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Contents

Foreword

Foreword by Editor-in-Chief

Prof. Nataliya Bhinder

As we embark upon the third issue of the "Annals of Innovation in Medicine," we find ourselves at the intersection of science, technology, and compassion. It is with great pleasure and enthusiasm that I welcome you to this latest installment of our journal, marking the culmination of another year of groundbreaking discoveries and transformative achievements in the field of medicine.

In these pages, you will discover a collection of remarkable contributions from some of the brightest minds and most dedicated professionals in the realm of healthcare and medical research. The journey we have embarked upon in the "Annals of Innovation in Medicine" is a testament to the relentless pursuit of excellence, the ceaseless exploration of new frontiers, and the unwavering commitment to improving the human condition.

Medicine is an ever-evolving discipline, shaped by innovative ideas, cutting-edge technologies, and the tireless efforts of those who dedicate their lives to the pursuit of healing. The last quarter of 2023 has brought forth an array of innovations that have the potential to redefine the boundaries of what is possible in healthcare. From groundbreaking pharmaceutical developments to revolutionary surgical techniques, from digital health advancements to novel therapies, each article in this journal represents a unique contribution to the mosaic of medical progress.

This issue encompasses a wide spectrum of topics, reflecting the diversity of thought and expertise in our global medical community. The contributions herein shed light on the profound implications of AI and machine learning in diagnosis, the ethical dimensions of genetic editing, the role of telemedicine in expanding access to care, and the impact of regenerative medicine on the treatment of degenerative diseases. These topics, and many more, embody the spirit of innovation that fuels our ever-advancing field.

In a world that continually grapples with unprecedented challenges, from pandemics to global health disparities, our collective response as healthcare practitioners, researchers, and innovators has never been more critical. We stand on the precipice of immense potential, guided by the pioneering spirit that has defined the practice of medicine for centuries. The third issue of the "Annals of Innovation in Medicine" celebrates this spirit and the profound impact it has on human lives.

We are immensely grateful to the authors, reviewers, editors, and readers who have made this journal a platform for the exchange of knowledge and the dissemination of ideas. Together, we continue to push the boundaries of what medicine can achieve and embrace a future that holds the promise of better health, longer lives, and a deeper understanding of the intricate tapestry of human well-being.

As we delve into the contents of this issue, may the stories and findings contained within these pages inspire you, challenge your preconceptions, and ignite your own passion for innovation in medicine. Together, we move forward into an exciting and ever-transforming landscape, driven by the unwavering pursuit of health, well-being, and the greater good.

Thank you for joining us on this extraordinary journey through the "Annals of Innovation in Medicine." Your participation, readership, and unwavering commitment to the advancement of healthcare inspire us all.

Warm Regards

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Case Report

When Eagle Stares into The Eye

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Abstract: Retinal pigment epithelial detachment (PED) is the separation of the retinal pigment epithelium(RPE) from the Bruch's membrane(BM). Eagle syndrome(ES) is characterized by an abnormally elongated styloid process with/without abnormal direction and/or ossification of the styloid ligament. The presence of the above entities is the rarest of rare sights. It may be a coincidence, or the diseases may have an association. Hence, further studies are warranted.

Keywords: Eagle syndrome, ocular, retinal pigment, styloid ligament

Case

A 60-year-old female reported to us with a history of floaters in bilateral eyes off and on for the past six months. There was a history of pain in the angle of the mandible(right) off and on since that period, too. There was no other significant history. Her best corrected visual acuity was 6/6 in both eyes. Bilateral pupillary reactions, colour vision, ocular movements, intraocular pressure and B Scan ultrasonography were normal. Fundus examination of the right eye revealed a well-demarcated orange-yellow dome-shaped lesion at the macula(figure 1- yellow arrow), while the fundus of the left eye was within normal limits. Optical coherence tomography(OCT) revealed a serous PED in the right eye(figure 1 and 1a-red arrow) with a posterior vitreous detachment(figure 1 and 1a-green arrow) and a subretinal fluid level(figure 1 and 1a-blue arrow). The facility for fundus fluorescein angiography and indocyanine green angiography was not available to us.

A vitreoretinal consultation was taken, and they advised a regular follow-up without further intervention. ENT consultation was taken for the mandibular pain, and a complete workup was done, and radiological imaging of the site was advised, which revealed an elongated right styloid process(figure 2- highlighted in yellow). They diagnosed it as a case of Eagle Syndrome and started treatment as per their protocol. The patient is on regular follow-up in our department of ophthalmology.

Discussion

PED is seen in various ocular diseases like central serous chorioretinopathy, age-related macular degeneration, etc.[1] Various classifications of PEDs have been described in the literature.[2] Serous PED is caused by fluid collection between RPE and BM due to increased choriocapillary leakage and decreased RPE pump function. The fundus lesion in serous PED is a well-demarcated, dome-shaped lesion, and the characteristic finding is best seen in OCT.[3] On OCT, they appear as a dome-shaped elevation of the RPE over a hyporeflective space, with Bruch's membrane being commonly visible as a straight, thin hyperreflective line

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at the base of the elevation. Treatment includes regular follow-up and monitoring for any complications like choroid neovascular membrane.[4] Clinical features of ES include headache, throat and neck pain, radiation to the ear, dysphagia, etc. Sometimes, the elongated styloid process compresses the internal carotid artery and causes transient ischemic attacks and stroke.[5] ES is treated both by medicines and by surgery(styloidectomy). Medical treatment includes analgesics, local injection of steroids / anaesthetics and stellate ganglion block. [6]

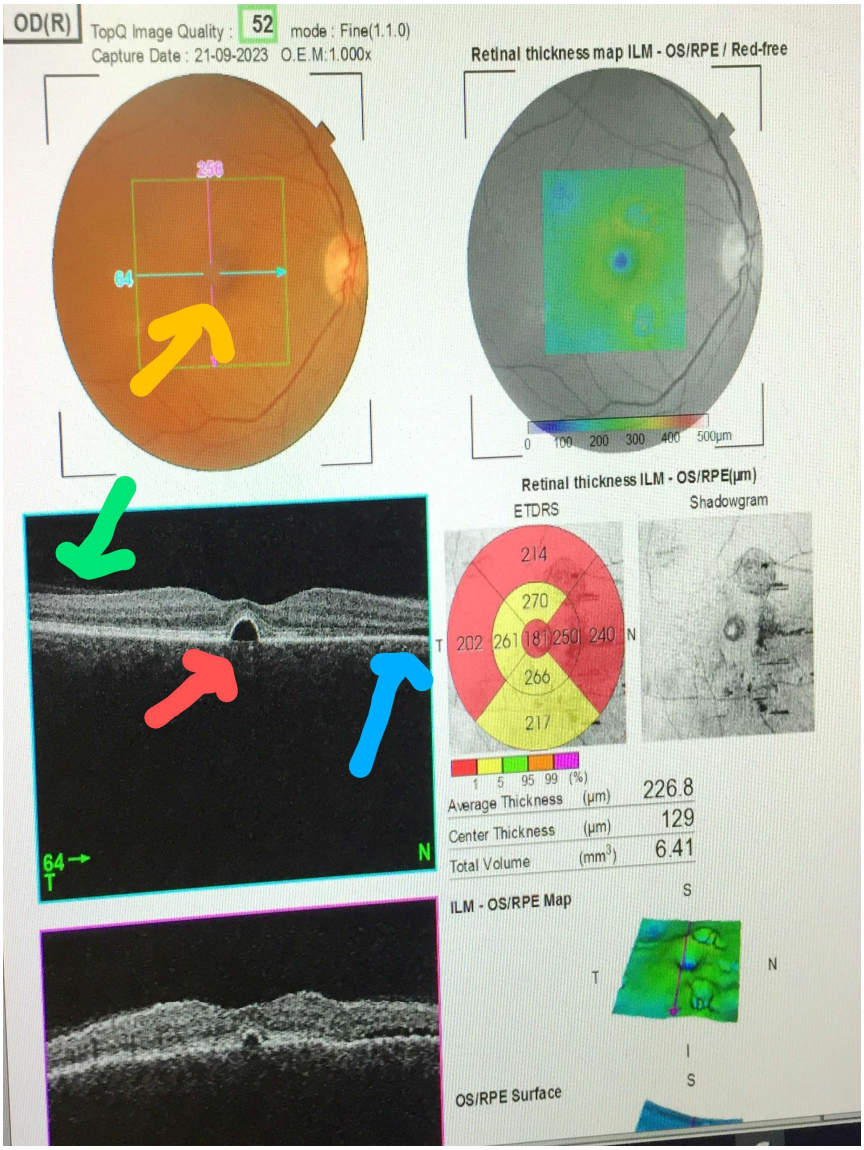

Figure 1

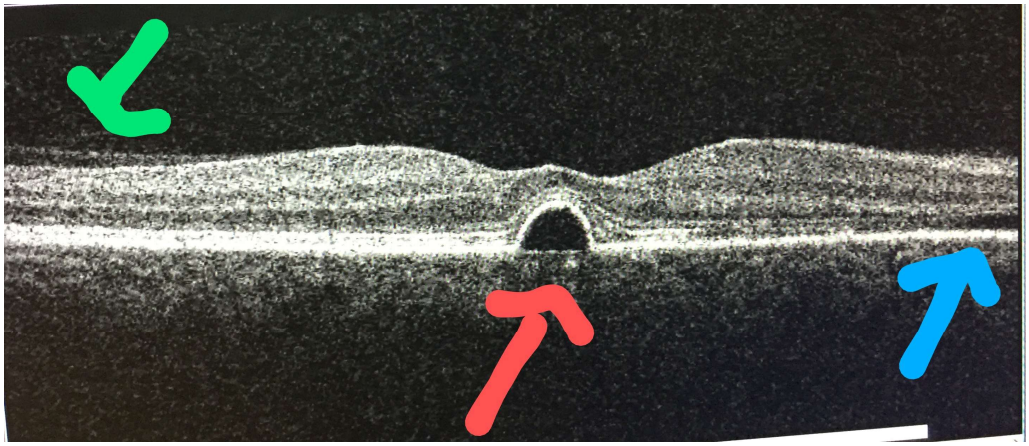

Figure 1a

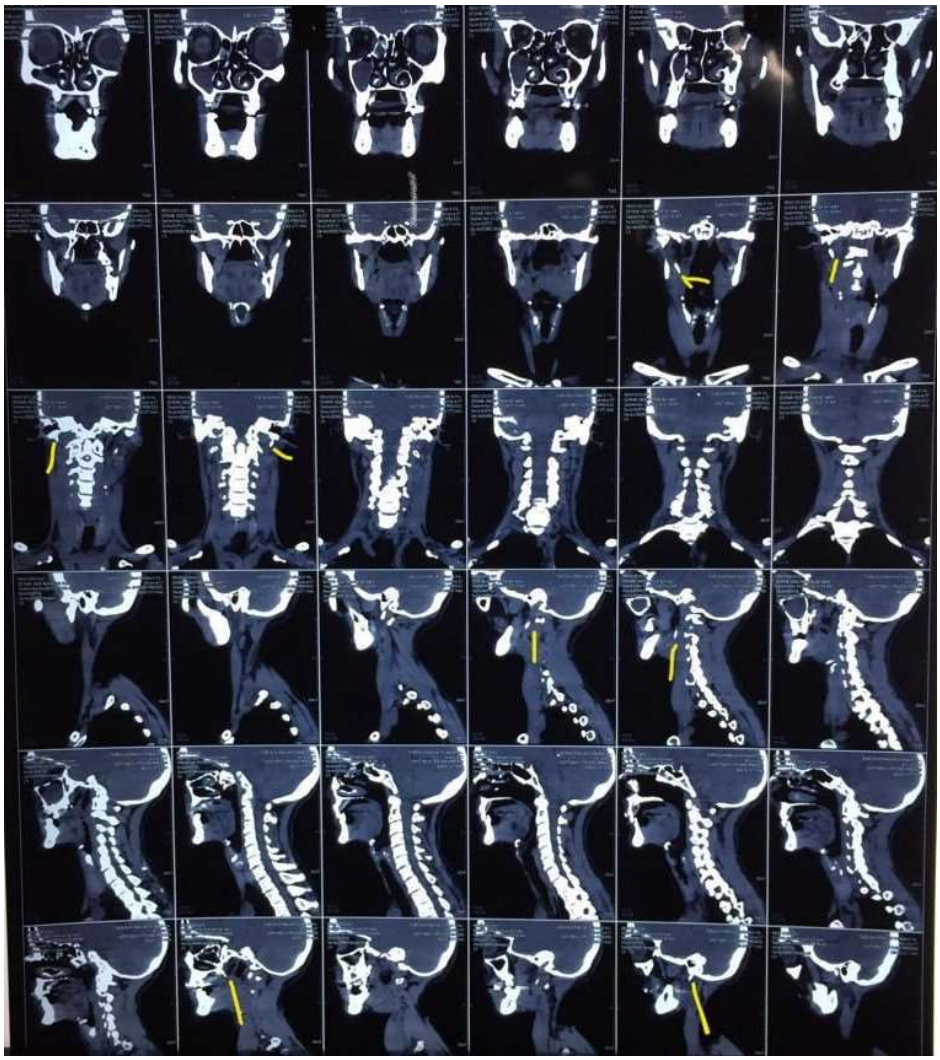

Figure 2 Radiological Imaging

Conflicts of Interest: The authors declare that they have no competing interest.

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Literature review

Delayed Onset Muscle Soreness (DOMS): Management Update

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Abstract

Delayed Onset Muscle Soreness (DOMS) is a prevalent issue in sports medicine and among physically active individuals, causing significant pain and disability. While the exact pathophysiology of DOMS remains incompletely understood, this article delves into non-pharmacological approaches to effectively manage and alleviate its symptoms.

The research discusses multifaceted aspects of DOMS, encompassing its complex etiology, theories, and contributing factors. Numerous theories have been proposed, including delayed inflammatory responses, lactic acid accumulation, muscle spasms, connective tissue damage, and muscle micro-tears. These theories underscore the intricate nature of DOMS and the need for a diverse management approach.

The article explores non-pharmacological strategies to address DOMS, focusing on evidence-based methods. These methods include massage, exercise, nutrition, and natural supplements. Research has shown that massage therapy enhances muscle recovery, exercise therapy reduces soreness, and nutrition therapy through protein and amino acid intake can alleviate DOMS. Furthermore, natural supplements like ginger, tart cherry juice, and curcumin have demonstrated the potential to reduce inflammation and manage DOMS.

While pharmacological interventions may be considered for severe cases, the article underscores the importance of exercising caution due to potential side effects. In summary, DOMS management necessitates a holistic approach, combining multiple modalities and nutritional strategies to alleviate pain, enhance muscle recovery, and minimize the impact of this common condition on physically active individuals and athletes.

Keywords: DOMS, delayed onset muscle soreness, DOMS management, NSAIDs

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Introduction

Delayed onset muscle soreness (DOMS) is a common problem in sports medicine. Although the majority of athletes experience DOMS, but it remains a highly neglected subject. A literature search in some of the leading medical databases like PubMed shows that there are very few updates on the topic. There are very few relevant studies published on the topic. DOMS is not a disease. Nonetheless, it causes significant pain and disability in physically active individuals or sports people. It is a condition when muscle pain is more severe in proportion to muscle damage. The condition is not acute. DOMS causes muscle ache, swelling, tightness, and tenderness 24 hours after strenuous exercise.[1]

Perhaps one of the biggest challenges in managing DOMS is that it is still a poorly understood phenomenon. It is known that DOMS occurs due to micro tears in muscle fibers. However, unlike acute soreness, pain and muscle tightness in the condition starts after 24 or

even 48 hours. It means compromised physical training and delayed muscle recovery.[1] Years of research into the topic have failed to understand its pathophysiology. This could also be due to insufficient research into the topic, as the condition is temporary and not classified as a disease, unlike sports injury or trauma. Researchers have proposed many theories for the condition. The condition is caused by delayed inflammatory response after eccentric exercise. This response is mainly due to micro-tears in muscles.[2]

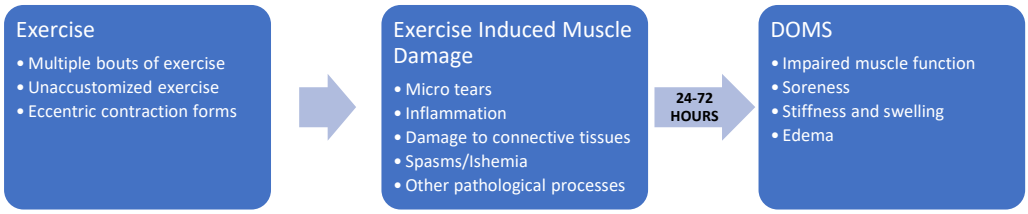

Figure 3 DOMS - possible pathophysiology

However, micro tears do not explain DOMS in all cases. Many people experience the condition after moderate-intensity exercise. Thus, the role of degenerative processes cannot be neglected. Hence, researchers have proposed some other theories like lactic acid accumulation, muscle spasms, muscle micro tears, connective tissue damage, inflammation, and higher efflux of certain enzymes. It appears that DOMS is most likely due to more than one reason. This is why managing the condition using a single modality remains elusive.[3]

Pain stimulus theory states that this delayed pain could be due to stimulation of small nerve endings in the muscles. Lactic acid theory, on the other hand, did not gain much traction since its role in DOMS is unclear. Lactic acid accumulation is more relevant in acute muscle fatigue and pain than in DOMS. Spasm theory was first proposed in the 1960s, and it says that high-intensity training causes muscle ischemia and damage, thus the pain. Connective tissue damage theory proposes that DOMS occurs due to damage to muscle sheaths. Similarly, the theory regarding micro-injuries to muscle fibers remains highly relevant. It probably contributes significantly to DOMS. Further, those prone to DOMS have higher muscle inflammation. It is evident that DOMS most likely occurs due to a combination of factors. Hence, managing the condition would also need the use of different modalities.[4]

Delayed onset muscle soreness management

There is a need for more research to identify the pathophysiological processes underlying DOMS, as it would help manage pain more effectively. DOMS has a significant negative impact on the training of athletes or sportspeople. Hence, managing the condition is vital. Moreover, in many instances, pain continues for several days and could be of high intensity. This literature review will explore various ways to manage the condition. There is no doubt that the primary focus of this literature review would be on managing DOMS without pharmacological drugs. However, the study will also explore the role of pharmacological options.

Before we explore some ways to manage DOMS, it is also vital to realize that some common methods used to manage pain in sports medicine do not work for DOMS. Thus, Chueng et al., in their literature review, found that methods like cryotherapy, stretching, ultrasound, homeopathy, and electrical current modalities do not seem to have demonstratable benefits in DOMS.[3] Other studies also had similar findings showing the limited value of stretching, heat and cold application, and acupuncture.[5] A more extensive systemic review by O'Connor and Hurley also had similar findings and concluded that cryotherapy, acupuncture, stretching, pulsed ultrasound, and transcutaneous electrical nerve stimulation (TENS) did not benefit, and thus, these methods have limited utility in managing DOMS.[6]

Massage Therapy

Systemic reviews and clinical trials confirm that athletic massage post exercise is more effective than no treatment.[6] Massage therapy is frequently used to manage sports injuries. It has the benefit of an excellent safety profile. Moreover, massage therapy may have other

health benefits, like reduced stress. It appears that massage therapy helps overcome muscle spasms, enhances local blood flow, and thus promotes muscle recovery. There are multiple studies to support the use of massage therapy for managing DOMS. Thus, a study by Hilbert et al. compared massage therapy with sham treatment given two hours after exercise. In the study, researchers measured muscle soreness 6, 24, and 48 hours post-exercise. The study found that although massage therapy did not enhance muscle function, the massage group reported lower muscle pain and stiffness after 48 hours.[7] A study by Zainuddin and colleagues found that massage could reduce DOMS by approximately 30%.[8] One of the recent systemic reviews by Ernst also concluded that there is sound evidence that massage therapy works.[9]

Exercise Therapy

DOMS is caused by unaccustomed exercises or by extensive exercise sessions. Hence, one of the good ways to manage this pain is to introduce systemic exercise or a physical therapy regime. Experts also recommend engaging other supportive muscles. One should avoid stressing painful muscles. Instead, one would benefit from compound exercises. A study by Nahon et al. analyzed one hundred and twenty-one studies. The study found that there is sound evidence that active exercise helps. Additionally, it also found that combining exercise with compression therapy may have some additional benefits.[10]

Nutrition Therapy

Among all the methods, nutrition therapy must form the backbone of DOMS management. Numerous kinds of nutrition therapies have been shown to help. Nutrients help not only fasten muscle recovery but also lower inflammation. Among various options, increasing protein intake is quite important. Higher protein intake promotes muscle regeneration. It may not prevent DOMS, but it would reduce its severity. Studies show that though high protein intake or supplementing diet with whey protein may not prevent DOMS, it can facilitate recovery and post-exercise anabolism.**[11]** Another more efficient way to overcome DOMS could be increasing intake of specific amino acids like branched-chain amino acids (BCAAs). A study by Weber et al. found that the use of BCAAs, even after a single bout of strenuous exercise, is helpful.**[12]** A systemic review and meta-analysis by Fedewa and colleagues that included eight high-quality clinical studies found that there is sound evidence in favor of BCAA use. BCAA's taken just after exercise may reduce DOMS severity by as much as 30%.[13]

Apart from proteomic amino acids, non-protein-forming amino acids may also help. Thus, studies suggest that supplementing with creatine during the pre-workout phase may help reduce DOMS risk. This is due to increased energy production.[14] Yet another non-proteomic amino acid, taurine, can be of great help. Taurine is often added to various energy drinks. It helps boost energy levels and reduce fatigue. Studies show that supplementing with taurine before physical training may help lower DOMS severity.[15] Beta-alanine is another amino acid known to prevent DOMS. It works in multiple ways, like increasing muscle carnosine levels and exercise performance and reducing lactic acid accumulation.[16]

Besides amino acids and proteins, increasing the intake of essential fatty acids may help muscle recovery. Omega-3 fatty acids have anti-inflammatory properties. Since, in DOMS pathology, inflammation plays a central role, omega-3 fatty acids may help. Thus, a study by Tartibian and colleagues found that omega-3 was perhaps effective in preventing DOMS in untrained young men.[17] Similarly, Mesta and colleagues reviewed the literature regarding the efficacy of omega-3 fatty acids and concluded that regular supplementation of diet with omega-3 is suitable for both athletes and non-athletes.[18]

Natural Supplements for DOMS

It is common practice to use natural supplements and herbs. These supplements are not likely to prevent muscle damage. However, they can lower inflammation and thus prevent DOMS, or they can be useful in managing the issue. Moreover, prolonged use of herbals may modulate immune responses. Thus, studies show that regular use of ginger may be helpful. Hence, a daily intake of 4g of ginger supplementation may lower the severity of DOMS.[19]

Another way in which natural supplements help is due to their antioxidant properties. Studies suggest that foods rich in antioxidants, like berries, may be especially good for preventing and managing DOMS. Thus, the Cochrane systemic review found that higher antioxidant intake is associated with lower DOMS risk, and antioxidants may also lower its severity.[20] Another well-tested natural DOMS remedy is tart cherry juice, which is rich in antioxidants and known to reduce inflammation. It has been extensively tested for managing DOMS. A study by Kuehl and colleagues found that ingesting tart cherry juice seven days prior to strenuous training or running may help reduce DOMS.[21] A literature review by Vitale et al. found that there is some sound evidence that a few days of tart cherry use may help promote muscle recovery and reduce inflammation.[22]

In recent years, curcumin has gained significant popularity in managing inflammatory conditions. Curcumin is derived from turmeric. This yellow compound found in turmeric has antioxidant and anti-inflammatory properties. It is often used to manage joint pains. Now, studies show that regular intake of turmeric may help counter DOMS symptoms and help relieve pain.[23] A clinical study by Nicol and colleagues found that curcumin likely reduced pain scores in DOMS.[24]

Pharmacological Therapy

Pharmacological therapy is not a treatment of choice. Moreover, prolonged drug therapy may be counterproductive, as it may cause more harm than good. Pharmacological drugs have many known and unknown side effects, and thus, using medications to reduce physical activity-related muscle soreness is the last choice. Nonetheless, some people with severe DOMS may need pharmacological treatment. Studies show that painkillers like paracetamol/acetaminophen and even certain opioids like codeine have little value in managing DOMS, as they lack anti-inflammatory effects. Instead, non-steroidal anti-inflammatory drugs (NSAIDs) like ibuprofen may be of more significant benefit.[25–27]

Discussion

Delayed Onset Muscle Soreness (DOMS) is prevalent in sports medicine and among physically active individuals. While DOMS is not a disease, it can result in significant pain and disability, making its management crucial for athletes and sportspeople. This research article discusses various aspects of DOMS, its pathophysiology, and non-pharmacological approaches to manage and alleviate its symptoms.

The primary challenge in dealing with DOMS is its poorly understood nature. Although it is generally attributed to micro-tears in muscle fibers, the exact mechanisms behind its onset and persistence remain elusive. Researchers have proposed various theories, including delayed inflammatory response, lactic acid accumulation, muscle spasms, connective tissue damage, and more, highlighting the complexity of DOMS. This multifactorial nature underscores the need for a multifaceted approach to manage the condition effectively.

The article explores non-pharmacological methods to manage DOMS, with a focus on practical and evidence-based strategies. Several approaches have been examined, and their effectiveness has been assessed in different studies. These methods include massage therapy, exercise therapy, nutrition therapy, and natural supplements.

Massage Therapy: Research supports the effectiveness of massage therapy in reducing DOMS symptoms. It enhances muscle recovery by relieving muscle spasms, improving local blood flow, and decreasing muscle pain and stiffness. Massage therapy is a safe and beneficial approach for managing DOMS.

Exercise Therapy: Engaging in systemic exercise or physical therapy while avoiding excessive stress on painful muscles can help reduce DOMS symptoms. Active and compound exercises have been shown to alleviate muscle soreness effectively.

Nutrition Therapy: Proper nutrition is crucial in managing DOMS. Higher protein intake, especially through whey protein or branched-chain amino acids (BCAAs), can promote muscle recovery and reduce DOMS severity. Other amino acids, such as creatine, taurine, and

beta-alanine, may also play a role in mitigating DOMS. Additionally, increasing the intake of omega-3 fatty acids and antioxidants from natural foods and supplements can aid in lowering inflammation and promoting muscle recovery.

Natural Supplements: Natural supplements and herbs, such as ginger, tart cherry juice, and curcumin, are known for their antioxidant and anti-inflammatory properties. Regular consumption of these supplements may help reduce inflammation and alleviate DOMS symptoms.

Pharmacological Therapy: While not the preferred treatment option, pharmacological therapy can be considered for severe cases of DOMS. Non-steroidal anti-inflammatory drugs (NSAIDs) like ibuprofen are more beneficial than painkillers like paracetamol/acetaminophen or opioids, as they possess anti-inflammatory effects. However, it is essential to exercise caution with pharmacological approaches due to potential side effects.

Conclusion

Delayed Onset Muscle Soreness remains challenging in sports medicine due to its multifaceted nature and the lack of a single, universally effective treatment. This research article emphasizes the importance of non-pharmacological management strategies for DOMS, which are often safer and more sustainable than pharmacological options. These approaches include massage, exercise, and nutrition therapy, focusing on enhancing muscle recovery, reducing inflammation, and promoting overall well-being.

While pharmacological interventions can be considered in severe cases, they should be used sparingly due to potential side effects. In summary, managing DOMS effectively requires a holistic approach, combining multiple modalities, including natural supplements and nutritional strategies, to alleviate pain, enhance muscle recovery, and minimize the impact of this common condition on physically active individuals and athletes. Further research is needed to refine our understanding of DOMS and improve its management.

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Research Article

To study the demographic profile of HCC patients and the pattern of clinical characteristics in a tertiary care center of north western India

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Abstract

Hepatocellular carcinoma (HCC) is a prevalent malignancy globally and the fifth most common cancer worldwide. This retrospective study, spanning six years, explores the shifting etiological patterns of HCC in Northwestern India, particularly influenced by factors like Hepatitis B and C endemics, alcohol consumption, and vaccination programs. Data from 164 HCC patients reveal a significant shift, with Hepatitis C surpassing Hepatitis B as the primary etiological factor. The study highlights the distinctive HCC profile in Northwestern India, emphasizing the imperative to address HCV as a silent precursor to HCC and the need for enhanced surveillance and intervention strategies. The findings underscore the significance of controlling alcohol abuse, managing cirrhosis complications, and the urgency for improved diagnostic markers beyond AFP. The study prompts a reevaluation of vaccination interventions and advocates for heightened screening measures to detect and mitigate HCV-related HCC at earlier stages.

Keywords: Hepatocellular carcinoma, Etiology, Northwestern India, Hepatitis C, Retrospective Study

Introduction

Hepatocellular carcinoma (HCC) is one of the most prevalent malignant tumors worldwide and the fifth most common cancer in the world. In nations like India, where endemics of Hepatitis B and C it is extremely common in certain parts, the risk of HCC is particularly high. Also, other risk factors like alcohol consumption are on the rise, and with the vaccination program for Hepatitis B, the demographic profile of etiology is having a shift, especially in the North West region of India[1].

From a pattern of being Hepatitis B endemic zone and being the most common cause of chronic liver disease in India, Hepatitis C being a hidden factor and presenting as HCC as the only symptomatic presentation is turning heads. The profile of the Northwestern region matches that of the West despite the lifestyle pattern being very different. [2].

In this study, a retrospective data evaluation for the past six years was studied, and an entirely shifting pattern profile compared to the earlier Indian data was noted. This was to establish the difference in the etiological factor of HCC compared to the rest of the country due to local factors causing the change.

Methods

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All patients of HCC presenting to the Oncology OPD and IPD of Sri Guru Ram Das Rotary Cancer Hospital, Sri Amritsar, under SRDUHS, Sri Amritsar, a tertiary care Centre in Punjab, Northwestern India, and caters to populations coming from J&K, Punjab, Himachal Pradesh & Haryana; between 2017 – 2022 were included in the study.

Study Design

Patients already diagnosed with HCC and presenting to the Oncology OPD for treatment and those who were diagnosed at our center between 2017-2022 were included in our study, and the data was collected retrospectively from the case records.

Patient Evaluation

The patient was subjected to clinical evaluation, including a detailed history, to list out the presenting signs and symptoms and also make out any causation from the history pattern like alcohol, blood transfusion, IV drug abuse, or other means of unsafe needle use in the periphery.

Laboratory Investigation included routine evaluation -Complete blood counts, liver function tests, renal function tests, and viral markers for HBV and HCV. Serum Alpha-fetoprotein (AFP) was estimated using a particle enzyme immunoassay.

Hepatitis viral markers, including HBsAg, IgM Anti HBc, HBV Quantitative DNA, and HCV RNA, were first detected using qualitative PCR, and if they were positive, they were quantitated.

Radiology workup included an Ultrasound abdomen, a Triple Phase CT abdomen was done for all patients, and a PET CT scan was done to ascertain the extent of the disease before instituting therapy.

Diagnosis of cirrhosis was made on the basis of clinical, biochemical, and endoscopic findings. HBV cirrhosis was diagnosed when detectable HBsAg in serum was present. HCV cirrhosis was diagnosed when detectable anti-HCV, HCV RNA, or both were present in serum. Alcoholic cirrhosis was labeled when the patient had a history of alcohol consumption of more than 80 g/day for more than five years. The severity of cirrhosis was graded based on the Child-Pugh classification.

Diagnostic criteria for HCC were any of the following: AFP more than 500 ng/ml or hypervascular liver mass on contrast-enhanced CT abdomen Triple phase or Fine needle aspiration cytology (FNAC). As per the modified European Association for Study of Liver, criteria were followed, which consisted of either FNAC or any 2 of the following: AFP more than 500 ng/ml or arterialization of the mass on TPCT or MRI.

Treatment

Various types of treatment therapies are available at our center. Treatments were given, keeping into account factors like the stage of the disease, the underlying presence of cirrhosis, and its severity. Therefore, findings on TPCT/PET CT indicating tumor burden, portal vein involvement, presence of extra-hepatic disease, or distant metastasis were recorded. The child's score and the PST score of the patient were also noted, and the treatment was then finally decided.

Stage A patients were offered surgery if their liver function was good with no clinically relevant portal hypertension. If not, then surgery could not be undertaken, and instead, local ablative therapies were performed.

Local ablative therapies were radiofrequency ablation and were undertaken at our center. RFA was done in those patients who had HCC less than 5 cm and less than 5 in number. Also, Trans Arterial Chemo Embolization was performed.

Surgical Options- included Lobectomy / Hepatectomy depending upon the extent of the lesion.

Oral Chemotherapy options included sorafenib.

Add On Therapy-

All patients with cirrhosis who had evidence of high-risk varices on endoscopy underwent primary prophylaxis with endoscopic variceal banding. Patients who had HBV-related HCC, along with markers of active viral replication, were given antiviral treatment. The other complications of chronic liver disease and HCC were managed with conventional treatment.

Results

A total of 164 patients with HCC were registered in the liver clinic. The mean age at presentation was 58 ±14.4 years (range 18–88 years), and 131(80%) of them were males (Figure 1). Abdominal pain was the predominant symptom in the right upper quadrant or epigastric in location, presenting in 67% of the patients. Patients presenting with complaints of abdominal distention were less than 44%, and about 14% presented with Ascites. Not all patients with ascites complained of abdominal pain, and only half of them complained of associated abdominal pain. Patients presenting with weight loss stood at 21%.

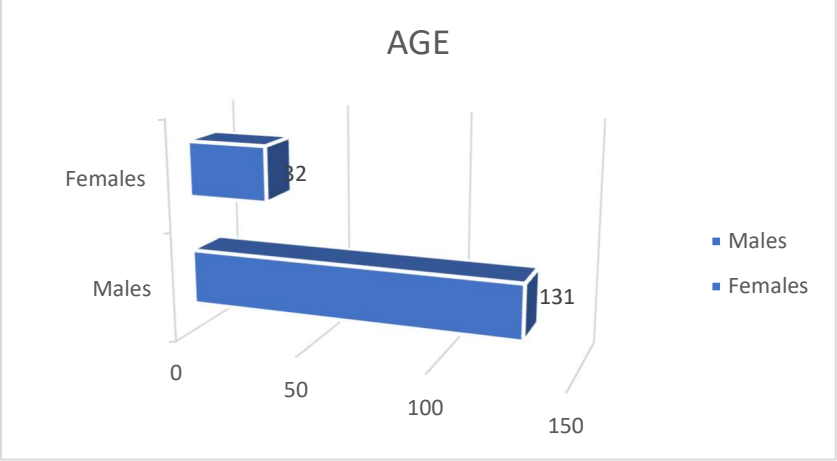

Figure 4 Patients gender

History of episodes of acute hepatitis in 27%, and those with chronic hepatitis stood at 58%. History of significant intake of alcohol was present in 14% with a mean intake of 92 g/day and median duration of 17.5 years (range 0–40).

The association with serum biochemical markers and Child-Pugh score is detailed in the table below.

Table 1. Liver function tests, Child's class (n=164)

PARAMETER	Median(range)
Serum Bilirubin;mg/dl	1.6(0.2-18.11)
Serum Albumin,g/dl	2.8(1.08-4.2)
AST,U/l	76.4(18-466)
ALT,U/l	64.3(11-428)
Child Class A	22(17.7%)
Child Class B	82(66.12%)
Child Class C	20(16.1%)

Etiology

HCV was the most common etiological factor and was detected in 44.6 % of the patients, out of which a significant number was associated with a history of IV drug abuse or a history of blood transfusion in the past. Compared to the Pan India data pattern, where HBV was the predominant factor, HCV was predominant as an etiology in this part of the country (Figure 2).

The Spread of HCV was also related to the past history of blood transfusion and the use of unsafe needles by peripheral practitioners. Alcohol association was present in 16.2% of the patients. The mean age of presentation in HBV patients was significantly lower than HCV-related HCC.

Table 2. Etiological factors associated with HCC (n=164)

ETIOLOGY	n(%)
HCV	44.6%
HBV	32.4%
Alcohol	16.2%
Unknown	6.8%

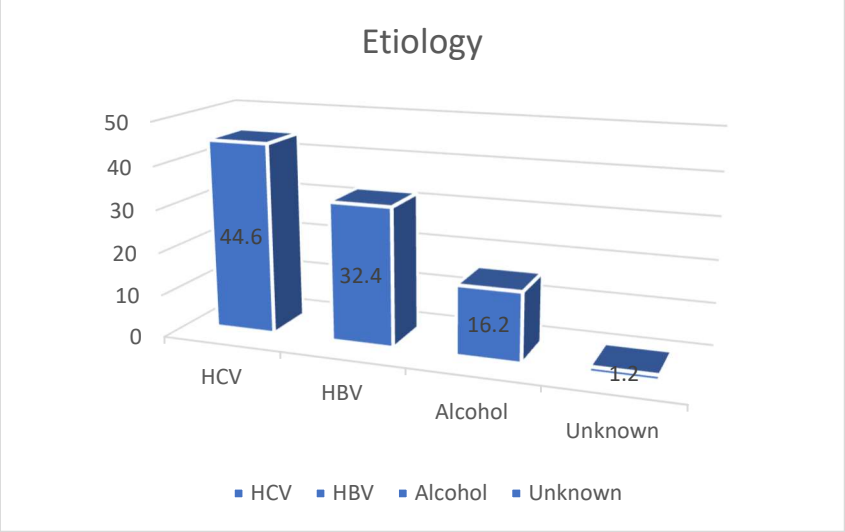

Figure 5 HCC etiological factors in the study

Tumor Characteristics

In 124 (76%) patients, the largest/ dominant lesion was more than 3.8 cm in size. There was a single lesion identified in 55 patients (34%) and > 5 lesions in 29 (18%). Portal vein involvement as thrombosis partial or complete was identified on imaging in 75 patients (46%). Extra-hepatic metastasis to peri-pancreatic nodes, celiac nodes, inferior vena cava thrombosis, and lungs were seen in 27 (17%) of the patients. The median serum AFP value in the 144 patients in whom it was available was 324 ng/ml (range 1.82– 48,552 ng/ml).

Treatment pattern

Patient were given all options as per their clinical profile and prognosis. The treatment option sought was biased because of cost constraints and phobia related to surgery and that attached to cancer. A total of 17 patients opted for Radiofrequency Ablation. 6 patients underwent TACE, and 2 opted for Open surgery for liver lobe resection. Rest patients choose Oral chemotherapy regimens, even if they qualified for minimally invasive surgery procedures or surgery was given an option.

Discussion

This comprehensive study was carried out to understand the profile of patients pertaining to HCC, especially in the North Western region, which is plagued by different risk factors due to the border area profile and peripheral needle abuse profile in the form of drug abuse or use by the quacks.

It was pertinent to see how the etiological factor profile was different from the pattern seen in the rest of the country. Also, the study found that HCC was the final outcome of a silent disease hidden in the form of HCV, and neither any pattern for detecting these silent cases is one to detect and plug the risk factor at an earlier time.

Almost all our patients about (86%) had underlying cirrhosis, and different from the usual profile pattern in the rest of the Indian subcontinent, Hepatitis C was the predominant risk factor. Hepatitis B was seen as the next-in-line etiological factor, and alcohol abuse followed it. The pattern of the etiological factors resembled the West, even though the socioeconomic and lifestyle patterns of the two vary a lot.

The mean age of presentation in our study was 58.8, which is more than the age in the earlier series report. The increase in the mean age could be attributed to HCV being the main etiological factor in HBV-related HCC patients in our study presented a decade earlier when compared to HCV-infected HCC patients, the pattern which resembled the earlier studies and with studies describing HBV as the main etiological factor[3].

HBV also showed a decrease due to increased vaccination patterns of Hepatitis B. The study followed the strong Male preponderance as in earlier studies.

Serum AFP level 500 ng/ml was taken as a conventional diagnostic level for HCC. In this study, AFP was elevated in 84% of patients but was above the diagnostic range in only 44% of patients. Low serum levels may be either because of the smaller size of a tumor or due to the differentiation of masses that do not produce high AFP[4]. The level of AFP did not show any correlation to the number of lesions/ the etiology of HCC/or the presence of malignant spread.

In conclusion, HCV is the most common cause of HCC in this part of the country, followed by HBV infection. Prevention of these etiologic agents is the only realistic means of reducing the morbidity and mortality of HCC. Also, alcohol pattern abuse needs control. The survival of these patients can be improved by aggressively treating HCC complications of cirrhosis and by controlling etiological factors. Serum AFP is not a very sensitive marker for diagnosis or surveillance, and there is an urgent need for better markers and imaging to diagnose smaller tumors. The way vaccine intervention has shifted the etiology profile away from hepatitis B and the factors leading to the spread of hepatitis C need to be looked into. Also, screening for the same at a more significant level could plug the development at an earlier stage.

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Case Report

Management of Pediatric Upper Extremity Scald Burn in a Tertiary care hospital

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Abstract

Burns injuries are a common presentation of childhood injuries. The majority of admissions result from scalds, followed by contact and flame burns. The incidence of burns is higher in children than adults, and it starts when they begin to reach up for things and also because of more vulnerability and inability to move away from the causative agent. Although the upper extremity constitutes approximately 18% of the total body surface area, the sequelae and subsequent functional outcomes following upper extremity burns significantly impact the quality of life for the affected children. Appropriate initial management commencing from the acute phase in children remains of great importance in optimizing functional outcomes and minimizing long-term scar formation. In this case report, we discuss the management of upper extremity scald burn wounds in our center.

Keywords: management, scald, burns, upper extremity, Pediatric

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Introduction

Burns to the upper extremities have detrimental effects on a person's quality of life in terms of their physical, functional, and psychological well-being. Because of the severity of these burns, both the patient and the treating surgeon are very concerned about them. These patients usually experience a lengthy hospital stay that is linked to high morbidity and elevated mortality. Along with conventional treatment, we adopted regenerative technology for better healing with minimal abnormal scarring.[1,2] In essence, extremity burns, specifically, the prolonged institutional stay and high mortality, represent the severity of trauma. The purpose of this study was to report our experience with the management and outcome of extremity burns at our burn center.

Materials and Methods

This study was conducted in the Department of Plastic Surgery in a tertiary care center in South India after obtaining the departmental ethical committee approval. Informed written consent was taken from the patient. A 4-year-old male had a scald burn injury after an accidental self-fall into a hot sambhar pot wherein he sustained injuries to the left upper extremity involving the arm, distal forearm, and wrist (figure 1). The patient was admitted with the above symptoms and managed according to WHO burn protocol. He underwent wound debridement and silver steam wash, initially managed with silver ointment and collagen dressing for 24 hours (figure 2). The patient underwent tangential excision of the deep burns over the arm and raw area covered with skin grafting (figure 3). The superficial burn wounds were

managed with regenerative therapies like Collagen application and Negative Pressure wound therapy (figure 4). Once the wound showed promising signs of healing and epithelization was complete, we applied aloe vera gel over the healed wound till complete healing to prevent the abnormal scarring (figure 5). To minimize the abnormal scarring, we used Silicone gel application, onion extract application, Low-level laser therapy, and Pressure garment therapy (figure 6-9).

Figure 1. Upper extremity burns at presentation

Figure 2. Collagen and silver dressing

Figure 3. Tangential excision of deeper burns and Split skin grafting

Figure 4. Negative Pressure Wound Therapy

Figure 5. Aloe vera gel over healed scar

Figure 6. Silicone gel application

Figure 7. Onion extract application

Figure 8. Hand held Low-level laser therapy

Figure 9. Pressure therapy application

Results

The patient's burn wounds healed, and there was minimal abnormal scarring and no hypertrophic scarring at the time of discharge. Vancouver Scar Scale- 4/13 at the time of discharge.

Discussion

Upper extremity burns have the potential to damage or impair function, appearance, and the limb's capacity to continue functioning normally. In addition to causing pain, deformity, and social embarrassment, the loss of normal tissue and scarring can restrict movement. One part of the therapy plan is surveillance to maintain the function of the involved extremities. Before considering any surgical options, patients with superficial and deep burns to the extremities should first get conservative care, which includes cleaning, using topical antibacterial agents and bandages, and gently debriding any loose burned tissue with gauze.

Patients whose extremities have sustained significant burns require more complicated care. The extremity's joints became immobile to aid in recovery and pain relief. The extremity's joints are immobilized at the proper angles to avoid malfunction in the future [2]. The early therapy of a patient with significant burns requires not only local topical medications and bandages but also preserving the affected extremity from developing compartment syndrome.

The process of gradually removing eschar in thin layers from a wound until healthy tissue is reached is known as tangential excision. The underlying wound bed's punctate bleeding indicates the end of the excision process and the existence of live tissue. Any skin eschar can benefit from tangential excision, which reduces tissue removal while protecting healthy tissue beneath. With the advent of infection control, early excision and grafting of burns have become a crucial component of any effective burn therapy. Tangential excision is a type of early excision grafting that can be done either by itself or in combination with other methods to obtain a desired depth. It aids in the healing of some deep burns that result in partial skin loss, particularly scalds, which are common in kids. A thin to moderately thick allograft is immediately inserted following the removal of many slices of necrotic skin. Following the acquisition of numerous slices of necrotic skin until a deep dermal punctate bleeding surface is formed, an allograft with a thin to moderate thickness is applied right away. By maintaining the deep dermis, the area that can be transplanted can be reduced, resulting in a graft with improved texture and less scarring. Since split-thickness skin grafting restores epidermal function and reduces the risk of infection, additional hypothermia, protein, and fluid losses, and wound infection, it remains the primary permanent way of closing burn wounds and integrates into the healing process [3].

Biomaterials play a major role in the numerous tissue-engineered constructs and dressings used in burn therapy. The study's numerous reconstructions made effective use of dermal regenerates, soft tissue regeneration techniques, biologic scaffolds [4], fat grafting techniques, and adipose-derived stem cells. Dry collagen was used as a scaffold to promote tissue regeneration in the wound bed in preparation for further intervention.

As a result of promoting cutaneous perfusion and potentially decreasing oedema, negative pressure may cause an interstitial gradient shift that makes it easier for blood or serous fluid to be evacuated from the body. Furthermore, it is postulated that the ability of Negative Pressure Wound Therapy to produce mechanical stress or force that directly affects cellular activity—specifically, the formation of new blood vessels—may aid in delaying the progression of burn injuries. Maintaining a moist environment that provides the best conditions for epithelialization and avoids tissue desiccation may also be advantageous [5].

Those with chronic wounds have shown a considerable reduction in pain, bleeding, and recovery time when aloe vera is applied. Studies have shown that aloe vera is effective in preventing ulcers. Aloe vera contains mucopolysaccharides, zinc, and amino acids, which have been shown to support the preservation of moisture, the avoidance of skin ulcers, the reduction of erythema, and the maintenance of skin integrity [6]. Aloe vera's anti-inflammatory, increased immunological activity, antibacterial, antiviral, and histamine-lowering properties all

help to speed up the healing process of burn wounds. Aloe vera is often considered the best option for wound dressings, according to the results of the current review study [7].

Under silicone gel, the skin surface temperature of hypertrophic burn scars increases by 1.7°C. Temperature increases this large has the potential to considerably boost collagenase activity, which in turn may have an impact on scarring. Therefore, it is plausible that the mechanism of action of silicone-based scar management products involves an increase in skin surface temperature. The formation of a static electric field may also be related since it has been proposed that the negative static electric field created by the friction between silicone gel and the skin may induce collagen realignment and result in the involution of scars [8].

A hypertrophic scar or keloid may occur as a result of excessive extracellular matrix accumulation if MMP-1 activity is out of equilibrium during ECM synthesis during the healing phase of wounds. In both pathologic scenarios, excessive type I collagen accumulation reduced MMP-1 activity, and increased TIMP-1 expression could all be involved [9]. Onion extract has been shown in several studies to inhibit the proliferation of fibroblasts. It is believed that onion extract has antiproliferative and fibroblast inhibitory properties. Through the up-regulation of MMP, onion extracts themselves can cause the alteration of ECM. [10]

Sometimes referred to as biological stimulation or photobiological regulation, Low-Level Laser Therapy (LLLT) is a technique that can cause photochemical reactions in tissue and cells. According to earlier studies, LLLT influences the photoreceptors on the mitochondria, activates the created energy's electron transport chain, improves mitochondrial respiration, and increases adenosine triphosphate (ATP) synthesis. Consequently, LLLT possesses the capacity to alter the redox state of cells and initiate the activation of signaling pathways that propel transcription factors linked to tissue repair, proliferation, and regeneration. [11]

It has been reported that 60 to 85 percent of patients see a regression of hypertrophic scars following compression. It was demonstrated that scarring did not occur when a compressive force was given to incisional wounds in the opposite direction from the wound tension.[12] These findings imply that mechanical pressures exerted on the scar may help prevent fibroblasts from differentiating into myofibroblasts, which in turn may prevent collagen deposition and scar contraction. It is possible that decreasing the strain state within the scar, which in turn reduces myofibroblast differentiation and excessive collagen deposition, contributed to the reduced scar contraction seen in the current study.[13,14]

Burns to the upper extremities can potentially impair or destroy function, aesthetics, and the ability to maintain proper function of the limb. The loss of normal tissue and scarring can limit movement and cause pain, disfigurement, and social embarrassment. Surveillance for the preservation of the function of the involved extremity is a component of the treatment plan. The initial management of patients with superficial and deep burns to the extremities prior to any potential surgical management is conservative, including cleansing, gentle gauze debridement of loose burned tissue if present, and coverage with topical antimicrobial agents and dressings.

For patients with substantial burns involving the extremity, the management is more complex. The joints of the extremity are immobilized to facilitate healing and pain management. The joints of the extremity are immobilized at appropriate angles to prevent dysfunction later.2 In addition to local topical agents and dressings, the initial management of the extensively burned patient also includes protecting the extremity from the development of compartment syndrome.

Tangential excision of a wound is defined as the sequential removal of eschar in thin layers until healthy tissue is reached. Punctate bleeding of the underlying wound bed signals the presence of viable tissue and the end point of excision. Tangential excision can be applied to any eschar of the skin in order to minimize the amount of tissue removed and preserve underlying viable tissue. Early excision and grafting of burns have become an essential part of any successful burn therapy with the emergence of infection control. A sort of early

excision grafting called tangential excision can be used alone or in conjunction with other techniques to reach a specific depth. It helps with some types of deep burns that cause partial skin loss, especially scalds, which are frequent in children. Immediately after many slices of necrotic skin are removed, a thin to moderate-thickness allograft is placed. After obtaining many slices of necrotic skin until a punctate bleeding surface is established in the deep dermis, an allograft of thin to moderate thickness is immediately applied. A graft with better texture and less scarring can be produced by limiting the region that can be transplanted by preserving the deep dermis. Split-thickness skin grafting, which integrates into the healing process, is still the major permanent method of burn wound closure because it restores epidermal function and prevents further hypothermia, protein and fluid losses, and infection risk.[3]

The various dressings and tissue-engineered constructions used in burn therapy depend heavily on biomaterials. Dermal regenerates, soft tissue regeneration methods, biologic scaffolds 4, fat grafting methods, and adipose-derived stem cells were all successfully used in the study's various reconstructions. As a scaffold for tissue regeneration of the wound bed for additional intervention, dry collagen was employed.

Negative pressure might generate an interstitial gradient shift that can reduce oedema and, as a side effect, promote cutaneous perfusion, facilitating the evacuation of blood or serous fluid. Additionally, it is hypothesized that Negative Pressure Wound Therapy's capacity to generate mechanical stress or force that directly influences cellular activity, particularly the growth of new blood vessels, may help slow the advancement of burn wounds. Additionally, it may be desirable to maintain a wet environment that offers ideal circumstances for epithelialization and prevents tissue desiccation.[5]

The application of aloe vera shown a significant reduction in pain, bleeding, and recovery duration among those with chronic wounds. Aloe vera has demonstrated efficacy in the prevention of ulcers. The presence of mucopolysaccharides, amino acids, and zinc in Aloe vera has been found to contribute to the maintenance of skin integrity, the preservation of moisture, the reduction of erythema, and the prevention of skin ulcers.6 The healing process of burn wounds is expedited by Aloe vera because of its anti-inflammatory, heightened immunological activity, antibacterial and antiviral actions, as well as its ability to lower histamine activity. The findings of the current review study indicate that Aloe vera is universally regarded as the optimal choice for wound dressings.[7]

The skin surface temperature of hypertrophic burn scars under silicone gel is increased by 1.7°C, and temperature increases of this magnitude can significantly increase collagenase activity and could affect scarring. As a result, it is possible that an increase in skin surface temperature is involved in the mechanism of action of silicone-based products for scar management. Because it has been suggested that the negative static electric field produced by friction between Silicone gel and the skin may cause collagen realignment and lead to the involution of scars, the development of a static electric field may also be implicated.[8]

Excessive extracellular matrix accumulation may result in the formation of a hypertrophic scar or keloid if MMP-1 activity is imbalanced between ECM syntheses during the wound-healing process. Excessive type I collagen build-up, decreased MMP-1 activity, and elevated TIMP-1 expression may all play a role in both pathologic situations.[9] In various investigations, onion extract has been demonstrated to suppress fibroblast growth. Onion extract is thought to be involved in fibroblast inhibition and antiproliferative. Onion extracts itself can induce the modification of ECM through up-regulation of MMP.[10]

Low-Level Laser Therapy (LLLT), which can trigger photochemical reactions in tissue and cells, is sometimes referred to as biological stimulation or photobiological regulation. Previous research has demonstrated that LLLT affects the photoreceptors on mitochondria, stimulates the electron transport chain of produced energy, enhances mitochondrial respiration, and boosts the synthesis of adenosine triphosphate (ATP). As a result, LLLT has the ability to change the cellular redox state and to trigger the activation of signaling pathways that drive transcription factors involved in proliferation, tissue repair, and regeneration.[11]

Compression is reported to produce regression of hypertrophic scars in 60 to 85 percent of patients. When a compressive force was applied to incisional wounds in the opposite direction to the wound tension, it was shown that scars did not form.12 These data suggest that the mechanical forces applied to the scar can assist in reducing differentiation of fibroblasts to myofibroblasts, ultimately decreasing scar contraction and collagen deposition. It is likely that the reduced scar contraction observed in the current study was, in part, a result of reducing the strain state within the scar, which subsequently abates myofibroblast differentiation and excessive collagen deposition.[13,14]

Conclusion

With the advent of newer technologies, the treatment of scald burn wounds has been much more streamlined and produces better results in patients. In our experience, we have seen better wound healing in patients with scald burns with minimal scarring. However, large randomized control trials are necessary to establish an association between the same.

Conflicts of interest: None

Disclosures: None.

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Research Article

Exploring Emotional and Psychological Impacts of Mammography in Women

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Abstract

Introduction: Mammography is a diagnostic tool that is routinely used to test women for breast cancer. While it has been shown to be beneficial in detecting early-stage malignancies, it can also have emotional and psychological consequences for patients. The goal of this study is to dive into the emotional and psychological experiences of mammography patients. We hope to obtain a better understanding of the potential complications and problems faced by women during the screening process by investigating these elements.

Materials and Methods: The Psychological Consequences Questionnaire (PCQ) and a self-administered questionnaire were used to collect data. SPSS was used for statistical analysis. All participants were given information about mammography technology and safety, and their participation was based on informed consent.

Results: The study included 60 women ranging in age from 40 to 67 years old, with a mean age of 50.22. The PCQ results revealed a high prevalence of symptoms such as difficulty sleeping, changes in appetite, depression or unhappy feelings, fear and panic, nervousness or tension, feeling under pressure, withholding items, venting frustrations on others, withdrawal from relationships, difficulty with daily tasks, and difficulties fulfilling obligations. These findings shed light on the psychological repercussions that people face and point to the necessity for support networks or therapy to address these concerns.

Conclusion: This research focuses on the emotional and psychological effects of mammography on women. The data suggest that anxiety is a common feeling for women undergoing mammography, which could be exacerbated by previous negative experiences or fear of breast cancer. In order to provide holistic and comprehensive care, healthcare providers must recognize and meet patients' emotional and psychological needs.

Keywords: Mammography, Breast Cancer Screening, Emotional Impact, Psychological Impact, Women's Health.

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Introduction

Breast cancer is the most common form of cancer in women worldwide, posing a considerable health concern. Every year, an alarming number of women are diagnosed with breast cancer, highlighting the critical need for effective screening and treatment. The incidence of Breast cancer in Pakistan has been steadily rising, with one out of every nine women at risk of having the disease. Tragically, Pakistan has one of the highest rates of breast cancer death in the world [1,2]. Breast cancer afflicted over 2.3 million persons worldwide in 2020, with 0.685 million deaths. [3] According to the WHO, the global prevalence of Breast cancer is growing by 1.8% to 2.0% every year. It is anticipated that more than 2.5 million new cases will be diagnosed each year by 2035. [4] Unfortunately, the death rate of breast cancer patients in the country is significant due to delayed referral to specialized facilities and late diagnosis. [5] Several studies have continuously stressed the need of early cancer diagnosis for successful cancer treatment. When cancer is identified early, the odds of healing and long-term survival improve dramatically. In contrast, late diagnosis diminishes the likelihood of successful treatment. As a result, it is critical to enhance broad public knowledge about the need of early detection and treatment for breast cancer. By raising awareness, we can encourage early discovery, increasing the chances of a happy outcome for those impacted by the condition. [6]
Mammography screening is an excellent tool for detecting breast cancer in its early stages. The American College of Radiology and the American Cancer Society both suggested annual screenings for women aged 40 and over, with a specific emphasis on those aged 45-54. Biennial screenings are advised beginning at the age of 55. Over a 14-year period, studies demonstrate that screening mammography reduces breast cancer mortality by roughly 20-35% in women aged 50-69, and to a slightly lesser extent in women aged 40-49. Following these guidelines can help to improve early detection and survival rates. [7, 8] Mammography screening for breast cancer has recently become a source of debate and international concern as a result of negative pre- and post-screening effects observed in several trials [9]. However, the level of anxiety felt by women waiting for breast cancer screening visits has been shown to fluctuate, reflecting patients' different levels of concern about breast cancer screening [10].
The purpose of this study was to explore women's emotional and psychological experiences during the process of undergoing mammography.

Materials And Methods

A cross-sectional study was carried out at the Aliya Begum Diagnostic and Cancer Care Center in Mirpur, AJK, which serves as the region's sole cancer care center. The research was conducted during August and October of 2023. Female patients referred for mammography screening by their primary care physicians were recruited directly from the Radiology Department. Participants were interviewed using a two-part self-administered questionnaire while waiting for their scheduled mammography appointments.
The first section of the questionnaire collected clinical and demographic information, such as age, marital status, educational level, work position, and personal or family history of breast cancer. The second component was the Psychological Consequences Questionnaire (PCQ), a trustworthy measure of the emotional, physical, and social impact of mammographic screening. The PCQ included 12 measures divided into three domains: emotional dysfunction, physical dysfunction, and social dysfunction. Ratings for symptoms within each domain were averaged to create a score indicating the level of dysfunction encountered. [11]
For categorical data, frequencies and percentages were given, while for continuous variables, descriptive statistics like means and standard deviations were computed. A significance criterion of $P \leq 0.05$ with two tails was employed. Furthermore, the Statistical Package for the Social Sciences (SPSS) was utilized to compile the characteristics of the participating ladies through exploratory factor analysis (EFA) and descriptive statistics.
All participants were given information on the mammography technology and its safety, as X-rays were used throughout the screening process. The research protocol for this study was approved by the Hospital's Research Ethics Committee, and verbal consent was obtained from all participants following a detailed explanation of the study.

Results

A total of 60 women aged 40 to 67 years (mean 50.22) participated in this study. A wide diversity of educational backgrounds is reported among women receiving mammography.

According to the data, 8.3% of these women are uneducated, while 3.3% have completed basic school and an equal amount have finished middle school. Furthermore, 6.6% have a secondary education, and a sizable proportion (26.6%) have an intermediate education. Notably, 30% of these women have a bachelor's degree, 18.3% have a master's degree, and 3.3% have a doctorate. Examining the employment status of women undergoing mammography, it is clear that 58.3% of them are working at the moment. Still, a sizable portion of women (41.6%) is unemployed. Married women make up a substantial majority of those having mammography procedures (93.3%). This result raises the possibility that a number of variables, including interpersonal connections and familial support networks, may have an impact on the decision to have a mammogram (TABLE 01).

Table 01: demographic characteristics of patients

Characteristics	Frequency	Percentage
Age		
40-49	34	56.6
50-59	17	28.3
60-69	9	0.15
Education		
Uneducated	5	8.3
Primary	2	3.3
Middle	2	3.3
Secondary	4	6.6
Intermediate	16	26.6
Bachelors	18	30
Masters	11	18.3
PHD	2	3.3
Employment		
Employed	35	58.3
Unemployed	25	41.6
Marital Status		
Married	56	93.3

Unmarried	4	6.6
Residence		
Mirpur AJK	60	100

To evaluate the individuals' various psychological symptoms, the Psychological Consequences Questionnaire (PCQ) (TABLE 02) was used. In this self-reported survey, participants rated their responses on the scale of 0-3. According to the findings, a sizable portion of people said they were having problems in several spheres of their lives. At a mean score of 1.37 (±1.008), 55% of participants reported having difficulty falling asleep. Additionally, with a mean score of 0.95 (±0.982), 38% of respondents stated that their hunger had changed. 48% of participants had an average score of 1.23 (±0.871), indicating a high prevalence of depression or unhappy sentiments. With an average score of 1.23 (±1.11), 42% of respondents said they felt afraid and panicked. An average of 1.48 (±0.833) was scored by 53% of individuals who reported feeling nervous or tense. 62% percent of respondents reported feeling under pressure, with an average score of 1.55 (±0.852). Furthermore, 21% of respondents acknowledged withholding items from others that mattered to them; they received an average score of 0.9 (±0.817). 30% of the individuals reported venting their frustrations on others, with a mean score of 0.92 (±0.979). An additional 30% of respondents noted a withdrawal from close relationships, with an average score of 0.9 (±0.915). A total of 43% of participants reported difficulty with daily tasks at home that were previously manageable, with an average score of 1.08 (±0.889). 35% of respondents found it difficult to fulfil their obligations, with a mean score of 0.98 (±0.93). Additionally, 65% of respondents scoring an average of 1.77 (±1.577) expressed concern about their future.

The psychological effects that the individuals went through are clarified by these PCQ results. The findings demonstrate the frequency of a number of symptoms, such as poor sleep, altered appetite, emotional distress, anxiety, strained relationships, social disengagement, and difficulties carrying out everyday tasks. These realizations help to improve our comprehension of the psychological effects on people and guide the development of possible support networks or therapies to deal with these issues.

Table 02: Items of psychological consequences

Item of PCQs	Percentage	Mean	Standard Deviation
Having trouble sleeping	55%	1.37	1.008
Experience changed appetite	38%	0.95	0.982
Been Unhappy or Depressed	48%	1.23	0.871
Been Scared and Panicky	42%	1.23	1.11
Felt Nervous or Strung Up	53%	1.48	0.833
Felt Under Strain	62%	1.55	0.852
Found You Have been Keeping things from those who are close to you	21%	0.9	0.817

Found yourself taking things out on other people	30%	0.92	0.979
Found yourself noticeably withdrawing yourself from those who are close to you	30%	0.9	0.915
Had difficulty doing things around the house which you normally do	43%	1.08	0.889
Had difficulty meeting work or other commitments	35%	0.98	0.93
Felt Worried about your future	65%	1.77	1.577

Discussion

While screening for breast cancer is essential for early identification and prevention, it can also have negative psychological effects on women. Although the majority of women with a family history of breast cancer do not report significant levels of worry when it comes to mammography screening, those who have false-positive results may have more long-term distress and show lower rates of attendance for follow-up exams. Participants may experience severe anxiety during the interim between aberrant results and additional testing. An elevated level of awareness, worry, and emotional discomfort during mammography screening may be attributed to a positive family history of breast cancer. Healthcare providers must give these women with individualized assistance and information in order to empower them to make educated decisions and take proactive measures toward early identification and prevention of breast cancer. Early intervention, continuing support, and counseling are required to treat these psychological effects. Healthcare workers, particularly nurses, can be extremely helpful in determining anxiety levels, offering individualized assistance, and encouraging adherence to screening recommendations. More study is required to comprehend the psychological effects of mammography and create plans to lessen anxiety in women who have a family history of breast cancer. [10, 14, 15, 16, 17]

The purpose of this study was to investigate the consequences of screening mammography on a woman's emotional, social, and physical well-being. [11] The table displays the PCQ section that was examined in this investigation. This measure is reliable for assessing how mammography screening affects a person's physical, emotional, and social functioning. Five items assess emotional dysfunction (E), four assess physical dysfunction (P), and three assess social dysfunction (S). Overall, this is evident. A higher score indicates more dysfunction. The scores for symptoms within the emotional, bodily, and social dimensions are summed to yield a score that indicates the extent of dysfunction on each dimension. As a result of worries about breast cancer, the three survey has acquired measures of emotional, social, and physical dysfunction. [12] The questionnaire asks, "How often have you experienced the following over the past days due to thoughts and feelings regarding breast cancer?" then came the items. Response options are ranked from 0 to 3 and include "not at all," "rarely," "some of the time," and "quite a lot of the time." Each dimension's ratings are subtracted to yield the corresponding subscale scores. Higher scores correspond to higher dysfunction on that dimension. Field testing was done on a pilot version of the PCQ at screening and recall clinics. Items were evaluated for their floor effect, ability to measure variations between female groups, and perceptions of ease of completion by women. The judgments of a clinical interviewer, who was blinded to the PCQ score, were compared with the responses of women in initial screening and assessment clinics. Each subscale's high degree of agreement was regarded as a sign of concurrency validity. [13]

According to the study's wide educational background, women having mammography screening have varying levels of education, including higher levels such as bachelor's and master's degrees. This discovery may have consequences for their health-related habits and decision-making processes.

The majority of study participants were employed, implying possible access to healthcare resources for mammography screening. However, a significant number of women were unemployed, implying that there may be hurdles or inequities in healthcare access.
The fact that the majority of participants were married suggests that interpersonal relationships and familial support networks may play a role in the decision to undergo mammography. This demonstrates the importance of social variables in healthcare decision-making.
According to the findings of the PCQ Psychological repercussions Questionnaire, women who undergo mammography screening may face a number of psychological repercussions, including difficulty sleeping, changes in appetite, feelings of despair or dissatisfaction, dread, nervousness, and strained relationships. These findings emphasize the possibility of emotional distress and anxiety associated with the screening process, which can have an impact on overall well-being and future screening adherence.

The findings of the study are consistent with earlier research, underlining the significance of continued support and counseling for women undergoing mammography screening, particularly those who have false-positive results. Addressing psychological implications and providing appropriate support can enhance patient experiences, mental health outcomes, and future screening attendance rates.
Overall, the findings of this study shed light on the complex relationships between women's psychological outcomes following mammography, their job and marital status, and their educational backgrounds. The findings highlight the importance of holistic approaches to healthcare that take into account the psychological and social factors that may influence women's experiences. By addressing these factors through all-inclusive support systems, healthcare practitioners can endeavor to improve people's well-being and ensure a positive patient experience during the mammography treatment. Healthcare professionals should consider incorporating interventions such as pre-screening education, emotional support throughout the screening procedure, and post-screening counseling sessions to meet these emotional and psychological requirements. Positive screening experiences can also be facilitated by patient-centered care strategies that emphasize open communication and collaborative decision-making. Healthcare professionals can improve the general wellbeing of women undergoing mammography by recognizing these emotional issues and acting to offer support and counseling.
It is important to keep in mind that this study has a number of limitations. The sample size was tiny, consisting just of sixty women from a specific age range and area and another significant limitation of the study is lack of control groups. These results might not apply to all populations of women undergoing mammography. Future study should aim to include larger and more diverse samples in order to better investigate the relationship between psychological effects, demographic variables, and the factors influencing women's experiences during mammography.

Conclusion

In conclusion, this research illuminates the psychological and emotional effects that women who are having mammograms go through. The results underscore the possible discomfort, unease, and modifications in overall health that women might undergo throughout the screening procedure. These experiences may vary depending on variables like marital status, work position, and educational background. The psychological needs of women undergoing mammography, particularly those who receive false-positive results, must be acknowledged and attended to by healthcare personnel. Healthcare providers can enhance mental health outcomes, patient experiences, and screening attendance rates by offering customized interventions, counseling, and continuous support. In order to improve patient-centered care even more, future studies should keep delving into the intricate relationships that exist between demographic traits, psychological effects, and other variables that affect women's experiences during mammography.

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Literature review

Analyzing the Role of Language and Religion in Culturally Competent Healthcare: An Interdisciplinary Perspective

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Abstract: Cultural competence in healthcare refers to the ability of providers and organizations to effectively deliver healthcare services that meet the social, cultural, and linguistic needs of patients. The current interdisciplinary approach aims to elucidate the critical roles of language and religion in healthcare, focusing on their impact on communication, patient satisfaction, health literacy, and cultural competence in healthcare delivery. Through meticulous analysis of academic databases, health organization reports, and religious institution publications, this literature review consolidates findings from few peer-reviewed articles published in English. Findings reveal that effective healthcare communication is significantly hampered by language barriers, leading to risks of misdiagnoses, improper treatments, and diminished patient satisfaction. The review highlights the indispensable roles of language and religious competence in healthcare, advocating for their integration into healthcare practice, education, and policy to enhance the quality and cultural competence of healthcare delivery for diverse patient populations. Future research should continue to explore and expand on these findings, contributing to the development of practical strategies and theoretical frameworks supporting culturally competent healthcare.

Keywords: Interdisciplinary Research; Healthcare Communication; Healthcare Delivery; Language, Religion, and Healthcare

1. Introduction

Cultural competence in healthcare refers to the ability of providers and organizations to effectively deliver healthcare services that meet the social, cultural, and linguistic needs of patients. A culturally competent healthcare system enhances equity and reduces disparities by improving care access and quality for all patients, irrespective of their cultural background. This study aims to analyze the integral roles of language and religion in fostering a culturally competent healthcare environment.

Theoretical Background

Cultural competence in healthcare has been a subject of scholarly interest for decades, serving as a critical framework for providing effective and equitable health services to diversely populated communities. Early foundational studies acknowledge the intricate relationship between culture and health, suggesting that patients' cultural attributes significantly influence their health beliefs, behaviors, and outcomes (Betancourt, Green, Carrillo, & Park, 2005).

In a pivotal 2017 study by Smith and Lee, the researchers analyzed the importance of cultural competence among healthcare professionals working with diverse religious groups, noting that cultural sensitivity significantly improves patients' trust and compliance with prescribed medical regimens (Smith & Lee, 2017).

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Similarly, Wang et al. (2018) conducted a longitudinal assessment of linguistic barriers in healthcare settings in multilingual societies. Their findings illustrated that language discordance between patients and providers substantially affected the quality of healthcare delivery, pointing to a pressing need for bilingual healthcare providers or interpreter services (Wang et al., 2018).

Within the broad spectrum of cultural competence, language and religion emerge as pivotal components. Razzaq's (2023) recent study extensively analyzed linguistic features and persuasive strategies within Islamic sermons, highlighting the importance of understanding religious discourse as it significantly impacts believers' perspectives and behaviors, including their attitudes and responses to health and wellness.

Johnson and colleagues (2016) emphasized the necessity of religious literacy among healthcare providers, pointing out that a deep understanding of patients' religious backgrounds and beliefs contributes significantly to providing empathetic and personalized care (Johnson et al., 2016).

Past research has indicated that language barriers impede effective communication between healthcare providers and patients, often resulting in misunderstandings, misdiagnoses, and inappropriate or ineffective treatment plans (Flores, 2006). In their groundbreaking work, Razzaq & Khan (2023) established a link between linguistics and physical therapy, demonstrating that a team approach incorporating linguistic expertise can significantly improve communication and rehabilitation outcomes in physical therapy settings.

Furthermore, studies have unveiled a direct correlation between language competence and health literacy, suggesting that patients who are not proficient in the predominant language of the healthcare system are likely to experience challenges in understanding and navigating medical information and services (Nielsen-Bohlman, Panzer, & Kindig, 2004).

Williams and Martinez (2019) contributed to the discourse by exploring the influence of language proficiency on the effectiveness of telemedicine, concluding that linguistic competence remains crucial, irrespective of the mode of healthcare delivery (Williams & Martinez, 2019).

Similarly, the role of religion in healthcare cannot be overstated. Early studies underscored the influence of patients' religious beliefs on their perceptions of health and illness, treatment preferences, and expectations from healthcare providers (Koenig, McCullough, & Larson, 2001). These studies further highlighted that a lack of understanding or disrespect for patients' religious beliefs could lead to mistrust, dissatisfaction, and non-adherence to medical advice and treatments (Curlin et al., 2007).

More recent studies have continued to explore the intersectionality between language and religion in the context of cultural competence in healthcare. Research conducted by DeLilly and Flaskerud (2012) highlights the importance of considering both linguistic and religious competence as essential components for effectively meeting the needs of diverse patient populations. Another study by Ano and Vasconcelles (2005) explored the psychological mechanism linking religion, spirituality, and health, providing valuable insights into how religious beliefs can significantly impact patients' mental health and coping mechanisms.

Current State of Research

Recent investigations into culturally competent healthcare have identified an intersectionality between language and religion, recognizing these elements as integral to patients' cultural identities and essential for their engagement in healthcare. This recognition has fueled discussions on the need for healthcare providers to develop both linguistic and religious competence, acknowledging that sensitivity and responsiveness to these cultural aspects are not just ethical imperatives but also prerequisites for effective and efficient healthcare delivery.

Objective of the Present Study

Building upon this robust theoretical foundation and responding to the identified gaps in the literature, the present study seeks to provide a comprehensive analysis of the roles of language and religion in culturally competent healthcare. Through the literature review of existing literature, this research aims to deepen our understanding of how linguistic and religious competence among healthcare providers contributes to improved communication, increased patient satisfaction, and better health outcomes across diverse patient populations.

2. Materials and Methods

Research Design

This research employs a literature review design, meticulously consolidating and analyzing existing scholarly literature to offer a coherent understanding of the intersectionality between language, religion, and cultural competence in healthcare. This design facilitates the identification and synthesis of key themes, findings, and gaps in the current body of knowledge, providing a foundation for future empirical and theoretical endeavors in this interdisciplinary field of study.

Data Sources

Data for the current research were extracted from a variety of authoritative and reliable sources to ensure a comprehensive and nuanced understanding of the research topic:

Academic Databases: Scholarly articles constituting the primary data sources were accessed through academic databases renowned for their extensive collections of peer-reviewed journals, books, conference papers, and theses in the fields of healthcare, linguistics, and religious studies.

Governmental and Non-Governmental Health Organization Reports: These sources provided invaluable insights into the policy, practice, and advocacy dimensions of culturally competent healthcare, offering a macro-level perspective on the challenges and opportunities associated with integrating language and religion into healthcare delivery.

Publications from Religious Institutions: These sources offered theological, ethical, and cultural perspectives on health and wellness, providing a depth of understanding regarding the influence of religious beliefs and practices on health behaviors, patient-provider relationships, and healthcare decision-making.

Selection Criteria

The literature included in this study was selected through a stringent process, adhering to the following criteria:

Type of Publications: The review considered peer-reviewed articles published in English, ensuring the credibility, rigor, and accessibility of the selected literature.

Focus of the Articles: All selected articles focused on the themes of language, religion, and cultural competence in healthcare, with particular emphasis on the roles and intersections of these elements in healthcare delivery, patient-provider interactions, and health outcomes.

Materials and Protocols

The literature review was conducted using a predetermined protocol designed to ensure comprehensive and unbiased identification, selection, and synthesis of relevant literature. The primary texts for the review included peer-reviewed journal articles obtained from databases-PubMed, Scopus, and Google Scholar. Specific search strings were developed using relevant keywords and Boolean operators to identify articles related to language, religion, and cultural competence in healthcare.

3. Results

The literature review yielded critical insights into the roles of language competence and religious competence in healthcare, each significantly impacting various dimensions of healthcare delivery and patient experience.

3.1. Language Competence in Healthcare

The selected studies consistently highlighted the indispensable role of language in the effective communication and comprehension within the healthcare context.

3.1.1. Communication Effectiveness

Misdiagnoses and Improper Treatment: The literature suggests that language barriers often contribute to misunderstandings that could lead to misdiagnoses and subsequently, improper treatment plans. Lack of clear communication compromises the accuracy of the information exchanged between patients and healthcare providers, ultimately affecting the quality of care delivered.

Patient Satisfaction: Patient satisfaction levels were observed to be considerably higher when healthcare providers communicated in the patients' native languages. Effective communication fosters a sense of comfort and trust, enhancing the overall patient experience and satisfaction with the healthcare services received.

Enhanced Communication through Translation Services: Several studies emphasized the positive impact of providing translation services within healthcare settings. Translation services mitigate language barriers, facilitating more accurate and effective communication, which is crucial for diagnosis, treatment planning, and patient education.

3.1.2. Health Literacy

The review identified a strong correlation between language competence and health literacy. Patients with limited proficiency in the language used by their healthcare providers often found it challenging to comprehend medical information, instructions, and advice, which could lead to suboptimal health outcomes. Studies highlighted the necessity of addressing language disparities to improve health literacy and empower patients to make informed health decisions.

3.2. Religious Competence in Healthcare

Insights into the intersection of religion and healthcare elucidated the significant influence of religious beliefs and practices on patients' health behaviors, perceptions, and expectations.

3.2.1 Religious Sensitivity

The selected literature revealed that sensitivity and acknowledgment of patients' religious beliefs and values are vital in building trust and rapport between patients and healthcare providers. This sensitivity is instrumental in creating an inclusive and respectful healthcare environment that accommodates and understands the diverse religious beliefs of patients.

3.2.2. Ethical Considerations

Healthcare providers often encounter ethical dilemmas and decision-making challenges, especially in contexts involving end-of-life care and other significant treatment decisions. The reviewed studies indicated that understanding and considering patients' religious beliefs and doctrines are crucial in navigating these ethical challenges while ensuring that patients' wishes and values are respected and upheld.

3.3. Intersection of Language and Religion

The review also illuminated the interplay between language and religion, both central to patients' cultural identities and crucial for patient engagement and culturally competent care.

3.3.1. Cultural Identity

Language and religion are integral elements of cultural identity. The studies underscored that acknowledgment and respect for patients' linguistic and religious identities are essential for culturally sensitive and competent healthcare.

3.3.2. Patient Engagement

The literature supports the notion that patients are more inclined to actively engage in their healthcare when healthcare providers demonstrate respect and understanding for their linguistic and religious identities. Engaged patients are more likely to adhere to treatment plans, attend follow-up appointments, and participate actively in their healthcare, leading to better health outcomes.

Summary

The results shed light on the intricate dynamics between language and religion in healthcare, emphasizing the necessity of competence in both areas to enhance communication, patient satisfaction, and engagement, thereby improving the quality and effectiveness of healthcare delivery. These findings offer valuable insights for healthcare professionals, educators, and policymakers aiming to foster a more inclusive and culturally competent healthcare environment.

4. Discussion

Overview:

The synthesized findings from the literature review offer significant insights into the roles of language and religion within the healthcare sphere, emphasizing their intrinsic value in fostering culturally competent healthcare delivery. Below, researchers discuss the implications of these findings in depth, considering the practical and theoretical contributions they make to the existing body of knowledge.

4.1. Language Competence and its Implications

The observed relationship between language competence and effective communication within healthcare settings cannot be overstated. Language barriers not only impede accurate diagnostics but also hinder the establishment of trust and understanding between patients and healthcare providers.

Miscommunication Risks: The risks associated with miscommunication due to language disparities underscore the necessity of linguistic competence or effective translation services within healthcare settings. This is crucial not just for diagnosis and treatment, but also for providing patients with a clear understanding of their health conditions and care plans, ultimately affecting their health outcomes and satisfaction levels.

Enhancing Health Literacy: The review highlights the direct impact of language competence on health literacy. With improved language compatibility between patients and providers, patients are better equipped to understand and navigate healthcare information and services. This enhanced understanding is pivotal for informed decision-making and adherence to prescribed treatments and medications, consequently improving patients' overall health and well-being.

4.2. The Significance of Religious Competence:

Religious beliefs and doctrines play a significant role in shaping patients' perceptions, values, and attitudes towards health and healthcare, influencing their expectations and interactions with healthcare providers.

Building Trust through Religious Sensitivity: Acknowledging and respecting patients' religious beliefs and values fosters a supportive and trusting healthcare environment. This trust is fundamental in establishing positive patient-provider relationships, facilitating

open communication, and ensuring patients feel respected and understood in their healthcare experiences.

Ethical Navigation: The knowledge of patients' religious beliefs aids healthcare providers in navigating complex ethical dilemmas, particularly in critical care and end-of-life situations. The review indicates that religious competence is integral in ensuring ethical, respectful, and patient-centered care, accommodating patients' wishes and values while making critical healthcare decisions.

4.3 Intersectionality of Language and Religion

The complex interplay between language and religion within healthcare settings demands attention, as these elements collectively influence patients' identities, healthcare experiences, and outcomes.

Recognizing Cultural Identity: Understanding that both language and religion are significant components of cultural identity is crucial for healthcare providers. This acknowledgment informs culturally sensitive practice, ensuring that care is not only clinically appropriate but also culturally congruent, fostering an inclusive and respectful atmosphere within healthcare settings.

Promoting Patient Engagement: Engaging patients in their care is fundamental for successful healthcare delivery. When patients feel understood and respected in their linguistic and religious identities, they are more likely to engage actively in their care, adhere to treatment plans, and report higher satisfaction with healthcare services.

4.4 Practical Implications of the Study

The current study has direct implications for healthcare practice, education, and policy:

- Healthcare providers should receive training and development opportunities to enhance their language and religious competence, improving communication and relationships with diverse patient populations.
- Institutions should consider implementing language services and religious support within their healthcare delivery models, acknowledging the diverse needs of their patient communities.
- Educational programs for healthcare professionals should incorporate modules or courses on cultural, linguistic, and religious competence, preparing future practitioners for the diverse and globalized healthcare environment.

4.4.1 Theoretical Contributions

The current research contributes to the theoretical understanding of cultural competence in healthcare, underscoring the importance of considering both language and religion as significant influencers on patient engagement and satisfaction. It fosters a more nuanced conceptualization of cultural competence, providing a foundation for future empirical and theoretical work in this area.

5. Conclusions

The present study meticulously explored the crucial roles and interplay of language and religion in healthcare delivery, revealing their indispensable contributions to effective, respectful, and culturally competent care. As healthcare environments continue to diversify, the findings of the study are particularly pertinent, offering valuable insights for practitioners, educators, and policymakers in the healthcare field. The findings bear significant implications for the practice of healthcare. While this review sheds light on the vital roles of language and religion in healthcare, it also highlights areas where further research is needed. Future studies might explore the practical implementation of language and religious competence training programs for healthcare providers and assess their effectiveness. Additionally, future research could investigate patients' perspectives and experiences related to language and religious

competence in healthcare, providing a more comprehensive understanding of their needs, preferences, and expectations.

Final Thoughts

The current study highlights the imperative for language and religious competence in healthcare settings, advocating for an integrated, respectful, and culturally sensitive approach to healthcare delivery. Implementing the insights derived from this review can significantly contribute to promoting health equity, inclusivity, and the provision of care that is attuned to the diverse cultural identities of patients. Through concerted efforts to enhance cultural competence in healthcare, practitioners can better meet the needs of all patients, ensuring that care is not only clinically effective but also culturally congruent and respectful.

6. Patents

Author Contributions: Nasir Razzaq (NR): As the primary author, NR conceptualized and designed the study, providing a significant intellectual contribution to the research topic and framework. He took the lead in conducting the literature review, meticulously identifying, selecting, and analyzing relevant articles. NR was actively involved in interpreting the data and synthesizing the findings from various studies. He was primarily responsible for drafting the manuscript, articulating the research objectives, methods, results, discussion, and conclusions. Additionally, NR took the initiative to revise and refine the manuscript based on feedback and insights from co-authors and reviewers, ensuring its coherence, accuracy, and integrity.

Eesha Farzeen Khan (EFK): EFK, as the second author, made substantial contributions to the design and methodology of the review. She played a pivotal role in the data collection process, assisting in identifying and selecting articles that met the inclusion criteria. EFK collaborated closely with NR in analyzing and interpreting the data. She provided valuable insights and perspectives that enriched the discussion and interpretation of the review findings. EFK also actively participated in revising and enhancing the manuscript, offering critical feedback and suggestions to improve its quality and relevance.

Dr. Salma (DS): As the third author, DS brought her expertise and knowledge to the research, providing a critical review and intellectual input to the study's design and methodology. She acted as a supervisor and advisor throughout the research process, offering guidance, support, and feedback to enhance the rigor and quality of the study. DS contributed to refining the study's focus and objectives, ensuring it addressed relevant and significant issues within the field. She reviewed and provided constructive feedback on the manuscript, helping shape the final version for publication. DS also ensured that the research adhered to ethical standards and scholarly practices, validating its credibility and reliability.

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Original Research Article

Evaluation of Side Effects of Anti-Seizure Drugs Among Sudanese Children with Epilepsy in Wad Medani Pediatric Teaching Hospital

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Abstract:

Background: Treatment of epilepsy with anti-seizure drugs (ASDs) for 2-5 years is important to control epileptic seizures. Side effects of ASDs are well recognised and affect treatment outcomes if ASDs are severe.

Methods: A cross-sectional descriptive hospital-based study was conducted on 67 children with epilepsy on follow-up visits at a neurology referral clinic in Wad Medani Pediatric Teaching Hospital, Central Sudan, from February 2022 to July 2022. Side effects of ASDs were measured using the Pediatric Epilepsy Side Effects Scale (PESQs). Data were entered into the Statistical Package of Social Sciences (SPSS) version 20, and descriptive analysis was done to calculate frequencies and percentages and chi-square test for association. The P-value of < 0.05 was considered statistically significant.

Results: Gender assessment showed that 36 (53.7%) of study patients were male. 43(64.2%) of participants had low severity of side effects, 14(20.9%) had low–moderate severity, and 8(11.9%) had no side effects. Significant associations were found between age and cognitive side effects (P-value .008); epilepsy type and cognitive side effects (P-value .026); seizure frequency and behavioural side effects (P-value .018); Type of ASD and behavioural side effects (P-value .000) and; type of ASD and neurological side effects (P-value .004).

Keywords: Anti-seizure drugs, epilepsy, paediatric, side effects, PESQ

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1. Introduction

Treatment of epilepsy with anti-seizure drugs (ASDs) for 2-5 years is important to control convulsions. Antiseizure drugs decrease membrane excitability, increase postsynaptic inhibition or alter the synchronisation of neural networks to decrease excessive neuronal excitability associated with seizure development. Adverse effects were categorised into a lot of classes according to the Medical Dictionary for Regulatory Activities, which included nervous system disorders like dizziness, headache, and memory impairment, and psychiatric disorders like drowsiness, mood and behavioural changes (Alsfouk et al., 2020) Adverse effects can develop acutely or many years after starting treatment (Perucca & Gilliam, 2012). In

clinical practice, tolerability is a major issue and the choice of a certain (ASDs) is at least partially based on a comparison of tolerability profiles of the drugs (Ijff & Aldenkamp, 2013). Multiple new ASDs have been developed and introduced into the market in recent years. Many of these drugs have been promoted as having an advantage over older medications because of the smaller risk of side effects and better seizure control. Global changes in the CNS excitation levels, behavioural deficits and cognitive impairment associated with (ASDs) in children affect learning and school performance (Loring & Meador, 2004) (Ortinski & Meador, 2004). Three factors are clearly involved in cognitive impairment in patients with epilepsy: the underlying etiology of epilepsy, the effects of seizures or the epileptiform EEG discharges themselves, and the central nervous system effects of (ASDs) (Ijff & Aldenkamp, 2013). Phenobarbital and benzodiazepines are associated with the greatest risk of cognitive side effects. Valproic acid (VPA) is considered to be a drug of first choice and one of the most frequently prescribed antiseizure drugs worldwide and is usually well tolerated (Gerstner et al., 2008). Multiple new ASDs have been developed and introduced into the market in recent years. Lamotrigine showed better performance in memory, sedation, and cognitive speed than carbamazepine (Cavanna et al., 2010). Cognitive side effects are usually reversible after withdrawal of AED(Helmstaedter & Witt, 2020). Behavioral side effects (BSEs) associated with ASDs are often overlooked. Agitation, aggression, psychosis, behavioural disorders, hyperactivity, and restlessness are some ASD-related BSEs (Thigpen et al., 2013). Antiseizure medications (ASMs) may affect appetite, affecting normal growth and weight gain(Buraniqi et al., 2022).

2. Materials and methods

Study Design:

A cross-sectional descriptive, hospital-based study design was used for the assessment of side effects of ASDs in pediatric patients.

Study Area:

This study was conducted at Wad-Medani Pediatric Teaching Hospital, a tertiary hospital established in March 1987 in Wad-Medani city, the Capital of Gezira State in Central Sudan. The patients and their family members visited the outpatient referral clinic frequently for regular follow-ups where the study was carried out. The study was conducted in the period of February 2022 to July 2022.

Population of the study:

The study subjects were 2 to 16-year-old children with epilepsies visiting this hospital neurology refer clinic. Information on young children, that is, those of two to eight years old, was collected from their caregivers.

Inclusion criteria:

Children who were diagnosed with epilepsy and prescribed one or more ASD/s, were between 2 and 16 years of age, had no comorbid medical conditions requiring daily medication, and had no significant developmental disorders reported by their caregivers. Informed consent was obtained from family members.

Exclusion criteria:

Refused consent

Sample size:

The total number of study participants was 67.

Sampling techniques:

Probability sampling (systematic random sampling) was used.

Data Collection Method:

A patient within the inclusion criteria was assigned a patient identification number and then interviewed.

Descriptive medical data (type of epilepsy, disease duration, prescribed ASDs, and seizure frequency) and demographic data (child age and gender) were collected from patient's charts. The father's employment status was collected directly from the family member during the interview—Appendix A.

Seizures were classified according to the International League Against Epilepsy (ILAE) (Berg et al., 2010).

Patients and/or family members were interviewed using the pediatric epilepsy side effect questionnaire scale (PESQs), consisting of 19 questions involving cognitive, motor, behavioral, neurological and weight side effects. Likert scale type was used to give scores. The overall score began with zero (no side effects) to 114 (high severity of side effects, and then sub-scoring was measured for each type of side effect (cognitive, motor, etc) by the same scoring system.

Statistical analysis:

Collected data were entered into the Statistical Package of Social Sciences (SPSS) version 20, and descriptive analysis was conducted to calculate frequencies and percentages for categorical data chi-square tests for association. A P-value of < 0.05 was considered statistically significant in related tests.

3. Results

3.1. Socio-clinical demographic data:

Total number of patients who were studied was 67. There were 36(53.7%) of study patients were male and 31(46.3%) were female. Exactly 27(40.3%) of patients were between 2 and 6 years old, and 19(28.4%) were between 12 and 16 years old. The rest were aged 6 to 12. Fathers of 64 (95.5%) of patients were employed.

A total of 33 (49.3%) of study patients had 1-12 seizures/ year, 18 (26.9%) were seizure-free for > 12 months, 10(14.9%) had 2-4 seizures/ month, 3(4.5%) of had 1-7seizures / week, and 3(4.5%) had daily seizures. There were 39(58.2%) of participants had generalised seizures, 22 (32.8%) had focal seizures, 5(7.5%) had myoclonic seizures, and 1(1.5%) had unclassified seizures. Exactly 29 (43.5%) of study patients were prescribed valproate, 18(27%) received CBZ-IR, 7(10.5%) administered CBZ-CR, 6(9%) were prescribed levetiracetam and the rest received polytherapy involved clonazepam as add on therapy. 51 (76.1%) of participants had a seizure duration of> One year, 7(10.4%) of study patients had duration of 5-8 months. Exactly (89.6%) of study patients were prescribed monotherapy. Table (1)

Table 1 This is a table of **the** distribution of Study patients according to clinical demographic characteristics.

Variable	Frequency	Percent %
Seizure frequency		
Seizure free for > 12 months	18	26.9%
1-12 seizures/ year	33	49.3%
2-4 seizures/ month	10	14.9%
1-7seizures / week	3	4.5%

Daily seizures	3	4.5%
Type of epilepsy		
Generalised	39	58.2%
Focal	22	32.8%
Myoclonic	5	7.5%
Not classified	1	1.5%
Prescribed ASDs		
Valproate	29	43.3%
Carbamazepine	25	37.3
Levetiracetam	6	9%
Other ASDs	7	10.4%
Duration of epilepsy		
1-4 months	4	6%
5-8 months	7	10.4%
9-12 months	5	7.5%
> One year	51	76.1%
Other		
Monotherapy	60	89.6%
Polytherapy	7	10.4%
Total		
	67	100%

3.2. Overall Side effects of ASDs:

Exactly 43(64.2%) of the study population had low severity of side effects, 14(20.9%) had low –moderate severity of side effects, and 8(11.9%) had no side effects. See Figure1.

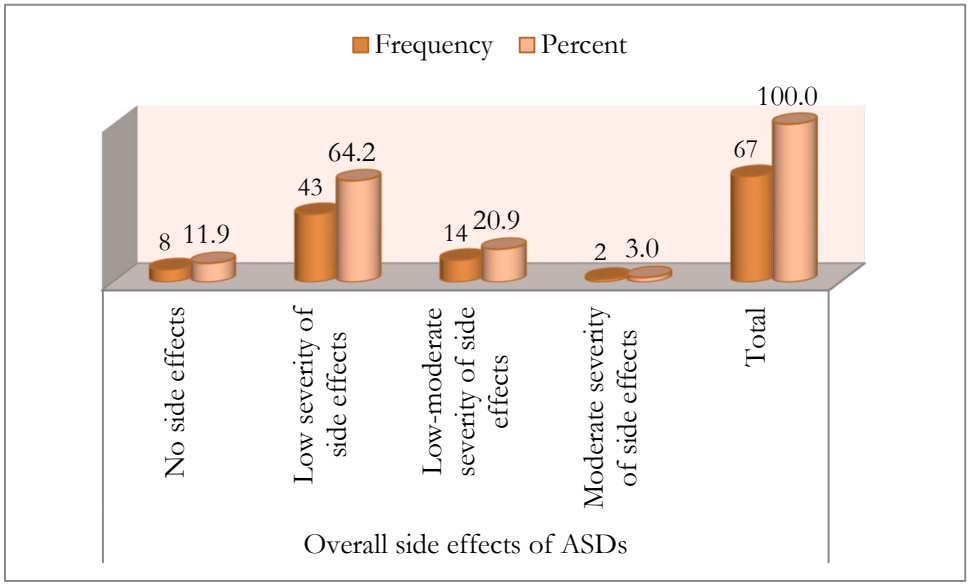

Figure 1 This is a figure of the distribution of study patients according to the overall side effects of ASDs

3.3. Subscales for side effects of ASDs

Of all the study participants, 24(35.8%) of study patients had cognitive side effects, 27(40.3%) had low-severity of cognitive side effects, and 10(14.9%) had low-moderate severity of cognitive side effects. Exactly 45(67.2%) of the study population had no motor side effects, and 15(22.4%) had motor side effects. Further, 31(46.3%) of patients had no behavioural side effects, and 20(29.9%) had low-severity side effects. Moreover, 31(46.3%) of patients had no neurological side effects, and 23(34.3%) had low-severity side effects. Precisely 39(58.2%) of study patients had no change in weight side effects, and 16(23.9%) had low severity of weight change side effects (See Table 2).

Table 2 This is a table of **the** distribution of study patients according to cognitive, motor, behavioural, neurological and weight change side effects.

Variable	Frequency	Percent
Cognitive ASDs side effects (subscale)		
No side effects	24	35.8
Low severity of side effects	27	40.3
Low – Moderate severity of side effects	10	14.9
Moderate severity of side effects	5	7.5
Moderate - high severity of side effects	1	1.5
Motor ASDs side effects(subscale)		
No side effects	45	67.2

Low severity of side effects	15	22.4
Low-moderate severity of side effects	7	10.4
Behavioural ASDs side effects(subscale)		
No side effects	31	46.3
Low severity of side effects	20	29.9
Low- Moderate severity of side effects	12	17.9
Moderate severity of side effects	3	4.5
Moderate-high severity of side effects	1	1.5
Neurological ASDs side effect (subscale)		
No side effects	31	46.3
Low severity of side effects	23	34.3
Low-moderate severity of side effects	6	9.0
Moderate severity of side effects	5	7.5
Moderate- high severity of side effects	2	3.0
Weight change-related ASDs side effects (subscale)		
No side effects	39	58.2
Low severity of side effects	16	23.9
Low-moderate severity of side effects	6	9.0
Moderate severity of side effects	2	3.0
Moderate-High severity of side effects	4	6.0
Total / each subscale		
	67	100

3.4. Age and cognitive side effects:

There were 17(65.4%) patients in the age group 2-6 years who had no cognitive side effects, and 8(30.8%) had low severity of cognitive side effects. 7(43.8%) of participants in the age group >6-12 years had low severity of cognitive side effects. Exactly 9(50%) of study patients in the age group >12-16 years had low severity of cognitive side effects.

3.5. Type of epilepsy and cognitive side effects:

There were 14(40.0%) and 14(40.0%) patients with generalised seizures with no cognitive side effects and low severity of cognitive side effects, respectively. Exactly 7(41.2%) and 7(41.2%) of study patients with focal epilepsy had no cognitive side effects and low severity of cognitive side effects, respectively. There were 2(50%) and 2(50%) of the study population with myoclonic seizures had low severity of cognitive side effects and moderate severity of cognitive side effects, respectively.

3.6. Seizure frequency and behavioural side effects:

There were 6(50.0%) study patients who were seizure-free for >12 months had no behavioural side effects, 14(51.9%) of the study population with 1-12 seizures/year had no behavioural side effects, and 9 (33.3%) had low severity of behavioural side effects. Two (66.7%) of patients with daily seizures had low severity of behavioural side effects.

3.7. Anti-seizure drug/s and behavioral side effects:

There were 8(61.5%) patients who were prescribed CBZ- IR and had no behavioural side effects, 3(23.1%) had low severity of behavioural side effects, and 2(15.4%) had low–moderate severity of behavioural side effects. There were 4(66.7%) patients who received CBZ-CR who had no behavioural side effects, and 2(33.3%) had low severity of behavioural side effects. Exactly 13(48.1%) of participants who administered VPA had no behavioural side effects, and 1(100%) of patients who received polytherapy (CBZ+ phenobarbital (PHN) + clonazepam (CLZ)) had high severity of behavioural side effects.

3.8. Anti-seizure drug/s and neurological side effects:

7(53.8%) of study patients prescribed CBZ-IR had no neurological side effects, and 4(30.8%) had low severity of neurological side effects. There were 4(66.7%) patients who were prescribed CBZ-CR who had low severity of neurological side effects. Three (75.0%) of patients who were prescribed levetiracetam (LEV) had low-moderate severity of neurological side effects and 16(59.3%) of the study population who received VA had no neurological side effects.

3.9. ASDs side effects and associated factors:

Statistically significant associations were found between: age and cognitive side effects P-value =.008, type of epilepsy and cognitive side effects P-value.026, Seizure frequency and Behavioral side effects P- value .018, type of anti-seizure drug/s and Behavioral side effects P-value .000, Type of anti-seizure drugs and neurological side effects P-value .004. Table 3

Table 3 This is a table of the distribution of study patients according to side effects and associated factors

Association Tests	
Socio-clinical demographic variable/side effects	Pearson Chi-Square / Asymp. Sig. (2-sided) (p-value)
Age * Cognitive	.008*
Type of epilepsy * Cognitive	.026*
Seizure frequency * Behavioral	.018*
Type of anti-seizure drug/s * Behavioral	.000*
Type of anti-seizure drugs * Neurological	.004*

***= significant. The P-Value is assumed statistically significant if it is < 0.05**

4. Discussion:

More than half of the study patients were males, which indicated that epilepsy was more common in males than in females in our setting. This result agreed with a result from a study by (Lee et al., 2016), which showed male predominance (64.9%) and (54.7%) in Southwest Ethiopia (Mohammed et al., 2022).

Epilepsy was more common in young children than in older children in the study setting. This result agrees with the fact that the resolution of epilepsy occurs spontaneously when the brain develops with the advancement of age. Around half of the study patients had 1-12 seizures/year.

More than half of the study patients were diagnosed with generalised seizures, which were the most common type of epilepsy stated by a study (Dima & Shibeshi, 2022). Another study from Sweden found that focal seizures alone or plus generalised seizures were more common (54.0%) in epileptic patients (Larsson & Eeg-Olofsson, 2006). Focal epilepsy was also common in the study setting but with fewer frequencies.

Valproic acid (VPA) for ASD was the most commonly prescribed, followed by CBZ. A similar result was found in many studies (Kwong et al., 2012) from China and (50.5%) from Jordon (Albsoul-Younes et al., 2016). Levetiracetam (LEV) as monotherapy was prescribed to a lesser extent despite the fact that it is one of the safest ASD and is recommended in the management of different types of epilepsy by international guidelines. In the study setting, LEV was not available as free, which may explain why it was less frequently prescribed.

The overall side effects were accepted in most patients. Around two-thirds of study patients had low severity of side effects, while less than a quarter had low-moderate severity of side effects.

Regarding cognitive side effects, nearly half of patients had low-severity side effects, about one of three had no side effects, and few had low-moderate severity side effects. The most common cognitive side effects were "finding difficulties in remembering" and "obtaining poor school results".

Motor side effects were not common in this study population. This was explained by the number of patients in this category: around two-thirds had no motor side effects, while the rest had low motor side effects. The most common motor side effect stated by the caregivers was hyperactivity. Near half of the study population had no behavioural side effects, while around one-third of them had low severity of behavioural side effects. The most common behavioural side effect was aggressiveness.

Neurological side effects were comparable to behavioral side effects, and the same results were observed. The patients experienced sleepiness, drowsiness, and headaches.

More than half of patients had no change in weight as a side effect of ASDs, and less than a quarter of them had low severity of weight change. Good appetite was more common than weight increase.

Low severity of cognitive side effects was common in most age groups except in the age group from 2- 6 years, where about two-thirds of them had no cognitive side effects, and the rest had low severity of cognitive side effects. Less than half of the age group >6-12 years had low severity of cognitive side effects, a quarter of them had no cognitive side effects, and another quarter had low-moderate severity of cognitive side effects. In the age group >12-16 years, half had low severity of side effects, while the other half involved other categories of cognitive side effects, with only one patient having moderate-high severity of cognitive side effects. The most common cognitive side effects of ASDs mentioned by patients/ family members were poor school results, memory problems and confusion. One

study found a similar result (33.8%) regarding poor school results (Kaushik et al., 2019). Another cohort study found that Slow thinking and decreased concentration were less likely with levetiracetam or carbamazepine than valproic acid ($p < .05$)(Egunsola et al., 2018).

Patients with generalised and focal seizures had equal percentages of no to low severity of side effects(less than half in each). Low –moderate severity of cognitive side effects of ASDs was found to be higher in generalised seizure than in focal seizure. Half of the patients with myoclonic seizures had low severity of cognitive side effects, and the other half had moderate severity of cognitive side effects. Not classified seizure involved only one patient who showed low-moderate severity of cognitive side effects of ASDs.

Half of the study patients who were free from seizures for > 12 months and half of those who had 1-12 seizures/ year had no behavioural side effects of ASDs. Two-thirds of the study population who had daily seizures experienced low severity of behavioural side effects, while the remaining third experienced moderate-high severity of behavioural side effects. Moderate-high severity of side effects was only shown in patients who had daily seizures. The most common behavioural side effects of ASDs stated by patients/ family members were "aggression" and "hyperactivity".

No behavioural side effects of ASDs were found in nearly two-thirds of patients who received CBZ-IR and in two-thirds of those who received CBZ-CR. There was a higher percentage of low severity of behavioural side effects in the study population who received CBZ-CR than those who received CBZ-IR (one-third to about a quarter, respectively). Some patients who received CBZ-IR showed moderate severity of behavioural side effects compared to no patients in the CBZ-CR category. Nearly half of the patients who received VPA experienced no side effects, while around one-third of them experienced low-severity of behavioral side effects. In the category of (CBZ+ PHN + CLZ) polytherapy receipts, there was one study patient (the only study patient in this category) who experienced moderate–high severity of behavioural side effects of ASDs.

Around one-third of the study population who received CBZ-IR had low severity of neurological side effects, compared to two-thirds of patients who received CBZ-CR. Low - moderate severity of neurological side effects were found in three-quarters of study patients who received levetiracetam, while no neurological side effects were shown in nearly two-thirds of those who received VPA. VPA and CBZ-IR receipts both showed comparable percentages of no neurological side effects and low severity of neurological side effects in this study. One published review article mentioned that the cognitive side effects of CBZ, phenytoin and VPA were comparable and associated with modest psychomotor slowing accompanied by decreased attention and memory (Loring, 2005).

Cognitive, behavioural, and neurological side effects of ASDs were found to be associated with many factors. Cognitive side effects were found to be associated with age and type of seizure, with the latter having a higher significance. Behavioural side effects of ASDs were associated with types of ASDs (higher significance) and seizure frequency. Neurological side effects of ASDs were associated with types of ASDs. Among all these factors, types of ASDs had the highest association with side effects. Motor and weight change side effects were not found to be associated with any factors. A published study found that LEV and VPA were associated with significant weight gain, TPM was associated with significant weight loss, and LTG and CBZ were not associated with significant weight change (Pickrell, 2013). A more recent review article found an association between weight change and the uses of VBA and no association with other antiepileptic drugs (Buraniqi, 2022)

5. Conclusions:

The overall side effects were tolerated by most patients. Most study patients experienced low severity of side effects, especially cognitive side effects. Neurological side effects were found to be comparable (similar percentages) to behavioural side effects. Motor and weight change side effects were not common. Cognitive, behavioural, and neurological side effects of ASDs were found to be associated with many factors, while Motor and weight change side effects were not found to be associated with any factors.

6. Patents:

Author Contributions: Conceptualisation, investigation, methodology: Prof. ImadEldeen Mohammed Taj El, Prof. Haydar El Hady Babikir, and Dr. Ibrahim Osman M. Omer. Data curation, software, formal analysis, writing original draft and visualisation: Dr. Salma Hassan Mohammed Eltahir. Resources (Patients): Prof. Haydar El Hady Babikir and Dr. Salma Hassan Mohammed Eltahir. Validation: Prof. ImadEldeen Mohammed Taj El Deen and Prof. Haydar El Hady Babikir. Writing-review and editing: Prof. ImadEldeen Mohammed Taj El Deen and Prof. Haydar El Hady Babikir.

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Appendix A

Patient's clinical and socio-demographic characteristics (outpatient neurology refer clinic)

Variable	**Frequencies/percentages**			
Sex	Male ( )		Female ( )	
Age(Y)	2-6 ( )	6-12 ( )	12-16( )	
Father employment status	Employed ( )		Not employed( )	
Duration of epilepsy	1-4 month ( )	5-8 month ( )	8-12 month ( )	more than one year( )
Type of epilepsy	Generalised ( )	Focal ( )	Myoclonic ( )	Unclassified ( )
Seizure frequency	1–12 seizures per year ( )	2–4 seizures per month( )	1–7 seizures per week( )	Daily seizures( )
Anti-seizure drugs				
Monotherapy				
Polytherapy				
Total				

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