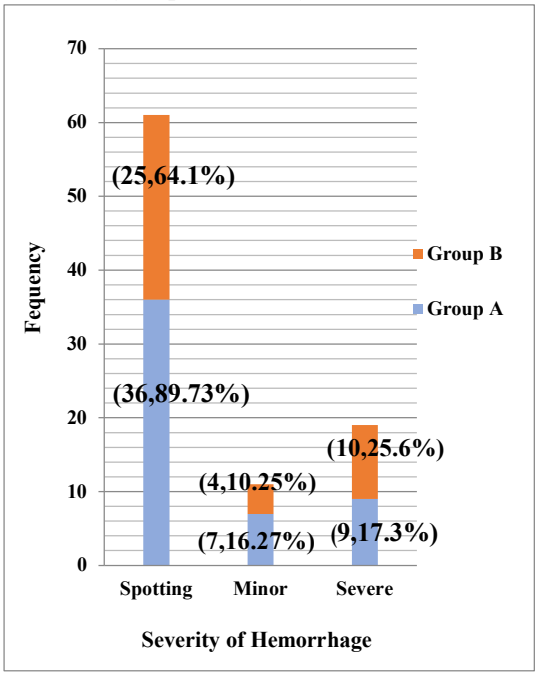

Figure 1: Frequency and Severity of Hemorrrhage

Although, Group B had more percentage of patients with severe post operative bleed as compared to Group A (25.6% versus 17.3%), there was no statistically significant difference in terms of the frequency of severe post operative hemorrhage in both groups as seen in (p-value=0.339) Table 2.

Table 2: Comparative Frequency of Moderate to Severe Post Operative Hemorrhage

Severe Post Operative Hemorrhage	GROUP A (n=52)	GROUP B (n=39)	p Value
Present	9 (17.3%)	10 (25.6%)	0.339
Absent	43 (82.7%)	29 (74.4%)	

DISCUSSION

Hemorrhoids form a major portion of the surgical workload.[1] Surgery for hemorrhoids is done usually after the failure of conservative management There are many post operative complications encountered after hemorrhoid surgery such as postoperative hemorrhage, pain ano-rectal stricture.[2] Post operative hemorrhage is a significant complication that may require infusion, admission and even re-operation. This retrospective comparative study provided us an opportunity to find out the frequencies of severe bleeding after two different surgical procedures and comparing them to ascertain a better technique in this regard in our setup. There was an increasing concern about post operative hemorrhage requiring surgical hemostasis after SH. It was deemed necessary to look into hospital record retrospectively and compare MMH and SH as done in the study. No such study was done in our hospital previously. SH has been compared with conventional MMH in many randomized controlled trials.[12,15,16,17] Some meta-analysis have also been done that reveal mixed results.[18,20] Till date, there is no definitive result. SH was found to have post operative pain significantly less than MMH. It was also associated with lesser pain with the first. However, interestingly enough, none of the trials reported any statistically significant difference between the two procedures. The central finding of this retrospective comparative study is that the difference in the frequency of moderate to severe post-operative hemorrhage between SH and MMH was not statistically significant (p=0.339). This also means that both the procedures are comparable to each in this aspect. Gupta et al performed a long term follow up after SH spanning over 33 months in 2003. In this SH trial and long term follow up, there was no statistically significant difference between the two procedures in terms of post operative bleeding, functional outcomes, quality of life and post operative pain. Our results are in accordance with the result of these studies. Despite the areas of agreement, some studies have reported contradictory results, indicating that SH may be superior to MMH in terms of post-operative bleeding and other complications.[13,14] Current study is in contradiction to these results. Through SH seems to be simpler in technique and application, a number of complications are associated with it such as ano-rectal perforations, dehiscence (which may require colostomy) and severe pelvic infections. Acute ano-rectal obstruction has also been reported. Therefore, proper training is required for actual employment of the procedure.[18,19,20] This study has a few limitations. Being a retrospective study is the biggest limitation. A prospective experimental study or randomized trial would be a better option. Including only elective cases of hemorrhoid surgery was another limitation. This study only focused on one complication of the procedures thereby improving but narrowing focus of the study at the same time. Also, this is a single center study. More randomized trials with larger study population in multiple centers may improve the quality of studies on this subject.

CONCLUSION

This study concludes that in terms of post operative hemorrhage, MMH and SH are not superior to each other. Although SH has been projected to have lesser post operative pain and decreased procedural duration, both procedures remain comparable to each other in this aspect. The high cost associated with the PPH03 circular stapling gun used for SH becomes a major decision factor especially in a country like Pakistan, with meager financial and medical resources. MMH remains the most affordable and often the best choice for those who cannot bear the cost of the stapling device. This study provides evidence for allowing procedure selection based on the surgeon's preference or the patient's financial capacity.

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CONFLICT OF INTEREST

None

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AUTHOR'S CONTRIBUTION

ZA: Concept, Data Collection, Surgeries, Manuscript Draft writing, Final approval
OBAA: Concept, Design, Analysis of data, manuscript revision, Final approval
MJ: Concept of work, critical review of manuscript, Final approval
MAM: Design of study and Analysis of data, Revision of manuscript, Final approval
BA: Analysis of data, Manuscript drafting, Final approval
NARAT: Analysis, critical review of draft Manuscript, Final approval

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Original Article

PREVALENCE AND RISK FACTORS OF MALARIA AMONG INTERNALLY DISPLACED PERSON IN TENT CITY OF HYDERABAD, SINDH

Muhammad Arsalan Khan[1], Ambrina Qureshi[2]

Abstract:

Background: Flooding is associated with increased malaria transmission in many regions worldwide. However, there is a lack of comprehensive studies that specifically investigate the seroprevalence and determinants of malaria subtypes among flood-affected internally displaced population (IDPs) in Sindh, Pakistan. The objectives of this study were to determine the prevalence of malarial types and risk factors associated with them.

Material and Methods: A cross-sectional study was conducted on the IDPs in Hyderabad, Sindh who were affected during August – October 2022 floods. A structured questionnaire was used to collect data about their demographic background, current signs and symptoms, and basic knowledge on malaria. Individuals with an axillary temperature > 100ºF and myalgia at the time of data collection were included in the study and after seeking consent they were assigned to either Rapid Diagnostic Testing (RDT) or Microscopy for malaria. Data was entered, described and analyzed using Stata v. 16.0.

Results: Out of all registered IDPs [N= 4980], almost half of them [n=2640; 53%] who were found to be suffering from fever, were included in the study [age range= 1 day to 96 years]. Total prevalence of malaria patient positive was found to be 13.41%; 1.7% affected by Plasmodium Falciparum and 11.7% by Plasmodium Vivax. Gender, age and pregnancy were found significantly associated with malaria [$p \leq 0.05$].

Conclusion: This study offers a thorough analysis of the demographics, diagnosis, and prevalence of malaria in a IDPs in Sindh due to flood. The results underline the necessity of specialized healthcare interventions that take gender, age, and pregnancy status into account.

Keywords: Malaria, Plasmodium, Disease Outbreak, Flood

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INTRODUCTION

World Health Organization (WHO) reported that among the seven Eastern Mediterranean countries, Pakistan responsible for 98% of burden of malaria in this region. The statistics showed that approximately 217 million Pakistani is at intermediate risk of malaria, 63 million are at high risks with 0.47 million malaria infections and 800 fatalities reported in 2020.[1] Malaria is endemic in many parts of Pakistan, with significant variations in transmission intensity across the country. Sindh, located in the southern region of Pakistan, has historically been prone to malaria outbreaks primarily due to its tropical and subtropical climate, suitable breeding grounds for mosquito vectors, and a lack of adequate healthcare infrastructure in rural areas.[2] The

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province consistently ranks among the regions with high malaria burden in Pakistan.

Pakistan has witnessed its worst humanitarian crisis of a decade, resulting in torrential rains and the most devastating flash floods. In the last 73 years of Pakistan's history, this was the most widespread flooding that brought a lot of complications with it. This has left one-third of Pakistan's area under water and made it resemble a small ocean. Among the severely affected areas the provinces of Sindh and Baluchistan are at the top of the list. Approximately 6.4 million people are in dire need of immediate support. People are still forced to live under open skies in most parts of the country, waiting for relief goods and shelter.[3] Climate change has been perceived as on urgent global challenge, resulting in outbreak of many infectious diseases. Flooding events have been associated with increased malaria transmission in many regions worldwide.[4] The displacement of populations, disruption of healthcare services, and the creation of suitable breeding habitats for mosquito vectors in stagnant water can contribute to increased malaria risk among flood-affected communities. Seroprevalence studies play a crucial role in understanding the epidemiology of infectious diseases. They provide insights into past and current exposure to pathogens within a population. In the context of malaria, seroprevalence studies can help determine the extent of transmission, identify high-risk groups, and assess the effectiveness of control measures.[5] Despite the well-documented association between flooding and increased malaria risk, there is a lack of comprehensive studies that specifically investigate the seroprevalence and determinants of malaria subtypes among flood-affected IDPs in Sindh, Pakistan. This research aims to bridge this gap and provide valuable insights into malaria control and prevention strategies in similar disaster-prone regions. The positive and exact or near-to-exact determination of the prevalence of Plasmodium infection can likewise help increase malarial infection observation and its management to the flood affected in need of time.[6] Unfortunately, we do not have exact information and data regarding the prevalence of Plasmodium subtypes in internally displaced persons of Pakistan.[7] To plan for and carry out incorporated Malaria control intervention. The result of this study will affirm that Malaria disease in Pakistan changes with irregularity variety in the environment. The study aims to strengthen the health system and to help policymakers take proper intervention and manage malaria endemic with the best of their knowledge. The objectives of this study were to determine the prevalence of malarial types and risk factors involved among internally displaced persons of Sindh.

MATERIAL AND METHODS

A cross-sectional study was conducted on the internally displaced population group in Hyderabad, Sindh who were affected by rain and flood. Only those registered individuals residing in the Tent City during the period from August 2022 to October 2022 were eligible to participate in the study. A structured questionnaire was used that was adopted from previous study, to collect data about their demographic background, current signs and symptoms, and basic knowledge on Malaria.[8] Ethical approval was obtained from the Institutional Review Board of Health Services Academy (IRB-HSA).F.No.Fall/HAS/ MSPH-2021, dated 29th May 2023. Convenience sampling method was used to collect the data after explaining the purpose and objectives of the study and written informed consent was obtained from each participant. The clinical signs and symptoms of Malaria that were assessed included fever, chills, myalgia, vomiting headache and sweating. Individuals presenting with fever (axillary temperature > 100ºF) and myalgia at the time of data collection were included in the study and after seeking consent they were randomly assigned to either Rapid Diagnostic Testing (RDT) or Microscopy for malaria testing. The procedure involved pricking the participant's fingertip, collecting a blood sample, and using the RDT

kit to test for the presence of Malaria antigens *(Plasmodium vivax and Plasmodium falciparum).* The results were interpreted, distinguishing between positive and negative cases for both Malaria subtypes. Data was entered, described and analyzed using Stata v. 16.0. Prevalence of all individuals tested positive for Malaria using RDT and Microscopy was calculated. Prevalence of subtypes of malarial infection was also calculated and presented in frequency and percentages. For analysis all tested positive on both RDT and Microscopy were combined to assess the differences in independent variables including demographic variables, testing types, clinical signs and symptoms, and individual responses on questions related to malaria. For independent variables which were continuous in nature, student t-test was used, whereas, for categorical variables fisher exact chi-square test was used to calculate the p-values considering $p \leq 0.05$ as statistically significant. Significant differences were considered a p-value ≤0.05 and 95% confidence interval. Multivariate analysis was also done to calculate odds ratios (ORs) to assess the confounding association of independent variables with individuals tested positive for malaria.

RESULTS

Out of all registered and residing population in the Tent City of Hyderabad [N= 4980], almost half of the population [n=2640; 53%] were found suffering from fever (axillary temperature > 100ºF) and myalgia. The mean age of these individuals was found with 37.87±17.17 [range= 1 day to 96 years]. Majority of individuals were uneducated and had no formal education; only less than 2% had formal education of secondary and graduate level in all. Around 5% of all the women were found pregnant. Out of all study participants 28% underwent microscopy test and 72% underwent rapid diagnostic test (RDT) for malaria. The prevalence of individuals found positive for malaria in both RDT and Microscopy groups was found as 13.41%. Their demographic details in different categories are given on table- 1.

Table 1: Demographic details of the study participants (n=2640) residing in Tent City of Hyderabad

Gender		
	(n=2640)	**(%)**
Female	828	31.4
Male	1812	68.6
Educational level		
Un-educated	2477	93.8
Educated	163	6.2
Categories	**(n=2640)**	**(%)**
Age groups		
0 – 29 years	867	32.8
30 – 44 years	863	32.7
45 – 96 years	910	34.5
Pregnant women (n=828)		
Yes	45	5.4
No	783	94.6
Religious belief		
Muslim	2436	92.3
Non-Muslim	204	7.7
Use Mosquito Nets		
Yes	2210	83.7
No	430	16.3
Heard of Malaria		
Yes	2001	75.8
No	639	24.2
Malarial Test Types		
RDT	1900	72.0
Microscopy	740	28.0
Test Result		
Positive	354	13.4
Negative	2286	86.6

Table-2 presents the detailed description of participants who were found positive with Plasmodium Falciparum and Plasmodium Vivax types of malaria. Only 12.4% [n=44] were found affected by *Plasmodium Falciparum* in comparison to *Plasmodium Vivax* who were 87.6% [n=310] out of all

malaria positive individuals. The overall population affected by *P. Falciparum* was 1.7% and those affected *by P. Vivax* was 11.7%. However, there was no statistical difference [p > 0.05] with respect to demographic variables (age, gender, and religious belief), pregnancy status, signs, symptoms and use of mosquito nets between individuals affected by *P. Vivax or P. Falciparum.* Yet the results show that not a single pregnant woman was affected by P. Falciparum and only 10 out of 80 pregnant women were affected by *P. Vivax.*

Table 2: Detailed background of individuals tested positive for Malaria (n=354)

P. Vivax (%) n= 310		**P. Falciparum (%) n= 44**
Gender		
Female	69 (22.3%)	11 (25.0%)
Male	241 (77.7%)	33 (75.0%)
Educational level		
Un-educated	286 (92.2%)	43 (97.7%)
Educated	24 (7.8%)	1 (2.3%)
Categories	**P. Vivax (%) n= 310**	**P. Falciparum (%) n= 44**
Age groups		
0 – 29 years	124 (40.0%)	24 (54.5%)
30 – 44 years	86 (27.7%)	11 (25.0%)
45 – 96 years	100 (32.2%)	9 (20.5%)
Pregnant women (n=80)		
Yes	10 (14.5%)	0 (0.0%)
No	59 (85.5%)	11 (100.0%)
Religious belief		
Muslim	288 (92.9%)	41 (93.2%)
Non-Muslim	22 (7.1%)	3 (6.8%)
Have you ever heard of Malaria?		
Yes	216 (69.7%)	25 (56.8%)
No	94 (30.3%)	19 (43.1%)
Do you have rigors or chills?		
Yes	291 (93.8%)	44 (100.0%)
No	19 (6.1%)	0 (0.0%)
Do you have vomiting?		
Yes	295 (95.1%)	42 (95.5%)
No	15 (4.8%)	2 (4.5%)
Do you have headache?		
Yes	221 (71.2%)	30 (68.2%)
No	89 (28.7%)	14 (31.8%)
Do you have sweating?		
Yes	71 (22.9%)	7 (15.9%)
No	239 (77.1%)	37 (84.1%)
Do you use Mosquito Net		
Yes	263 (84.8%)	38 (86.4%)
No	47 (15.2%)	6 (13.6%)
Test Type		
Microscopy	70 (22.6%)	2 (4.5%)
RDT	240 (77.4%)	42 (95.5%)

Table 3: Factors found associated with Malarial Infection (Negative=0, Positive=1) of the study participants (n=2640) residing in Tent City, Hyderabad

	Un-Adj. ORs	p-value (95% CI)	Adj. ORs	p-value (95% CI)
Gender				
Female	Ref.	--	Ref.	--
Male	1.66	**0.000** [1.279 – 2.168]	6.39	**0.000** [2.666 – 15.382]
Age groups				
0 – 29 years	Ref.	--	Ref.	--
30 – 44 years	0.61	**0.001** [0.467 – 0.810]	0.63	**0.002** [0.480 – 0.846]
45 – 96 years	0.66	**0.002** [0.506 – 0.863]	0.71	**0.019** [0.544 – 0.946]
Education				
Educated	Ref.	--	--	--
Uneducated	1.20	0.296 [0.847 – 1.722]	--	--
Pregnancy status				
Yes	0.68	**0.002** [0.539 – 0.874]	3.22	**0.002** [1.512 – 6.873]
No	Ref.	--	Ref.	--
Use Mosquito Net				
Yes	1.12	0.471 [0.820 – 1.532]	--	--
No	Ref.	--	--	--
Heard about Malaria				
Yes	0.63	**0.000** [0.499 – 0.813]	0.70	**0.007** [0.542 – 0.909]
No	Ref.	--	Ref.	--
Rigors/ Chills				
Yes	0.89	0.679 [0.545 – 1.483]	--	--
No	Ref.	--	--	--
Vomiting				
Yes	0.84	0.521 [0.495 – 1.427]	--	--
No	Ref.	--	--	--
Headache				
Yes	0.61	**0.000** [0.481 – 0.795]	0.71	**0.012** [0.545 – 0.928]
No	Ref.	--	Ref.	--
Sweating				
Yes	1.34	**0.036** [1.019 – 1.762]	1.35	**0.033** [1.024 – 1.785]
No	Ref.	--	Ref.	--

In binary logistic regression one category of each variable is set as the reference group (Ref.) so that all other categories are compared relative to it. For category one female is taken as the reference because: It is often the larger or more stable group in population surveys. epidemiologically, males often have higher outdoor exposure so hypothesized higher risk, It provides a baseline to see how much males are to be infected compared to females. For second category age group of 0-29 years as reference it is usually the largest age category in disaster-affected populations. It represents the youngest and potentially least exposed baseline group. Older age groups may have different exposure levels, immunity, or comorbidity. For third category reference educated individuals are used as reference because, they are assumed to have greater awareness of malaria prevention, hygiene, and health-seeking behavior. uneducated individuals are compared relative to this

baseline of awareness. Use of mosquito nets is taken "No" as reference because the absence of preventive measure ("No net") serves as baseline. Using a net ("Yes") is expected to reduce risk. Individuals with less knowledge are baseline. Comparison checks whether awareness affects infection risk. Or not. pregnancy status "No" is taken as reference non to pregnant individuals form baseline. Because pregnant women are a biologically vulnerable group. Symptoms (vomiting, headaches, sweating, chills) "No" as Reference is a Logical baseline: absence of symptom. Interpretation of Unadjusted Odds Ratios (UOR) Unadjusted Odds Ratio shows the association between one variable and malaria infection, without controlling for other variables

Table-3 presents the factors associated with the test positive malaria (including both caused by *P. Falciparum* and *P. Vivax)* with reference to individuals found negative. Gender, age and pregnancy were found significantly associated with malaria. Those who had already heard about malaria were also found associated with malarial positivity. Furthermore, out of all current symptoms, only headache and sweating were found associated with malaria. While adjusting for these factors, pregnancy was found to be more than 3-times [adj. OR= 3.22] likely to be associated with malaria than no pregnancy and males were found more than 6-times [adj. OR= 6.39] likely to be affected than females [95% CI= 2.666 – 15.382]. The link test revealed no problem with our specification [_hat= 0.003; hatsq= 0.106]. The overall Hosmer and Lemeshow's goodness-of-fit (GoF) test result also showed that the model fitted well [Pearson's chi-2 (52) = 57.97; p > 0.05].

DISCUSSION

Malaria remains a critical public health concern globally, particularly in regions which are vulnerable to environmental disasters such as flooding resulting in potential global health emergency, endangering human health and well-being for many years.[9] Many studies have been conducted globally to assess the impact of climate change on malaria; however, the uncertainty among the results persists with wider variation. It has been claimed that due to extremely high temperatures followed by floods due to climate change, certain vector such as Anopheles calcifies has been wiped off from Pakistan and has been replaced by a harmless mosquito known as Anopheles pulcherrimus, particularly in Sindh.[10] This change in trends of mosquitos due to climate change and flood urged us to analyze the data regarding plasmodium species and whether they have been affected by climate change and flood or not. Therefore, we aimed to examine the situation pertinent to malaria immediately after the flood that occurred in Pakistan in 2019 where Sindh province was massively affected and more than 10 thousand flood effete were suspected of being affected by Malarial infection. Understanding the seasonality of malaria parasitemia is crucial for planning and implementing effective malaria control interventions.[11] The findings of this study support the belief that seasonal climate change has caused fluctuations in malaria parasitemia in displaced populations. By observing the peak prevalence and density of *Plasmodium vivax* throughout the post-monsoon season (August to October), we were able to identify new seasonal trends in this study. Because of climatic change and the higher levels of gametocytemia produced by *Plasmodium Vivax* during the monsoon, there has been a seasonal shift in *Plasmodium Vivax* dominance and suppression of *Plasmodium Falciparum*. This seasonal change extended the summer and boosted the breeding habitat for mosquitoes, which in turn promoted the late summer spike of malaria.[12,13] The prevalence of malaria by species in our study was found as 11.7% for *Plasmodium vivax* and 1.67% for *Plasmodium falciparum*. The lowest prevalence of *Plasmodium vivax* is so far reported by Naqvi et al which was 8.38% in 2021.[7] Whereas the highest so far has been reported is by Khan et al which is 26.3% in 2019.[14] Our result is somewhere in between these two reported

prevalences. Similarly, Ullah et al in 2019 found out that the prevalence of Malaria resulting from *P. Falciparum* is much lower which is only 1.2% and our result is in line with it.[15] The highest prevalence of *P. Falciparum* was reported as 2.5% by Ajmal and Rehan in 2019.[16] Thus, we found no conflict with the existing reports; and therefore, safely claim that this could be because of the flood's altered temperature and humidity levels. Malaria in pregnancy is a threat to the normal delivery and is considered a major public health problem. Out of global pregnancies, 9.1% of pregnant women are at risk of malaria only in Eastern Mediterranean Region (EMRO). [17,18] Luckily, our study found only 45 pregnant women residing in this high risk flooded area. However, 10 of these pregnant women were found infected with malaria in our study. Although this number looks very small but this accounted for almost a quarter (22%) of all these pregnant women. This result is not so satisfactory because even in an African region like Ethiopia where around 14% of the pregnant women were malarial positive, even when these women were found residing near stagnant water.[19] On the contrary, our study data was collected immediately after flood occurred where water was still flowing and not stagnant. Other studies have also shown that susceptibility to malaria particularly in area where people reside in close vicinity to stagnant water.[20,21] Comparing our result with other local studies, a prevalence of 1.43% was observed by Qureshi et al, 2021,[22] and 7.54 % as reported by Afridi 2019. [23] Only one study shows a very high prevalence of malaria which is 42% in pregnant women.[24]. The discovery of malaria in pregnant women emphasizes the need for early identification and prenatal screening. According to our results, it was found crucial to provide rest of the 75% of pregnant women who were still malaria negative the preventive services like bed nets, and repellents etc. to keep them safe until their delivery or re-mobilize them to places away from the area before the flood water would get stagnated. With respect to the demographic variables of the study participants there were no significant differences found between those affected by *P. Falciparum* or *P. Vivax*. This finding was in conflict with the African regional data where early childhood age and pregnancy were the significant variables particularly related to *P. Falciparum* as compared to *P. Vivax*.[25,19] There may be a slight idea of the observation that more than 50% of participants belonged to younger age group who were found affected by *P. Falciparum.* However, this difference was not statistically significant. Moreover, when malaria caused by both species were combined and analyzed in our study, it was observed that increasing age was significantly associated with malaria. On the other hand, not a single pregnant woman was found affected *by P. Falciparum;* all were affected by *P. Vivax*, and therefore, the odds ratio remained unidentified. The preponderance of *P. Vivax* in expectant women emphasizes the necessity for precise species identification to direct suitable therapy. It is known that pregnant women are three times more likely to suffer from malaria as compared to women who are not pregnant.[25] Our study showed an adjusted odds ratio of 3.22 which is in line with this study. Furthermore, our multivariate analysis showed that males are 6 times more vulnerable to be affected by malarial infection than females. Typically, only high fever, myalgia and chills / rigors are found as classic signs and symptoms associated with malaria but in our study, factors found significantly associated with malaria were sweating and headache. This emphasizes how crucial it is to include malaria in the differential diagnosis. For problems to be avoided and the right therapy to be started, a prompt and correct diagnosis is essential. One important finding in our study which needs to be highlighted was that the participants who had already heard of malaria were 37% less likely to suffer from malaria. Malaria preventive programs may take leverage from this crucial finding and target towards increasing the awareness regarding malaria particularly in communities and areas effected by such disasters caused by climate change. This study offers a thorough analysis

of the demographics, diagnosis, and prevalence of malaria in a population that has been relocated (IDPs) within its limitations. The results underline the necessity of specialized healthcare interventions that take gender, age, and pregnancy status into account. The study also emphasizes the significance of precise species identification and the frequency of traditional malaria symptoms in the populace. However, the results being based on a cross-section of a limited population group of only those residing in the tents, they may not be enough to extrapolate the findings in the entire population. But based on the cross-sectional investigation, we may strive towards more effective malaria control and improved health outcomes in vulnerable groups by addressing these issues in order to lessen the impact of malaria in vulnerable areas. More longitudinal data may be required once an appropriate public health initiative has taken place focusing on population-based prevention programs towards malaria particularly in the seasons during which the population is most vulnerable.

CONCLUSION

This study identified a notable malaria burden (13.41%) among internally displaced persons (IDPs) affected by floods in Sindh and reported predominant species was *Plasmodium Vivax*. The association of age, gender, pregnancy and previous knowledge about malaria highly draw attention towards the need for targeted and inclusive healthcare strategies including preventive measures, early diagnosis, treatment approaches and syndromic surveillance to improve health outcomes.

CONFLICT OF INTEREST

None

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None

AUTHOR'S CONTRIBUTION

MAK: Conception of Idea, Data collection, data entry and cleaning, write-up

AQ: Data Analyses, interpretation, write-up and final review

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Original Article 1

NORMATIVE REFERENCE VALUES OF HAND GRIP STRENGTH AMONG GERIATRIC POPULATION OF LAHORE

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Abstract

Background: Ability to perform daily activities independently is crucial for the quality of life of the geriatric population. The objective of this study was reduced muscle strength is one of the major contributors to functional decline in geriatric population. Muscle strength is considered as an important part of examining the patient physically. The grip strength measurement through dynamometric method is highly valuable for indicating the major outcomes.

Material and Methods: A cross-sectional study was conducted at Farooq Hospital Lahore. (February 2023 to May 2023) in which the technique of non-probability convenient sampling was used, in order to collect data from 148 participants, among the geriatric population of Lahore.

Results: The average normative value of hand grip strength was determined using the upper extremity functional scale of the participants. The normative reference values for this cross-sectional study were 17.9 kg for women and 26.2 kg for men.

Conclusion: Normative reference values provide crucial benchmarks for assessing overall muscle strength in geriatric population.

Keywords: Normative refence values, Hand grip strength, Muscle strength

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INTRODUCTION

The ability to perform daily activities independently is crucial for the quality of life of the geriatric population. Reduced muscle strength is one of the major contributors to functional decline in older adults. It has been noticed widely and has been discussed in various publications that the grip strength measurement through dynamometric method is highly valuable for indicating the major outcomes.[1] Hand grip strength (HGS) is a simple and reliable measure of overall muscle strength, and it has been widely used to assess the functional ability of the geriatric population.[2] Muscle strength and effective hand grip is associated with ageing in human beings. Ageing involves various physiological changes in the body with the risk of occurrence of various chronic diseases. The physiological changes due to ageing are complex in nature and involves two geriatric syndromes named as Sarcopenia and frailty. Sarcopenia is defined as the geriatric syndrome which involves the decrease in muscle mass of an individual due to age. It involves the loss of muscle mass and its function in geriatric population. This further leads to the adverse outcomes including the reduction in lifespan and increased risk of death with disability. The diagnosis criteria is divided

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into stages of pre-sarcopenia, sarcopenia and severe sarcopenia according to the overall performance and strength. HGS is typically regarded as a routine component of a standard physical examination in clinical settings, alongside vital sign measurements. HGS evaluates the maximum voluntary strength of the hand and is commonly assessed using a dynamometer. Its simplicity and minimal training requirement make it a useful tool for screening and risk stratification of muscular strength and neuromuscular function, as well as indirectly assessing cardiovascular or pulmonary health, nutritional status, and identifying frailty and sarcopenia.[3] Normative reference values for HGS refer to the values obtained from a healthy and representative population, and they are used to determine whether an individual's grip strength falls within the expected range for their age, gender, and other relevant characteristics. [4] The normative values for HGS vary widely among different populations and ethnicities, and they also change with age.[5] Therefore, it is essential to establish age- and gender-specific normative values for hand grip strength among the geriatric population to accurately assess muscle strength and identify individuals at risk of functional decline.[6] Several studies have reported on the normative values for HGS among the elderly. For instance, it has been reported that the normative values for grip strength ranged from 16 to 30 kg for women and from 23 to 49 kg for men aged 60-69 years.[7] Similarly, it has been found that the normative values for grip strength ranged from 14.3 to 28.5 kg for women and from 21.4 to 46.4 kg for men aged 70-74 years.[8] These values serve as a reference point for identifying individuals who are at risk of functional decline and for tracking changes in muscle strength over time. Despite the importance of normative reference values for hand grip strength, there are several challenges associated with establishing these values. Firstly, the definition of what constitutes normal or abnormal grip strength varies widely among different studies and organizations. Secondly, there are several methodological issues related to the measurement of grip strength, such as the choice of dynamometer, the posture of the participant, and the number of measurements taken. These methodological issues can lead to discrepancies in the reported normative values and limit the comparability of different studies. Furthermore, there is a need to establish normative values specific to different populations and settings, as well as to determine the association between grip strength and other clinical outcomes.[9] The importance of normative reference values for HGS among the geriatric population is further highlighted by the fact that reduced grip strength has been associated with several adverse health outcomes. For instance, low grip strength has been linked to an increased risk of falls, functional decline, disability, and mortality among older adults.[10] So far, no studies have been performed in Pakistan which would determine the hand grip strength among geriatric population, which would point out certain underlying diseases related to hand grip strength such as cardiovascular diseases and other neurological deficits. Also, no certain standard has been developed in the region so far to determine normative reference values with respect to hand grip strength. The objective of this study is to measure the hand grip strength of geriatric population of Pakistan, and to determine the normative reference values of HGS among these population.

MATERIAL AND METHODS

The study sample consisted of people of both the genders aged above 65 years from different regions of Lahore. The study was conducted from February 2023 to May 2023 IRB Letter # REC-19-2025 during which the data was collected regularly. The objectives of the study were explained to each participant individually. The population was screened on the basis of the inclusion and exclusion criteria. The questionnaire comprised of demographic data and upper extremity functional index. People of both the genders between the ages of 65-100

were involved in the study, who belonged to different regions of Lahore. It was made sure that the participants were apparently fit, and those who volunteered for the study. People of both the genders who declined to participate, were excluded from the research. It was made sure that people suffering from cognitive impairments, diabetes and neurological diseases were excluded from the study.

RESULTS

The average normative value of HGS was determined using the upper extremity functional scale of the participants.
The normative reference values for this cross-sectional study were 17.9 kg for women and 26.2 kg for men.

Table: 1
Demographic data: Gender of participants

Gender	Frequency (n)	Percent (%)
Male	97	65.5
Female	51	34.5
Total	148	100.0

Table: 2
Demographic data: Gender of participants

Statistic	Value
Mean	4.9932
Std. Deviation	2.16495
Minimum	1.00
Maximum	10.00

Upper extremity functional scale score of participants ranged from 1-10 with mean value of 4.998+2.16

DISCUSSION

Hand Grip strength is used as a general indicator to determine the strength for some important outcomes. The measurements of HGS are required for getting the population-specific values to interpret the desired outcomes. The issue of HGS is prevalent among older adults, yet there is a lack of research on this topic, particularly in context of Pakistan. This study involved 148 participants, and a substantial majority of 31 individuals reported experiencing this issue of hand grip strength. Similarly, a cross-sectional study was conducted in British community to determine the differences among the HGS using the age and gender-stratified normative data to determine the HGS. The results indicated that the normative data deducted from the developing regions was lower with a Z-score of (-0.85 SDs).[11]
In the same way, a study conducted in the community of Germany compared the prevalence of sarcopenia and to determine its effect on the HGS and physical performance. This study measured the muscle strength using the HGS, skeletal muscle mass index (SMI) using the (DXA) dual energy X-ray absorptiometry and TUG (timed up and go test) as their functional parameter. The results indicated that the sarcopenia was prevalent with 24.3% as compare to reduced SMI, with reduced strength for grip (4.1%) having limited mobility of (2.4%). It was concluded that the reduced strength is strongly associated with the physical performance of an individual as compared to the reduced muscle mass.[12]
The average normative value of HGS was determined using the upper extremity functional scale score of participants, and among those participants, our cross-sectional study determined that the normative values for grip strength ranged from 14.3 to 28.5 kg for women and from 21.4 to 46.4 kg for men aged 70-74 years. These values would serve as a reference point for identifying individuals who are at risk of functional decline and for tracking changes in muscle strength over time.[13]
Normative values for adult handgrip strength (HGS) have been extensively reported over the past several decades. However, most of these standards have been derived from samples taken within specific cities or regions rather than from nationally representative

populations. Furthermore, they often focus on a narrow age range, typically older adults instead of encompassing the entire adult lifespan, including early, middle, and late adulthood.[14] While muscular strength cannot be represented by a single indicator, it is most commonly evaluated through handgrip strength (HGS) measured using a handgrip dynamometer. This method is practical and highly recommended for use in clinical, research, and community environments.

HGS testing offers a simple, safe, non-invasive, and reliable approach to assessing muscle strength across all age groups. It can be easily administered by personnel with limited training and allows for straightforward scoring and interpretation.[15] The assessment of strength capacity through handgrip strength demonstrates moderate to high construct validity and is associated with lower exclusion and dropout rates in epidemiological studies compared to more complex evaluations of total body or major muscle group strength. Additionally, handgrip dynamometers have become increasingly cost-effective, with research showing that inexpensive models produce HGS readings comparable to standard devices. HGS measurements hold strong clinical significance, as reduced grip strength is incorporated into diagnostic algorithms and assessment frameworks for conditions such as sarcopenia, dynapenia, and frailty. Moreover, HGS serves as an effective surveillance indicator for tracking long-term health trends in populations and for assessing and monitoring the impact of public health interventions.[16]

CONCLUSION

Based on the findings of this Study, it was observed that then mean normative reference values for this cross sectional study were 17.9 kg for women and 26.2 kg for men

CONFLICT OF INTEREST

None

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AUTHOR'S CONTRIBUTIONS

SA: Data Collection, Analysis and synopsis writing
MMA: Data Analysis and final draft
HB: Assistance in literature Review
SK: Assistance in Data collection

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Original Article

BRIDGING THE GAP: EXPLORING THE ACCEPTANCE OF ARTIFICIAL INTELLIGENCE PREDICTIONS IN FERTILITY TREATMENT BY PATIENTS

Noor-i-Kiran Naeem

Abstract

Background: As Artificial Intelligence (AI) becomes increasingly integrated into healthcare, it becomes important to understand the viewpoint of the patients, as they are the main stakeholders in healthcare management. In reproductive medicine, predictive AI is demonstrating its role in the management of subfertility treatment. However, the viewpoint of the patients remains unexplored. The Objective of this study was to explore the acceptance of using AI predictions in the treatment of subfertility among female patients seeking consultations.

Material and methods: An exploratory qualitative study was conducted with individual semi-structured interviews of sixteen female patients undergoing subfertility treatment at Dr. Rehmatullah's Hospital, Gojra. After taking informed consent, data were collected upon data saturation from June 2024 to August 2024. Interview transcripts were transcribed, translated with validation, and analysed for emerging themes using Braun and Clarke's steps of thematic analysis.

Results: Data analysis revealed 6 themes and 15 codes, including AI accuracy, need for clinician presence, transparency and clarity of process, data privacy concerns, and patient education. The study participants highlighted both hope as well as concerns for using AI for predictive analysis in subfertility treatment.

Conclusion: This study highlights that patient acceptance of Artificial Intelligence in fertility care is deeply linked to trust, transparency, clinician involvement, and ethical reassurance.

Key words:
Artificial Intelligence; Patient Acceptance of Health Care; Decision Making, Computer-Assisted; Reproductive Techniques, Assisted; Trust.

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INTRODUCTION

Artificial Intelligence (AI) has demonstrated significant potential to enhance diagnostic accuracy, predict treatment outcomes, and improve the overall efficiency of clinical decision-making.[1,2] The multi-faceted role of AI in multiple disciplines has already begun to transform clinical workflows and patient management. On the other hand, subfertility treatments are often complex, costly, and stressful for couples. The decision-seeking couples are often exhausted and seek solutions with a positive outcome that they can trust. AI has an emerging role in supporting decision-making for such patients by analyzing patient presentations, clinical and hormonal markers to predict treatment success.[2] This predictive ability of AI can aid clinicians in counselling patients with evidence-based data, providing optimal treatment suitable for individual

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couples. In its long-term impact, it can hence reduce the psychological and financial burden on patients by providing accurate predictions about what can work and what cannot.[3] Although AI holds promise for patient management, its acceptance remains uncertain. In sensitive areas such as conception and reproduction, where personal data and intimate decisions are involved, patient trust is less frequently addressed. Existing studies point to a lack of awareness about how AI functions, along with skepticism regarding data privacy, both of which can hinder patient acceptance.[4,5] In addition, important ethical issues including informed consent, transparency, and accountability in AI-assisted clinical care have yet to be fully explored in reproductive health settings.[6] Globally, much of the research on AI in healthcare has focused on technical dimensions such as performance, accuracy, and system-level integration.[7]

Far less attention has been paid to how patients themselves view AI, and in the area of fertility treatment, this neglect is particularly evident. In order to understand the context of the patients and how "ready" they are to accept AI tools for healthcare predictive analysis and disease management; it will be difficult to integrate AI into healthcare management.[4] Hence the successful use of AI in healthcare relies heavily on the perceived trust, awareness, and willingness to accept AI in clinical decision-making.

The lack of this evidence in reproductive medicine leaves a critical gap in achieving safe and ethical AI Integration into management. This study aimed to explore how female patients undergoing subfertility treatment perceive and accept the use of Artificial Intelligence in clinical decision-making. Specifically, it sought to identify the factors that influence their trust, awareness, privacy concerns, and willingness to engage with AI-based predictive tools.

MATERIAL AND METHODS

This study adopted a qualitative exploratory design, well-suited for gaining an in-depth understanding of participants' perceptions and experiences without the constraints of pre-defined theoretical models. Semi-structured interviews allowed participants to freely express their views while ensuring coverage of the key study objectives. The study was conducted at the infertility clinic of Dr. Rahmatullah's Hospital, Gojra, Pakistan, from June 2024 to November 2024. IRB number is AWBA/DME/MC/539/24 dated 17th May 2024. The clinic provides diagnostic and therapeutic services for couples undergoing fertility treatment and serves as a trusted site for patients from both urban and rural catchments. The target population included patients currently undergoing fertility treatment at the clinic. Purposive sampling was used to ensure diversity in terms of age, type (primary or secondary), and duration of infertility. Participants were eligible if they were receiving fertility treatment during the study period were able to provide informed consent; and were willing to share their perceptions and experiences regarding AI. Patients unwilling to participate or those experiencing acute psychological distress were excluded. A total of 16 female participants were recruited after explaining the nature of the study and obtaining informed consent. Recruitment continued until data saturation was reached, defined as the point when no new codes or themes emerged from subsequent interviews. Individual semi-structured interviews were conducted in a private consultation room to ensure confidentiality and comfort. Each interview lasted approximately 30–45 minutes and was guided by an interview schedule with open-ended questions. An interview protocol was developed via a literature review followed by pilot testing on 2 patients to check for understanding of the interview questions. Interviews were conducted in the Urdu language and were audio-recorded with permission. Verbatim transcripts, after translation to English, were prepared, and non-verbal observations were noted in field diaries. Table 1 presents key questions and probes guiding the interviews.[8]

Table 1: Interview Protocol guiding individual semi-structured interviews.

Guiding Questions	Probes
What do you know about Artificial Intelligence in healthcare or fertility treatment?	Where have you heard about AI? How do you think it works?
Do you think AI could be helpful in predicting the success of your fertility treatment?	In what ways could it be useful or not useful for you?
Would you be comfortable trusting AI predictions about your chances of conception?	What would make you feel more confident about such predictions?
How do you think AI should be used alongside your doctor's advice?	Should AI replace or support doctors? Why?
What concerns or worries would you have if AI were used in your treatment?	Do you worry about your personal data or decision-making?
Under what conditions would you accept AI as part of your fertility treatment?	What would make you reject it?

Data were analyzed using Braun and Clarke's (Braun & Clarke, 2006) six-phase thematic analysis, facilitated by Atlas.ti software (version X).[9] The process was iterative and reflective, ensuring deep engagement with participant narratives. First, transcripts were read repeatedly for familiarization, and memos were recorded in Atlasti. Second, initial codes were generated inductively, capturing both explicit statements and underlying meanings. Third, codes were clustered into categories using Atlas.ti's network view, creating broader themes. Fourth, themes were reviewed for internal consistency and alignment with the dataset. Fifth, themes were refined, defined, and named to capture their essence. Finally, a report was produced, integrating illustrative quotations from participants. To enhance rigor, coding was cross-checked by a second reviewer in Atlas.ti, and discrepancies were resolved through discussion. A reflexive journal-maintained transparency of analytic decisions. Ethical approval was obtained from the Institutional Review Board (IRB) as well as permission to collect data from the data collection site prior to data collection. All participants provided written informed consent. Anonymity was maintained by assigning participant codes (e.g., P1, P2). Sensitive data were securely stored, and participants retained the right to withdraw at any stage without consequences to their treatment. The study adhered to Lincoln and Guba's criteria for trustworthiness.[10] Credibility was ensured through prolonged engagement, peer debriefing, and the use of verbatim quotations. Transferability was enhanced by detailed contextual descriptions. Dependability was supported through audit trails and documentation of analytic decisions. Confirmability was maintained by reflexive journaling and triangulation of interpretations.

RESULTS

A total of six overarching themes and fifteen codes emerged from data analysis. These themes capture the perceptions, expectations, and concerns of patients regarding the use of artificial intelligence in fertility treatment.

Table 2. Themes, Subthemes, and Codes Identified in Patient Perspectives on AI in Fertility Treatment

Theme	Representative Codes
Trust in AI Systems	Consistency, prediction accuracy, confidence
Knowledge & Awareness	Understanding, curiosity, lack of awareness
Complementing Clinical Practice	Human oversight, AI as support, not replacement
Data Privacy	Confidentiality, data security, autonomy
Explanation & Guidance	Clear communication, patient education
Clarity of Processes	Transparency, accountability, process understanding

Most patients talked about concerns regarding trusting AI. Participants highlighted that for AI to be accepted in clinical management, it should be reliable and provide accurate answers. Further patients discussed the importance of having a transparent system for using AI. They wanted clarity on how AI-generated insights

would be incorporated into treatment plans. Participant P10 said, "If I understand clearly how my data is used, I would feel more comfortable." This calls for a need to disseminate information about AI and its accountability. Participant P3 remarked, *"I need to be sure the AI system is reliable before I can trust its predictions about my treatment."* Another participant, P7 said, *"If the AI tool shows high accuracy, it would give me more confidence in following its recommendations."* The participants revealed varying levels of awareness about AI. Many of the participants reported limited exposure to AI and how it functions. One participant, P5, acknowledged, *"I don't fully understand how AI works or how it applies to my case."* While most of the patients felt unrelated to knowing about AI, some participants were curious and willing to learn more, noting that they were open to discovering possible benefits. This variation in understanding of AI Represents a clear knowledge gap, emphasizing a need for structured patient education on AI during subfertility consultations. Most of the study participants discussed that instead of using AI as a standalone tool, it can be used as a supportive tool and cannot be a substitute for the clinical expertise provided by the doctor herself. Participant P11 noted, *"I hope AI doesn't replace the person, but only supports the doctor in making decisions."* Similarly, another participant, P8, explained, *"AI can help, but I still want my doctor to explain things and guide me."* These perspectives highlight a clear preference for collaborative human–AI integration, with clinicians remaining central to patient care. Participants were inquiring about the use of data while using AI and showed concerns about the confidentiality of personal and medical information. Participant P2 shared, *"I worry about the privacy of my data and how it is being used by the AI."* Some participants expressed concern that their personal data might be misused or that confidential clinical information could be leaked. These entities point to the broader ethical implications of introducing AI into subfertility care. Patients emphasized the need for clarity in how AI-generated predictions about their treatment outcomes They felt that transparency in this process was essential for building confidence and trust. Participant P13 said, *"It is important for me to know how the AI comes to its results, not just what it says."* Such expectations highlight the important role of clinicians in explaining AI outputs, offering reassurance, and ensuring that the patients remain active partners in the decision-making process. Finally, participants emphasized the importance of having a transparent process in the implementation of AI. They expressed the need to be informed about when and where AI would be applied in their treatment and how their personal data would be utilized. Participant P1 said, *"If I understand clearly how my data is used, I would feel more comfortable*

DISCUSSION

This study aimed to explore how patients viewed the use of artificial intelligence in subfertility care. The findings demonstrated that although patients acknowledged the potential benefits of AI, their acceptance is dependent on multiple factors. This study revealed those factors as trust, awareness, clinician involvement, privacy, and process transparency. Another factor adding to the complexity of patients' acceptance was the limited knowledge and awareness that patients demonstrated regarding AI. Although a few experts expressed curiosity, many admitted confusion and uncertainty about how AI related to their treatment and were openly skeptical about its use. This reflects the study findings of Saatci et al., who emphasized that the effective implementation of AI must be accompanied by efforts to strengthen AI awareness among the patients.[7] In the context of subfertility care, where decisions carry significant emotional and social burdens, the need for education and reassurance becomes even more pressing. The patients also highlighted the strong resistance to the notion of AI replacing clinicians. The patient emphasized the irreplaceable quality of

empathy, contextual judgment, and personal care provided by the clinicians, which cannot be replaced by AI. A study from consumer psychology indicated patient reluctance when AI appears to undermine human agency.[11] In contrast, our present study revealed that patients do not reject AI outright. Instead, they view it as a valuable tool only when embedded within human-led care. In other words, AI is acceptable when it operates as a supportive tool under the guidance of clinicians, rather than as an autonomous decision-maker. These insights resonate with the call for a human in the-loop system in medical AI, which reinforces that technology should serve to enhance, not replace, doctor-patient relationships.[12] In our study, patients expressed anxiety about sharing their sensitive reproductive information, which highlights that current ethical frameworks are not sufficient to ensure responsibility.[13,14] These concerns are consistent with Lupton's view that digital health data is never neutral but carries deep social and emotional significance to those it represents.[15] In reproductive care, these sensitivities are heightened by family aspirations and cultural expectations, making privacy and security particularly critical. This hence calls for a need of a robust governance system that can ensure accountability, confidentiality, and responsible data management. Another key factor influencing patient acceptance was the need for clear explanations of how predictions were generated. Patients indicated that outcomes alone were not sufficient. They also wanted to understand the reasoning and processes that produce those results. This finding aligns with the growing literature on explainable AI, which cautions that reliance on black box algorithms risks distancing the very individuals technology is intended to support.[16] In the context of subfertility care, transparent communication combined with clinical lead interpretation of AI output can provide reassurance, enhance trust, and enable patients to participate more confidently in the shared decision-making process.[17] This study showed that patient acceptance of AI in subfertility care cannot be reduced to a simple choice of acceptance or rejection. Instead, it is a negotiated process in which patients carefully balance the potential benefits against the possible risks. Their willingness to engage is shaped not only by the accuracy and performance of the technology but also by wider expectations of trust, transparency, accountability, and ethical responsibility. These findings highlight that the adoption of AI is socially constructed and shaped by context. For developers and policymakers, the challenge is therefore to move beyond technical optimization and respond to the lived realities, concerns, and values of patients if AI is to be meaningfully integrated into reproductive healthcare. This study had various strengths. The use of qualitative methods provided rich contextualized insights that could not be captured by quantitative surveys. Additionally, adopting Braun and Clark's thematic analysis ensured of systematic yet flexible approach to coding and theme analysis. However, limitations must also be acknowledged. The study was conducted in a single center in Pakistan, which may limit transferability. Also, cultural factors including patient's prior exposure may shape perceptions in ways that differ from other contexts, suggesting the need for research across diverse populations and geographical locations.

CONCLUSION

This study highlights the importance of building trust, transparency, and ethical safeguards when integrating Artificial Intelligence into fertility care.

CONFLICT OF INTEREST

None

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AUTHORS'S CONTRIBUTIONS

NIK: Idea Conception, Data Collection, Analysis, Manuscript Writing

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Original Article

ASSESSMENT OF CARPAL TUNNEL SEVERITY IN THIRD-TRIMESTER PREGNANCY USING THE BOSTON CARPAL TUNNEL QUESTIONNAIRE (BCTQ) AT JINNAH HOSPITAL, LAHORE

Maira Saeed, Aimen Saeed, Sobia Zia Raheela Amjad, Umer Ali.

ABSTRACT:

Background: Carpal Tunnel Syndrome (CTS) is the entrapment of the median nerve at the level of wrist causing symptomatic neuropathy. The most typical symptoms are numbness and tingling in the thumb, index, middle, and radial half of the ring finger. Other common manifestations include burning dysesthesia wrist pain as well as the loss of grip strength and dexterity. Objective of this study was **t**o determine the severity of carpal tunnel syndrome in third trimester of pregnancy with using the Boston carpal tunnel syndrome questionnaire (BCTSQ) in Gynecology and Obstetrics outdoor of Jinnah Hospital Lahore.

Material and Methods: In this cross-sectional observational study,87 subjects were included in study by Non-Probability Convenience sampling technique. Boston carpal tunnel syndrome questionnaire (BCTSQ) was used to evaluate subjects to detect carpal tunnel syndrome severity. Data was analyzed using SPSS version 21.

Results: As per Boston Carpal Tunnel Symptom Severity Scale (BCTQ-SSS), from the total of 87 people who answered the survey, 18 (20.7%) reported with slight symptoms, 44 (50.6%) moderate ones, 22 (25.3%) severe ones, and 3 (3.4%) very severe ones.

According to Boston Carpal Tunnel Functional Status Scale (BCTQ-FSS), we took the same group of 87 respondents, 39 (44.8%) reported with slight functional impairment, 30 (34.5%) moderate, 14 (16.1%) severe, and 4 (4.6%) very severe.

Conclusion: This study concluded that third-trimester pregnant women generally experience mild functional impairment and moderate symptom severity of carpel tunnel syndrome.

Keywords: Boston carpal tunnel Functional status scale, Boston carpal tunnel symptom severity scale, Carpal tunnel syndrome

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INTRODUCTION

Carpal Tunnel Syndrome (CTS) results in compressive neuropathy when the median nerve gets entrapped at the wrist, consequently causing the hand and fingers to have sensory and motor symptoms.[1] According to the American Academy of Orthopedic Surgeons, CTS is the entrapment of the median nerve at the wrist, which leads to symptomatic neuropathy.[2,3]The most common manifestations of the disease are numbness, tingling, and weakness in the thumb, index finger, middle finger, and the radial half of the ring finger. The disease is very common in women, especially during pregnancy when there are hormonal, vascular, and mechanical changes that make the nerve more susceptible to being compressed.[4] The incidence of CTS among pregnant women is very different, ranging from 2% to 62%, and

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this is due to the varying characteristics of the study participants and the diagnostic methods used.[5] The majority of cases occur in the third trimester due to swelling of the body tissues, general edema, and increased pressure inside the wrist area. For the pregnancy period, CTS is a contributing factor to severe pain and discomfort, decreased physical ability, and a lower quality of life. Therefore, its evaluation and treatment are a significant concern in obstetrics.[4, 6] Various researchers have explored the clinical symptoms and underlying risk factors of CTS during pregnancy.[7] The recent developments bring to light the influence of hormonal fluctuations, gestational diabetes, obesity, and body mass index in the process. According to Gahlot et al, women's suffering from higher fluid retention and metabolic changes experienced it more.[8] Dias et al, pointed out gestational diabetes and maternal age to be the non-modifiable risk factors,[9] whereas Elmoniem et al, showed that the educational program had a positive impact on the degree of symptoms and functional condition of pregnant women suffering from it.[10] The (BCTQ) Boston Carpal Tunnel Questionnaire, which comprises the Symptom Severity Scale and Functional Status Scale, is still one of the most validated and reproducible patient-centered tools for assessing the severity of CTS and evaluating treatment outcomes. Although the number of studies from different countries is increasing, South Asia is still not well represented in terms of literature, and there is a lack of local epidemiological data.[10] Carpal tunnel syndrome (CTS) during pregnancy is a well-known and widely recognized condition, yet there is still not enough information regarding its clinical profile and severity in Pakistani women. The severity of pregnancy-related carpal tunnel syndrome (PRCTS) has not been investigated in published studies that utilized standardized techniques, such as the BCTQ.[4, 11] Grasping the level of functional disruption and symptom burden in third-trimester women would support improved screening, early intervention, and postpartum management. Given the limited local data, particularly from Pakistan, this study aimed to fill the gap by evaluating the severity of carpal tunnel syndrome using the Boston Carpal Tunnel Syndrome Questionnaire (BCTQ) among pregnant women in their third trimester visiting the Gynecology and Obstetrics Outpatient Department at Jinnah Hospital, Lahore.

MATERIAL AND METHODS

The current research was a cross-sectional observational study done at the Gynecology and Obstetrics Outpatient Department of Jinnah Hospital, Lahore, for six months after getting the research synopsis approved. Ethical review board (ERB) of Allama Iqbal Medical College/Jinnah Hospital Approved the study with reference no. 189/27/01/2022/S1 ERB.

The study group had only third-trimester pregnant women who were diagnosed with carpal tunnel syndrome (CTS). Eighty-seven participants were recruited using a non-probability convenience sampling technique. Women were added to the study if they were in their third trimester and passed the CTS diagnosis criteria by the Carpal Tunnel Syndrome-6 (CTS-6) scale. The study did not include participants who had other neurological, metabolic, or musculoskeletal disorders, such as cervical radiculopathy, gout, thyroid disease, hypertension, gestational diabetes, or any previous wrist trauma. As part of the data collection process, medical history was taken as per guidelines and questionnaires were not only structured but also standardized. First, the diagnosis of CTS was confirmed using the CTS-6 diagnostic tool that evaluates the median nerve distribution of symptoms, nocturnal numbness, thenar muscle atrophy, and clinical tests such as Phalen's, Tinel's, and two-point discrimination. Afterward, patients diagnosed with carpal tunnel syndrome were subjected to the BCTQ test for the evaluation of symptom severity and functional impairment.[12] There are two components of the BCTQ test: The Symptom Severity Scale (containing 11 items) and the Functional Status Scale (consisting of 8 items). Each item was rated using a 5-point

Likert scale where the highest score indicated the most severe symptom or greatest functional limitation. The data were collected through direct interviews conducted manually and recorded on pre-designed proformas.

All actions were taken following informed consent, a promise of participant anonymity, and the observance of ethical norms during conversations with the participants. SPSS version 21 was utilized to perform the data analysis. The numerical variables like age, symptom severity, and functional scores were presented in terms of mean ± SD and range, while the categorical variables such as the number of births and severity grades were delineated in terms of counts and percentages. The chi-square test was used to evaluate the associations among the categorical variables, and t-tests or ANOVA was applied to discover discrepancies in the mean scores when suitable. A p-value of less than 0.05 was regarded as statistically significant.

RESULTS

The research comprised 87 expectant mothers in their third trimester who had been diagnosed with carpal tunnel syndrome (CTS). The participants' average age was 26.16 ± 4.47 years, weight was 66.97 ± 12.82 kg, and height was 60.97 ± 6.95 inches. The average gestational age was 33.54 ± 3.08 weeks, with an overall parity of 2.45 ± 1.58. The CTS-6 evaluation revealed that every participant (100%) had provoked symptoms in the distribution area of the median nerve, while 94.3% of them stated having numbness during the night. Moreover, therapeutic hand exercise practice, among others, reported that 65.5% of the population had muscle wasting in the thenar area, the positivity rate for Phalen's test was 77%, Tinel's sign was identified in 43.7%, and 58.6% of the participants were indicated to have lost the ability to differentiate between two points. The average CTS-6 score obtained was 18.01 with a standard deviation of 3.24, while the minimum and maximum scores were 12 and 26, respectively. Figure no. 1 showing detailed result of CTS-6 evaluation.

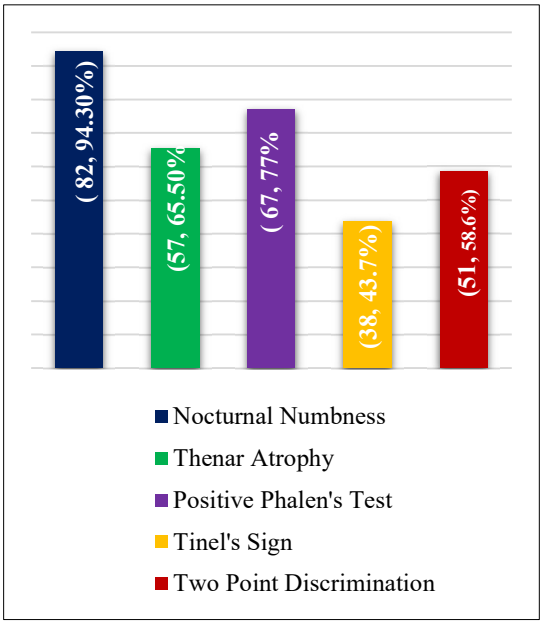

Figure no. 1: Carpel Tunnel Syndrome-6 Evaluation

The average result for the Symptom Severity Scale (SSS) was 29.06 ± 7.81, while the Functional Status Scale (FSS) score was 18.69 ± 6.81. According to BCTQ classification:

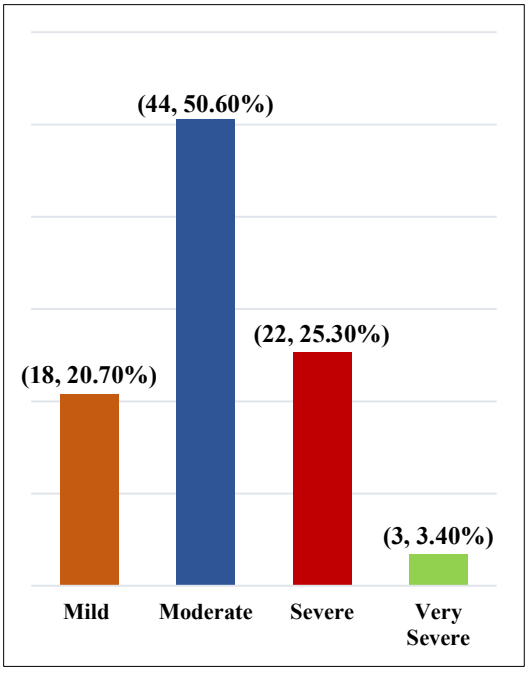

Figure no. 2: BCTQ Symptom Severity and Functional impairment distribution

There was a significant link between BMI and the Functional Status Scale (p = 0.028), while no significant connection between BMI and the Symptom Severity Scale (p = 0.221) was noticed. The distribution of BMI among subjects with severe functional impairment was as follows: 50% were obese, 28.6% were overweight, and 21.4% had normal BMI. On the other hand, 75% of very severe functional impairment patients were obese.

Table no. 1: Association between BMI and BCTQ Scores

SEVERITY	BMI			Total	P value
	Normal BMI (18 - 24.9)	Over weight BMI (25 -29.9)	Obese BMI > 30)		
Functional status scale (8 items)					
Mild Score (9 - 16)	20	9	10	39	0.028
	51.3%	23.1%	25.6%	100.0%	
Moderate Score (17 - 24)	6	14	10	30	
	20.0%	46.7%	33.3%	100.0%	
Severe Score (25 - 32)	3	4	7	14	
	21.4%	28.6%	50.0%	100.0%	
Very Severe (33 – 40)	0	1	3	4	
	0.0%	25.0%	75.0%	100.0%	
Symptom severity scale (11 items)					
Mild Score (12 - 22)	10	4	4	18	0.221
	55.6%	22.2%	22.2%	100.0%	
Moderate Score (23 - 24)	14	13	17	44	
	31.8%	29.5%	38.6%	100.0%	
Severe Score (34 - 44)	5	10	7	22	
	22.7%	45.5%	31.8%	100.0%	
Very Severe (45 - 55)	0	1	2	3	
	0.0%	33.3%	66.7%	100.0%	

Age and functional status did not show any statistically significant association (p = 0.476) and the same applied for the case of symptom severity (p = 0.559). Nonetheless, a considerable proportion of women with severe and very severe CTS were under 30 years old.

Table no. 2: Association between Age and BCTQ Scores

SEVERITY	Age		Total	P value
	< 30 Year	> 30 Year		
Functional status scale (8 items)				
Mild Score (9 - 16)	31	8	39	0.476
	79.5%	20.5%	100.0%	
Moderate Score (17 - 24)	26	4	30	
	86.7%	13.3%	100.0%	
Severe Score (25 - 32)	10	4	14	
	71.4%	28.6%	100.0%	
Very Severe Score (33 – 40)	4	0	4	
	100.0%	0.0%	100.0%	
Symptom severity scale (11 items)				
Mild Score (12 - 22)	13	5	18	0.559
	72.2%	27.8%	100.0%	
Moderate Score (23 - 24)	36	8	44	
	81.8%	18.2%	100.0%	
Severe Score (34 - 44)	19	3	22	
	86.4%	13.6%	100.0%	
Very Severe (45 - 55)	3	0	3	
	100.0%	0.0%	100.0%	

DISCUSSSION

This research determined the degree of carpal tunnel syndrome (CTS) in pregnant women who were in the third trimester while visiting the Gynecology and Obstetrics Department of Jinnah Hospital, Lahore. The third trimester was selected as the time when multiple recent studies reported that CTS was mostly caused by hormonal changes, the increase in fluid retention, and the compression of the wrist.[6] The Boston Carpal Tunnel Questionnaire (BCTQ), a reliable and patient-centered tool,

was employed to measure impact and function. Out of 87 participants, 39 (44.8 %) were found to have mild functional impairment, and 44 (50.6 %) had moderate symptom severity, suggesting that the majority of the cases were non-severe but still clinically relevant.[6]

The results of the current investigation are in agreement with a number of studies that have been published over the past ten years. As a matter of fact, Meems et al, noted that the majority of women experiencing pregnancy-related carpal tunnel syndrome (CTS) exhibited mild-to-moderate symptoms, which did not greatly affect their daily activities. [13]

In a more recent study, Padua, Coraci et al, have indicated that the swelling and nerve compression which is characteristic of late pregnancy is related to the median nerve's electrophysiological changes but usually does not lead to severe dysfunction.[14] On the other hand, Elmoniem, Abdelhakm et al, showed that the educational interventions had a great effect on the already reduced symptom severity and increased functional outcomes in the case of the affected women, thus pointing out the need for antenatal awareness.[10, 15] For the purpose of diagnosis, the CTS-6 clinical assessment was applied in this research, which included symptoms located in the distribution of the median nerve, thenar muscle wasting, and also the Phalen's and Tinel's tests. The current literature still supports this method as a quick and non-invasive screening technique.[6] These findings add to the already substantial global evidence that pregnancy-related CTS is a frequent occurrence, but its severity is usually mild to moderate. By not considering other conditions like diabetes and thyroid disease in this group, it was easier to find idiopathic CTS during pregnancy. However, the pain from even moderate CTS can be very bothersome and affect the women's performance during the last months of their pregnancy. Early ergonomic education, splinting, and conservative management may improve maternal comfort and prevent postpartum complications. This research presents the case-specific data from Pakistan which is in line with the global trends predicted around 2015 and 2025, and it also indicates the necessity for early detection and prevention of pregnancy-related carpal tunnel syndrome.

CONCLUSION

The research ultimately states that the Boston Carpal Tunnel Syndrome Questionnaire (BCTQ) is a reliable and convenient method for the assessment of carpal tunnel syndrome (CTS) in pregnant women. The majority of the third-trimester women showed only slight functional impairment and moderate symptoms severity, which proves that CTS during this period is very common but hardly if ever, painful. No relationship was found between age and symptom severity or function, but higher BMI was associated with more limitation in function. This study points out the potential of BCTQ in detecting pregnancy-related CTS and at the same time underlines the necessity of early diagnosis and supportive care in order to enhance maternal comfort and hand function in the last trimester of pregnancy.

LIMITATIONS

This research is not without limitations. Generalization might be an issue because of the small sample size and the fact that the data were gathered in one place. The participants were only pregnant women in their third trimester suffering from idiopathic carpal tunnel syndrome, thus excluding those with other neurological or metabolic disorders. The study only assessed severity, not prevalence or treatment outcomes. Due to time and resource limitations, data collection had to be done in a short period, and some participants' limited knowledge of CTS might have impacted the accuracy of their responses. As a result, the findings apply only to the third-trimester pregnant women at Jinnah Hospital in Lahore and should be taken with caution.

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None.

CONFLICT OF INTEREST

None

AUTHOR'S CONTRIBUTIONS

MS: Principal Investigator, Data Collection
AS: Data Analysis, Initial Results Write up
SZ: Final Article Write up
RA: Critical Review, Rewriting and Results Modification
UA: Data Collection, writing and review

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Case Report

RARE CASE OF HENOCH–SCHÖNLEIN PURPURA IN A 34-YEAR OLD MALE

Omair Farooq, Ibtahaj Mohsin Iqbal, Izza Ali Rai, Muhammad Omar Rashid, Adeena Afzal, Zara Afzal, Fiza Ashfaq

Abstract:
Henoch-Schönlein purpura (HSP), also known as IgA vasculitis, primarily affects children but can also occasionally present in adults. The symptoms are thought to result from the deposition of IgA in the walls of blood vessels within various organs, most commonly the skin, gastrointestinal tract, joints, and kidneys. Here, we report a case of a 34-year-old man who developed severe abdominal pain resembling acute appendicitis two weeks after a viral gastrointestinal infection and administration of cefoperazone-sulbactam antibiotic. The diagnosis of HSP was established based on a progression of symptoms, including severe abdominal pain, arthralgias, melena, and a distinctive non-blanching rash on the trunk and lower extremities. This report will detail the diagnostic workup and treatment approach that resulted in symptom resolution in this unusual adult presentation of HSP.

Key Words: IgA vasculitis, Henoch-Schönlein purpura; adult case; abdominal pain; non-blanching rash; melena

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INTRODUCTION

Immunoglobulin A (IgA) vasculitis is a sudden-onset systemic condition characterized by inflammation of small blood vessels due to the buildup of IgA-containing immune complexes around them and the activation of neutrophils. infectious agents such as viruses or bacteria, as well as certain medications or toxins.[1] The hallmark features of Henoch-Schönlein purpura (HSP) typically consist of four key symptoms: raised purplish skin rashes (palpable purpura (100%), joint discomfort or arthritis (60–75%), abdominal pain and bloody stools (50-65%) and nephropathy (20–55%). The order in which symptoms appear can differ among patients; some may develop the characteristic rash first, while others might experience abdominal pain up to two weeks before the rash emerges. In 10–40% of patients, gastrointestinal manifestations may precede the onset of skin purpura.[2] Abdominal pain in IgA vasculitis is often diffuse, colicky, or angina-like in nature, and may localize to the periumbilical area. It is frequently associated with symptoms such as nausea, vomiting, diarrhea, rectal bleeding, or melena as demonstrated in our case report as well. In certain cases, the clinical picture can resemble an acute surgical abdomen. A fecal occult blood test is recommended to help identify subclinical gastrointestinal involvement.[3] The diagnostic criteria for HSP/IgA vasculitis include the Ankara 2008 classification criteria for IgA vasculitis (IgAV), supported by both the European Alliance of Associations for Rheumatology (EULAR) and the Pediatric Rheumatology European Society (PReS). According to these criteria, the

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presence of purpura is essential for diagnosis, accompanied by at least one of the following: (a) abdominal pain, (b) biopsy-confirmed IgA deposits, (c) joint pain or arthritis, or (d) kidney involvement, such as hematuria or proteinuria. These criteria were assessed using data from 827 patients diagnosed with IgAV and 356 with other vasculitis's, demonstrating a sensitivity of 100% and specificity of 87% in pediatric cases. Initially made for pediatric population, these criteria hold true for adult population as well after numerous trials showing both increased specificity and sensitivity in adult population.[4] Management of milder symptoms is usually symptomatic involving hydration and analgesics. NSAIDs are beneficial in arthralgias but should be avoided in case of renal and gastrointestinal system involvement due to potential worsening of symptoms as demonstrated in our case report as well. In case of severe clinical manifestations especially in adults, glucocorticoids alone or with an immunosuppressive agent are the first choice of treatment. They are especially beneficial during the early and acute phases of the disease, owing to their potent anti-inflammatory properties and quick therapeutic effect. However, the effectiveness of these treatment approaches remains a subject of ongoing debate, with no clear consensus established.[5] This case report underscores the uncommon presentation of Henoch-Schönlein purpura (HSP) in an adult male, a condition that predominantly affects the paediatric population. It also illustrates how the patient's severe abdominal pain, initially suggestive of acute appendicitis on ultrasound, was accurately diagnosed through appropriate investigations. Prompt initiation of moderate-dose corticosteroid therapy led to a successful resolution of symptoms.

CASE SUMMARY

A 34-year-old male (identifier withheld), presented on 5 August 2025 with a 10-day history of fever, abdominal pain, palpable purpura, and melena. The illness began on 26 July 2025, when he developed diffuse colicky abdominal pain after consuming shawarma and a soft drink. The pain persisted despite oral and intravenous analgesics and empiric antibiotics. Over the following days, the pain localized to the right iliac fossa with rebound tenderness, leading to a provisional diagnosis of acute appendicitis. On 3 August, he developed melena, and by 5 August, multiple palpable non-blanching purpuras appeared on his lower limbs, prompting hospital admission. He also reported fever, arthralgias, myalgias, nausea, and vomiting. His past history included a recent viral illness and two unspecified "SUM" injections prior to symptom onset. During hospitalization, proteinuria, microscopic hematuria, and a decline in GFR were noted, consistent with renal involvement. On admission, the patient was alert and oriented with a Glasgow Coma Scale (GCS) of 15/15. His vital signs were stable, with blood pressure of 118/76 mmHg, pulse 88 bpm, temperature 37.2 °C, and normal oxygen saturation. Examination revealed multiple palpable purpuric lesions on both lower limbs (*Figure 1 shows purpura on the patient's feet; Figure 2 shows purpura on the back; Figure 3 shows purpura on the arm*). The abdomen was soft but tender in the right iliac fossa, with normal bowel sounds and no guarding or rigidity. Cardiovascular and respiratory examinations were normal, with audible S1 and S2 and vesicular breath sounds, respectively. Neurological examination showed no focal deficit. Laboratory evaluation revealed markedly elevated inflammatory markers with CRP >100 mg/L, lactate 10.4 mmol/L, and D-dimer >100, while procalcitonin was normal. Liver and renal functions were initially preserved, and electrolytes were within normal limits. Immunological studies showed normal IgA (207 mg/dL) and anti-dsDNA elevated normal levels (51 IU/mL), with normal rheumatoid factor, C3, and C4 levels. HbA1c was 6.2%. Stool microscopy revealed numerous red blood cell 12 pus cells per high power field, and was positive for occult blood. CT abdomen suggested possible mesenteric venous involvement, but a mesenteric

venogram demonstrated patent superior mesenteric, portal, and inferior mesenteric veins, excluding thrombosis. Renal investigations later showed reduced GFR with proteinuria and hematuria. Based on the clinical trial of abdominal pain, gastrointestinal bleeding, and palpable purpura, supported by elevated IgA and renal involvement, a diagnosis of IgA vasculitis (Henoch–Schönlein purpura) was established. Initial management included intravenous tramadol and Toradol for analgesia, metoclopramide for nausea, and proton pump inhibitor infusion. Broad-spectrum antibiotics were commenced, including intravenous meropenem paracetamol IV and metronidazole (500 mg TDS). Owing to refractory abdominal pain, persistent melena, renal involvement, and systemic symptoms including arthralgias, myalgias, nausea, and vomiting, corticosteroid therapy was initiated with intravenous methylprednisolone (125 mg IV stat, followed by 80 mg IV BD). The regimen was subsequently tapered and switched to oral prednisolone (Deltacortil 5 mg, 6 tablets BD). Following steroid therapy, the patient demonstrated gradual improvement, with resolution of abdominal pain, reduction of purpura, stabilization of gastrointestinal bleeding, and improvement in renal function.

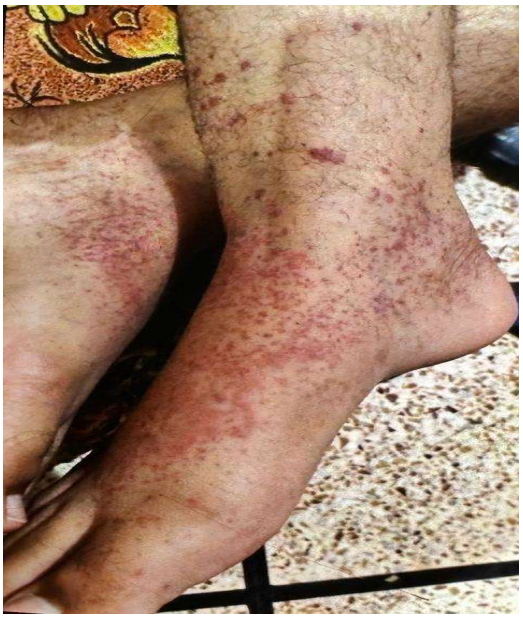

Figure 1: Purpura on patient's feet

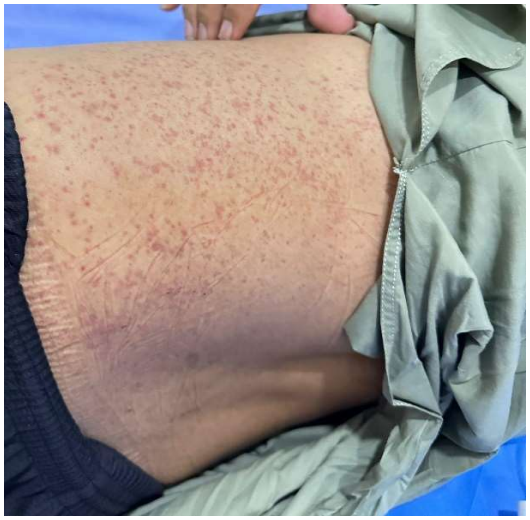

Figure 2: Purpura on patient's back

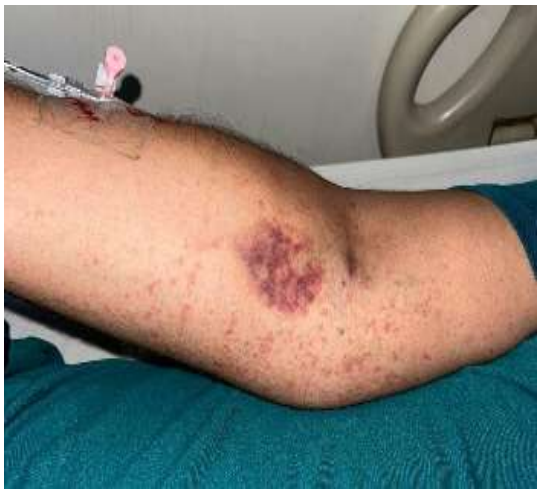

Figure 3: Purpura on patient's arm

DISCUSSION

IgA vasculitis, previously known as Henoch–Schönlein purpura (HSP), is a small-vessel vasculitis predominantly seen in children, with a frequency of 3–26.7 per 100,000, while adult cases are relatively uncommon (0.1–1.8 per 100,000). [1,3,4,5] In adults, the disease is usually more severe with poorer outcomes, as 20–80% [2] develop glomerulonephritis (IgAVN)[5], and 30–40% may progress to end-stage kidney disease (ESKD) within 20–30 years of symptom onset.[3,5] Our patient, a 34-year-old male, presented with the classic tetrad of gastrointestinal involvement (abdominal pain

and melena), palpable purpura as shown in *Figures 1-3*, arthralgia, and renal involvement, which developed during hospitalization. In adults, the frequency of these features is as follows: palpable purpura in 100%, arthralgia in 60–80%, gastrointestinal manifestations in 50–75%, and renal involvement in 40–85% of cases.[3] This presentation aligns with the diagnostic frameworks of the Ankara Criteria 2008, American College of Rheumatology (ACR, 1990), the European League Against Rheumatism/Pediatric Rheumatology International Trials Organization/Pediatric Rheumatology European Society (EULAR/PRINTO/PRES, 2010), and the revised Chapel Hill International Consensus (2012).[2,3,4,5] Although originally developed for children, these criteria remain valid in adults, as no specific adult criteria exist. The EULAR/PRINTO/PRES classification is generally preferred, with 12.4% higher sensitivity and 5% higher specificity compared to the ACR criteria.[3,5] A notable feature in this case was the atypical sequence of symptom onset. The patient initially experienced diffuse abdominal pain localizing to the right iliac fossa, closely mimicking acute appendicitis. Gastrointestinal symptoms may precede cutaneous manifestations in up to 40% of cases[2], often creating a diagnostic dilemma and risking unnecessary surgical intervention. The differential diagnoses include HSR vasculitis, cryoglobulinemic vasculitis, microscopic polyangiitis, and polyarteritis nodosa.[3] The later appearance of melena, palpable purpura, and proteinuria helped confirm the diagnosis, underscoring the importance of considering IgA vasculitis in adults with unexplained abdominal pain and gastrointestinal bleeding. Multiple agents have been implicated as triggers for IgAV. Drugs such as quinolones, fluoroquinolones (levofloxacin, ofloxacin, ciprofloxacin), ACE inhibitors, angiotensin II receptor antagonists (losartan), clarithromycin, and some NSAIDs have been reported.[1] Infectious triggers include *Parvovirus*, *Hepatitis B*, *Parainfluenza virus*, *Influenza virus*, *Adenovirus*, *Respiratory Syncytial Virus (RSV)*, Coronavirus, *Helicobacter pylori*, Group A *Streptococcus*, *Haemophilus parainfluenzae*, and *MRSA*.[1,2,5] The most common association is with upper respiratory tract infections, which stimulate IL-6 and alter IgA glycosylation, leading to galactose-deficient IgA1 and subsequent immune complex deposition in small vessels and the renal mesangium.[3,5] Genetic predisposition is also important [2], with associations reported for HLA-DQA1, HLA-DQB1, HLA-DRB1[1,3], and HLA-B41:02.[5] Incidence varies by ethnicity, being higher in Asians compared to Caucasians, and lowest in Africans, Caribbeans, and South Asians. Familial aggregation further supports a genetic component.[5] In this patient, a recent viral illness was the likely trigger. Renal involvement emerged during hospitalization, with proteinuria, microscopic haematuria, and reduced eGFR. Persistence of skin lesions and melena for more than two months is considered a risk factor for glomerulonephritis;[3] however, IgAVN developed in this patient within a week of the classical triad. Histologically, renal biopsies in IgAVN and IgA nephropathy (IgAN) are indistinguishable, both showing mesangial IgA deposition.[3,5] While microscopic hematuria may also occur in nephritic syndrome, nephrotic syndrome, or renal failure, the clinical context and biopsy findings confirm IgAVN.[3,5] Children rarely progress to CKD and are often diagnosed on clinical grounds without histopathology.[3,5] The absence of crescents and glomerular sclerosis in the biopsy favored a good prognosis.[3] Early diagnosis and treatment prevented disease progression, resulting in complete remission.[1] Generally, the short-term prognosis of IgAV depends on gastrointestinal involvement, while long-term outcomes are determined by renal disease.[3] Diagnosis remains clinical, as no confirmatory test exists.[5] In adults, evaluation relies on the 2010 EULAR/PRINTO/PRES pediatric criteria.[5] Other causes of purpura should be excluded through platelet counts and coagulation studies.[1,5] Renal function tests (serum creatinine, eGFR) and urine studies (hematuria, dysmorphic RBCs, RBC casts,

proteinuria quantification) are recommended.[5] Renal biopsy is indicated for impaired renal function, persistent proteinuria >1 g/day despite RAAS inhibitors, nephrotic/nephritic syndrome, or rapidly progressive glomerulonephritis.[5] A skin biopsy typically shows leukocytoclastic vasculitis in postcapillary venules, and direct immunofluorescence within 48 hours of onset demonstrates IgA and C3 deposition.[2,5] However, IgA deposits are not pathognomonic, as they may occur in other vasculitis's, and serum IgA is neither diagnostic nor prognostic despite possible elevation.[2,5] Importantly, IgAV in adults carries a stronger association with malignancies, particularly solid tumors (lung, prostate) and hematological cancers, necessitating age- and sex-appropriate cancer screening.[2,5] Several histological classifications exist: ISKDC (for children only), Oxford 2009 (MEST-C system with clinical risk factors), Haas (linking IgA subclass to renal survival), and the Semi-Quantitative Classification (SQC) by Koskela, 2017 (scoring glomerular, tubular, interstitial, and vascular biopsy findings).[5] Among these, the SQC offers the best predictive value, followed by the Oxford system.[5] Treatment aligns with KDIGO 2021 guidelines, which recommend symptomatic management.[2,5] The patient received comprehensive supportive care, including analgesics (IV tramadol, ketorolac), antiemetics (metoclopramide), PPIs for gastrointestinal protection, and antibiotics (IV meropenem, metronidazole) for infection coverage. Given the severity of his presentation persistent abdominal pain, gastrointestinal bleeding, systemic symptoms, and renal involvement glucocorticoids were initiated. Intravenous methylprednisolone followed by oral prednisolone with a gradual taper led to rapid improvement in purpura, abdominal pain, gastrointestinal bleeding, and renal function. Although evidence for steroids in altering long-term renal outcomes remains inconclusive, their role in acute severe disease is supported by clinical reports, particularly for rapid symptom relief.[1,2,3,5] This case underscores the importance of recognizing IgA vasculitis in adults presenting with abdominal pain and gastrointestinal bleeding, as this awareness may prevent unnecessary surgical intervention. It also highlights potential triggers such as viral infection and prior antibiotic exposure, consistent with reports of infections and medications precipitating IgAV in genetically predisposed individuals.[1,5]

CONCLUSION

This case emphasizes the diagnostic and therapeutic challenges of adult-onset IgA vasculitis. Clinicians should maintain a high index of suspicion in adults with abdominal pain and gastrointestinal bleeding, particularly when followed or accompanied by purpura. The atypical sequence of symptoms in our patient, with abdominal pain and gastrointestinal bleeding preceding cutaneous manifestations, mimicked acute appendicitis and posed a diagnostic dilemma. Early recognition, thorough investigation, and prompt corticosteroid therapy were crucial in preventing complications and achieving remission. While corticosteroids are effective for acute systemic and renal manifestations, long-term renal monitoring remains essential. Early intervention in adults with unexplained abdominal pain and purpura can significantly improve prognosis.

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