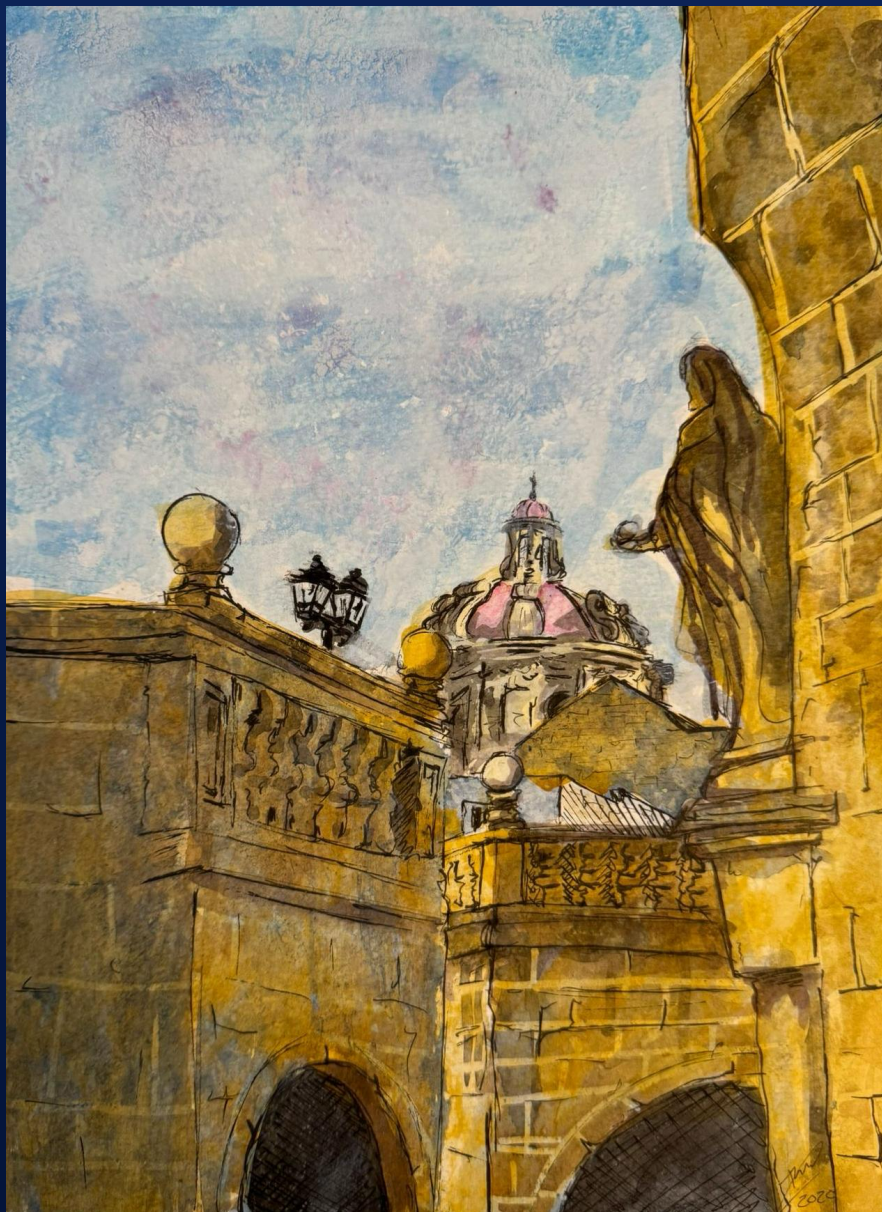


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The Malta Medical School: 350 years in the making

Charles Savona-Ventura

The founding of the Scuola di Anatomia e Chirurgia within the Valletta Sacra Infermeria in December 1676 stands as a seminal moment in Maltese medical history. Instituted by Grandmaster Nicolas Cottoner and first led by Fra Dr Giuseppe Zammit, the School was created in direct response to the catastrophic 1675–76 plague that decimated the islands' medical workforce and exposed the limits of an apprenticeship-based system of medical education. Its establishment marked the deliberate shift from informal, craft-oriented training to organised, sustained medical instruction anchored within a major clinical institution.

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COVER PICTURE

'A Walk Through Mdina' - Ink and acrylic on paper

Dr Ben Chetcuti is a Maltese psychiatrist and artist. He studied medicine at the University of Malta before completing his postgraduate psychiatric training in Glasgow, and now practises as a consultant psychiatrist in Ayrshire, Scotland. Alongside his medical career, he has continued to develop his artistic practice. Working primarily in ink and acrylic, he draws inspiration from the architecture, history, and atmosphere of the Maltese Islands, creating paintings that celebrate their distinctive character and evoke a sense of place and nostalgia.

Clinical integration and hands-on anatomical work were central to the school's impact. Under successive *lettori*—most notably Gabriele Henin (1723–1753) and Michelangelo Grima (1763–1797)—the curriculum evolved from theoretical lectures to regular public dissections, post-mortems and weekly anatomical demonstrations. The construction of a dissection room and later an anatomical theatre (1716) adjacent to the Casetta delle Donne, the acquisition of anatomical models and instruments, and the creation of a dedicated medical library (original donation by Zammit) equipped Malta with pedagogic resources comparable to contemporary European centres.

Beyond technical instruction, the school fostered a scholarly culture through the *Accademia Medica*—weekly clinical and academic meetings where cases and methods were debated publicly. This promoted clinical observation, post-mortem evidence, and peer review as norms—practices foundational to modern clinical reasoning and patient safety. The school also broadened health workforce education by formalising training pathways for surgeons, apothecaries, midwives and nursing attendants—anticipating later professionalisation of allied health roles.

Institutional consolidation followed: in 1771 the *Scuola* was incorporated into the *Collegio Medico* of the newly established *Pubblica Università di Studi Generali*. This transition enabled degree

granting, structured curricula (botany, chemistry, anatomy, surgery, medicine) and standards for licensure—critical steps that linked Malta's medical education to wider European university systems. Throughout political upheavals—the French interlude of 1798, 19th-century reforms, and two world wars—the school's legacy persisted in successive iterations of Malta's medical faculty and hospitals.

Why this matters today: the *Scuola di Anatomia e Chirurgia* exemplifies how a focused educational response to a public-health crisis can create durable institutional capacity. Its blend of bedside teaching, anatomical science, public case review, and formal certification anticipated key features of contemporary medical education: integrated clinical exposure, evidence-based practice, interprofessional training, and alignment with university standards. As the Faculty of Medicine & Surgery grapples with 21st-century challenges—AI, genomics, constrained clinical resources—the 350-year legacy is a timely reminder that resilient, patient-centred education rooted in rigorous clinical training and scholarly culture remains the surest foundation for future innovation.

The *Scuola's* story is not merely historical commemoration; it is a model of adaptive education: crisis-driven, clinically integrated, and institutionally ambitious – principles we must preserve and renew for the next generations of physicians.

Current euthanasia debate in Malta

Pierre Mallia

In May 2025 the Maltese government launched a public consultation on a proposed framework for Assisted Voluntary Euthanasia (AVE). Over the following eight weeks thousands of individuals and dozens of organisations — medical bodies, palliative-care groups, religious organisations, academics, political parties and civil-society campaigns — made submissions. This article synthesises material published publicly during and shortly after the consultation (May–July 2025). Sources used include the official government consultation page, position papers from professional associations and the University of Malta, press coverage and civil-society releases. The article relies on the publicly visible submissions and statements that organisations published or that were reported in the press. Where relevant I cite the original consultation document and the main public position pieces.

On 7 May 2025 the Government of Malta published a consultation document titled Public Consultation on Assisted Voluntary Euthanasia (sometimes described in press coverage as an AVE or “assisted dying” consultation). The consultation sets out a principles-and-safeguards framework that the government says is intended to open a national debate and inform future legislation. The stated aim in government materials and statements by the Parliamentary Secretary leading the consultation was to respect personal dignity and autonomy in the context of terminal illness while ensuring tight eligibility criteria and safeguards.¹

The published proposal included three important points:

1. AVE/assisted dying would be limited to adult patients who are terminally ill and meet strict eligibility criteria (for example, prognosis limits, residency requirements and the patient’s explicit request). The consultation document repeatedly stressed that old age, disability or mental-health conditions would not by themselves be grounds for access.
2. The government framed palliative care as the first-line response, and the consultation document requires that palliative-care options be offered to every eligible person. However, the government also argued there are cases where palliative care cannot fully alleviate suffering and that a legal framework for assisted dying might be considered in those limited circumstances.
3. The document also set out proposed safeguards (for example, protections against coercion and criminalisation of pressure to request AVE) and discussed processes such as medical wills / advance directives and certification procedures — while inviting comment on the detail and possible alternatives.

The government opened the consultation for eight weeks, inviting submissions from the public and stakeholders; Parliamentary Secretary Rebecca Buttigieg led the launch and subsequent community sessions. The Ministry emphasised engagement with stakeholders and experts in health, ethics, disability and religion, and said the exercise was intended to be evidence-based and participatory. The consultation portal was run as part of the Office of the Prime Minister’s public consultation infrastructure¹; while

individual submissions are confidential unless the submitter agrees to publication, the government will typically publish a summary report and use the responses to inform policy-making. (As of the time of writing, the Government had not yet published a final, aggregated summary or an official white paper converting responses into legislative text — officials stated the review was ongoing and that a bill would follow.)

It should be noted that, as opposed to the proposal of the Bioethics Consultative Committee (BCC) a public consultation does not public education and discussion. The former costs more money but is what is proposed by the Committee for Bioethics (CDBIO) of the Council of Europe.

RESPONSES AND PUBLIC CAMPAIGNS

The consultation generated an unusually high civic response. During and immediately after the consultation period officials and press reports described a “record” number of submissions. Parliamentary sources and reporters noted hundreds of submissions in the early weeks and later indicated a much larger number once campaign activity intensified. One report cited the Parliamentary Secretary saying that more than 500 submissions had been received (this figure was an early count reported in mid-June).²

Conversely, Civil society campaigns amplified response numbers. The Life Network Foundation (a public-facing NGO opposed to legalising assisted dying) ran a campaign and delivered a petition and physical submissions, publicly presenting 11,571 signatures/submissions delivered to the Prime Minister’s Office as part of its campaign near the conclusion of the consultation.^{3,4} (Campaign organisers said these submissions had also been sent through the government consultation website.)

The Media polls in June showed public opinion was mixed: one MaltaToday survey reported support at roughly 49% for the government’s proposal “under certain conditions”⁵, with a substantial share undecided. Other smaller polls suggested a significant portion of the public prioritised investment in palliative care over legal change. So the consultation unfolded against a background of divided public sentiment and energetic campaigning on both sides.

However, the government's launch and follow-up reporting make clear that the consultation process was meant to engage a broad set of stakeholders. The Parliamentary Secretary and officials met with and invited input from:

- Medical professional bodies (for example the Medical Association of Malta and other doctor groups).
- Public-health and specialist medical associations, including the Malta Association of Public Health Medicine.⁶
- Palliative-care organisations and providers, such as Hospice Malta, which issued its own position paper in response to the consultation document.⁷
- Academic bodies and university academics, many of whom produced position papers or coordinated group submissions (notably an interdisciplinary group of University of Malta academics produced a formal position paper).⁸
- Religious bodies and faith-based organisations, including Catholic groups and senior Church organs that publicly warned against the proposal.⁹
- Civil-society organisations and campaigns, both those supporting the idea of a legislative framework for assisted dying and those opposing it (for example Life Network Foundation and coalitions of NGOs calling for strengthened palliative care).^{3,4,10,11}
- The Bioethics Consultative Committee of the Ministry of Health(2025) updated its document recommending safeguard should euthanasia within the last six months of life be introduced but emphasising the Palliative Care Strategy and more importantly Public education and debate rather than opinions in favour or against.
- Political parties and elected representatives, who submitted positions or participated in public events or press briefings (e.g., Momentum Party submitted an official position).^{12,13}

The public consultation portal and government statements also made clear that any member of the public could submit written comments online — and that the public sessions would allow direct engagement.

PRINCIPAL RESPONDENTS

The following are the major identifiable respondents or respondent-groups that made public responses or whose position papers were widely reported, with a concise summary of each position and citation to the source material. Whilst not an exhaustive list of the many individual submissions, this covers the main institutional voices that shaped public reporting and the debate.

The Medical Association of Malta raised ethical and professional concerns about the proposal, emphasising patient safety, the risk of normalising euthanasia, potential harms to the doctor-patient relationship, and the need to prioritise palliative care and resources. MAM's formal feedback argued for caution and for safeguards that protect vulnerable patients; it also raised concerns about whether the health system is prepared for such a change. MAM represents clinical professionals and was treated as a central stakeholder. Its response shaped media coverage and other professional groups' positions.¹⁴

Malta Association of Public Health Medicine (MAPHM) reviewed the government document and publicly stated that debating AVE at this juncture was "at best premature." They echoed MAM's call to prioritise investment in palliative care and advanced care planning, warned about statistical and public-health implications (for example how deaths would be registered), and expressed concerns about safeguards and implementation capacity. MAPHM framed the issue in public-health terms, raising concerns about system readiness and population-level effects rather than only clinical ethics.⁶

An interdisciplinary team of academics (law, medicine, theology, disability, social policy and ethics) of the University of Malta published a joint position paper.⁸ The Interdisciplinary group was led and drafted by the Faculty of Theology, although this is not mentioned in the position paper. They were critical of aspects of the consultation document — arguing the paper's language sometimes conflated assisted suicide and euthanasia, questioned the framing of advance directives, and urged more focus on palliative care and on protecting vulnerable groups. The group cautioned against hasty policy changes and urged rigorous analysis of legal, ethical and social implications. The academics' submission

added scholarly weight to the critique and was widely reported, encouraging more cautious public discussion. Subsequently another group of academics made a statement in favour of euthanasia.

Hospice Malta (a national NGO) issued a position urging caution and emphasising the centrality of palliative care. While acknowledging the sensitivity of the topic and the suffering that terminal patients can experience, Hospice Malta stressed that strengthening palliative-care services should be the primary policy priority and raised concerns about the broader implications of legalising assisted dying.⁷ As a leading palliative-care provider, Hospice Malta's view shaped the framing that palliative care must be central in any policy response. Moreover it has just finished a state-of-the art Hospice for around 16 beds. Whilst this seems to be a small number, in Malta it is relatively more feasible and preferable to die at home and the Hospice provides an excellent service in this regard.

Several Church bodies and Catholic organisations publicly opposed the proposal, warning that legalising euthanasia risks harming the most vulnerable and could signal a retreat from commitments to palliative care. A senior Catholic group described the proposal as "dangerous" and argued that discussion was premature until palliative care provision was comprehensively strengthened.⁹ The Life Network Foundation led a public campaign opposing AVE, collecting and delivering thousands of submissions/petition signatures (reported as over 11,500). Their public messaging stressed testimonies from families and palliative-care professionals and called for investment in palliative care rather than legalisation. They actively encouraged supporters to use the government consultation portal and to submit individual responses. The volume of submissions associated with the campaign amplified the anti-legalisation voice and created a visible mobilisation but not to the extent that it can make a difference.^{3,4}

However, there was also a cross-sector coalition of more than 30 organisations publicly urged the government to reject euthanasia and prioritise palliative care, citing risks to vulnerable populations and the need for stronger health-system supports. Their joint appeal was widely reported in early July.^{10,11} The coalition signalled broad organised opposition beyond strictly religious groups, including

NGOs, professional associations and social-welfare organisations. The coalition said that euthanasia proposal poses ethical and social risks for the most vulnerable in society.

In addition, the relatively newly formed political party Momentum submitted an official position to the consultation in favour of serious public discussion and supported advancing the debate (their public release framed the change as necessary for personal autonomy and dignity in terminal illness).^{12,13} This illustrates that political parties and actors were engaged on both sides. Political party submissions show the issue is being treated as a matter of public policy and party politics, not only clinical ethics.

Finally, several media outlets carried polls during June showing mixed results: some polls found near-even public support for a tightly framed assisted-dying proposal (for example ~49% in one MaltaToday poll), while other smaller polls suggested that a majority prefer prioritising palliative care over legalising assisted dying. These mixed poll results were frequently cited in the media coverage of the consultation.⁵ Varied polling shows public opinion is not uniform and both sides could claim support among sections of the electorate.

The Bioethics Consultative Committee (BCC) was not one of the main respondents although it was called by the committee of the Parliamentary Secretary in charge of the debate. Several years ago, the BBC had published a statement on end-of-life in general and included a section on euthanasia, but not so much for the last six months of a terminally ill patient. The statement was given to two consecutive Ministers but was never put on the website. This is indeed a pity as it could have served well before the consultation process, showing the intended direction that end of life was being taken seriously. Attempts to change the law tend to be difficult unless there is a strong push from the government and therefore pain relief and refusal of treatment remain only on the government patient charter but there are no clear definitions on futile treatment being the sole responsibility of the doctor and that no-one can impose on her to effect further treatment considered to have no use. There is an ongoing case on this which is an appeal by a family who had lost the initial hearing in court which would have had to decide whether it could go to open further legal proceedings.

One should note that not every individual or small organisation that submitted views is available in the public record; the government's internal summary of submissions will be the most complete account of every respondent. Some submissions were made directly via the consultation portal and are not individually published; others were attached to wider campaigns or petitions (for example the Life Network petition). Reporting and poll results vary between outlets.

THE COMMON ARGUMENTS FOR AND AGAINST

In summary, the recurring themes for and against that shaped the debate seem to be the following:

In favour

Autonomy and dignity

Terminally ill adults should be able to choose the timing and manner of their death when suffering is intolerable and irreversible. The consultation itself framed AVE as an option for a strictly defined group of terminal patients.¹

Safeguards and tight eligibility

Proponents often argue that careful law-making with strict safeguards can minimise abuse, and pointed to models elsewhere as examples.

Real suffering despite palliative care

Some proponents suggest that while palliative care must be expanded and strengthened, it cannot in every case completely relieve suffering, so the law should allow a last-resort option. Parliamentary Secretary statements emphasised this point.¹

Against

Priority for palliative care

Many respondents (medical, public-health, hospice and NGO groups) said that the system needs far stronger investment in, and implementation of, palliative care before even considering legal change.

Risk to vulnerable groups

Critics warned euthanasia laws can disproportionately affect the elderly, people with disabilities, and socially isolated people, even if the

law nominally excludes them; they asked for stronger protections and better social supports.

Ethical and professional concerns

Medical associations emphasised risks to the doctor-patient relationship, conscientious objection for healthcare professionals, reporting and registration issues, and the moral implications for clinical practice.

These themes fed into the submissions: organisations worried about system readiness favoured delaying legislation and focusing on palliative care; organisations and individuals emphasising autonomy supported opening the legal route with safeguards.

WHAT NEXT?

From government statements and the pattern of public consultations in Malta, the likely steps are:

- Internal review: civil servants and legal advisers will consolidate submissions, identify recurring issues and red lines raised by stakeholders, and draft possible legislative approaches. The government has said it will consider the "huge volume" of submissions before introducing a bill.^{15,16}
- Drafting of a bill or white paper: depending on the review's conclusions, the government may publish a bill for parliamentary consideration or produce a formal white paper with recommended legislative text and safeguards.^{15,16}
- Political and parliamentary debate: any proposed bill would be subject to parliamentary scrutiny, party positions and likely further public debate — with the potential for amendments and for some MPs to emphasise conscience protections for professionals or expanded palliative-care funding as part of the legislative package.
- As the BCC wrote, a true public debate includes not only consultation but an analysis of knowledge based on reason and not merely feeling. It is important that in health care, as with individual patients, such processes follow an informed choice. The following are the guidelines, adopted from the CDBIO document on Public Dialogue, which was presented to the Ministries involved.

- A possible referendum, which was promised by the Labour Party prior to the elections.

are clear guidelines on how to engage in dialogue which are not the scope of this article.

BOX: AUTHOR’S NOTE

The need for public debate and education1

Article 9-11 of the European Convention on Human Rights (ECHR) establish the rights to: freedom of thought, conscience and religion, the right to freedom of expression, and the right to freedom of peaceful assembly and to freedom of association with others. The Oviedo Convention of the Committee of Bioethics (DH-BIO) of the Council of Europe exists to promote Human Rights, democracy and the rule of law in relation to biomedical science, which includes issues dealing with End-of-Life. The Convention acknowledges Public Debate in this regard:

‘Parties shall see to it that the fundamental questions raised by the developments of biology and medicine are subject of appropriate public discussion’ Article 28 of the Convention, entitled ‘Public Debate’.

Note: Public debate is not public consultations but involves engagement and education about main issues which was shown to be unclear. Both public consultations and referenda show merely a statistic based on opinion, whilst many may not know all the facts to both sides of the argument. Public dialogue, conversely is rather impossible in large groups as it tends to be polarised. There

CONCLUSION

Malta’s 2025 AVE consultation produced an intense, polarized but also highly participative national debate. The government’s proposed framework attempted to thread a needle — offering AVE strictly for a limited class of terminally ill adults, while insisting that palliative care remain a priority. That framing satisfied neither many professional bodies nor many advocacy groups: clinicians and public-health experts urged more investment in palliative care and care in policy timing; religious and pro-life groups mobilised large petitions; some political actors and civic voices argued for the primacy of autonomy.

The consultation’s legacy will depend on how government legislators reconcile competing demands: strengthening palliative care (as many respondents requested), protecting vulnerable people, and addressing the autonomy claims of terminal patients. Officials have committed to review the submissions carefully and to draft a bill in due course; the path from consultation to legislation will be shaped by legal drafting choices (definitions and safeguards), parliamentary politics, and continued public engagement.

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Management of children presenting with suspected febrile seizures to the emergency department: analysis of practices at a national acute hospital

Clarissa Sultana, Amaris Spiteri

Background: This audit aimed to assess adherence to best practices in the management of febrile seizures in children at Mater Dei Hospital's Paediatric Emergency Department, Malta's national acute teaching hospital.

Methods: A retrospective review of 54 patient charts diagnosed with febrile seizures in the Paediatric Emergency Department over a 3-month period was conducted. Data collected included demographics, seizure details, medical history, family history, physical examination findings, investigations performed, discharge education provided, and follow-up practices.

Results: A review of seizure documentation revealed inconsistencies in data capture. While core demographic information and seizure descriptions were consistently recorded, crucial details necessary for accurate seizure classification were discrepant. These discrepancies included information pertaining to past medical and family history, as well as thorough documentation of potential seizure risk factors. Physical examinations often demonstrated an incomplete picture, lacking a comprehensive neurological assessment. Furthermore, utilization of diagnostic investigations exceeded recommended international protocols for uncomplicated cases. Additionally, significant variability was observed in both discharge education practices and follow-up appointment scheduling. Inconsistencies in medical record terminology, potentially stemming from non-standardized clerking, may have contributed to underreporting of certain seizure details.

Conclusion: These findings suggest a need for improvement in managing febrile seizures in the Paediatric Emergency Department. Implementing standardized documentation based on the National Institute for Health and Care Excellence's Clinical Knowledge Summaries guidelines and developing a comprehensive febrile seizure information leaflet for parents are recommended. This would promote consistent, high-quality care, reduce parental anxiety, and enhance adherence to best practices for febrile seizure management.

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Febrile seizures represent a significant encounter within the Paediatric Emergency Department (PED) and are the most common form of convulsions seen in children, accounting for a substantial proportion of visits. 3-5% of children experience a febrile seizure in the first 5 years of life, with peak onset at 2 years of age.¹ Despite their frequent occurrence, febrile seizures can be a source of considerable anxiety for parents and caregivers witnessing their child experience a convulsive episode. Whilst most presentations are simple and self-limiting², a crucial aspect of emergency care lies in differentiating them from more concerning central nervous system infections that may manifest with similar clinical features. This distinction necessitates a meticulous approach, emphasizing a comprehensive history, a thorough physical examination, and the judicious use of ancillary investigations. By focusing on these core principles, physicians in the PED can ensure optimal patient outcomes, providing reassurance to families and initiating appropriate management strategies.

The National Institute for Health and Care Excellence (NICE) Clinical Knowledge Summaries (CKS) offer invaluable guidance in standardizing the approach to febrile seizures within the Emergency Department. By adhering to the CKS recommendations, healthcare professionals can ensure a consistent and evidence-based evaluation process. This includes employing a structured history-taking template to capture crucial details regarding the seizure characteristics, fever duration, and past medical, developmental, and family history. The CKS framework also promotes a targeted physical examination, focusing on neurological assessment to identify potential focal deficits or meningeal signs. Furthermore, the CKS guides the judicious use of investigations, advocating for selective laboratory testing and neuroimaging only when clinical suspicion of a more serious etiology warrants further workup. This standardized approach, informed by the NICE CKS, fosters efficient and effective management of febrile seizure cases in the PED.³

MATERIALS AND METHODS

Following the acquisition of data clearance approval from the institutional Data Protection Office, a

prospective observational audit design was utilised. This involved the extraction of data from clerking sheets utilized within the Paediatric Emergency Department for the period commencing on March 1st, 2023 and concluding on May 31st, 2023. All children under the age of 16 presenting with a suspected seizure in the context of fever as the primary complaint were included in the data collection.

Clerking sheets were then individually assessed for adequate documentation of child demographics, seizure characteristics, characteristics of the febrile illness, presence or absence of red flags, possible differentials, past medical and family history. The subsequent examination and disposition were also audited. Cases seen by the authors of this audit were excluded from data collection.

RESULTS

A total of 54 children were included in this audit, with ages ranging from 8 months up to 8 years of age. The mean age of presentation was 2.32 years, and the most common age of presentation was 2 years of age. 68.5% of the cases were male, with 31.5% female. Child demographics were documented in 100% of the cases reviewed. From the patients reviewed 79.63% were admitted and 20.37% discharged. Advice on discharge was also audited and seizure advice, antipyretic advice and immunisation advice were given in 45.45%, 72.73% and 0% respectively. Resources were offered in 36.36% and follow up given in 36.6%. From the patients discharged, 36.36% were given follow-up. 50% of these were referred for a Paediatric Neurology follow-up appointment, 25% for a Paediatric Emergency Review Clinic appointment and 25% arranged follow-up with their respective private paediatrician.

Results of documentation analysis of the history and examination are illustrated in the accompanying [Table 1](#), [Table 2](#) and [Table 3](#).

DISCUSSION

A febrile seizure is defined by the International League Against Epilepsy (ILAE) as "A seizure associated with a febrile illness not caused by an infection of the central nervous system, without previous neonatal seizures or a previous unprovoked

Table 1 *Percentage of complete documentation of seizure characteristics in children*

Feature	Percentage
Isolated / clustered	27.78
Generalised / focal	16.67
Tonic-clonic	85.19
Facial twitching	11.11
Rolling back of eyes	64.81
Staring	53.70
Loss of consciousness	70.37
Foaming at the mouth	59.26
Seizure duration	88.89
Pallor / cyanosis / difficulty breathing	55.56
Post-ictal drowsiness / irritability/ confusion	62.96
Duration of post-ictal drowsiness	25.93
Complete recovery within 1 hr	27.78
Recurrence within 24 hours / same illness	18.52
Simple/complex	7.41
Decreased level of consciousness prior to seizure	29.63

Table 2 *Percentage of complete documentation of red flag signs and symptoms elicited from the history in children presenting with febrile seizures*

Feature	Percentage
Irritability	50.00
Neck stiffness	1.85
Petechial rash	31.48
Photophobia	3.70
Bulging fontanelle	0.00
Decreased level of consciousness	31.48
Prolonged post-ictal period	16.67
Focal neurological deficit lasting >1 hr	7.41

Table 3 *Percentage of complete documentation of examination findings and further assessment in children presenting with febrile seizures*

Feature	Percentage
GCS score / AVPU assessment	68.52
Power	0.00
Documentation of temperature	94.44
Signs of dehydration	96.30
Assessment for cause of fever	96.30
Stigmata of neurocutaneous disorder	0.00
Documentation of all red flag signs on examination	5.56
Irritability	53.70
Neck stiffness	64.81
Petechial rash	87.04
Photophobia	11.11
Bulging fontanelle	1.85
Decreased level of consciousness	87.04
Focal neurological deficit	57.41
Blood investigations taken	75.93

seizure and not meeting the criteria for other acute symptomatic seizure, which occurs in children aged 6 months to 6 years".⁴ Despite variations in literature of the reported age range of children experiencing febrile seizures, the ILAE definition was utilized for the purpose of this study.^{2,4-6}

The majority (80%) of febrile seizures present as 'simple'; characterized by generalized involvement and brevity (<15 minutes) or singular occurrence within a 24-hour period. These simple febrile seizures carry a low risk of complications and boast both excellent short and long-term prognoses. Conversely, seizures exhibiting focal features, exceeding 15 minutes in duration, or recurring within a 24-hour timeframe are classified as complex, potentially necessitating further evaluation.¹ Despite most episodes being self-limiting; febrile seizures are often a source of significant parental distress and represent one of the leading causes for paediatric emergency department presentations.^{5,6}

This audit reveals an increase in the number of febrile seizure cases presenting at the local Paediatric Emergency Department. The data shows 54 patients presented between March 1st, 2023, and May 31st, 2023. This compares to a previous study at the same department involving 51 patients presenting with febrile seizures between January 2013 and June 2013.⁶ The demographic data shows a preponderance of male patients with the average age of presentation being 2 years of age. This compares well to other similar studies showing a median age of onset between 19 to 23 months of age, with two-thirds of the patients being male.⁷ These demographics were documented in 100% of cases reviewed with name, identification number, age and gender all appropriately recorded.

The National Institute for Health and Care Excellence's (NICE) Clinical Knowledge Summaries (CKS) provide an evidence-based framework for the management of febrile seizures.³ Adherence to these recommendations serves as a vital tool for standardizing care and ensuring patients receive appropriate management. The following sections will evaluate the documentation of these key elements within the study population, divided into the framework recommendations.

Seizure characteristics

Accurate identification of seizure characteristics and the underlying symptoms of the febrile illness is crucial for appropriate management and determining the necessity for follow-up care. A comprehensive history and subsequent physical examination are essential to achieve this. During the examination, relevant positive and negative findings should be meticulously documented to ensure proper management and consistent care delivery. Seizure characteristics such as the presence of tonic-clonic movements, eye rolling, staring, loss of consciousness, pallor or cyanosis, foaming at the mouth, duration of seizure and presence of post-ictal drowsiness were documented in more than 50% of cases. Conversely, poor documentation was noted in reference to whether the seizures were isolated or clustered, generalised or focal, simple or complex, the presence of facial twitching, recurrence of seizures within 24 hours or within the same illness, decreased level of consciousness prior to the seizure, duration of post-

ictal drowsiness, and whether there was complete recovery within 1 hour. The above characteristics are all essential questions as recommended by NICE as they guide further management, with certain characteristics important in helping the classification of seizures into 'simple' or 'complex'.³ The terminology used in the NICE CKS was applied for this audit, however it should be noted that use of different jargon for seizure characteristics was used in some of the clerking sheets which did not fit into the terminology as explained by NICE, this led to possible underrepresentation of data to ensure a standardized approach in this data collection. This limitation could also be applied to other aspects of data collection in this audit, however using specific terms remains crucial for our history-taking practices and should be prioritized whenever possible. Based on the data analysis, it's worth noting that some details like 'seizure recurrence within 24 hours or same illness', 'post-ictal drowsiness duration', and 'presence of a full recovery within an hour' may be missing due to the rapid arrival at the emergency department. This is evident as over 50% of cases were brought by ambulance upon immediate symptom onset.

Fever characteristics

A defining feature of these seizures is the presence of a fever and its specific characteristics. Documentation was satisfactory for many fever history hallmarks as recommended by NICE; such as fever onset, duration, source, peak temperature, and relationship to the seizure. According to the NICE CKS; "reported parental perception of fever should be accepted as a valid indicator of fever", and consistent with this, when no quantitative temperature reading was present, parental perception of fever was documented in 61.54% of these cases.³ Lacking in the clinical histories reviewed was documentation related to recent antibiotic use or recent immunizations. NICE emphasizes the significance of inquiring about recent antibiotic use. This is because antibiotics can mask signs of a central nervous system infection, thus potentially leading to a misdiagnosis and altered treatment plan.³

Red flags

Similarly, inaccurate identification of red flags suggestive of central nervous system infection can also lead to misdiagnosis.³ Red flags suggestive of

central nervous system infections, like meningitis and encephalitis, include physical signs such as irritability, neck stiffness, petechial rash, photophobia, and bulging fontanelles. Additionally, the NICE CKS highlights other crucial red flags: decreased level of consciousness before the seizure, a prolonged period of post-ictal drowsiness, and a focal neurological deficit lasting over an hour.³ Documentation of red flag signs in the history taking section was not comprehensive during the audit, conversely these were well documented in the examination section. Nevertheless, the history taking section offers a critical window for early detection of red flags and prompt intervention, so this area requires further development to achieve optimal standards.

Differential diagnoses

The NICE CKS guidelines identify other conditions that can mimic febrile seizures.³ While the reviewed clerking sheets showed insufficient consideration of these differential diagnoses, some factors may have contributed to this finding. Firstly, vague criteria for certain differentials, like shivering and rigors, pose challenges in documenting their absence. Secondly, differentials readily identifiable during emergency triage, such as head injury, might not be explicitly documented in the clerking sheets. Whilst the consideration of 'hypoglycemia' was only explicitly documented once in the history taking section, over 80% of cases involved investigations for low blood sugar, either through capillary blood glucose or serum glucose testing.

Past history

An essential criterion dictating management in patients presenting after a febrile seizure is the past medical history, specifically whether the episode is the first of its kind in the patient's history. As per local guidelines, patients presenting after their first febrile seizure are admitted to hospital for overnight observation, whilst readily available international guidelines from the U.K., Australia, and the U.S. recommend an observation period (ranging from 2 to 6 hours) with close follow-up within 24 hours cases of the first episode of simple febrile seizures.^{8,9,10} Despite this, documentation of history of past febrile seizures was documented in 40.74% and further attention is necessary to address this issue and improve standards. Poor documentation of neurodevelopmental history and presence/absence of a neurocutaneous syndrome was noted, which is crucial, given the association of

increased risk of developing unprovoked seizures in patients with such a history.¹¹

Poor documentation was also noted with reference to questions regarding family history, specifically absence of specific documentation of family history of febrile seizures or epilepsy in first-degree relative (18.52%). This is imperative as there is a known risk of febrile seizures and their recurrence when there is a history of febrile seizures in first-degree relatives.^{1,12,13} Epidemiological studies have shown that a family history of febrile seizures is present in 30% to 50% of affected children.^{12,13} The potential underrepresentation of data concerning personal and family history of febrile seizures warrants consideration. Due to the lack of standardized documentation practices in the reviewed sheets, it is unclear whether the absence of documented family history signifies that the question about first degree relatives with a history of febrile seizures was not asked explicitly, or if the question was posed more generally regarding family history of any kind. Similarly, documentation may not explicitly state whether the question of a first-time seizure was asked. However, the high number of admissions for first-time febrile seizures suggests that the question was likely raised but not clearly documented. Regardless, clearly documenting this information is paramount, not solely as a diagnosis, but as a critical component of the patient's past medical history.

Examination

A comprehensive examination holds paramount importance in the post-ictal evaluation of patients presenting with febrile seizures. This serves a dual purpose: firstly, to ascertain complete clinical and neurological resolution, ensuring a return to the patient's baseline neurological status. Secondly, it aims to identify potential etiologies for the seizure and the underlying febrile illness. This entails an evaluation for meningeal signs suggestive of intracranial infection, as well as an assessment for signs and symptoms of elevated intracranial pressure. Additionally, a thorough dermatological examination is crucial, as specific cutaneous markers like port-wine stains in Sturge-Weber syndrome, neurofibromas or cafe-au-lait macules in Neurofibromatosis type 1, and hypopigmented macules in tuberous sclerosis can offer valuable diagnostic clues. Lastly, a targeted

physical examination is essential to identify the source of the febrile episode, potentially including pharyngitis, otitis media, chest auscultation for pulmonary pathology, and other relevant investigations.^{10,14}

The referenced NICE CKS provides a comprehensive framework for the clinical examination of patients experiencing febrile seizures. This framework encompasses all the crucial elements outlined above, ensuring a thorough and standardized approach to patient evaluation.³ Documentation of assessment of consciousness, signs of dehydration, irritability, presence of neck stiffness or petechiae, and presence of any focal neurological signs was appropriate. Conversely, the presence of a full neurological examination was lacking, with poor documentation of power during examination. Similarly, there was no documentation of the presence of stigmata of neurocutaneous conditions as mentioned previously. The documentation of the presence or absence of two critical signs in the examination; photophobia and bulging fontanelles, was concerning inconsistent. While examining young children for photophobia, which they cannot verbally express, can be challenging, its potential association with meningitis necessitates heightened attention and improved documentation practices. With regards to fontanelles, although the average presentation age of 2 years often coincides with their closure, younger patients necessitate documentation of this crucial examination point.

Recommended investigations

The NICE CKS does not refer to any specific recommended investigations, however it highlights the importance of measuring blood glucose for unresponsive patients and recommends urine analysis or culture if a clear source of infection remains unidentified. Investigations were taken in over 75% of patients reviewed, coinciding with the patients who were admitted. These were most commonly blood investigations including a complete blood count, renal function tests and electrolytes, inflammatory markers such as C-reactive protein, random blood glucose, venous blood gas, and blood culture tests. Within the Emergency department, a chest x-ray and urine testing were taken in 16.66% and 7.41% respectively. Notably, most urine tests were ultimately performed as part of inpatient care upon admission. Prior studies

investigating febrile seizure management generally advise against routine blood tests, such as those previously listed, for simple, uncomplicated febrile seizures. However, these investigations may be warranted when concerning clinical features are present, such as prolonged post-ictal drowsiness or suspicion of bacteraemia.¹⁵ This finding highlights a significant discrepancy between current research and local practices. The extended observation periods and inpatient admissions observed locally may require further evaluation.

Patient disposition

In line with what was previously discussed, the majority of those admitted presented with their first occurrence of a febrile seizure. No reason for admission was documented in 34.88%, whilst the first febrile seizure and complex febrile seizure were documented as reasons for admission in 55.81% and 9.30% of cases respectively. Inpatient lumbar punctures were performed in 100% of patients presenting under 1 year of age, as per local guidance and an EEG performed in 6.97%.

Discharge advice

While a relatively small percentage of patients with febrile seizures (those being recurring) were discharged directly from the Emergency Department during the study period, significant lapses were observed. Notably, documentation of seizure education for discharged patients was present in less than 50% of cases. As previously mentioned, febrile seizures can be a frightening experience for parents. Research suggests that fear and lack of knowledge about febrile seizures can negatively impact family life, parent-child relationships, and parental behaviour.^{16,17} The importance of educating parents with accurate information about fever and seizure management has been crucial in reducing their anxiety and concerns.^{18,19}

The documented discharge advice regarding febrile seizures varied in scope. It primarily focused on advising parents to seek medical attention for changes in seizure duration or character, or for the occurrence of two or more seizures within a 24-hour period. Notably, a seizure information leaflet was only offered on one occasion. However, it is crucial to highlight that the currently available leaflet at PED pertains to

SUMMARY BOX

This study aimed to assess current practices in managing febrile seizures in children at Malta's national Paediatric Emergency Department, aligning with the valuable guidance provided by the National Institute for Health and Care Excellence's Clinical Knowledge Summaries. The findings identified areas for potential improvement to ensure optimal care. The audit revealed consistent documentation of basic seizure details and demographics. However, opportunities were identified to enhance documentation in specific areas. This included capturing crucial details for seizure classification, obtaining more comprehensive medical and family histories to assess potential risk factors, and ensuring thorough physical examinations are documented.

Additionally, standardizing discharge education and follow-up practices would further optimize patient care.

epileptic seizures in general and associated Basic Life Support (BLS) recommendations, rather than specifically addressing febrile seizures. This represents an area for improvement, as providing a readily available, febrile seizure-specific leaflet would equip parents with accurate information and resources during such encounters. Along the same vein, anti-pyretic advice was noted to be better with 72.73% documentation, however immunization advice was never documented to have been given on discharge. The NICE CKS specifically address immunization following febrile seizures. They advise to counsel the parents to ensure that the child completes all childhood immunizations, even if the febrile seizure follows an immunization. Additionally, the NICE CKS discourages the use of prophylactic antipyretics before vaccination. It is equally important to emphasize during discharge counselling that antipyretic medication does not decrease or prevent the recurrence of febrile seizures. Equipping parents with this knowledge can further alleviate their anxiety regarding the risk of future seizures.³

International guidelines on follow-up for febrile seizures demonstrate some variation. Generally, these guidelines recommend follow-up as dictated by the underlying cause of the fever, but also in instances of complex or recurrent febrile seizures, or for patients identified with risk factors for developing epilepsy.^{9,10} It is important to note that specific recommendations for follow-up differ according to individual hospital protocols. Furthermore, providing standardized and clear parental education regarding red flags and features of complex seizures, along with recommendations on when follow-up is necessary, could significantly contribute to a more consistent approach to post-discharge care.^{9,10}

CONCLUSION

Febrile seizures are a common presenting complaint to the emergency department. These presentations are often accompanied by significant parental anxiety due to a lack of understanding surrounding this condition. The management approach for febrile seizures varies depending on the specific details obtained through a thorough history and physical examination, showing the importance of diligent history taking and meticulous, standardized examination. Unfortunately, deficiencies in these areas have been identified within local practices.

Therefore, it may be necessary to implement standardized pathways based on established guidelines and international best practices to ensure consistent and optimal care for these patients.

In addition to identifying shortcomings in documentation, another area requiring improvement pertains to parental counselling. The development and implementation of a standardized febrile seizure information leaflet would be highly beneficial. This resource should equip parents with crucial details encompassing necessary background information, basic life support (BLS) procedures, warning signs associated with febrile seizures, and clear guidance on when to seek emergency medical attention. Additionally, the leaflet should provide advice on the appropriate use of antipyretic medications. Equipping parents with this comprehensive resource would aim to empower them to manage future occurrences of febrile seizures in their children.

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Abbreviations

NICE:	National Institute for Health and Care Excellence
CKS:	Clinical Knowledge Summaries
PED:	Paediatric Emergency Department

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Management of Urinary Tract Infections: a retrospective review in the local Urology Unit

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Background: Urinary Tract Infections (UTIs) affect an estimated 150 million people per annum worldwide and can be classified into simple and complicated as well as upper and lower. The primary method of diagnosing a UTI is via an adequate and timely sample of urine for culture and sensitivity. The main aims of this retrospective audit were to determine the type of UTIs admitted to the Urology unit at Mater Dei Hospital, the rate of utilization and timing of urine and blood cultures, the empirical antimicrobials prescribed and the rate of resistance to these antimicrobials, especially the rate of Fluoroquinolone resistance.

Method: In this retrospective audit, patients admitted with a UTI to the Urology Department during a 4-week period were included in the study.

Results: The majority of patients included in this study were diagnosed with a complicated UTI. A urine sample for culture and sensitivity was taken on the first day of admission in most cases, with *Escherichia coli* being the commonest cultured organism. Resistance to Fluoroquinolones was exhibited in 36% of cases. Piperacillin/Tazobactam was the empirical antibiotic of choice in 59.4% of the patients with the majority showing sensitivity to it. Most patients were discharged with an outpatient follow-up however, only 35% of patients had further imaging studies.

Conclusion: International guidelines regarding diagnosing and treating UTIs are adhered to at large. However, local guidelines are required to improve empirical antimicrobial choice and prescription according to the local prevalent organisms and their sensitivities.

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Urinary tract infections (UTIs) are among the commonest presenting complaints to the Accident and Emergency (A&E) department, affecting an estimate of 150 million people per annum worldwide.¹ Infections affecting the lower urinary tract, that is, the bladder, prostate and urethra, generally present with dysuria, urgency and frequency while those involving the kidney (pyelonephritis) present with flank pain, fever and constitutional symptoms.²

UTIs are classified into simple and complicated with the latter being defined as infections that present in males, pregnant females, patients with anatomical and/or functional aberrations of the renal tract, patients with indwelling urinary catheters and immunocompromised patients.³ Risk factors associated with UTI include regular sexual intercourse, postmenopausal females and history of UTIs during pre-menopause or childhood, family history, incomplete voiding and patients with neurogenic lower urinary tract symptoms (LUTS).⁴ Possible complications of UTIs include persistent LUTS, abscess formation, renal failure and stone formation.⁵

Escherichia coli is the most common causative organism followed by *Klebsiella pneumoniae*, *Enterococcus* spp and *Proteus mirabilis*.⁶ Identification of the causative organism is essential in suspected complicated UTIs and in uncomplicated UTIs which recur within four weeks, do not respond to empirical antibiotics or those with an atypical presentation. The current gold standard for this is via a urine sample for microscopy, culture and sensitivity, ideally taken prior to any antimicrobial administration. Significant bacteriuria that is suggestive of UTI is characterised by 100,000 or more colony forming units (CFU) per millilitre of urine.⁷

The main roles of radiological imaging in patients presenting with UTIs are to identify possible underlying causes including obstruction and/or anatomical aberrations.⁸ Indeed, the European Association of Urology (EAU) recommends an ultrasound (US) examination of the upper urinary tracts in patients presenting with a UTI on a background of previous urolithiasis, deranged renal function and/or high urinary pH. Patients who remain febrile 72 hours after treatment initiation and those with clinical deterioration require further assessment

with a contrast-enhanced computed tomography (CT) scan. In pregnant females, an US or Magnetic Resonance Imaging (MRI) is preferred.²

Treatment of UTIs generally involves antimicrobials and symptomatic relief. The choice of antimicrobials should be determined by the sensitivity of the causative organism, efficacy of the drug as well as side effect profile, cost and availability. Aminopenicillins and fluoroquinolones are contraindicated as empirical treatment of uncomplicated UTIs in view of resistance.² In 2019, the European Medicines Authority (EMA) restricted the use of empirical Fluoroquinolones in all European Union (EU) member states on account of their long lasting, severe and potentially irreversible adverse effects.⁹

Urine culture should be repeated one week after treatment cessation in order to assess the efficacy of treatment. US imaging of the renal tract is advised in males after their first UTI and in females with more than two UTIs every 6 months. A CT intravenous urography (IVU) is recommended in patients with a slow response to antimicrobials, in cases of recurrent UTIs and in patients with a high risk for papillary necrosis. Additionally, urodynamic studies should be performed in patients with unexplained abnormal bladder emptying¹⁰

AIMS

The primary objectives of this retrospective audit are to determine the classification of UTIs to the local Urology unit as well as to evaluate the frequency at which urine and blood culture and sensitivity samples are collected. Additionally, this audit aims to identify the types and classes of empirical antibiotics prescribed to patients admitted with UTIs and to assess the rate of resistance to these antimicrobials. Secondary objectives include examining the type and indications of imaging modalities utilised in the diagnosis and management of UTIs, as well as evaluating the follow-up of UTI patients through outpatient visits, imaging studies, and flexible cystoscopies.

MATERIALS AND METHODS

Data regarding patients admitted with a UTI to the Urology Unit at Mater Dei Hospital was gathered retrospectively over a 4-week period in June 2023. All

data was obtained from iCM Clinical Manager and Patient Dashboard. Permission was obtained from the data protection officer at Mater Dei Hospital, and all data was anonymised in a spreadsheet.

Demographics, including age, gender, diabetic status, and whether they were on Empagliflozin prior to admission, were recorded. UTIs were then classified as either simple or complicated using the aforementioned criteria, and by anatomical site (i.e., lower versus upper UTI). Data regarding whether urine and blood samples for culture and sensitivity were taken, the timing of sample collection, the organism cultured, and the resistance pattern to Fluoroquinolones was noted. The type, route, dose, and duration of empirical antibiotics prescribed were recorded for each patient, as well as the sensitivity of the cultured organism to the initial antibiotic prescribed and whether the antimicrobials were altered according to the culture and sensitivity results. Furthermore, the patient's total length of hospital stay, any follow-up imaging and the imaging modality performed, as well as follow-up flexible cystoscopy and outpatient appointments, were recorded.

Patients admitted to Mater Dei Hospital with a UTI during June 2023 who were not under the care of a Urology firm and those under the age of 18 years were excluded from the study.

RESULTS

A total of 37 patients were included in this study with 33 being male and 4 female. The average age of the patients was 58.24 years. 13 out of 37 patients were diagnosed with diabetes mellitus prior to the admission and none of these patients were on Empagliflozin. A total of 6 patients out of 37 had a recent HbA1c over the last 6 months with the average recording being 6.8%.

94.5% (n=35) of patients were investigated with a urine culture and sensitivity, 80% of which were taken on the first day of admission with the remainder being taken on day 2. A complicated UTI was diagnosed in 36 out of 37 patients (97.2%). The commonest anatomical site was epididymo-orchitis in 17 (45.9%) of the patients followed closely by cystitis in 16 (43.2%) of the patients. The average length of the hospital stay was 6.14 days.

Escherichia coli was the commonest organism cultured (25.7%) and a total of 9 patients had a negative urine culture and sensitivity result. Amongst the positive urine cultures, 22.2% (n=12) were resistant to Ciprofloxacin, 33.3% (n=8) were sensitive and the remainder showed intermediate sensitivity.

Blood cultures were taken from a total of 15 patients (40.5%), 10 (66.6%) of which came back negative, 2 cultured *Serratia marcescens*, 1 with *Staphylococcus hominis*, 1 *Staphylococcus aureus* and 1 *Enterococcus faecalis*.

Piperacillin-tazobactam was the empirical antibiotic of choice in 22 of the patients, 4 patients were administered empirical Co-amoxiclav and 4 others were prescribed Levofloxacin empirically. 1 of the patients received Gentamicin, another patient received Ceftriaxone as an empirical antibiotic, 1 other patient was given Ciprofloxacin and another received a combination of Ceftazidime and Doxycycline.

Sensitivity to empirical antibiotics was seen in 18 of the patients, 1 patient was resistant and the other had intermediate sensitivity. No data was available for the rest of the patients.

Upon discharge, only 13 of the patients were followed up with imaging whilst no image follow-up was recorded for the other patients. US Kidneys was the commonest imaging modality used in 4 patients, followed by US testes in 3 patients and CT IVU in 2 patients. 62.1 % (n=23) of patients from the total cohort were discharged with a surgical outpatient follow-up whilst 29.7% (n=11) had no documented follow-ups and 8.1% (n=3) had no data recorded. Follow-up cystoscopy was only carried out in 14.2% (n=5) of patients,

DISCUSSION

UTIs are described as microbial infections of the urinary tract leading to inflammation of the affected structures.¹¹ Diagnosis of a UTI depends on the clinical history and the presence of risk factors. Uncomplicated cystitis in a female with no risk factors can be diagnosed on a history of lower urinary tract symptoms in the absence of vaginal discharge.¹² Urine cultures for uncomplicated cystitis are only indicated if suspecting acute pyelonephritis,

persistent symptoms, symptoms which recur within 4 weeks from treatment completion and females with atypical symptoms.¹³ All complicated UTIs merit a urine culture and sensitivity, as previously mentioned. The majority of patients in this cohort had a urine culture and sensitivity sample taken at presentation, in accordance with EAU guidelines.

Most patients with a UTI can be managed safely in the community with short courses of antimicrobials. To date, there are no scoring systems which help Emergency physicians decide which patients presenting with a febrile UTI are at risk of poor outcomes and thus require a hospital admission. Therefore, physicians tend to rely on the patient's clinical presentation, parameters, comorbidities and blood results to aid their decision-making.¹⁴

The absolute majority of the patients included in this study were classified as a complicated UTI. This might be because most patients with simple UTIs are either managed in the community by General Practitioners or discharged from A&E with a community follow-up. Another contributing factor is that patients with a simple UTI that require admission for any reason are admitted under a General Medicine Specialist rather than a Urology Consultant.

Complicated UTIs can be caused by a wider spectrum of microbial pathogens than simple UTIs. The commonest causative organisms in complicated UTIs are *E. coli*, *Proteus* spp, *Klebsiella* spp, *Pseudomonas* spp, *Serratia* spp and *Enterococcus* spp.¹ With *E. coli* being the commonest organism cultivated from our patients, this audit can be considered as a representative sample of the patients presenting with a complicated UTI.

The EAU recommends for all patients admitted with a complicated UTI to be prescribed intravenous antimicrobials according to local guidelines, resistance patterns and past urine culture and sensitivity results.³ According to our results, Piperacillin/Tazobactam is the most commonly prescribed empirical antimicrobial amongst patients admitted with UTIs. This is likely due to the high local resistance to Fluoroquinolones, as demonstrated in our patient cohort. Indeed, this is in concordance with the EAU guidelines which only advise the use of Fluoroquinolones if resistance rates are under 10%.³

First line antimicrobials recommended by the EAU include second or third generation Cephalosporins, Aminoglycosides with or without Amoxicillin or a broad-spectrum Penicillin with or without an Aminoglycoside.³ Piperacillin/Tazobactam is a very potent broad-spectrum β -lactamase inhibitor with activity against Gram positive, Gram negative, aerobic and anaerobic bacteria.¹⁵ The main problem with its empirical use is the increasing resistance throughout the last few years, especially in relation to *E. coli* and *Klebsiella pneumoniae*.¹⁶

A recent study conducted by Abolghasemi et al found that there is no difference in terms of efficacy and side-effect profile between Piperacillin/Tazobactam and intravenous Amoxicillin/ Clavulanic acid in patients admitted with complicated UTIs.¹⁷ This indicates that Piperacillin/ Tazobactam should be reserved for more severe infections, including those caused by extended spectrum β -lactamase (ESBL) producing Enterobacteriaceae and *Pseudomonas* spp.¹⁸

One of the six Ds that characterise antimicrobial stewardship is de-escalation. The others are correct diagnosis, drug, dose, duration and debridement and/or drainage.¹⁹ De-escalation is lacking among this cohort as most patients are switched from Piperacillin/Tazobactam to Amoxicillin/ Clavulanic acid and both are classified as broad-spectrum antibiotics. Proper follow-up of urine culture and sensitivity results as well as input from Microbiologists and Pharmacists can both improve this aspect of UTI management.

Regarding follow-up of adult patients admitted with complicated UTIs, there is very limited research and data available internationally in relation to clinical follow-ups, imaging and flexible cystoscopies. The only available guidelines advise all males with a documented UTI and females with recurrent UTIs to have either an US or CT IVU performed looking for any underlying anatomical abnormality as well assessment of bladder emptying and prostate size in males.¹⁰ However, these guidelines are not clear about the ideal timing and modality of choice for different patient cohorts. This ambiguity is likely why a large portion of our patients did not receive any outpatient follow-up. Additionally, the lack of protocols available can result in patients being lost to follow-up, especially those managed solely in the

community by family or emergency physicians. An interesting addition to this audit would have been to assess the percentage of patients diagnosed with a UTI who required admission after being initially discharged from A&E.

The main limitations of this audit are the limited sample size, short duration and method of data collection. As previously mentioned, only patients admitted to the Urology unit were included in the audit, further limiting the sample size and increasing the likelihood of the sample not being representative. Some data regarding urine culture and sensitivity results and follow-ups was not obtainable from ICM or Patient Dashboard, thus introducing bias in the results and their interpretation.

CONCLUSION

UTIs are amongst the commonest Urology admissions and therefore proper diagnosis and management are essential in accordance with antimicrobial stewardship principles. Proper urine sampling for culture and sensitivity prior to antimicrobial initiation is important for more targeted treatment. In our opinion, local departmental guidelines on the classification of UTIs and ideal empirical antimicrobials should be set up in accordance with the local prevalent microorganisms and their sensitivities. Further research is needed to develop an international clinical score to identify patients at higher risk of complications from UTIs, who would therefore benefit from admission. Additionally, more comprehensive protocols are necessary to provide primary care and emergency physicians with clear criteria for determining which patients require further diagnostic investigations and referral to Urology services.

Abbreviations

UTIs:	Urinary tract infections
A&E:	Accident and Emergency
LUTS:	Lower urinary tract symptoms
CFU:	Colony forming units
EAU:	European association of urology
US:	Ultrasound
CT:	Computed Tomography
MRI:	Magnetic resonance imaging
EMA:	European Medicines Authority
EU:	European Union
IVU:	Intravenous urography
ESBL:	Extended spectrum Beta-lactamase

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Patients' understanding of their upcoming anaesthetic after attending Pre-Operative Assessment Clinic Appointment

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Background: Patients attending the Preoperative Assessment Clinic (POAC) should be empowered to make informed clinical decisions. Clear, evidence-based anaesthetic information must be provided in an accessible format before consent is obtained. A telephone questionnaire was conducted to assess patients' understanding of the information given at POAC regarding their anaesthetic management and associated risks.

Methods: Following ethical approval, 227 adult POAC patients were consented over four weeks. They were conducted within 48 hours post-appointment and asked simple questions about the discussed anaesthetic modality and its complications.

Results: A total of 203 patients completed the questionnaire. Of these, 122 (60.1%) patients were aware of their planned anaesthetic modality and 125 (60.6%) patients recalled being informed about anaesthetic complications. However, 28 of the latter could not specify any complications. The most remembered complications were nausea and vomiting, death, and non-specific cardiac or respiratory issues. Additionally, 91 (44.8%) patients stated they were not informed about complications related to their comorbidities. 43 patients desired more information, but only 12 had asked the POAC doctor questions.

Conclusions: Communication of anaesthetic information at POAC requires improvement. Many patients struggle to retain critical details, and barriers might prevent them from asking questions. Addressing these issues could enhance patient understanding and engagement, ultimately improving shared decision-making and perioperative care.

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In recent years, patients have become increasingly engaged in clinical decision-making regarding their medical care, particularly in the perioperative setting. They frequently seek reliable information about medical conditions, surgical interventions, and anaesthetic options but are also influenced by 'ad hoc' information from friends, family and social media. The latter is readily accessible and widely disseminated, however it can be inaccurate and unreliable. Non-medical individuals often lack the skills to critically appraise this information, leading to misconceptions.

As a result, during appointments with healthcare professionals - especially at Pre-Operative Assessment Clinics (POAC) - patients may challenge medical recommendations based on inaccurate or incomplete prior knowledge. This underscores the need for medical personnel to possess a strong foundation of evidence-based knowledge and the ability to communicate it effectively. Clear and comprehensible dialogue is essential to ensure that patients give a valid and informed consent.

The Association of Anaesthetists of Great Britain and Ireland published guidelines in 2017, which are widely regarded as the gold standard for delivering anaesthetic information.¹ These guidelines were developed to build an ethical and legal framework within which anaesthetists, intensivists, and pain specialists operate. While addressing these changes, the guidelines uphold fundamental principles, including respect for patient autonomy and the necessity of providing clear, comprehensive, and adequate information.

Anaesthesia has advanced significantly in recent years, enabling numerous successful surgical outcomes. Despite the expanding role of anaesthetists in areas such as resuscitation, intensive care and pain management, public understanding of anaesthetic practices and the responsibilities of anaesthetists remains limited.²

The POAC plays a critical role in preparing patients for surgery by assessing their medical condition and providing detailed guidance to optimise their health and readiness for anaesthesia. As part of this process, a thorough medical review is conducted by a doctor, during which patients receive instructions on optimising their medical status and preparing for anaesthesia in the days or weeks preceding their procedure.³

To evaluate patients' understanding and expectations of their upcoming anaesthesia, a telephone questionnaire was conducted within 48 hours of their POAC visit. This assessment aimed to identify any gaps in understanding and ensure that patients were adequately informed about their perioperative care.

MATERIALS AND METHODS

Data protection clearance was obtained from the Data Protection Office of Mater Dei Hospital (MDH), and ethical approval was granted by the Faculty Research Ethics Committee of the University of Malta (UREC-DP2307001MED - MED-2022-00407). Nurses at the POAC acted as intermediaries, facilitating participant consent by providing patients with an information letter followed by a consent form.

Data collection was conducted over a four-week period in August 2023. All consenting adult patients (aged 18 years and older) attending the POAC clinic at MDH were eligible to participate in the telephone questionnaire. Consequently, patients younger than 18 years and those lacking capacity were excluded from the study. Additionally, patients who underwent their pre-operative assessment at locations other than the POAC clinic were not included.

The questionnaire included a combination of 'yes' or 'no' questions and simple short-answer questions. These questions focused on topics such as the type of anaesthesia, potential complications discussed, and the information provided regarding pre-operative preparations and possible intra-operative interventions ([Table 1](#)).

During the four-week study period, 227 patients provided consent to participate. Of these, 203 telephone questionnaires were successfully completed. The remaining 24 patients were excluded due to 21 being unreachable after multiple call attempts and 3 having undergone their surgical procedure within 48 hours of their POAC appointment. The sample was not randomised. No formal statistical methodology was applied in this analysis. The results are expressed as a percentage of completed questionnaires.

Table 1 Questionnaire used in the study

General Anaesthesia Questions
What was your planned procedure?
Were you made aware of what type of Anaesthesia you are expected to undergo?
If not specifically told, what type of anaesthesia do you expect?
Were you made aware that anaesthesia has its own complications?
If yes, which complications are you aware of?
Were you made aware that complications from anaesthesia may arise due to previous/pre-existing medical conditions?
Were you made aware that a cannula will be inserted
Were you told what time should you start fasting? If yes, how much time before the procedure should you fast?
Regional Anaesthesia Questions (only eligible patients)
Were you made aware that you can be given Regional Anaesthesia?
If yes, what do you think the complications are? (patient's perception)
Were you made aware of what the complications are?
Were you made aware that general anaesthesia may still be given?
Other POAC-related Questions
During the pre-op, did you have any questions specifically regarding Anaesthesia?
If yes, did the doctor answer satisfactorily? Answer 1 (unsatisfied) to 5 (satisfied)
Do you wish that the doctor at POAC discussed your anaesthesia more?
Was the doctor clear when explaining these things to you during POAC?
Were you given a leaflet during your pre-op to read more about Anaesthesia?
If yes, did you feel that you understood better after reading the leaflet?

RESULTS

A total of 203 questionnaires were completed during the data collection period and were used for the purposes of this study. The ages of the patients ranged from 20 to 85 years, with the majority falling within the 40–49 year age bracket (Figure 1). Most participants were scheduled for general surgery, followed by gynaecology, orthopaedics, and ENT surgeries. A small proportion of patients were undergoing procedures in ophthalmology, plastic surgery, and vascular surgery.

When patients were asked about the type of anaesthesia they were informed they would receive—general anaesthesia, regional anaesthesia, or local anaesthesia — 81 (39.9%) patients indicated that they were not informed. Of these, 68 patients assumed they would be receiving general anaesthesia.

Based on the procedure names collected during the initial consent process, some procedures were eligible for neuraxial regional techniques, such as single-shot spinal or epidural anaesthesia, either alone or in combination with general anaesthesia. A total of 22 (10.8%) patients were eligible for these techniques; however, only 4 patients were aware of

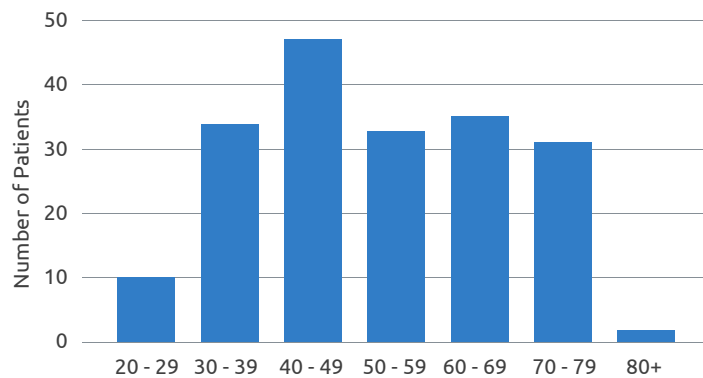


Figure 1 Number of patients per age group (20-85)

this option, and none were informed about the potential complications associated with neuraxial anaesthesia. 1 of these 4 patients mentioned awareness of back pain as a possible complication.

When asked whether they were informed of potential anaesthetic complications, 125 (61.6%) patients reported that complications were discussed. The most frequently recalled complication was postoperative nausea and vomiting, followed by death, non-specific cardiac or respiratory problems, stroke, and allergic reactions. Some patients also mentioned surgical complications, such as bleeding and infection. Notably, 28 patients did not recall any anaesthetic complications, despite reporting that such complications had been discussed during their POAC consultation (Figure 2).

Among the 78 (38.4%) patients who were not informed of anaesthetic complications, 43 expressed a desire for more information about their upcoming anaesthesia. However, only 12 patients actively asked the doctor any questions. In contrast, of the 125 (61.5%) patients who were informed about potential complications, 45 still desired additional information, although only 19 patients asked follow-up questions.

An increased risk of anaesthetic complications is well recognised in the presence of comorbidities. A total of 112 (55.1%) patients demonstrated awareness of this fact, although it should be noted that the presence or absence of comorbidities was not specifically addressed in the questionnaire.

Only 16 (7.9%) patients expressed dissatisfaction about the clarity of the information provided, citing the use of medical jargon, insufficient explanations, and language barriers as factors that hindered their understanding and did not meet their expectations. Lastly, only 44 (21.7%) patients reported that they received some kind of written information about their anaesthetic process.

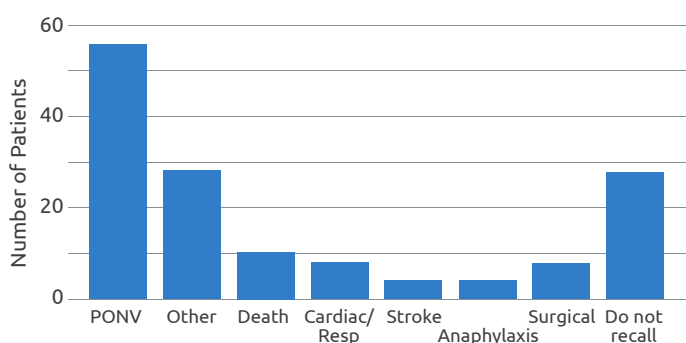


Figure 2 Number of patients recalling complications

This study aimed to assess patients' understanding and expectations regarding their upcoming anaesthesia following their pre-operative visit, and to evaluate our local informed consent process in relation to anaesthesia. In 2023, a total of 18,344 patients underwent procedures requiring anaesthetic care. Of these, 10,800 patients attended the POAC prior to their elective surgery.⁴ Despite the relatively small sample size of our study cohort (1.9% of all patients seen at POAC), the data collected can be considered a snapshot of the current situation at the POAC.

Surgery and anaesthesia can have a significant impact on a patient with pre-existing comorbidities. Given the high volume of surgeries performed, there is a good potential for the occurrence of adverse operative complications, highlighting the critical role of the POAC. During their visit, patients undergo a comprehensive history and examination, their medical records are reviewed, and they are investigated using blood, radiological, cardiology and lung function tests as indicated. Thereafter, they are referred to a specialist if necessary to optimise any pre-existing medical conditions.^{5,6}

The POAC clinic also serves as the setting where patients should receive education regarding their upcoming procedure, including anaesthesia. It is here that both nurses and doctors have the opportunity to inform patients about the risks and potential complications of anaesthesia, ensuring that they are fully aware of their options and able to make an informed decision.⁵

Informed consent is a process, not merely the signing of a form. It is designed to provide patients with the necessary information and understanding to authorize a medical procedure.⁷ Legally and ethically, informed consent is required prior to undertaking invasive or high-risk clinical interventions. It is defined as a communication process between a patient and a physician that culminates in the patient's authorization, agreement, or refusal to proceed with a specific medical intervention.⁸

For consent to be valid, the patient must fully understand the proposed intervention, including its potential risks, benefits, and available alternatives. The decision must be made freely,

without undue influence, and the patient retains the right to refuse treatment. Failure to obtain informed consent compromises patient autonomy, jeopardizes patient safety, and may legally constitute negligence or battery.⁸⁻¹⁰

In cases where the patient is unable to provide consent—such as minors, unconscious individuals, patients under general anaesthesia or sedation, those who are mentally incapacitated or intoxicated, or in emergencies where relatives are unavailable—substitute consent or refusal of treatment may be undertaken on their behalf.¹¹

Unfortunately, doctors undergoing their foundation programme may receive little training in how to conduct informed consent discussions. They themselves may not be privy to the procedure, its complications or the anaesthetic involved. Several other factors also hinder the informed consent process, including misunderstanding about consent requirements and goals, differing legal standards of disclosure, time pressures and competing demands of clinical medicine.⁹

In addition, it is vitally important to recognize that patients often do not view the consent process as primarily serving their interests or as a means to communicate their wishes. Instead, it is often seen as a protective measure for the hospital, which may lead to patients feeling disempowered and lacking control.¹² Although written consent specifically for anaesthesia is not currently mandated, our consent form incorporates key aspects of anaesthetic care.¹ It outlines the type of anaesthesia the patient will receive, ensures their right to discuss anaesthetic options with an anaesthetist, and includes information on potential dental damage.

The questionnaire provided valuable insights, including whether patients were informed about the type of anaesthesia they would receive. 81 patients reported not being informed about their anaesthesia type, with most assuming they would undergo general anaesthesia. However, 22 of these patients were scheduled for procedures that could be effectively performed using neuraxial techniques. Concerningly, only four of the patients surveyed were aware of this option, as they had been specifically informed during the POAC. This lack of communication is concerning, as it leaves patients insufficiently informed and unprepared for the

anaesthesia they may receive. This gap in patient awareness may be addressed with more teaching in anaesthesia during medical school.

According to the guidelines from the AAGBI, it is not acceptable to provide elective patients with such information only immediately prior to induction in the anaesthetic room since there will be insufficient time for patients to make informed and free decisions. Instead, this information should be conveyed as early as possible, ideally at the time of booking or during the POAC.¹ In cases where both a general anaesthetic and a neuraxial technique are viable options—depending on patient comorbidities and the anaesthetist's preference—patients should be informed about both possibilities in advance. This would enable them to make an informed decision and provide consent for either option on the day of the procedure.¹

Out of 125 patients who claimed to have been told about anaesthetic complications, 28 patients did not recall a single complication mentioned during the appointment. It has been previously studied that patients retain very little of the information provided, especially that concerning anaesthesia.¹³⁻¹⁵ Factors contributing to this limited recall include the use of complex medical terminology, the mode of information delivery (spoken versus written), and patient-specific factors such as education level and expectations.

It is commonly assumed that older patients have poorer information recall compared to younger individuals. Research indicates that, over time, medical information aligning with pre-existing beliefs is more likely to be remembered than information that contradicts these beliefs. Furthermore, patients with higher educational levels tend to recall information more accurately than those with lower educational attainment.¹⁶

The acquisition of new information is generally easier to retain than the correction of pre-existing knowledge. In stressful or emotional situations, attentional narrowing can occur, where patients focus primarily on one specific aspect of the experience. As a result, other important information—such as instructions regarding therapy adherence or follow-up appointments—may not be stored in memory and, consequently, cannot be recalled.^{14,17}

Importantly, patients are more likely to remember information they perceive as significant or directly relevant.¹⁴ For example, surgical complications are more readily recalled than anaesthetic complications. This discrepancy may arise because patients are less likely to view anaesthetic discussions as an integral part of the consent process, particularly in settings where these discussions are conducted by foundation doctors rather than the anaesthetists themselves.¹³ Additionally, patients' limited understanding of anaesthesia and the roles of anaesthetists beyond the operating theatre may contribute to this lack of recall as such uncertainty increases anxiety levels.¹⁸ Furthermore, as patients typically have no pre-existing relationship with their anaesthetist until the day of the procedure, their fears are often more focused on the surgical procedure itself rather than the anaesthetic process. This is unless their concerns are influenced by prior experiences or a personal familiarity with an anaesthetist.¹⁹⁻²¹

In line with these findings, 28 patients did not recall a single complication, a trend observed across all age groups. The most recalled complication was post-operative nausea and vomiting. While this memory may stem from prior personal experiences or those of relatives, it aligns with findings from other studies that indicate fear of nausea and vomiting, along with concerns about awareness and pain, is a common anxiety among patients.^{22,23}

Only 31 patients asked questions, regardless of whether they had been informed about complications or not. This represents a relatively low number, especially considering that 88 patients expressed a desire to know more. This may reflect issues such as time constraints, language barriers, or gaps in knowledge, where patients may be unaware of potential problems or techniques and, therefore, do not know what questions to ask. For patient-centred communication to occur, a two-way dialogue between patients and care providers is essential. Both parties should actively engage in the conversation, with each having the opportunity to speak and be heard without interruption. Questions should be encouraged for clarification, opinions expressed, and information exchanged in an environment free of verbal abuse, disrespect, or barriers to inquiry. Encouraging the active

involvement of relatives in decision-making is also an important aspect of fostering patient-centred care.²⁴ The traditional paternalistic approach to informed consent is gradually being replaced by a more collaborative and inclusive model.²⁵

A total of 88 patients expressed a desire for more information, potentially prompted by the questionnaire itself, which may have made them aware that additional information could have been provided. While most patients are interested in learning about the complications of their procedure and wish to know all potential risks, others prefer not to be informed about any complications or procedural details. This variation highlights the challenge of gauging what individual patients want or do not want to know.²⁵

Variation in practice based on individual patient preferences is appropriate; however, variation arising from differences between practitioners is more difficult to justify. Such discrepancies may lead to patient confusion and hinder the establishment of a standard, for what legally constitutes adequate risk disclosure.²⁶

A total of 112 patients reported being informed about increased risks associated with the presence of comorbidities. Although the questionnaire did not specifically address patients' comorbidities, this response indicates a general awareness that medical conditions predispose individuals to greater risk. Patients with comorbidities require a tailored approach to their pre-operative assessment, including the optimisation of their medical conditions and personalised disclosure of risks and complications. Beyond discussing the procedural details, the intended outcomes, and any additional post-procedure requirements, it is vital to address realistic treatment outcomes and the potential for significant morbidity or mortality.²⁵

This raises the question of whether foundation doctors are the most appropriate individuals to engage in such detailed discussions with patients, given their lack of specialist expertise in anaesthesia.

To enhance the delivery of information and improve the informed consent process, the information provided to patients should be clear, specific, and concise, emphasizing the most common and significant risks and complications. This focused

approach ensures that patients receive essential information without feeling overwhelmed. Furthermore, a second explanation should be provided on the day of surgery, even if consent was initially obtained during the POAC appointment.²⁶

To improve patients' recall of information, a structured approach should be adopted, supported by supplementary written or visual materials such as brochures, booklets, videos, or audio resources. This methodology not only enhances understanding but also helps to reduce anxiety and improve overall patient satisfaction with their care.^{14,17}

Various interventions, including revised consent forms, the provision of additional written materials, enhanced consent discussions, and the integration of audiovisual technology, have been developed and evaluated.⁹ These strategies can further support foundation doctors by bridging language barriers, minimizing the impact of medical jargon, and offering accessible reference materials for both patients and healthcare providers.

LIMITATIONS

Our study did not account for participants' prior experiences with general anaesthesia, which may have introduced bias into some responses, despite the questions being specifically focused on the recollection of information provided during the POAC consultation. Additionally, the study did not consider participants' educational levels, which could influence their understanding and recall of medical information. Prior to the study we did not test the general comprehension and recall ability across the age groups. However, this should still reflect the typical patient cohort attending POAC.

Furthermore, we did not assess the foundation doctors' knowledge regarding the conduct of pre-operative assessments, their awareness of anaesthetic risks and complications, or their familiarity with anaesthetic techniques beyond general anaesthesia. This limitation highlights the need for further evaluation of the training and preparedness of foundation doctors involved in the pre-operative assessment process.

RECOMMENDATIONS

Our findings indicate that although patients are receiving a considerable amount of information from foundation doctors, a gap persists in the delivery or retention of essential details. Therefore, we primarily recommend enhancing the training and education of foundation doctors, with a particular focus on pre-operative assessment, anaesthetic procedures, techniques, and associated risks and complications.

We acknowledge the effort that has been made before to provide written anaesthetic information. This material should be made available to patients by ensuring that there are enough copies. Health providers need to know of the availability of this material. This can be revised to concise, clearer and medical jargon-free version. A pictogram may also help those patients who have limited literacy skills. It may also help the understanding and retention of information.

The information can also be made available in different locally spoken languages, in Braille and large print versions. A digital format might also be helpful, as it would be readily available for distribution by email. Translator services should be easily accessible for those who need it.

The amount of information disclosed should be tailored to what is relevant to each individual patient. If a patient expresses a preference not to receive detailed information about their procedure, including its risks and potential complications, this choice should be respected and documented in writing.¹ However, it remains important to inform patients and make them aware that there are potential risks and complications associated with the procedure.

To support this, we are currently developing interactive workshops and formal teaching sessions for foundation doctors to improve their ability to communicate this knowledge effectively. Additionally, we propose displaying a slideshow or short informational video in the POAC clinic's waiting area to gradually and clearly convey key information.

CONCLUSION

This study highlights significant gaps in patients' understanding of anaesthesia and the informed consent process following their pre-operative assessment. Although patients generally receive information regarding their procedure, many remain unaware of key aspects such as anaesthetic options, associated risks, and potential complications. These findings suggest that the current approach, particularly when conducted by foundation doctors, may not fully meet the standards of informed consent required for patient-centred care. Enhancing the education and training of foundation doctors, improving the clarity and consistency of information delivery, and supplementing verbal explanations with written or audiovisual materials could substantially improve patient comprehension, satisfaction, and autonomy. By strengthening communication within the POAC setting, healthcare providers can ensure that patients are better informed, more engaged, and truly empowered to participate in decisions about their anaesthetic care.

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Audit on Patients with Above-Normal Blood Pressure in Community Health Clinics

Matthew Grech, Thea Difesa, Ruth Buttigieg

Background: Hypertension is a prevalent and under-diagnosed condition which can lead to severe possible complications affecting multiple organs, if not adequately managed. NICE guidelines include different blood pressure targets tailored to varying age groups, necessary to decrease the potential negative repercussions. Early diagnosis enables prompt management initiation and hence this highlights the importance of regular screening.

Method: Retrospective review of notes documented on Electronic Patients Record (EPR) was collected from over a 2-week period in November 2023.

Results: This audit assessed the screening, management adequacy and NICE guidelines adherence of hypertension in community clinics around Malta and Gozo. Results reveal how elderly patients above 80 years of age tend to have a higher blood pressure than 40-79 year-old patients. Nevertheless, patients in the elderly group who are on antihypertensive treatment are much better controlled than the younger cohort. The most frequently used management approach was blood pressure monitoring. Other management approaches included increasing the doses of anti-hypertensives or prescribing additional medications as well as lifestyle modifications and screening for end-organ damage. However, still not as frequent as the 2019 NICE guidelines suggest.

Conclusion: This retrospective study showcases the importance of regular blood pressure monitoring and adherence to standardized guidelines in order to mitigate the risks associated with hypertension.

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Hypertension is a common and relatively under-diagnosed medical condition, which can lead to serious medical complications including cardiovascular complications, cerebrovascular disease and kidney disease among many others. Treatment delays in managing hypertension can prove fatal, thus the importance of early diagnosis and management cannot be overemphasised.¹

In primary healthcare, monitoring of blood pressure is essential especially in those above 40 years of age. In 2019, the National Institute for Health and Care Excellence (NICE) set out a guideline on diagnosis and management of hypertension in adults.²

The 2019 NICE guidelines on hypertension suggest that an elevated blood pressure is that equal or greater than 140/90 when checked in the clinic. If the clinic blood pressure is between 140/90-179/119, the guidelines suggest further investigations which include ambulatory or home blood pressure monitoring (ABPM/HBPM), looking for target organ damage including an electrocardiogram (ECG), urine to assess for albumin-creatinine ratio (ACR), blood tests and fundoscopy and to assess cardiovascular (CV) risk such as by using the QRISK score. In those patients with a BP equal or more than 180/120, the NICE guidelines classify this as 'severe hypertension' which may require same-day referral for urgent investigations.

The NICE guidelines also recommend target blood pressure for those on treatment depending on their age. In those who are aged 80 or older, the clinic blood pressure should be aimed to be less than 150/90, however in those who are aged younger than 80, the blood pressure should be aimed to be below 140/90.

MATERIALS & METHODS

The aims of this audit are to to determine the percentage of patients who have an elevated blood pressure, whether optimal blood pressure ranges are being met in those with and without treatment and the management of patients with high blood pressure.

Retrospective review of patients attending the 22 community clinics in Malta and Gozo across a two week period from 6th November 2023 to 19th November 2023 was assessed. Data for this audit was primarily collected from Electronic Patient Records (EPR) including basic demographics such as age and sex and documented blood pressure readings, management and medication history. Approval to

carry out this audit was granted by the Data Protection Office of Primary Health Care. No ethical approval was required for this audit.

RESULTS

22 community health clinics across Malta and Gozo were assessed over a 2-week period in November 2023. A total of 789 patients attended the clinics over the specified time period, out of which 21.7% (n=171) had a consultation relating to blood pressure in their EPR note. Four patients who had their blood pressure screened in the clinic were excluded from the data as they were aged younger than 40, thus the total patient cohort included in this audit stands at 167. 31.1% (n=52) of the screened cohort were male whilst 68.9% (n=115) were female. Most of the patients were aged between 40 and 79, making up 83.2% (n=139) of the cohort whilst the remaining 16.8% (n=28) were aged 80 or above. Four patients (aged between 40-79) had documented a normal or raised blood pressure, however the actual value of the blood pressure was not documented in the EPR note.

When looking at all patients aged 40 – 79 who have a documented blood pressure (n=135), 33.3% (n=45) had an elevated systolic blood pressure (SBP). 49.6% (n=67) of the patients were not on treatment, out of which 26.9% (n=18) had an elevated SBP (≥ 140). The remaining 50.4% (n=68), were on treatment, out of which 39.7% (n=27) had an elevated SBP (≥ 140).

With regards to those patients aged 80 or above who have a documented blood pressure (n=28), 50.0% (n=14) had an elevated SBP. 53.6% (n=15) of the patients were not on treatment, out of which 73.3% (n=11) had an elevated SBP (≥ 140). The remaining 46.4% (n=13) were on treatment, out of which 23.1% (n=3) had an elevated SBP (≥ 150) (Figure 1).

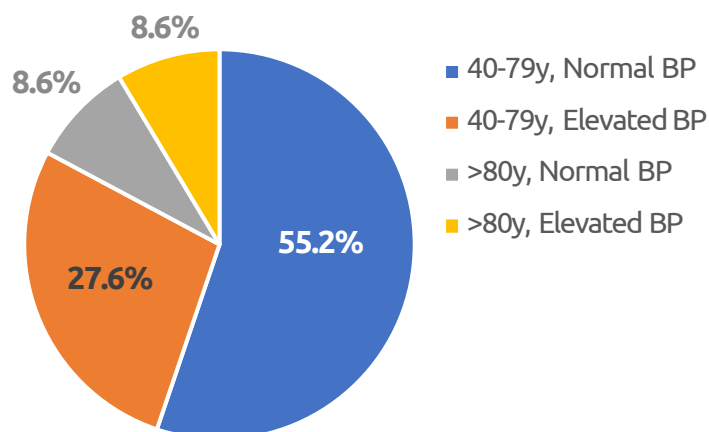


Figure 1 Figure showing percentage of patients with normal or elevated systolic blood pressure according to age, in those patients with documented blood pressure readings

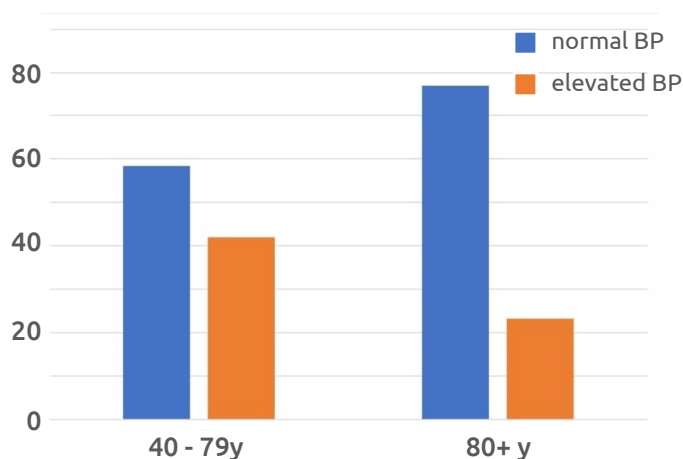


Figure 2 Figure showing percentage of patients on anti-hypertensive treatment with normal or elevated SBP according to age

Around half of all patients, 50.9% (n=85), were documented to have been on anti-hypertensive treatment, 84.7% (n=72) were aged between 40-79 and the remaining 15.3% (n=13) were aged above 80. In those patients aged between 40-79 who were documented to have been on anti-hypertensive therapy, 58.3% (n=42) had a SBP that was within the appropriate range whilst in those aged over 80 who were documented to have been on anti-hypertensive treatment, 76.9% (n=10) had a SBP that was within the appropriate range (Figure 2).

In this audit, management of elevated blood pressure was classified into 4; blood pressure monitoring, changes in anti-hypertensive treatment, no blood pressure management and other forms of management including bloods, ECG and lifestyle

changes. Taking into consideration patients aged 40-79 who have an elevated SBP (≥ 140) (n=45), the commonest form of management was blood pressure monitoring, which was done in 51.1% (n=23), followed by other forms of management including bloods and lifestyle changes.

In patients aged 80 or above who are not on treatment and have a high SBP (SBP ≥ 140) (n=11), most patients did not receive any management for their BP (54.5%, n=6). In those patients who are aged over 80 and are on treatment but have a high SBP (≥ 150) (n=3), most patients were managed with blood pressure monitoring (66.7%, n= 2) (Figure 3). In some cases, the total number of managements exceeds the number of patients because some patients were managed in more than one way.

DISCUSSION

Results of this audit show that in general, screening of blood pressure is still relatively low in community clinics, with less than a quarter of patients having their blood pressure checked. Additionally, the greatest predominance of blood pressure screening was noted to be in females, with cultural factors possibly contributing to this.

As can be seen from the results, in the population cohort aged between 40-79, blood pressure was poorly controlled when compared to the cohort aged 80 or above. Additionally, this can also be seen in those who are on treatment, as patients aged 40-79 who are

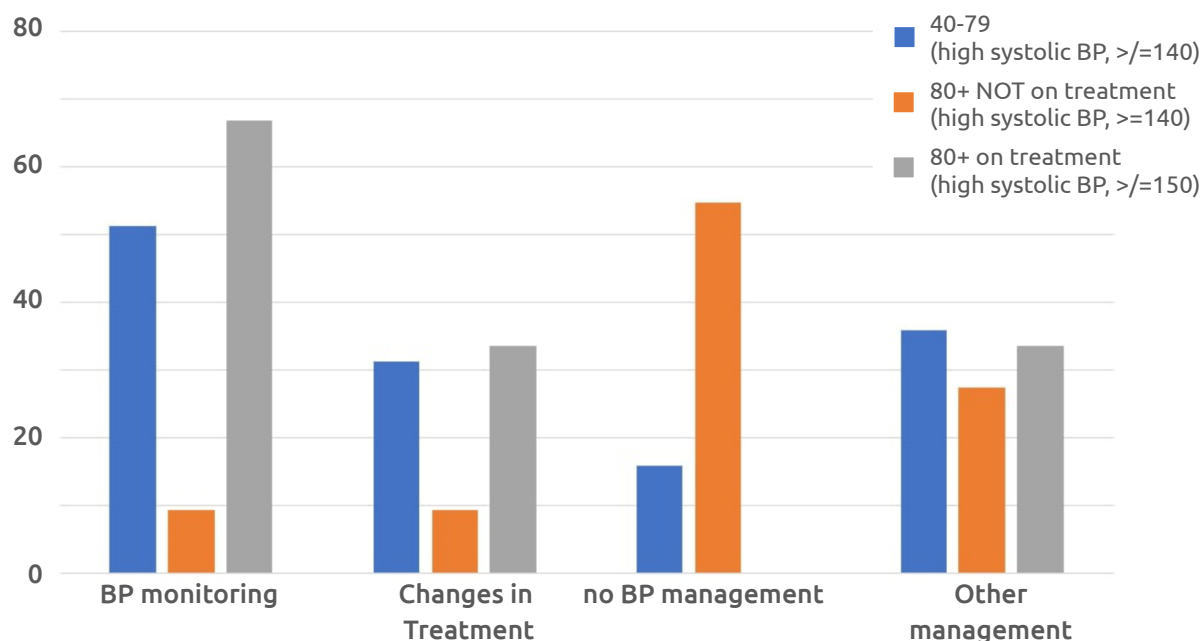


Figure 3 Figure showing the management of patients with high systolic blood pressure according to the different age groups

SUMMARY BOX

- We recommend that blood pressure monitoring is carried out in all patients aged above 40, at first medical contact, which in many cases are the community health clinics.
- Clinicians should be made increasingly aware of the different appropriate blood pressure targets in patients, according to their age and whether or not they are on treatment.
- As per the 2019 guidelines on hypertension, clinicians should provide appropriate treatment to hypertensive patients which can include home/ambulatory blood pressure monitoring, investigations to look for end-organ damage and the use of anti-hypertensive medications.

on treatment were noted to have blood pressures which were more poorly controlled than those aged 80 or above and are on treatment. This indicates that as patients get older, clinicians are more likely to screen and treat effectively high blood pressure.

In this audit, this is also reflected in the blood pressure management. This is because a greater proportion of patients aged 80 or above had home or ambulatory blood pressure monitoring when compared to those aged between 40-79.³

However, other forms of management including lifestyle changes and blood tests to look for end-organ damage (as is recommended by the NICE guidelines) were poorly applied in all population cohorts.

The first limitation of this audit is that the data is retrospective. Additionally, the data collected from EPR may not always have been documented appropriately, possibly leaving out necessary information including blood pressure readings and drug history of patients. Another limitation of the audit is that most data processing was done using systolic blood pressure. However, in clinical practice, diastolic blood pressure is as equally important to take into consideration.

CONCLUSION

Hypertension is a common medical condition with multiple possible sequelae. Patients' first medical contact are often the community health clinics and screening of blood pressure on first medical contact will help early identification and management of high blood pressure, enabling primary prevention of numerous medical complications. As emphasised in this audit, the 2019 NICE guidelines on hypertension should serve as a standard to clinicians, enabling them to manage hypertension accordingly, involving blood pressure monitoring, lifestyle changes, investigations and medications.⁴

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An Audit on Repeat imaging in patients who were admitted with Pneumonia

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Aim: To assess compliance with British Thoracic Society recommendations for repeat chest imaging following hospital admission with community-acquired pneumonia. Secondary outcomes included radiological resolution, persistent consolidation, and detection of underlying malignancy.

Methods: A retrospective audit was performed of patients admitted with community-acquired pneumonia to Mater Dei Hospital during the first six months of 2023. Data regarding patient demographics, risk factors, repeat imaging, imaging findings, and subsequent investigations were collected and analysed.

Results: A total of 273 patients were included, with repeat imaging performed in 54.1% of patients aged >50 years, 54.2% of those aged <50 years, and 55.2% of patients with a previous history of malignancy. Most patients demonstrated complete radiological resolution, while persistent consolidation was identified in 22 patients. Only one case of lung malignancy was diagnosed following repeat imaging, corresponding to a diagnostic yield of 0.37%.

Conclusions: Compliance with guideline-recommended follow-up imaging was approximately 54% across all patient groups. Although the diagnostic yield for lung malignancy was low, repeat imaging remains important for identifying persistent abnormalities that may require further investigation.

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Patients who have had a consolidation present on Chest X-Ray (or another imaging modality of the chest) are commonly required to have repeat imaging for assessment of resolution of the original findings, approximately in 6 weeks from the original radiograph/scan. The British Thoracic Society Guidelines (BTS) for the management of community-acquired pneumonia recommend repeat imaging in 6 weeks, along with a clinical review, in those patients with persistent symptoms or those at a higher risk of malignancy (for example those who have a history of smoking, or being more than 50 years of age).¹

AIM OF AUDIT

The aim of the audit is to assess the number of patients who have actually had repeat imaging to assess resolution of the original consolidation, data being obtained from admissions over a 6-month period in the first half of 2023. There will also be assessment of whether any further investigations took place if the repeat imaging is abnormal, including bronchoscopy. Data will include the percentage of the patients that have a confirmed histological diagnosis of malignancy after the repeat imaging. Patients with known lung cancer at the time of admission to hospital, will be excluded from the audit.

METHODOLOGY

All patients who were admitted in Mater Dei Hospital with pneumonia, over a 6-month period in the first half of 2023, will be assessed on whether there was repeat imaging after 6 weeks from the original detection of the consolidation. There will also be collection of data on the age (whether more than 50 or not), whether there is any smoking history, use of immunosuppressive drugs and whether there was

any history of previous malignancy prior to the presentation, therefore stratifying those with a higher risk of malignancy as a separate group. Furthermore, we will be assessing who followed up the repeat chest X-ray after 6 weeks, whether it was a primary health care physician or the original caring firm. All data will be anonymized and will be deleted after processing.

The exclusion criteria in the audit were as follows:

- Patients less than 16 years of age
- Currently with malignancy on active treatment
- Deceased prior to repeat CXR Date
- Patients who did not attend to follow-up
- Patients who went abroad after discharge

RESULTS

A total of 273 patients satisfied the inclusion criteria for this audit. These patients were divided into 3 sub-categories:

- Patients over 50 (220 patients)
- Patients under 50 (24 patients)
- Patients with a previous history of malignancy (29 patients)

In the over 50 category, the average age of patients with a detectable consolidation on chest X-ray was 79. The minority of these patients had a smoking history, with 15 patients (6.8%) being smokers at the time of investigation, with a further 33 patients (15%) being ex-smokers. Only 5 patients had a history of immunosuppression. As demonstrated in [Table 1](#), out of 220 patients in this category, 119 patients (54.1%) underwent repeat imaging. In these patients, the most common repeat imaging modality of choice was a chest X-ray, with 113 patients (94.9%) having a repeat chest X-ray and only 6 patients undergoing

Table 1 Proportion of patients who had repeat imaging, stratified according to their age or history of malignancy. Note: For Smoking History, the number of patients who were current or ex-smokers are indicated

	>50 years of age	<50 years of age	History of malignancy
Consolidation Detected on CXR	220	24	29
Average Age	79	42	74
Smoking History	48	10	13
Patients with repeat Imaging	119	13	16
Patients without repeat imaging	101	11	13

Table 2 Reason for no repeat imaging being performed, according to age or history of malignancy

	>50 years of age	<50 years of age	History of malignancy
Left country prior to repeat imaging	2	1	0
Deceased prior to repeat imaging	46	1	8
Had further imaging within the 6-week span showing normal findings	5	3	2
Confirmed Thoracic Malignancy prior to repeat CXR date	2	0	3
No reason found	46	6	0

cross-sectional imaging in the form of CT, as seen in [Table 2](#).

The most common outcome in patients undergoing repeat imaging following a consolidation was complete resolution in 100 patients (84%). Other outcomes included persistence of the consolidation in 17 patients (14.3%) and solitary cases of organizing pneumonia and lung malignancy.

The remaining 101 patients over the age of 50 did not undergo repeat chest X-ray. As highlighted in [Table 3](#), the most common reasons for this was found to be death in the 6-week period following initial chest X-ray and follow-up chest X-ray (46 patients, 45.5%) and patients failing to attend for repeat chest X-ray (46 patients, 45.5%). 2 patients (1.98%) did not undergo a repeat chest X-ray as lung malignancy was confirmed using an alternative imaging modality before the 6-week period for a repeat chest X-ray had elapsed.

In the under 50 category, the average age of patients with a detectable consolidation on chest X-ray was 42. A total of 6 patients (25%) were current smokers, with a further 4 patients (16.7%) being ex-smokers. Only 2 patients in this category were immunosuppressed.

Out of a total of 24 patients under the age of 50, 13 patients (54.2%) underwent repeat imaging. Similar

to the over 50 category, the most common repeat imaging modality was a chest X-ray, with 11 (84.6%) of patients undergoing a repeat chest X-ray. The remaining 2 patients underwent a CT scan. In the 13 patients who underwent repeat imaging, 10 patients (76.9%) had complete resolution of consolidation, with a further 3 having persistence of consolidation. All 3 of these patients did not have any further imaging, so we are unable to comment on the possible underlying aetiology of the consolidation. There were no cases of organizing pneumonia or malignancy diagnosed in this category.

A total of 29 patients in this audit had a consolidation detected on chest X-ray with a history of previous malignancy. The average age of these patients was 74 years, and the most common type of malignancy was breast cancer (8 patients, 27.6%). Gastro-intestinal, urological, and haematological malignancies made up the majority of remaining cases (16 patients in total, 55.2%). Only 3 (10.3%) of patients had a history of previous lung malignancy.

A total of 6 patients (20.7%) had a smoking history, with a further 7 patients (24.1%) being ex-smokers. 16 patients (55.2%) in this category underwent repeat imaging. In this case, chest X-ray was still the most common imaging modality of choice, with 11 patients (68.8%) undergoing repeat chest X-ray.

Table 3 Repeat Imaging modalities and findings according to age and history of malignancy

	>50 years of age	<50 years of age	History of malignancy
Chest X-Ray (CXR) or CT Scan	CXR – 113 / CT – 6	CXR – 11 / CT – 2	CXR – 11 / CT – 5
Resolution of Consolidation	100	10	14
Consolidation still present	17	3	2
Signs of Organising Pneumonia	1	0	0
Evidence of Malignancy	1	0	0

However, 5 patients (31.2%) proceeded immediately to cross-sectional imaging in the form of a CT scan.

In patients who underwent repeat imaging, 14 patients (87.5%) had complete resolution of the consolidation whilst the remaining 2 patients had persistence of the consolidation. One patient underwent repeat imaging within the 6-week time frame which showed partial improvement of the consolidation. This was further investigated by a 3rd repeat chest X-ray after 8 weeks which then confirmed resolution of the consolidation. One possible explanation for the slower resolution of this consolidation is that this patient was grossly immunosuppressed by immunotherapy as part of treatment for metastatic breast cancer.

The second patient with a persistent consolidation was not investigated further due to severe frailty and co-morbidity. The patient was also grossly immunocompromised with severe neutropenia secondary to myelodysplastic syndrome and passed away within 3 weeks of repeat chest X-ray.

13 patients (44.8%) did not undergo repeat imaging, the most common reason being death in the 6-week period between repeat imaging (8 patients, 61.5%). However, 3 patients underwent cross sectional imaging before the 6-week period elapsed and were confirmed to have lung malignancy.

In this audit, a total of 22 patients were found to have consolidations which were persistent on repeat chest X-ray. 16 of these patients did not have any further imaging investigations. From the remaining 6 cases who underwent repeat imaging, the following lung pathologies were identified:

- Post-covid organizing pneumonia.
- Bronchiectasis
- Two cases of recurrent aspiration pneumonia in patients with nasogastric tubes
- Recurrent aspiration pneumonia in patients with Huntington's disease
- COVID pneumonitis with ground glass opacification

DISCUSSION

Similar audits and studies can be found in the literature, which assess adherence to repeat imaging in a 6-week period. Results vary across the literature,

SUMMARY BOX

- Follow up rates for repeat chest x-ray did not vary with age, with 54.1% follow up in patients over 50 and 54.2% in patients under 50.
- The rate of follow up chest x-ray has increased marginally compared to a local audit performed in 2019.
- Repeat chest radiograph has a poor diagnostic yield for lung malignancy based on this audit.

one study by Tang et al mentioning less than half the patients in a 2 year period of having repeat imaging, (2) as well as another retrospective study by Bryl et al concluding only 55% of those deemed as high risk (>50 years of age or a smoking history) as having repeat imaging.³ On the other hand, a study by Upperton et al found that 88% had repeat imaging.⁴ Whilst the risk of radiation from imaging should be considered, it must however also be emphasized that the importance of re-assessment of a consolidation should take place to exclude malignant disease and/or atypical infections which may give a prolonged clinical course, associated with further morbidity and mortality.

A similar audit by Delicata et al was performed locally between 2013-2016 which analyzed the outcomes of the follow-up of consolidations.⁵ Some striking differences between the two audits however, was that the previous audit did not take into account patients under the age of 50. Furthermore, the previous audit allowed for a 12-week time window in which patients could repeat chest X-rays following consolidation.

Despite these differences, the results between the two audits were congruent, with the audit by Delicata et al revealing a 53.2% follow up rate of repeat chest X-ray, compared to the 54.1% (in patients over 50) and 54.2% (in patients under 50) follow up rate in this audit.

Furthermore, the study demonstrated that the diagnostic yield of lung malignancy was found to be 1.74%. In this audit, the diagnostic yield of repeat chest X-ray was only found to be 0.37%. Reasons which could explain the lower diagnostic yield include the smaller sample size in this audit and the fact that younger patients, who are much less likely to be diagnosed with malignancy, were included.

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Preoperative Fasting in Children Undergoing Elective Paediatric Surgery

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Background: Pre-operative fasting is important to prevent pulmonary aspiration of gastric contents. Prolonged fasting can have negative metabolic effects which are more pronounced in children. The most recent guidelines recommend preoperative fasting intervals of 6 hours for solid food; 4 hours for formula and non-human milk; 3 hours for breast milk and 1 hour for clear fluids.

This audit assessed local preoperative fasting times amongst the paediatric population undergoing elective surgery within Mater Dei Hospital.

Methods: 113 children under the age of 16 years and who underwent elective surgery within Mater Dei Hospital were enrolled in this audit. The time the child last ate and drank, the time surgery started and duration of surgery were noted from medical records. Results were then anonymised and analysed using a Microsoft Excel® Spreadsheet.

Results: Fasting times ranged from 3 to 20.1 hours with a median of 11.8 hours and a mean fasting time of 11.3 hours.

Most surgeries were planned for the morning and typically the child would start to fast at between 20:00 and 22:00. However, even in surgeries planned for the afternoon, the child still tended to skip breakfast.

Conclusion: This audit highlights the need for increased local awareness about paediatric preoperative fasting guidelines. Initiatives should be directed towards children, relatives and health care workers to optimise the preoperative experience for the child.

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Surgical procedures in the paediatric population are not uncommon, and are increasing in frequency. Amongst the nearly 15,000 procedures performed under general anaesthesia within Mater Dei Hospital in 2021, 600 were elective procedures carried out within the paediatric population.¹

Pre-operative fasting is important to prevent pulmonary aspiration of gastric contents but prolonged fasting can also lead to negative metabolic effects. These include dehydration, ketoacidosis, hypoglycaemia and hypotension on induction. Such metabolic effects are more pronounced in children since they have higher metabolic rates and reduced glycogen stores as compared with adults.^{2,3}

The most recent guidelines recommend preoperative fasting intervals of 6 hours for solid food; 4 hours for formula and non-human milk; 3 hours for breast milk and 1 hour for clear fluids.³

Unfortunately, it is common that medical practitioners may not be aware of the latest guidelines. For instance, Grech et al in 2019, showed that doctors taking care of children awaiting emergency orthopaedic procedures were unaware of the pre-operative fasting guidelines in children. This resulted in unnecessarily long fasting intervals. Amongst the recommendations brought forward, it was suggested to carry out further audits within other fields of paediatric surgery.⁴

The objective of this audit was to assess the extent to which preoperative fasting times in the paediatric population undergoing elective surgery complied with such guidelines.

MATERIALS AND METHODS

Approval from relevant Data Protection Office and Ethical Bodies (UREC-DP2310008MED) was obtained to proceed with this retrospective audit.

All children below the age of 16 years who presented for elective surgery (including but not restricted to General Surgery, Dental Surgery, Ear, Nose and Throat, Orthopaedic surgery and Urology) were included in this audit. Data collection was carried out between October and December 2022 and enrolled a total of 113 children.

Data was collected from medical records and included the time the child last ate or drank, name of

surgery underwent, the time surgery started and the duration of surgery. No patient contact was needed for data collection.

STATISTICAL ANALYSIS

Descriptive statistics were employed to summarise the data, presenting categorical variables such as counts (n) and proportions (%) and medians with interquartile range (IQR). Univariate analysis was performed with parametric tests, where appropriate. Data was first checked for normality and skewness using visual methods. Normality testing was done using the Shapiro-Wilk test. When appropriate, t-tests, Mann-Whitney U tests, Kruskal-Wallis test and chi-squared tests for contingency table analyses (two-sided) were used for univariate analysis. Most results did not show significant skewness, so mean values are reported. Significance was set at $p < 0.05$.

Data was gathered into an Excel® sheet (version 16.76, Microsoft, California, US) and analysed using RStudio (RStudio: Integrated Development Environment for R, Version 2023.06.1+524, Boston, Massachusetts, USA), with R version 4.0.3 (The R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

Data was collected from a total of 113 medical records. The median age of patients was 6.0 years (IQR 3.0 - 9.0 years). Most surgeries were within the general surgical speciality (41%), followed by Ear, Nose, Throat (ENT) (19.4%) and orthopaedic surgeries (16%). The rest included cardiothoracic, dental, ophthalmic, plastic surgery and urology.

Most cases were done in the morning (n=91, 80.5%), with 21 cases (18.5%) being done in the afternoon. Only one case was done electively in the evening.

Fasting times ranged from a minimum of 3 hours to a maximum of 20.1 hours, as shown in [Figure 1](#). The mean fasting time was 11.3 hours (SD: 3.1, 95%CI: 10.9 - 12.0 hours). In 109 cases (96%), the fasting time was longer than 6 hours. In 49.6% of cases (n=53), the last oral intake had been 12 hours or later. There was no relationship between fasting time and age, as shown in [Figure 2](#).

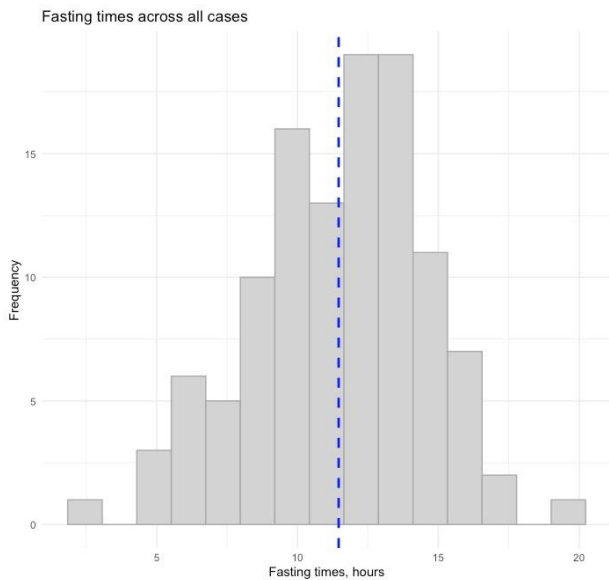


Figure 1 Distribution of fasting times in hours, with blue dashed line indicating mean value (11.3 hours)

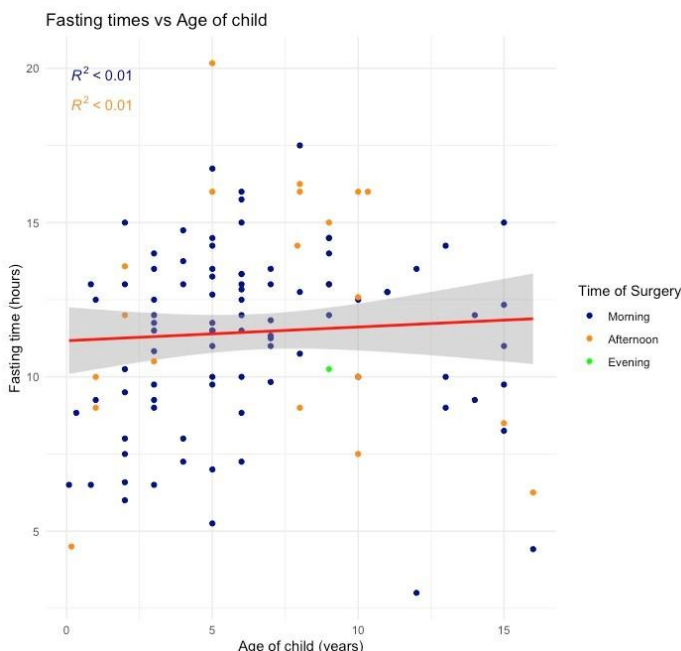


Figure 2 Scatter plot, fasting time in hours in relationship to age of child. This has been categorised by time of surgery. Red line indicates best fit, with confidence intervals in grey.

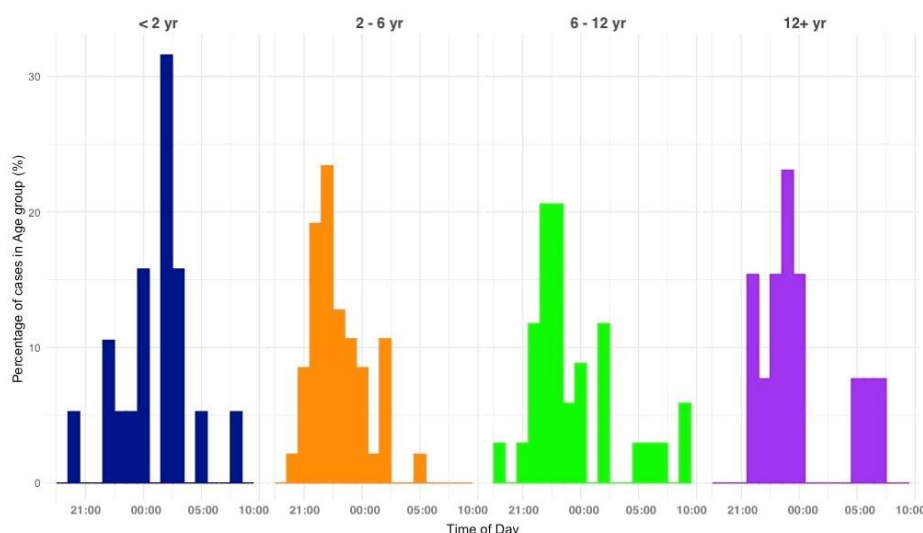


Figure 3 Distribution of time to start fasting, categorized by age group

Most children who were planned for a morning surgical procedure started their fast between 20:00 and 22:00 the night before, as shown in [Figure 3](#). Infants tended to be fasted later on with most of the infants included in our study being fed between 02:00-03:00 during the night. This was statistically significant when compared to children between the age of 2-6 years (3.0 hours earlier, $p=0.0008$) and nearly significant when compared to children of ages between 6 – 12 years (1.6 hours earlier, $p=0.08$). Surprisingly, 60% of children planned for surgery in the afternoon still skipped breakfast. This meant that longer fasting times occurred in surgeries carried out in the afternoon.

Excessively prolonged fasting times were noted across all surgical specialities covered by the study. Fasting times were not dependant on type of surgery, as shown in [Figure 4](#).

DISCUSSION

Our audit shows that there is poor adherence to the current paediatric fasting guidelines, with nearly all children being fasted for more than 6 hours. This was across all ages, and across all surgical specialities. Indeed, only 5 children were fasted for 6 hours or less.

Adherence to fasting guidelines is well known to be poor, including in adults.⁵ Aroonpruksakul et al studied 309 children prior to surgery, and found the mean fasting time was 11.1 hours for food.⁶ Engelhardt et al described a fasting time for solids of 12 hours, in a population of 1,350 children presenting for elective dental treatment under

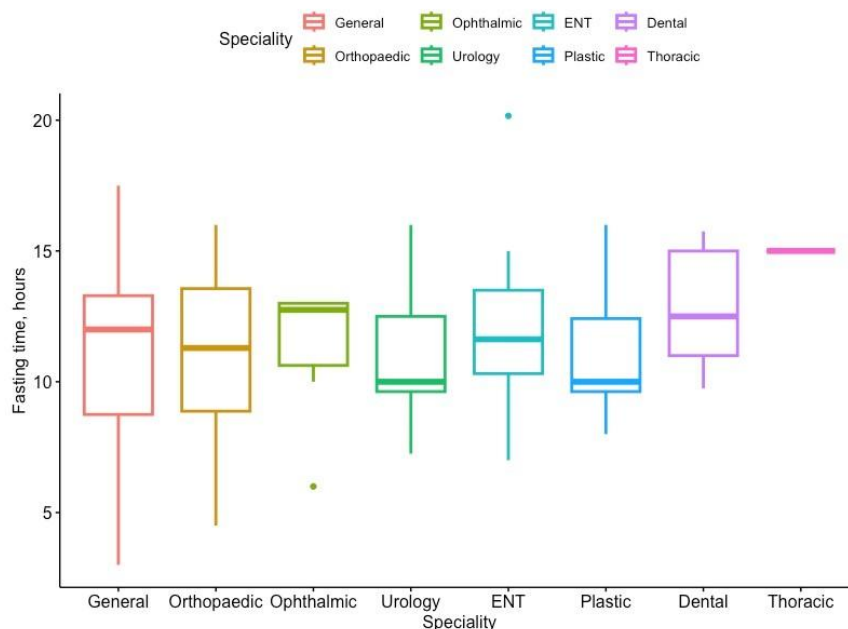


Figure 4 Boxplot for fasting times in hours categorized by surgical speciality. No statistical differences may be seen.

general anaesthesia.⁷ Rawlani et al performed an audit similar to ours, with 85 children enrolled, with a detailed history of last oral intake, and also of instructions given to parents.⁸ It was then followed up with an educational campaign, and re-audited. The mean fasting times for solids in the initial audit was 9.4 hours, and for clear fluids it was 6.6 hours. This is considerably shorter than the mean fasting times found in our audit, and indeed, only 13% of children were fasted for 12 or more hours, compared to 49.5% of children in our audit. On the other hand, Beck et al describe how the introduction of a 6-4-2 guidelines decreased last oral intake to around 2 hours for clear fluids,⁹ so it is possible to have children who are not severely fasted before surgery.

The relationship between surgical speciality and fasting times is not surprising, given that the guidelines are generic. There is no evidence to suggest otherwise, but there might be medical conditions that increase the risk of pulmonary aspiration that may be encountered more frequently in certain types of procedures. For instance, general surgeons might encounter children for a gastric fundoplication, which is performed to alleviate the symptoms of gastric regurgitation.

The main risk for a non-fasted child who is to undergo surgery is pulmonary aspiration following regurgitation. In a review by Phillips et al it was noted that in children allowed clear fluids until 2 hours

before scheduled time of anaesthesia, gastric contents and risk of aspiration pneumonitis was similar to those who have endured a longer fast whilst the complications of a prolonged fasting regimen were avoided.¹⁰ In fact, ultrasound studies that determined gastric emptying after light meals have shown a mean gastric emptying time of less than 4 hours.¹¹⁻¹² Similarly, gastric emptying time was shorter than one hour, after intake up to 5 mL/kg clear fluids.¹³ Most of these studies were small, with around 20 – 30 children involved, but collectively indicate that gastric emptying is faster than previously thought.

In fact, the actual risk of pulmonary aspiration has not been corroborated in recent studies. Beck et al⁹ did not find any increased risk in over 12,000 children, despite average fasting times being shorter than recommended. Indeed, regurgitation occurred in 0.26% of cases, with suspected pulmonary aspiration in 0.08%. All recovered with no consequences. It should be noted that in this study, fasting times were significantly shorter than in our sample, especially for light meals (9.3 hours), for milk (formula: 6 hours, breastmilk: 4.8 hours) and for clear fluids (2.3 hours), although for heavy meals, the fasting times were longer at 14 hours. We did not collect data on the type of last meal, as this was not recorded on the medical records, but it would seem that in our local sample, children would be given one last meal before midnight, and nothing else afterwards.

An optimal fasting practice may lead to lower incidences of dehydration, ketoacidosis, hypoglycaemia and cardiovascular complications during anaesthesia. Hence, it becomes critical that systematic analysis is directed to align observed fasting practises in paediatric surgery with international guidelines and best practices.

This study was not powered to explore reasons for not implementing the latest guidelines. However, other studies have listed suboptimal preoperative instructions, parental concerns, and institutional barriers.¹⁴ Newton et al conducted a quality improvement project in a teaching paediatric hospital, and found that parents were unwilling to wake children in the middle of the night to feed them, and generally erred on the side of safety.¹⁴ Similarly, contradictory advice given to parents from different specialities ultimately confuses parents on what to do.^{14,15} Changes in the surgical list order also upset fasting times and in fact provisional fasting to allow theatre flexibility was one of the main drivers towards excessively prolonged fasting noted by Koumarellis et al¹⁶ We suspect the same issues may play an important role in our local setting.

This would mean that is necessary to improve education of healthcare professionals and family members in order to reduce oral fasting times, as shown by Rawlani et al⁸ Canping Li et al demonstrated that efforts by a multidisciplinary team to educate parents and raise awareness amongst all healthcare professionals involved in a child's peri-operative care effectively translated into shorter fasting times.¹⁷ This is particularly relevant in the local situation where paediatric patients are assessed pre-operatively in the generalist settings and translation of fasting practices of adults into fasting intervals for paediatrics is very likely.

The use of pre-printed instructions for parents has also shown to have a beneficial effect, with a decrease of mean fasting times from 8.5 to 6.0 hours.¹⁸ At times, this was not enough, even when supplemented by phone calls on the day before surgery.¹³ Furthermore, such instructions usually advise nil-by-mouth for clear fluids for two hours prior to admission. This fails to consider, registration and preparation time before anaesthetic induction.^{14,15}

SUMMARY BOX

KNOWN FINDINGS

- Most recent guidelines recommend preoperative fasting intervals for healthy children of 6 hours for solid food; 4 hours for formula and non-human milk; 3 hours for breast milk and 1 hour for clear fluids.
- Excessively prolonged preoperative fasting has negative metabolic effects especially pronounced amongst the paediatric population.
- Suboptimal preoperative information, parental concerns and institutional barriers are amongst the commonest reasons identified to be contributing towards excessively prolonged preoperative fasting.

NEW FINDINGS

- Excessively prolonged preoperative fasting times (with a mean fasting time of 11.3 hours) noted amongst 113 paediatric patients undergoing elective surgery within Mater Dei Hospital.
- Excessively prolonged fasting times noted across all ages and surgical specialities.
- Quality improvement measures directed towards the multidisciplinary team caring for children peri-operatively should be implemented with further re-auditing.

The responsibility of ensuring that children are not overly fasted should not lie solely on the parents or guardians. Indeed, institutional procedures may have a greater impact.^{8,14,15}

Educational campaigns aimed at health care professionals involved in pre-operative assessment of paediatric surgical patients would be a start.¹⁹ This will help ensure pre-operative instructions communicated to patients are in keeping with guidelines. This may be done by designing leaflets summarising main points about pre-operative fasting and distributing these at pre-operative clinics will also help increase awareness. Nursing staff in paediatric surgical wards also play an important role, and may be offered such initiatives as well.

Younger children should be placed first in a surgical list, unless there are compelling reasons. The first patient should be identified, to ensure appropriate

fasting times. Any delays in theatre which would translate into excessively prolonged fasting times should be communicated clearly and timely with staff in these wards and also discussed with caring anaesthetist.

One intervention that has proven particularly efficient is the administration of a glucose drink to any child on arrival to hospital and whose induction is expected to occur more than 60 minutes later.^{14,15} This has been shown safe clinically, and also by gastric ultrasound^{20,21} and does not increase gastric acidity.²²

LIMITATIONS

The current audit has a number of limitations, especially the low number of cases evaluated. There was no intention to evaluate complications due to fasting or to regurgitation, as the number of cases that would need to be included would have been

much higher. Our aim was to evaluate compliance with recently published guidelines, both internationally and locally.

Another limitation is that we did not evaluate the type of meal that the children would have last taken before fasting. Similarly, we did not obtain information on what instructions were given at the preoperative assessment, or reasons for such long fasting times. This was not possible with the methodology used in this audit.

CONCLUSION

Our audit highlights the importance of further efforts in order to optimise fasting times amongst the elective paediatric population. Such efforts should be followed up by re-auditing in order to ensure ongoing optimisation of peri-operative care amongst elective paediatric surgical population.

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Sodium-Glucose co-transporter 2-inhibitors questionnaire: A survey amongst peers

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Background: Sodium-glucose co-transporter-2 (SGLT2) inhibitors are a relatively new class of oral antihyperglycemic agents which improve glycemic control in patients with type 2 diabetes mellitus (T2DM) by preventing reabsorption of glucose in the proximal convoluted tubules of the kidney. As their use has become widespread in both the diabetic as well as the cardiac patient population it was deemed appropriate that a survey amongst peers be designed to assess knowledge of this medication's characteristics.

Methods: An online 42 closed-ended question survey was drafted. It comprised of 7 sections, each pertaining to an important characteristic of this drug class. The survey was circulated via email to doctors in all levels of training in both primary and secondary care. .

Results: A total of 171 questionnaire responses were received. Subsequent data analysis demonstrated generalized limited awareness of the different important considerations to prescribing this medication class.

Conclusion: This study reveals that there is a need for better doctor education on SGLT2 drug class. Henceforth an informative poster highlighting the most pertinent drug characteristics and considerations was created and circulated amongst doctors.

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Sodium-glucose co-transporter-2 (SGLT2) inhibitors are a relatively new class of oral antihyperglycemic agents which improve glycemic control in Type 2 diabetes mellitus (T2DM) by preventing reabsorption of glucose in the proximal convoluted tubules of the kidney. Their introduction has been lauded as a cornerstone in the treatment of Type 2 diabetes. The American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD) have recognized their significant cardio- and renovascular benefits placing them as first-line add-on agents, following initiation of metformin, in the management of T2DM with chronic heart failure, atherosclerotic cardiovascular disease or nephropathy.¹ This has also been reflected in the updated National Institute of Clinical Excellence (NICE) guidelines (NG28).² A multitude of cardiovascular trials have taken place over the recent years, repeatedly demonstrating SGLT2 inhibitor's ability to provide a significant reduction in cardiovascular outcomes in both diabetic and non-diabetic patients. More specifically, a reduction in heart failure hospitalizations, cardiovascular death, all-cause mortality and MACE-3 events (i.e. a composite of nonfatal stroke, nonfatal myocardial infarction and cardiovascular death) has been demonstrated in various trial results.² They have been recognized to be the sole drug to be effective across the entire LVEF spectrum of heart failure, proving to be efficacious in both chronic heart failure with preserved and reduced ejection fraction.³ Current practice guidelines advocate the following recommendations: The American Diabetes Association (ADA) recommends the addition of SGLT-2 inhibitors in the management of T2DM with HF or patients at high risk of HF.¹ The most recent European Society of Cardiology (ESC) 2021 and the American Heart Association/American College of Cardiology/Heart Failure Society of America (AHA/ACC/HFSA) 2022 HF guidelines recommend the use of SGLT-2 inhibitors (currently only dapagliflozin and empagliflozin) in the management of chronic, stable HFrEF (class 1 recommendation for a reduction in cardiovascular death and HF hospitalizations) irrespective of baseline diabetes status. The AHA/ACC/HFSA HF guidelines 2022 provide a class 2A recommendation for HFrEF and HFpEF.⁴

This group of medications do however have their own adverse effects and treatment considerations. Thus, adequate knowledge of their mode of action, adverse effects, drug-drug interactions and monitoring requirements is paramount as their use becomes widespread.

These agents have been available for purchase in Malta from community pharmacies against a prescription by any registered clinician, for a number of years. In 2021, SGLT2 inhibitors in the form of empagliflozin were however introduced on the national formulary free of charge, for selected patients with type 2 diabetes mellitus meeting particular criteria. In the latter case, the initial prescribing rights are restricted to specialist diabetologists. As the cost of purchasing these medications was eliminated, the number of patients taking these agents increased. Clinicians irrespective of their specialty are thus likely to encounter these patients in their practice. It was thus felt important by the authors to explore the knowledge and awareness of this drug class amongst clinicians working in various specialties including community practice, A&E, internal medicine and surgical specialties.

MATERIALS AND METHODS

This study was carried out over a five-month period (May 2022 to September 2022). Data collection was carried out by means of a questionnaire. A standardized email demonstrating a description of the questionnaire was prepared together with a hyperlink to an online survey website (the questionnaire itself). This was sent to Medical and Surgical Departmental secretaries of both Mater Dei Hospital and Gozo General Hospital; i.e., Secondary care, for the necessary approval for dissemination. Once obtained, the email was disseminated to all members of each respective subspecialty within the department. The same process was used with regards to dissemination in Primary Healthcare, where email dissemination was carried out to each Primary Healthcare branch in both Malta and Gozo. Specialists in Endocrinology were excluded from participating.

Involved departments in Medicine included: Accident and Emergency, Cardiology, Respiratory, Gastroenterology, Geriatric Medicine, Oncology and

Palliative Care and Haematology. Involved departments in Surgery included: General Surgery, Urology, Orthopaedics, ENT, Cardiothoracic Surgery, Vascular Surgery, Anaesthesia, Obstetrics and Gynaecology.

Participation in this study was voluntary and confidentiality was guaranteed.

The respondent characteristics section included the specialty and the designation (consultant/resident specialist/higher specialist trainee/basic specialist trainee/foundation doctor). The cohort characteristics are summarized in [Table 1](#).

The questionnaire consisted of seven sections:

1. Respondent characteristics
2. SGLT2 inhibitor licensing and mode of action
3. Prescribing and patient counseling
4. Adverse Effects
5. SGLT2 and diabetic ketoacidosis
6. Drug interactions
7. Specific SGLT2 inhibitors

The questions were designed by the authors, formulating them with close consultation of the products’ summary of product characteristics leaflets. Special emphasis was placed on the clinical implications of SGLT2 Inhibitors given that our studied cohort are active prescribing clinicians. The chosen questions were evaluated by two medical specialists in an attempt to ensure their validity and relevance. 980 clinicians were invited to complete the questionnaire over a 5-month period. 3 reminders

were sent over the 5-month period. 172 responses were received. No responses were excluded.

Permission was sought from the Departmental Chairperson after a readthrough of the proforma. No funding was required and no patient-specific data was collected.

RESULTS

Of the 171 questionnaires that were collected, 78 originated from doctors in primary care and 93 from doctors in secondary care. The correct response rate for primary care participants in this survey was found to be of 45% whilst that of secondary care was of 47%. For participants in secondary care, grade participation was split as per [Table 1](#). Notably 20.93% of the participants were of consultant grade, closely followed by Foundation Year Doctors at 15.7%.

The different specialties involved were as demonstrated in [Table 2](#) with Medicine being the specialty with the highest number of participants.

[Tables 3 – 8](#) describes the question content and correct response rate per question.

- Licensing and MOA: overall correct response rate: 51% (Mean 38.78, SD 34.71) ([Table 3](#))
- Prescribing and Patient Counseling: overall correct response rate: 33% (Mean 47.11, SD 29.38) ([Table 4](#))
- Adverse Effects: overall correct response rate: 39% (Mean 55.62, SD 32.65) ([Table 5](#))

Table 1 Grade of Participants

Grade	Percentage
Consultant	21%
Resident Specialist	8%
Higher Specialist Trainee	15%
Basic Specialist Trainee	11%
Foundation Year Doctor	16%
General Practitioner	5%
Specialist GP	15%
GP Trainee	9%

Table 2 Participating departments according to responding frequency (%)

Department	Percentage
Medicine	45%
General Practice	43%
Accident and Emergency	39%
Surgery	29%
Unspecified	7%
Cardiology	6%
Anaesthesia	1%
Obstetrics and Gynaecology	1%

- SGLT2 inhibitors and DKA: overall correct response rate: 26% (Mean 28.32, SD 22.64) (Table 6)
- Interactions: overall correct response rate: 31% (Mean 43.50, SD 29.88) (Table 7)
- Specific SGLT2 inhibitors: overall correct response rate: 25% (Mean 29.46, SD 26.54) (Table 8)

The overall correct response rates per subsection were as summarized below and demonstrated in Figure 1.

The weakest data field was that of Specific SGLT2 Inhibitors, while the strongest data field was of Licensing and Mode of Action. However,

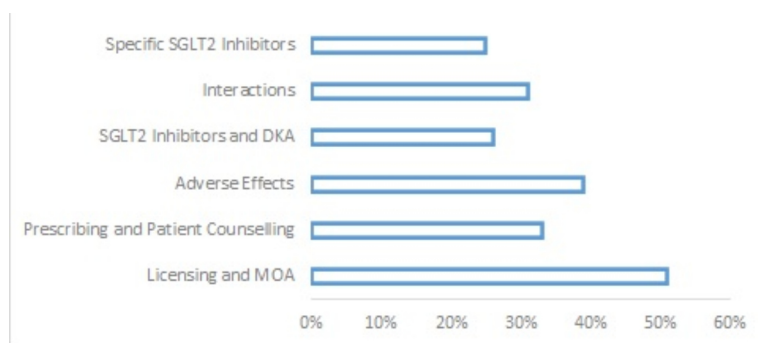


Figure 1 Correct Response rate per subsection

Table 3 Licensing and Mode of Action

Question	Description	Correct response (%)
4	SGLT2 inhibitors licensing in patients with chronic heart failure	18.90%
5	SGLT2 inhibitors licensing in patients with diabetes mellitus	9.60%
6	SGLT2 inhibitors mode of action on the kidneys	78.40%
7	SGLT2 inhibitors mode of action on insulin	6.50%
8	SGLT2 inhibitors effect on blood pressure and weight	11.29%
9	SGLT2 inhibitor effects on cardiovascular outcomes	83.87%
10	SGLT2 inhibitors effect in patients with chronic kidney disease	62.90%

Table 4 Prescribing and patient counselling

Question	Description	Correct response (%)
11	SGLT2 inhibitors method of administration	64.49%
12	Renal profile monitoring when taking SGLT2 inhibitors	7.48%
13	SGLT2 inhibitors effect on HbA1c levels	58.49%
14	Dapagliflozin dosing	22.43%
15	Empagliflozin dosing	19.81%
16	SGLT2 inhibitors effect in severely unwell hospitalized patients	18.69%
17	SGLT2 inhibitors administration prior to major surgical intervention	36.19%
18	Considering euglycaemic DKA in unwell patients who are taking SGLT2 inhibitors	82.24%
19	The need for counselling patients regarding the risk of euglycaemic DKA whilst taking SGLT2 inhibitors	80.95%
20	SGLT2 inhibitors prescription in patients with recurrent urinary tract infections	80.37%

Table 5 Adverse Effects

Question	Description	Correct response (%)
21	SGLT2 inhibitors in pregnancy	7.62%
22	SGLT2 inhibitors side effects	76.19%
23	Diuretic mechanism of SGLT2 inhibitors	76.19%
24	Orthostatic hypotension as an adverse effect of SGLT2 inhibitors in at risk patients	62.50%

Table 6 SGLT2 inhibitors and DKA

Question	Description	Correct response (%)
25	Likelihood of DKA in patients administering SGLT2 inhibitors	11.34%
26	Biochemical picture of DKA in patients administering SGLT2 inhibitors	6.25%
27	Risk of DKA in the context of SGLT1 inhibitor use in patients with a carbohydrate rich diet	28.13%
28	Insulin dosage changes and development of DKA in patients administering SGLT2 inhibitors	39.58%
29	Predisposing factors for DKA development in patients administering SGLT2 inhibitors	68.04%
30	Administration of SGLT2 inhibitors during DKA	4.12%
31	Recommencing SGLT2 inhibitor administration upon DKA resolution	19.59%
32	Pancreas insulin production as a risk factor for DKA	49.48%

Table 7 Interactions

Question	Description	Correct response (%)
33	Co-prescription SGLT2 inhibitors with diuretics	38.30%
34	Commencement of SGLT2 inhibitors in patient with Type 2 diabetes mellitus	59.57%
35	SGLT2 inhibitors hypoglycaemic effect in comparison to sulfonylureas	7.45%
36	SGLT2 inhibitors and renal impairment	41.94%
37	SGLT2 inhibitors effect on insulin induced weight gain	4.26%
38	Diuretic, antihypertensive and SGLT2 inhibitor co-prescribing	71.28%
39	Oral hypoglycaemic agents, insulin dosing and SGLT2 inhibitor co-prescribing	81.72%

Table 8 Specific SGLT2 inhibitors

Question	Description	Correct response (%)
40	Canagliflozin and lower limb amputations risk	26.64%
41	Eligibility criteria for empagliflozin via government formulary	57.30%
42	SGLT2 inhibitor entitlement requirements	4.44%

percentage correct was highest at only 51% correct response rate in the Licensing and Mode of Action subsection. For each subsection, participants had the option to answer True/False/I don't know and had the option to skip. With regards to skipped questions, a comparative figure of the average number of skipped questions per section is shown in [Figure 2](#). With respect to specific questions, the weakest recorded response rate was Question No. 11: "SGLT2 Inhibitors can be taken once daily ideally after the first meal", at 6% correct response rate. According to the summary of product characteristics, SGLT2 inhibitors are taken prior to the first meal. The question which generated the highest correct response rate was Question No. 9: "SGLT2 inhibitors have beneficial cardiovascular effects: decreasing heart failure hospitalization and reducing incidence of cardiovascular death", at 60% correct response rate.

DISCUSSION

To the best of the authors' knowledge, this study is the first of its kind to attempt evaluating clinicians' (specifically non-endocrinologists) understanding of SGLT2 inhibitors locally. SGLT2 inhibitors have only been introduced on the local hospital formulary relatively recently. The results show limited knowledge in all 7 seven domains of our questionnaire.

The mode of action of SGLT2 inhibitors and their beneficial effects seem to be known by the majority of participants. Knowledge in other domains is however notably lacking and needs addressal. There is a lack of awareness of the specific characteristics of these medications ranging from licensing details up to interactions with other medications. Of particular

clinical concern is the suboptimal response rate in the patient safety section.

Specific concerns arise when reviewing the results obtained from the section titled "SGLT2 Inhibitors and DKA". Unfortunately, the results indicate that there needs to be more awareness regarding the predisposing risk factors as well as the implications these medications have on the risk of diabetic ketoacidosis.

The design of the questionnaire was such that as the questions progressed, they became gradationally more specialized and specific as reflected in the incrementally increasing number of skipped and "I don't know" responses per subsection. This implies that, generally, a basic understanding of SGLT2 inhibitors' mode of action and the most common side effects can be assumed, however important in-depth knowledge as per the stipulated subsections is lacking. The low correct percentage response rate in the final section titled "Specific SGLT2 Inhibitors" was expected given this questionnaire did not involve specialist endocrinology consultants or trainees.

The fact that 5 out of 6 subsections scored a correct response rate of below 40% demonstrates the need to better equip and empower clinicians in Malta with knowledge on these medications. This is paramount, as these medications are now part of the treatment guidelines for both diabetes mellitus type 2 and congestive heart failure, both of which are increasingly prevalent in the Maltese population.

Limitations

The suboptimal participation rate is a limitation in this study. Henceforth care needs to be taken before generalizing the results of this study. The number of incorrect responses however still raise concern about the limited knowledge of SGLT2 inhibitors and the potential negative effects on patients, validating the need for the aforementioned recommendations. Question bias could pose as a possible weakness in this questionnaire as it was not tested for reliability. The questionnaire did not specifically cover genitourinary tract infections as an adverse effect of SGLT2 inhibitor use.

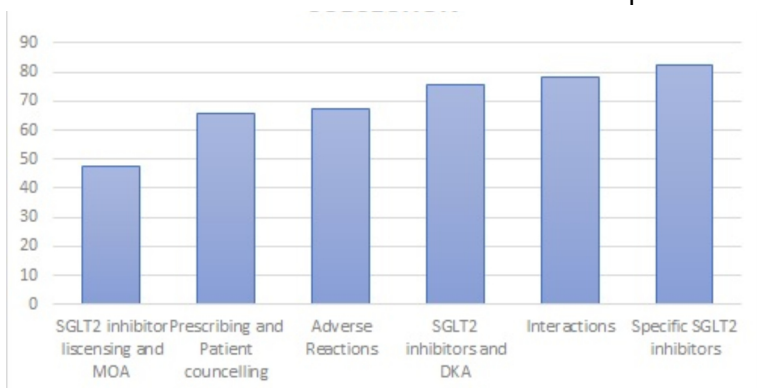


Figure 2 Average Skipped Questions per Subsection

RECOMMENDATIONS

In response to the results, the following recommendations are being put forward:

- To organize medical update meetings involving general practitioners as well as doctors in secondary care.
- To involve more clinical pharmacists in the wards.
- To create up-to-date clinical practice guidelines outlining diabetes sick day rules and medication modification guidance.

CONCLUSION

There is an important role for the use of SGLT2 inhibitors in the management of type 2 diabetes mellitus and chronic heart failure, and their use in these conditions is becoming increasingly prevalent. Thus, adequate knowledge on the specifics of this drug class is paramount. This questionnaire demonstrates that it is necessary to raise awareness on these medications, across all grades and specialties in both primary and secondary care.

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Parents suffering from depression, their experience engaging with school professionals

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Background: Schools are instrumental in supporting the wellbeing of children and adolescents, particularly when this occurs in partnership with families. When parents have mental health problems their children are at greater risk of developing internalising and externalising behaviours. The aim of this study was to acquire insights into barriers and facilitators to a successful parent-school relationship when parents suffer from depression.

Methods: This was a qualitative study applying Braun & Clarke's reflexive thematic analysis style. Data were gathered through individual semi-structured interviews and purposive sampling was used to recruit participants. Mental health professionals in Community Mental Health Clinics were asked to help in recruitment. Parents suffering from depression, having children aged 5-16, were invited to participate and six mothers came forward.

Results: The main themes identified to represent the experience of parents were, 'Children's needs prompt engagement', 'Ease of access matters', 'The value of being understood' and 'Understanding the silence and distancing'.

Conclusion: Findings showed that participants engaged with school professionals to address concerns related to their children. Parents recounted that they approached school professionals to share concerns about their children or responded to professionals who broached concerns. While an understanding attitude from these professionals encouraged parents to approach schools, blame and judgement led to withdrawal. It is recommended that engagement with parents is a core component in mental health literacy for educators. Discussion at an interagency level about the fear parents have of losing custody of their children is advised.

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In this study the term 'engagement' refers to the quality of the relationship between the school and home.^{1,2} Successful outcomes for children depend on the relationship between the child and parent or carer as well as the nature of interactions between the families and schools.³ The success of interventions with children and adolescents who have socio-emotional and behavioral difficulties is enhanced when school professionals collaborate with parents through consultation, psychoeducation, and support for vulnerable families.^{1,4-9}

Children of parents suffering from depression are at greater risk of developing internalising behaviours such as anxiety and depression and externalising behaviours such as conduct problems, than are children whose parents do not have depressive symptoms.¹⁰⁻¹⁵ While the correlation between mental health problems in parents and their offspring has been studied extensively, less is known about the perspectives of parents suffering from depression.

The study aimed to understand the lived experiences of parents with depression regarding their interactions with school professionals, exploring communication patterns, disclosure of diagnosis, valued professional attributes and school factors that promote or hinder family-school engagement.

MATERIALS AND METHODS

Approval for the study was granted on behalf of the Faculty Research Ethics Committee of the Faculty of Health Sciences of the University of Malta. A qualitative study method was used for its suitability to acquire understanding of experiences¹⁶ which could otherwise remain hidden.¹⁷ Braun & Clarke's reflexive thematic analysis (RTA) was chosen because of the methodological rigour that its six phases of analysis provide.¹⁸ The vulnerability of participants made conscientious reflectivity, a central feature of RTA, more crucial.

The researcher discussed themes with her supervisors during ongoing regular supervision. Clark and Braun describe themes as capturing multiple facets of a central organizing concept. They explain that subthemes are only used if they add strength to a story, analyzing in greater depth one aspect of a theme.¹⁸ This analysis was conducted at the level of themes, without other layers, but multi-faceted

manifestations were selected. These added meaning and depth to the theme but lacked sufficient data to constitute distinct sub-themes.

Purposive sampling was used to ensure participants provided relevant and ample data.¹⁹ The researcher selected Community Mental Health Clinics for geographical representativeness. Nurses in Charge were ideally positioned to present the information letters to interested patients, being familiar with medical histories without being their primary clinicians, thus reducing patients' perceived obligation to participate. These clinics were chosen over private practitioners for the above reasons. Target sample size was ten to twenty¹⁰ preferring the lower range due to time constraints. Recruitment occurred from October 2021 to March 2022.

Inclusion criteria

Participants were required to have children aged 5-16 to reflect current experiences, a stable diagnosis of Major Depressive Disorder, and at least six-monthly mental health appointments. This choice was made on the six-month criteria of stability mentioned in other studies.²⁰⁻²² Nurses in Charge at Community Mental Health Clinics informed eligible patients about the study and handed them information letters, while maintaining voluntary participation. Interested participants then communicated directly with the researcher to provide informed consent or withdraw. Both fathers and mothers could participate.

Exclusion criteria

The recruitment method excluded parents not engaged in mental health services. Ethical considerations regarding their potential vulnerability outweighed the benefits of broader study scope. Parents whose children attended the researcher's workplace schools, plus friends, neighbours, and colleagues were also excluded to prevent observation bias and dual role conflicts.

Figure 1 shows the recruitment process and decisions at each stage. The researcher used face-to-face contact with nurses in charge at the first five community mental health clinics, then emails/calls for subsequent recruitment. Despite these efforts, the initial five clinics yielded the same number of participants as all remaining Malta clinics combined

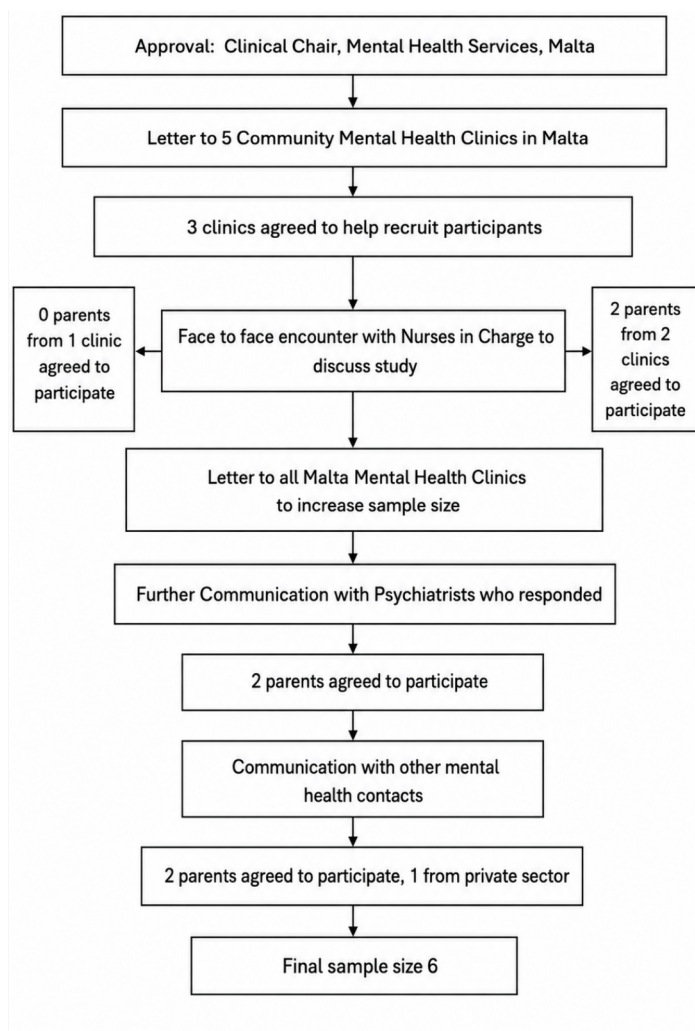


Figure 1 Flow / design of study

at stage two. In the last stage, two participants were recruited through two medical professionals, one working in the private sector, matching the recruitment of two participants in each of the previous stages.

Data gathering

Data were gathered through individual semi-structured interviews. While open-ended questions could expose vulnerable participants to risk, they potentially empowered parents with depression to share experiences that needed to be heard.^{16,23-25} Safety was increased using an interview guide based on research guidelines for composing interview questions.²⁶ A distress protocol²⁴ was formulated, allowing participants to skip questions and ensuring access to psychological support from Richmond Foundation if needed following the interview.

Analysis

Table 1 presents the phases of analysis guided by Braun and Clark's six phases of RTA.^{16,18}

Table 1 Six Phases of Analysis

Phase 1 familiarisation with data	Immersion into data starting from interview and transcription processes carried out by researcher. Rereading of transcriptions and annotation of initial comments and reflections.
Phase 2 Coding	Identification of potentially interesting segments and application of code label to them. No thoughts about themes at this stage.
Phase 3 Generating initial themes	Identification of shared patterned meaning across dataset. Manual compilation of clusters of codes that seemed to share a common concept relevant to the research question.
Phase 4 Developing and reviewing themes	Initial themes checked against coded extracts and full dataset. Central organising concept of each theme and relationship between all themes were reviewed with research question in mind. Themes narrowed down to four. Process of 'letting go' of themes required.
Phase 5 refining, defining and naming themes	Each theme checked to ensure it had a clear boundary while having a core concept related to the other themes. Its relevance to the research question was re-evaluated. A readiness to 'let go' of themes was still important.
Phase 6 Writing up	Inductive and semantic approach to analysis – focus on what presented itself rather than what was hidden, staying close to the experiences recounted by participants. Separate write up of findings and analysis drawn up for focus and clarity.

RESULTS

Although fathers could participate, all participants were women. Demographic data was not collected to protect participant identity on a small island. Some participants disclosed additional difficulties including physical health conditions and lack of family support. Professional contact ranged from solely mental health professionals to multiple specialists.

Following analysis, the researcher regarded four themes as encompassing the most significant findings: 'Children's needs prompt engagement,' 'Ease of access to school professionals matters,' 'The value of being understood,' and 'Understanding silence and distancing'. **Table 2** presents the themes and their manifestations.

Table 2 Themes and their manifestations

Themes	Multi-faceted manifestations of themes
1. Children's needs prompt engagement	Children are a priority Awareness of children's needs Hand in hand for the good of the child Feedback from school deeply appreciated Open parents open children
2. Ease of access matters	Online vs face to face communication Clarity of roles helpful Difficulty of access a deterrent Key professionals as a bridge
3. The value of being understood	Releasing tension Tailoring response to needs Taking time to understand
4. Understanding silence and distancing	No need therefore no disclosure The power of blame Fear of losing custody Discouraging format Non-inclusive language

Children's needs prompt engagement

One aspect that this study focused on was the nature of communication between parents and school professionals. Their children were a priority for participants. Participant 1 explained: "The children were always my priority [...]if, for example, they needed to do their homework, and I couldn't deal with it, somehow I had to find the strength to do it." Hence, parents approached school professionals to address concerns about their children's socio-emotional or academic well-being. Participant 2 approached a school professional when she suspected her daughter was making potentially troublesome decisions. Participant 3 came forward when special exam arrangements for her child were not implemented.

The study explored valued qualities in school professionals. Participants appreciated collaborative approaches to addressing concerns. Participant 4 explained, "I prefer that we sit around a table with the teacher and Head and see what the problem is." Participant 3 confirmed "We move on and work together as a team."

Parents appreciated school professionals who voiced concerns about their children. Participant 2 said, "The school had drawn my attention on Parents' Day [...] I was really pleased.". Participant 3 highlighted the importance of honesty from professionals: "I would like the teacher [...] to be open with me [...]. I will be the same with them."

The value of being understood

An understanding attitude was another key quality parents valued. Participant 1 describes the impact this had on her: "Mental health, it's like you have a stretched elastic band, if you pull it way too much, it explodes, and that's what I was feeling, like I'm stretched way too much [...] so the fact that they understood me, they helped this elastic band to loosen.". Participant 5 confirmed the value of "kindness and understanding because a depressed person can get offended, or cry. You might say a word, "You always bring your son late!" That's going to [be devastating]."

Understanding and sensitivity helps avoid a one size fits all approach to rules. Participant 4 explained that if for a parent without mental health difficulties it is

normal to see their son or daughter enter school crying, “for other parents this is an experience that becomes a trauma with time.”

Another important quality identified was professionals investing time to engage with parents. Participant 3 shared “Many people see me and they judge [...] but you need to spend time with a person [...]; the true person you are comes out.” Participant 2 confirmed the importance of investing time to build trust: “You need to lead him to the point when he tells you, ‘Yes now is the moment for me to seek help.’”

Understanding silence and distancing

The study explored whether parents disclosed their depression to school professionals. Findings suggest parents disclosed their mental health difficulty only when it impacted their children at school. Participant 2 explained “No, and not because I did not want to show, because I believe I would have. With the help I received, I started to control it.” Participant 1 recalled divulging her mental health problem when school professionals contacted her at the end of the scholastic year to return her child's schoolbooks. This was impossible as she was experiencing a difficult phase. Her openness resulted in understanding and support.

Findings confirmed the effects of blaming and judging on parents' disclosure of mental health problems. Participant 4, having experienced blame from a school professional, relates: “She did not see the situation as a whole, she just labelled [...] I felt like a small dot [...] I thought it was a good thing to speak up, but nowadays I shall not open up anymore.” When asked what advice she would give parents approaching schools about their children's needs, she advised, “if you need to speak up, you have to approach them, for the good of the children, but you need to be more careful.”

The study revealed that fear of being blamed and judged prevented parents from disclosing their mental health problems, even without previous negative experiences. This is illustrated by Participant 5: “I didn't speak to anyone at the school for a while. [...] Me thinking that they're feeling I'm not a good mother.”

Participant 1 related “I think the greatest deterrent against opening up with schools is always fear [...]

that in some way, they are going to take their children away [...] what if they send someone over [...] will they see that the children have all they need emotionally or will they say, “because her room is in a mess or the floor needs to be swept.”

Ease of access matters

Participants appreciated easy access to school professionals, with different preferences. Participant 6, for example, praised online communication. “These services have become so efficient and [...] God forbid they will be stopped [...]because, we are well served.” Other participants, like Participant 4, preferred face-to-face communication: “Face-to-face [...]Understanding, how one is speaking, how the other person is reacting to me.”. Another preference was using Maltese rather than English in meetings, as expressed by Participant 2.

The study revealed other potential barriers to engagement. Participant 1 explained: “In a certain school, I often had a problem to get through by phone, so it was a bit of a deterrent, a person might then think twice, she would start saying, ‘Shall I say this or shall I let it pass once they're not answering?’” Confusion about which service provider to contact also left matters unresolved. Participant 3 expressed how she had not communicated about an issue concerning her child “because I was telling myself, “Shall I discuss with the psychiatrist or with the school?”. A key finding was the value of an assigned professional in schools for parent communication.

This study provided insights into the lived experiences of parents with depression who engage with schools and seek partnership with school professionals. While positive experiences encouraged collaborative relationships, negative experiences sometimes led to distrust and disengagement. Therefore, allocating appropriate resources and time to engage with these parents is crucial.

DISCUSSION

Research on engagement with parents with mental health problems focuses mostly on home visiting²⁷⁻²⁸ and parenting programmes²⁹⁻³⁰ rather than day to day interactions of parents with school professionals. Moreover, most studies focus on the impact of

parental mental health problems on child outcomes.^{11-12,31-33} The subject is approached from a risk perspective, leaving parents' experiences with school professionals understudied. Interview data provided valuable insights into this experience. Findings reflect mothers' opinions since no fathers participated, though their participation would have provided interesting insights into engagement facilitators and barriers.

While aspects of engagement mentioned by participants would be valued by all parents, participants with mental health problems mentioned them specifically and spontaneously. School professionals may benefit from keeping these findings in mind when engaging with parents with mental health challenges.

Findings around "Children's needs prompt engagement" suggest that focusing on the child's needs is the best approach when communicating with parents with depression. This confirms findings from a home visiting study where families were more likely to remain in programmes when the focus was on child development and parent-child interaction rather than the parent or family. A family/parent case management approach was negatively associated with visit completion and retention.

This study's insights into collaboration between parents and school professionals confirm earlier findings. Previous studies on parent engagement³⁴⁻³⁵ including parents with post-natal depression receiving psychological therapy³⁶, support the value of cooperation between parents and professionals.

Participants' perspectives about feedback from school professionals reaffirm findings from a study on psychological therapy for mothers with post-natal depression, where many mothers would have appreciated parenting feedback as they were sometimes uncertain whether they were "doing a good job."³⁶

This study's findings about the value parents attach to understanding corroborates findings in a previous study on women's experiences accessing perinatal and infant mental health services.³⁷ Furthermore, results about understanding and sensitivity leading to a more flexible approach to rules supports another study underlining the need for schools to adapt to parents' particular needs.³⁵ As this can be time

consuming, it is important to allocate differing and sometimes increased time and resources to vulnerable parents, as affirmed in an earlier study.³⁸

This finding links to the two-generation approach that responds to both parents' and children's needs.³⁹ It proposes that prevention and early intervention with depressed parents be carried out in settings engaging both children and parents, such as childcare centers and school-based programmes. This could help vulnerable parents who have difficulty transitioning between services like health care, mental health, and community-based programmes. The potential of two-generational programmes⁴⁰ merits discussion among mental health professionals working with students and parents.

Some of the participants in this study alluded to the idea of being seen as a bad mother, resonating with findings from research on mothers at a mental health service⁴¹ where mothers experienced feeling they were a bad mother. Consequently, they were cautious about whether and how much to be open with staff.

The other fear leading to silence - having their children taken from them - echoes findings in earlier studies on mothers with mental health problems in mental health services and educational settings.⁴¹⁻⁴³ This knowledge has serious implications, as families who might benefit from professional support may not reach out.

The 2020 legislation on mandatory reporting of suspicions of child abuse in Malta has put an onus on professionals working with children and adults⁴⁴. The fear that parents with depression have of losing custody of their children could be heightened by premature flagging of suspicions to child protection services. Hence, school professionals, child protection services and mental health agencies need to discuss mandatory reporting, as confirmed in another study.⁴³

This study's findings on communication preferences (online versus face-to-face and mother tongue use) could be significant. The importance of addressing language barriers to improve parent engagement has been confirmed in several studies.^{35,45-47} Potential communication barriers could be avoided if professionals invest time early in the engagement process to discuss parents' communication preferences, with other studies confirming the

importance of addressing barriers early in the relationship.⁴⁸⁻⁴⁹ Furthermore, having an assigned professional could help facilitate communication between parents and school professionals, and between school professionals and external agencies working with the family. Other studies affirm the importance of parents knowing that someone at school was committed to their needs.³⁴

Strengths And Limitations

As far as the researcher is aware, this was the first study to focus on the daily interactions between parents suffering from depression and school professionals. The study offered parents an opportunity to share their experiences of engagement, with the resultant body of knowledge generated by parents as experts of their own experience. Since all parents were suffering from depression, the study contributed to understanding this particular group. At the same time, the group was heterogeneous, participants hailed from different socio-economic backgrounds with varied family structures and different experiences with school professionals. This provided a broader understanding of the research topic while semi-structured interviews facilitated in depth exploration of the research question.

Another strength of this study was the methodological rigour of data analysis, guided by RTA. This, together with the researcher's reflexivity and discussion of findings with supervisors and mentors throughout the study, contributed to the results being as close as possible to the experiences related by participants.

The study has several limitations, including the novice researcher's inexperience with reflexive thematic analysis. All themes were discussed with the researcher's supervisors during ongoing regular supervision and discussions helped validate interpretations and findings. Nevertheless, more experience applying the six stages of analysis could have enhanced reliability of findings.

The number of participants fell below the optimum minimum sample size recommended by Braun & Clarke.¹⁶ Additional participants would have helped to consolidate the results or provide new findings. Several reasons could have led to the small sample size, including Community Mental Health Clinics

being under pressure due to a surge in mental health problems during the Covid Pandemic. Mental health professionals also mentioned that the six month criterion` restricted the number of potential participants. In future studies, this might need to be discussed with mental health professionals. The length of the information letter might also have been a deterrent. Following European Commission recommendations on informed consent for vulnerable adults⁵⁰ the researcher departed from the traditional format. This resulted in lengthy forms. Finally, the low sample size could also confirm the stigma that still exists around mental health problems.

A further limitation is that the voice of parents who are silent about their mental health problem is absent. Future research could address this gap, perhaps through quantitative methods such as questionnaires. As for the participants who did come forward, it is possible that they withheld some information knowing that the study could be made public. Social desirability might also have impacted the data provided.

Recommendations

Recommendations point towards increased professional knowledge on engagement with parents who have mental health problems, decisions at school and policy level and interagency collaboration.

Education for school professionals could be enhanced by addressing the relational aspect of engagement with parents, particularly those with mental health problems. This would lead to adopting practices to promote better engagement. These include addressing barriers early in the parent-school relationship and, when multiple professionals are involved, clearly explaining different roles and services to parents, supported by written information and contact details.

Judging from the insights that research participants such as Participant 6 contributed, professional education for mental health literacy could be enriched by input from parents who suffer from depression. This was recommended in a report from a World Health Organization (WHO) European Ministerial Conference⁵¹ and encouraged in a later study.²²

The presence of a key professional in schools to support parents with mental health problems could prove valuable. This requires discussions at a school and policy level to identify and provide trained professionals. Discussion on the two-generation approach is also highly encouraged between mental health professionals supporting children and those supporting parents, both within and outside schools.

Finally, there appears to be a significant need for discussion on parents' fear of losing custody of their children. School professionals, especially those in psychosocial roles, Child Protection Services and mental health agencies supporting families could discuss ways of mitigating this fear. Such interventions would need to be in line with the Mandatory Reporting Guidelines for Professionals.⁴⁴ Moreover, clear communication to parents about school policies regarding safeguarding of children is also pivotal to addressing this barrier.

All families can benefit from support from professionals. However, the needs of families with parental mental health problems are particular and merit specific decisions and interventions.

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SUMMARY BOX

What is already known:

- Trusting, collaborative relationships among teachers, parents and the community are the key principle in schools that succeed in engaging families.
- Parents with depression fear being seen as a bad mother and losing custody of their children; this can keep them from seeking treatment or accepting help.
- Parents with depression appreciate receiving feedback from mental health professionals about their parenting to ascertain whether they are doing a good job.

What are the potential new findings:

- Parents suffering from depression wish to work in partnership with schools for the good of their children. They value having a professional in school who is committed to the needs of the family. This is especially true when their health and home circumstances are more complex.
- Parents could divulge their mental health problem, albeit cautiously, for the good of their children.
- An understanding disposition from school professionals helps mitigate anxiety in parents suffering from depression.
- Parents have different preferences with regards to the medium for communicating with school professionals. Respecting this could facilitate engagement.

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Antenatal Women's Knowledge and Attitudes respecting the practice of Ultrasonography in Saudi Arabia

Muhannad Faleh Alanazi

Introduction: Widely acknowledged as a crucial tool for antenatal care follow-up, ultrasound diagnoses early pregnancy problems and lowers maternal mortality. The purpose of this study was to ascertain the pregnant women's attitudes, knowledge, and related factors with regard to the safe use of ultrasonography in hospital research.

Methods: This hospital-based cross-sectional study was conducted from January 2023 to September 2023 at the Obstetrics department of Maternity and Children Hospital (MCH), enrolling 304 pregnant women who came for antenatal care and referred to Radiology department for routine follow-up. 15 consecutive volunteers were given a pretested questionnaire both before and after the ultrasonography examination. Data analysis by IBM SPSS 22.0. The quantitative variable's percentage, frequency, and standard deviation calculations. Bivariate and multivariate logistic regression was used to identify factors associated with knowledge and attitude. Chi-square test with a p-value of less than 0.05 for significance.

Results: A total 304 pregnant women participated by questionnaires and face to face interview in this study. The age less than 25 years found 41.1% higher compared to others age groups. Pregnant women who agreed to safe use of antenatal ultrasonography that noticed fairly good of knowledge and a positive attitude at 61.6% and 65.5%, respectively. Multivariate logistic regression of knowledge and attitudes revealed statistically significant relationships age between 26 and 30 and over 30 years (AOR 0.94, 95% CI, (0.44–1.66), (AOR 1.35, 95% CI, (0.78–1.77), educational background (AOR 0.53 95% CI, 0.12-2.36), occupation (AOR 0.186, 95% CI, 0.053-0.67), and location of residence in cities (AOR 0.151 95% CI, 0.033-0.44) and attitudes (AOR 0.63 95% CI, 0.78-2.68), educational background (AOR 0.54 95% CI, 0.11-2.17), occupation (AOR 0.181, 95% CI, 0.049-0.66), and location of residence in cities (AOR 0.153, 95% CI, 0.036-0.55) respectively.

Conclusion: According to this study, pregnant women have a generally good magnitude of knowledge and attitude regarding ultrasonography. Enhancing pregnant women's knowledge can be achieved by health workers in antenatal care facilities teaching them about the efficacy of ultrasonography.

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Prof. Donald brought ultrasound technology to the obstetrics department for the first time in 1958. Worldwide results for antenatal follow-up and pregnancy outcomes have shown that routine use of ultrasonography during pregnancy is significantly beneficial.¹ In the last several years, antenatal follow-up ultrasound has been regarded as a standard technique or approach for evaluating the pregnant mother and foetus. According to a previous study, all expectant mothers viewed ultrasound as a useful diagnostic radiological tool that might aid in the early detection of difficulties.² However, ultrasound is a very valuable diagnostic tool for pregnant women. This tool is frequently used to assess various anatomical characteristics of the foetus, including gestational age, femur length, head circumference, abdominal circumference, and transverse length of the cerebellum.³ Several countries provide prenatal screening for foetal structural abnormalities and aneuploidies like Down syndrome as part of standard prenatal care.⁴ In order to determine gestational age (GA), assess placental placement, identify single or multiple pregnancies, increase foetal abnormality detection, and improve pregnancy outcomes, the World Health Organization (WHO) recommends that all pregnant women have one ultrasound scan before 24 weeks of pregnancy.⁵ While all expectant women should undergo two US scans in the first and second trimesters, according to the International Federation of Gynaecology and Obstetrics (FIGO), to lower the risk of adverse perinatal outcomes.⁶ Proper antenatal care (ANC), in which the US plays a significant role, can prevent the pregnancy-related complications that plague women in underdeveloped nations.^{7,8} Considering that women's decisions to undertake obstetric ultrasound tests are influenced by their attitude and amount of knowledge regarding pregnancy procedures. Pregnancy problems, however, might arise from a lack of knowledge of and understanding of the role of ultrasonography during pregnancy. Ultrasonography, on the other hand, can determine the date of delivery and discover foetal problems, health, and gestational weeks early. As a result, it's critical that all expectant mothers understand the benefits of using ultrasound. Numerous studies have demonstrated the significance of women's attitudes toward prenatal ultrasound and how it impacts their mental health; therefore, more research in this area is necessary.

Besides, determined that pregnant women undergoing antenatal ultrasounds have a variety of expectations, the majority of which centre around learning the sex of the pregnancy, viability, anticipated due date, and assurance that the baby is healthy.⁹ Nevertheless, research findings on the safe use of ultrasound during pregnancy were scant in Saudi Arabia, and no studies were conducted to assess attitudes and understanding in this Aljouf area. Therefore, the purpose of this study was to evaluate pregnant women's attitudes and knowledge regarding the safe use of ultrasonography.

MATERIAL AND METHODS

Design, Area and duration of study

This cross-sectional study was carried out from January 2023 to September 2023 at the Obstetrics department of the Maternity and Children Hospital (MCH) who were referred to the Radiology department for their ultrasonography follow-up. The MCH located at the Sakaka, Aljouf Saudi Arabia. The Sakaka has one Maternity and Children Hospital. At the Maternity and Children hospital (MCH), the pregnant women referred from surrounding cities and primary health care services including antenatal care (ANC) follow-up, delivery facilities and as well as postpartum care. This research approved by IRB of research with project No 2023-89. We have selected the pregnant women who came at OPD for antenatal care. A convenient and randomly method for collecting the participants who were came for ANC and consultants referred them to ultrasonography for routing follow-up. All recruited individuals were gathered from the Radiology department as well as the Obstetrics OPD.

Participants of study

The source of participants for this research study was the attendance at MCH for antenatal care follow-up of all pregnant mothers. We included the three hundred four pregnant women by convenience sampling who were available during data collection for this study from January 2023 to September 2023.

Method of Sampling and Estimating Sample Size

The Cochran formula was used to determine a minimum sample size of 304, giving this study a

power of 80% at a 95% level of significance and an alpha level of 0.05. For events such as non-response or recording error, an attrition value of 10% was permitted.

Sampling methods

Convenience sampling method applied for collection of participants who came in this hospital for their ANC between our research period.

Gathering of data

Face-to-face interviews were conducted using semi-structured, pretested questionnaires and posttest that recorded interviewee information or data. The

questionnaires were initially written in English, then translated into Arabic as a native language before being distributed to the participants. The questionnaires were designed with the participants' demographics, obstetrical history, awareness of and use of ultrasound for ANC, and mother attitudes and knowledge about ultrasonography.

Data quality

Five percent ($n = 15$) of the 304 participants took the pretest at the MCH. During the pretest period, the interview questions were evaluated for their readability, comprehensiveness, and simplicity. Based on the pretest results, adjustments and modifications were made.

Data analysis

All information was initially gathered on a data collection sheet, which was subsequently moved to an Excel spreadsheet in 2014 for statistical analysis using IBM SPSS 22.0. The quantitative variable's percentage, frequency, and standard deviation calculations. The crude relationship between the utilization of prenatal ultrasounds and explanatory variables was found using logistic regression. An odds ratio with a 95% confidence interval was used to assess the strength of the link. The test of significance for proportions was the Chi-square test. Less than 0.05 for the two-tailed P value was deemed significant.

Table 1 Demographic criteria of all participants

Factors	Frequency (%)	Percentage %
Age (years)		
Less than 25	125	41.1
Between 26-30	102	33.5
Over 30	77	25.3
Education background		
Primary school	66	21.7
Secondary school	109	35.8
Above secondary school	129	42.4
Occupation		
House wife	71	23.3
Students	17	5.4
Government job	50	16.4
School teacher	37	12.1
Others	129	42.4
Financial situation		
Middle class	34	11.1
Upper middle class	147	48.3
High class	123	40.4
Residence		
Cities	185	60.8
Out of cities	151	49.6

RESULTS

Three hundred four pregnant women were part of the current study, having attended MCH for antenatal follow-up. For their ultrasonography, all participants were referred to the Radiology department. Our study used questionnaires to collect data and present them. The demographic parameters include age, which is broken down into three categories: under 25 years old (41.1%), 26 to 30 years old (33.5%), and above 30 years old (77%). The mother's educational background is primary, secondary, and upper secondary school. 21.7%, 35.8%, and 42.4%, in that order. Whereas [Table 1](#) showed occupation, financial situation, and place of residence.

Of all individuals, 21.3% and 78.6%, respectively, were found to be primigravida and multigravida. In

the current study, there were 5.5% and 15.4% of birth defects and abortion histories, respectively. In this study, all antenatal pregnant women in variable trimesters—40.7% in the first, 43.7% in the second, and 15.4% in the third—participated. While 7.2% of minor issues were discovered, **Table 2** displays all of the facts.

Table 3 asked participants a series of questions about safety ultrasound procedures during pregnancy, to which all participants provided answers. At a value of $p < 0.05$, the majority of participants demonstrated good knowledge that was statistically significant. "Are you aware that US can decide on the delivery date?" is one such query. possess no discernible differences.

Factors related to obstetrical ultrasound knowledge of pregnant women

Among the study participants, the mother's age, educational background, occupation, and place of residence were appropriate for both bivariate and multivariate analysis. Multivariate logistic regression in the current study revealed statistically significant relationships between age between 26 and 30 and over 30 years (AOR 0.94, 95% CI, (0.44–1.66), (AOR 1.35, 95% CI, (0.78–1.77), educational background such as secondary and above seconder school (AOR 0.54, 95% CI, 0.11–2.17), (AOR 0.44, 95% CI, 0.021–

Table 2 *Obstetrics history of participants among study*

Factors	Frequency	Percentage
Gravida		
Multi	239	78.6
Primi	65	21.3
History of abortion		
No	257	84.5
Yes	47	15.4
Trimester of current pregnancy		
First (less than 3 months)	124	40.7
Second (between 3 to 6 months)	133	43.7
Third (above 6 months)	47	15.4
History of delivery approach		
Spontaneous vaginal delivery (SVD)	212	69.7
Caesarean section (CS)	92	30.2
History of birth defect		
Yes	17	5.5
No	287	94.4
Minor ailment of recent pregnancy		
Yes	22	7.2
No	282	92.7

Table 3 *knowledge of participants regarding use of Ultrasonography during pregnancy*

Items	Responses total number =304	
	Agree	Disagree
Is ultrasound a crucial part of prenatal care?	248 (81.6)	56 (18.4)
Does ultrasonography (US) pose a risk to your health or the health of your foetus?	19 (6.3)	285 (93.7)
Are you aware that the US can ascertain the pregnancy week?	235 (77.3)	69 (22.7)
Are you aware that US can decide on the delivery date?	182 (59.8)	122 (40.2)
Can foetal well-being be assessed with ultrasonography?	232 (76.3)	72 (23.7)
Is the foetal anomaly detectable by ultrasonography?	219 (72)	85 (28)
Can US aid in delivery management?	153 (50.3)	151 (49.7)
Are you aware that the US evaluates the amniotic fluid?	209 (68.8)	95 (31.2)
Good knowledge 61.6%		
Poor knowledge 38.4%		

Table 4 Bivariate and multivariate assessment of variables related to pregnant mothers' knowledge about obstetrical ultrasonography

Factors	Condition of knowledge		COR (95% CI)	AOR (95% CI)	P value
	Good	Poor			
	Age				
Less than 25	17	24	1		
Between 26-30	121	63	1.39 (1.168–2.018)	0.94 (0.44–1.66)	0.03
Over 30	47	32	2.08 (1.679–3.787)	1.35 (0.78–1.77)	0.01
Education back ground					
Primary school	47	70	1		
Secondary school	67	17	1.89(.68-2.44)	0.53(0.12-2.36)	0.02
Above secondary school	87	16	1.63(0.42-1.82)	0.32(.038-2.58)	0.01
Occupation					
House wife	91	69	1		
Students	12	7	.52(.28-.96)	0.52(0.16-1.73)	0.29
Government job	50	9	1.71(0.92-3.23)	0.186(0.053-0.67)	0.01
School teacher	21	29	.41(.11-1.34)	0.000(0.000)	0.998
Others	6	10	2.27 (1.65–4.34)	1.63 (0.35–1.02)	0.266
Residence					
Out of cities	42	82	1		
cities	144	36	1.76(0.66-3.19)	0.151(0.033-0.44)	0.01

2.46), occupation as Government job (AOR 0.181, 95% CI, 0.049-0.66), school teacher (AOR 1.201, 95% CI, .678- 2.177) and location of residence in cities (AOR 0.151 95% CI, 0.033-0.44) all data represented in [Table 4](#).

Attitude towards Ultrasonography

Every participant in the current study demonstrated a positive attitude toward the safe and other important aspects of using ultrasonography while pregnant. Although there were some negative statements, 37.2% and 21.3% of respondents thought that the ultrasonography process was painful and that it was a cause of cancer, respectively ([Table 5](#)).

Factors related to obstetrical ultrasound attitude of pregnant women

The Bivariate and multivariate assessment were performed and significant positive responded comparatively more than negative. Their noteworthy attitude toward age, educational background, and location was revealed by the logistic regression as far as (AOR 0.63 95% CI, 0.78-2.68), (AOR 1.02,95% CI, 0.86–3.25), educational background (AOR 0.54 95% CI, 0.11-2.17), (AOR 0.44 ,95% CI, 0. .021-2.46), occupation (AOR 0.181,95% CI, 0.049-0.66), (AOR 1.201,95% CI, 0.678- 2.177), and location of residence in cities (AOR 0.153, 95% CI, 0.036-0.55) respectively ([Table 6](#)).

Table 5 Attitudes of participants regarding use of Ultrasonography during pregnancy

Variables	Responses total number =304(%)	
	Agree	Disagree
Is antenatal ultrasonography safe to use when pregnant?	269(88.5)	35 (11.5)
Can an ultrasound scan result in cancer?	65 (21.3)	239 (78.6)
Do you think getting an ultrasound painful?	113 (37.2)	191 (62.8)
Do you believe that foetal sex can be determined using ultrasound?	245(80.6)	59 (19.4)
Are you aware that routine ultrasound scans can be provided?	234 (77)	70 (23)
Do you know that Ultrasound finding is more accurate.	269 (88.5)	35 (11.5)
Positive attitude ($\geq 50\%$): 65.5%		
Negative attitude ($< 50\%$): 34.5%		

Table 6 Bivariate and multivariate assessment of variables related to pregnant mothers' knowledge about obstetrical ultrasonography

Factors	Condition of attitude		COR (95% CI)	AOR (95% CI)	P value
	Positive	Negative			
	Age				
Less than 25	56	30	1	1	
Between 26-30	89	33	1.22 (1.462–1.249)	.63 (0.78–2.68)	0.01
Over 30	69	27	1.86 (1.342–2.47)	1.02 (0.86–3.25)	0.03
	Education back ground				
Primary school	50	67	1		
Secondary school	71	13	1.78(0.50-2.12)	0.54(0.11-2.17)	0.03
Above secondary school	93	10	1.83(0.45-1.91)	0.44 (0.021-2.46)	0.01
	Occupation				
House wife	100	60	1		
Students	15	4	0.39(0.122-.89)	1.19(0.29-4.98)	0.87
Government job	52	7	1.69(0.89-3.21)	0.181(0.049-0.66)	0.01
School teacher	30	20	1.623(1.121–2.572)	1.201(0.678-2.177)	0.03
Others	7	9	2.31 (1.63–4.39)	0.64 (0.37–1.05)	0.41
	Residence				
Out of cities	38	86	1	1	
cities	155	25	1.26(0.68-3.21)	0.153(0.036-0.55)	0.02

As far as we are aware, the Aljouf area was the site of our initial investigation; there are no published statistics on this field there. Three hundred four pregnant women in total voluntarily participated in this study, and all of them answered the questionnaire. For their antenatal imaging follow-up, we enrolled pregnant women who were referred by the obstetrics department to the Radiology department. The chosen questions were designed so short and easy to answer that pregnant women with any kind of educational level may do so. Nonetheless, the majority of respondents in this study were between the ages of 26 and 30, which is the right age to become pregnant, according to earlier research that revealed similar data.¹⁰⁻¹² According to earlier research, the majority of pregnancy-related issues, including chromosomal defects, preterm or premature birth, and foetal abnormalities, develop after the age of 35.¹³ In addition, the study's multigravida individuals had a response rate that was significantly higher than that of primiparous. In the current study, about 60.8% of the pregnant women are from cities; as a result, they have access to more information than those who live outside of cities and have similar reports regarding their place of residence.¹⁴ The purposes, indications, and limitations of ultrasound were far better understood by patients with college degrees. As to the recommendations of the American Institute of Ultrasound in Medicine, ultrasonography is a safe and appropriate diagnostic tool during pregnancy.¹⁵

Knowledge of Antenatal Ultrasonography

The current study's findings showed that 61.6% of participants had strong knowledge, which was almost identical to what was observed in the other study.^{6,16,8} These findings would suggest that when they visited the obstetrics department for antenatal care, they learned impotency of ultrasonography from medical professionals there. Additionally, those multigravida pregnant women who reside in Sakaka and have access to MCH frequently do so because they have a strong understanding of ultrasonography from a previous pregnancy. A total 8 question selected for knowledge and 84.9% of pregnant women agreed to know that ultrasonography (US) is important and safe investigation during pregnancy.

While 76.3%, 72% and 77.3%, pregnant women believe that US detected the foetal wellbeing, foetal defect and week of gestation respectively. The primary reason for this high proportion of knowledge is because ultrasonography is now widely conducted in numerous countries and is routinely utilized as a component of antenatal (ANC) investigation in addition to other investigations. After learning the purpose of amniotic fluid in detail, 68.8% of participants in the current study were aware of it. According to a previous study, having a solid understanding of safety ultrasonography is crucial for identifying and managing pregnancy issues early on.¹⁷ Nonetheless, it is essential that medical practitioners inform pregnant women about the safety of ultrasound during ANC.

Attitudes towards Antenatal Ultrasonography

Antenatal ultrasonography scans were generally viewed positive by 65.5% of participants. This positive rate is attributable to ANC services provided by medical personnel. Therefore, the majority of participants learn about ultrasonography scans by health providers from their initial appointment with the ANC. Furthermore, in the present study, the participants exhibited 88.5% and 88.5% positive attitudes on the safety of ultrasound during pregnancy, as well as knowledge regarding foetal sex determination, which in turn influences the respect for ultrasound during pregnancy. Nevertheless, comparable studies described in a different study.¹⁸⁻²⁰ Moreover, 78.7% of pregnant women had confidence in safe ultrasonography.²¹ Although 21.3% of participants stated that ultrasonography causes cancer (Table 5), this concern was not well-represented due to low educational background. In contrast to other studies such as Nigeria, Jeddah and India, the attitude level in the current study is thought to be lower than 73.1% ,78.9% and 88%.²²⁻²⁴

Factors associated with knowledge regarding used antenatal ultrasonography

The educational standing of pregnant women has a major impact on their knowledge; women who have completed secondary school or higher are more likely to have good knowledge than those who have not. Comparable results were found in research done in other nations.^{23,25,26} One possible explanation for this could be that pregnant women who have higher

educational statuses may also be more exposed to information. Living in a city is linked to having better ultrasound knowledge than living outside of one. This suggests that a lack of facilities stems from a lack of educational background, while comparable results were found in another study.^{25,26}

Factors associated with attitude regarding used antenatal ultrasonography

The status of education, age, and city of residency all had an impact on the pregnant women's attitudes of the safe use of ultrasonography in the current study. Evidence from earlier research shows that education level is crucial for obtaining knowledge about the safe use of ultrasonography in pregnant women.²² Current study, it is known that people working for the government had an upbeat attitude than others, however a similar finding was made in another study.²³ Since its inception in clinical care, obstetric ultrasound has become a major part of obstetrics, and there is no question that the benefits of this method have improved pregnancy outcomes. Therefore, in order to improve the management of pregnancy problems and ensure improved pregnancy outcomes, all pregnant women should undergo an ANC ultrasonography scan. A few limitations apply to this study: first, the research follow-up period was too short; second, because this study focused on pregnant women from a single hospital, the results could not be applied to the total community of pregnant women. We hope to conduct additional study that may involve various hospitals.

CONCLUSION

According to this study, pregnant women have a generally fairly good magnitude of knowledge 61.6% and attitude 65.5% regarding ultrasonography. Age, occupation, educational background, place of residence, and attitude toward antenatal ultrasonography were associated factors. Enhancing pregnant women's knowledge can be achieved by health workers in antenatal care facilities teaching them about the efficacy of ultrasonography. It is necessary to dispel the myth about the negative consequences of ultrasonography, particularly the cancer risk, by promoting interaction between sonographers and pregnant women and holding health discussions during ANC sessions. The author concluded by recommending that antenatal ultrasound screening be a component of antenatal care and that mothers should be informed about the benefits of obstetric ultrasonography. However, ultrasonography is widely acknowledged as a crucial study that plays a major role in antenatal care.

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Clinical evolution of health care workers during the SARS-CoV-2 pandemic

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Background: Coronavirus disease 2019 (COVID-19) front line Health care workers (HCWs) and its variants are in high risk of acquiring the disease and subsequently exposing patients and others. The aim was to describe COVID-19 infected HCWs evolution in a third level hospital in the State of Mexico.

Methods: This observational, descriptive, and retrospective study was carried out from January 2020 to August 2021. To determine the factors associated with the mortality of HCWs, different models were built with the logistic regression test using the SPSS program, considering a value of $P < 0.05$ as statistically significant.

Results: 323 HCWs were studied, of which there was a mortality of 8 (2.4%). A regression model introducing only the variables marital status, confinement, sex and age, the following values were obtained: $R = 0.467$, $R^2 = 0.218$, adjusted $R^2 = 0.208$ and a standard error of the estimate of 0.140 (ANOVA with a $p \leq 0.01$).

Conclusion: 28% of COVID-19 health worker infected and a mortality of 2.4%. The variables marital status, confinement, sex and age were strong enough in a regression model to be significant for survival.

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The coronavirus disease 2019 (COVID-19) pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has accumulated more than 14 million infections and 600,000 deaths worldwide¹ and has been described as the greatest global crisis since the Second World War.²

Health care workers (HCWs) who are on the front lines of responding to COVID-19 and its variants are at increased risk of acquiring the disease and subsequently of exposing patients and others,³ not only due to their close contact with highly infectious patients, but also due to their exposure to undiagnosed or subclinical infectious cases. This risk has been increased by poor access to personal protective equipment around the world.⁴

Currently, there is no clarity regarding the prevalence of SARS-CoV-2 infections among HCWs according to specific clinical settings, limiting the possibility of designing effective preventive measures to limit transmission of the virus within a hospital and other spaces.^{5,6} This would allow us to understand the behaviour of HCWs in a specific way and to be able to specify the effectiveness and operation of the strategies or measures implemented by the health authorities in a local context.

In addition, it is unknown whether the clinical characteristics and outcomes of HCWs may be different from those of the general population, considering that repeated exposure to the virus may lead to a higher viral load of SARS-CoV-2 and, therefore, to worse clinical outcomes.^{7,8} It is necessary to know how HCWs face or have faced the pandemic, to specify the effects of exposure to the virus and thus recognise any differences compared with the rest of the population. However, official flowcharts on the risks for HCWs remain limited.⁹ The WHO estimates that as of April 8, 2020, more than 20,000 HCWs in 52 countries had contracted COVID-19.¹⁰

In addition to the above, COVID-19 has placed an enormous burden on health systems due to high transmission rates, and the prevalence of serious disease and mortality.¹¹ This forces health systems to increase their hospital capacity, both in terms of infrastructure and human capital.

The risk of viral transmission to HCWs has been a concern since the start of the outbreak and the first person to raise concerns about the disease to the

international community was Dr. Li Wen-Liang, an ophthalmologist from Wuhan who sadly died of the disease, which he probably contracted while he was at work.¹² From a historical and conjunctural analysis, pandemics have left lessons to humanity, which must be quantified by health sciences.

In Mexico, according to the official report of May 22, 2021, of the 280,781 total accumulated cases confirmed as COVID-19, 38.9% were nurses, 35.3% doctors, 32% other health workers, 2% laboratory technicians, and 1.8% dentists.¹³ Based on this, the following study aims to identify the main factors that determined the clinical evolution of health care workers during the SARS-CoV-2 pandemic in a Mexican third level hospital.

MATERIAL AND METHODS

Study Design

This observational, descriptive, and retrospective study was carried out from January 2020 to August 2021 at the "Mónica Pretelini Sáenz" Maternal Perinatal Hospital (HMPMPS) of the Institute of Health of the State of Mexico (ISEM), a third level care in Toluca, Mexico, with a total of 1,156 assigned HCWs.

Statistical Analysis

To determine the factors associated with the mortality of HCWs, different models were built with the logistic regression test using the SPSS program, considering a value of $p \leq 0.05$ as statistically significant.

Ethics Approval

The study was approved by the Research Ethics Committee and the Research Committee of the HMPMPS, in accordance with the Declaration of Helsinki¹⁴ and in compliance with the provisions of the Mexican General Health Law,¹⁵ Fifth Title Research for the Health, Single Chapter, as well as the regulations of the General Health Law Regulation¹⁶ on research in human beings.

RESULTS

323 HCWs were studied, of which there was a mortality of eight (2.4%). The highest percentage of

COVID-19 infections occurred among nursing staff (Table 1). However, there were personnel with contagion in all areas. Of the HCWs studied, 215 were women (66%) and 108 men (33%), the mean age was 40 ± 10 years old, 318 (98%) were not sent to confinement and 5 (2%) were, 285 (88%) had COVID-19 patient contact and 38 (12%) had no COVID-19 patient contact. 24 (7%) were vaccinated at the time of acquiring COVID-19 and 299 (93%) were unvaccinated at the time of acquiring COVID-19. 211 (65%) presented symptoms and 112 (35%) were asymptomatic. 23 (7%) were hospitalised and 300 (93%) were not.

Two logistic regression models were built, the first with all the variables of the database: does he/she have internet at home, did he/she work with symptoms, performs substantive activities and/or customer service, vaccinated, lactation, worker with children under 12 years old, marital status, suspicion of COVID-19, gender, sick leave or resignation, allergies, with symptoms, worker in contact with COVID-19 patients, required hospitalisation, suffers from obesity, does he/she offer care to dependents or third parties, suffers from hypertension, suffers from diabetes, another chronic disease, current reincorporation status, older than 60 years, age, travel time to work, worker is within the parameters for not returning to work, type of transport. Table 2 shows the coefficients of each variable, obtaining for this model, $R = 0.950$, $R^2 = 0.902$, adjusted $R^2 = 0.893$ and a standard error of the estimate = 0.052. Table 3 shows the corresponding ANOVA with $p \leq 0.01$.

In a second simplified model introducing only the variables marital status, confinement, sex and age, the following values were obtained: $R = 0.467$, $R^2 = 0.218$, adjusted $R^2 = 0.208$ and a standard error of the estimate of 0.140. Table 4 shows the corresponding ANOVA with a $p \leq 0.01$.

Regarding the eight HCWs who died, 5 were women (63%) and 3 were men (27%), the mean age was 46 ± 18 years, 5 (63%) practised confinement and 3 (27%) did not, 7 (88%) had COVID-19 patient contact and 1 (12%) had no COVID-19 patient contact. Eight (100%) were unvaccinated at the time of acquiring COVID-19, all of them presented symptoms and were hospitalised.

Table 1 Health personnel with COVID 19

Position	N	% of the total infected people
Nurse	151	47%
Medical specialist	60	19%
Administrative support	45	14%
Head of department	15	5%
Stretcher bearer	8	2%
Chemical	8	2%
Others	36	11%

DISCUSSION

COVID-19 has placed an enormous burden on health systems due to high rates of transmission, prevalence of serious illness, and mortality.¹⁷ The global mortality rate among HCWs and social assistance workers has been similar to that of the general population.¹⁸ HCWs in Mexico were no exception, and this study indicates the behaviour of the HCWs in a third-level hospital for maternal-fetal care and neonatology during the COVID-19 pandemic.

It is important to clarify that at the beginning of the pandemic there was a total of 1,157 HCWs, of which 323 were infected, which represented 27%, mostly women (66%), with an average age of 40 years. One of the strategies in the face of the pandemic was the confinement of HCWs with risk factors such as age, associated morbidities, high-risk pregnancy, and lactation period, which made it necessary for younger personnel without associated morbidities to be the ones at the forefront of caring for pregnant patients with COVID-19.

Based on UK registries, the vast majority of COVID-19-associated mortality occurs in patients over working age (>70% of deaths occur in people >75 years of age) and 57% are men,¹⁹ while of employees of the National Health Service in the United Kingdom health system 77% are women.

In Mexico, due to the work they carry out in the health sector, women are on the front line against COVID-19 and, therefore, also exposed to greater risks of contagion and physical and emotional exhaustion. As official reports show, as of June 16,

Table 2 Regression analysis of variables in health personnel during the SARS-CoV2 pandemic

Variables (N=323)	Non-standardized coefficients		Standardized coefficients	t	Sig.
	B	Standard error	Beta		
(Constant)	-0.797	0.236		-3.379	0.001
Age	-9.19E-06	0.001	-0.001	-0.018	0.986
Sex	-0.011	0.007	-0.034	-1.735	0.084
Marital status	0.012	0.009	0.037	1.303	0.194
Confinement	-0.13	0.039	-0.103	-3.32	0.001
Economic dependents	0.019	0.022	0.022	0.844	0.399
Public attention	-0.005	0.041	-0.003	-0.13	0.897
Contact with COVID patients	-0.007	0.011	-0.012	-0.597	0.551
Vaccinated	0.016	0.011	0.028	1.453	0.147
Worked with symptoms	0.011	0.012	0.018	0.93	0.353
Symptomatic	0.002	0.007	0.006	0.297	0.767
Hospitalization	-0.033	0.014	-0.055	-2.334	0.02
Return to work	0.407	0.032	0.454	12.913	≤0.001
With children under 12 years old	-0.019	0.028	-0.014	-0.693	0.489
> 60 years	0.189	0.036	0.164	5.193	≤0.001
Diabetes	0.149	0.031	0.139	4.825	≤0.001
Hypertension	0.222	0.042	0.137	5.305	≤0.001
Obesity	-0.058	0.024	-0.054	-2.407	0.017
Lactation	0.229	0.056	0.082	4.102	≤0.001
Suspected COVID	-0.011	0.022	-0.01	-0.508	0.612
Quit the job	0.013	0.02	0.014	0.617	0.538
Other chronic disease	0.018	0.021	0.024	0.835	0.405
Allergies	-0.001	0.008	-0.003	-0.147	0.883
Worker within the parameters to not return to work	0.230	.016	.551	14.285	≤0.001
Type of transport (own or public)	-0.018	0.019	-0.058	-0.993	0.322
Time spent to arrive at work	0.006	0.016	0.019	0.378	0.706
Internet at home	-0.017	0.014	-0.055	-1.263	0.207

a. Dependent variable: survival vs death. Sig: significance.

Table 3 Analysis of variance of two factors survival vs death, including all the independent variables

Model	Sum of squares	Degrees of freedom	Mean square	F	Sig.
Regression	7.031	26	0.27	101.712	0.000 ^b
Residual	0.766	288	0.003		
Total	7.797	314			

a. Dependent variable: survival vs death. Sig: significance.

Table 4 Analysis of variance of two factors survival vs. death, including only the independent variables marital status, confinement, sex and age

Model	Sum of squares	Degrees of freedom	Mean square	F	Sig.
Regression	1.700	4	0.425	21.606	0.000 ^b
Residual	6.097	310	0.020		
Total	7.797	314			

a. Dependent variable: survival vs death. Sig: significance.

2020, women represented 57% of positive cases of the virus and 29% of deaths. Most infected were nurses, who are mostly women.²⁰

Time and preparation are crucial to protect HCWs with sufficient access to protective equipment, continuous training, access to technologies and development.²¹ In our hospital, the first training for the prevention and mitigation of COVID-19 was given on February 7, 2020, which made it possible to integrate a care protocol for patients with suspected and confirmed cases of COVID-19.²²

Italy and Spain were among the first and most severely affected European countries by COVID-19 with limited or no time to prepare the health sector and take precautions to reduce the spread of infection among HCWs. 9% of all people who tested positive for SARS-CoV-2 by PCR in Italy and 26% in Spain, where SARS-CoV-2 transmission has been intense, were HCWs.²³⁻²⁵

In the UK an analysis of COVID-19 deaths among HCWs and white collar workers was conducted and identified 119 deaths from public reports. In the vast majority of cases, they were able to establish that people had been working before death and the degree to which their work was patient-oriented. However, it was not possible to determine whether the HCWs were infected at work or elsewhere.²⁶ One element of focus in some studies is that minorities have been overrepresented in early deaths.^{27,28}

Government strategies and public responses have led to a "flattening of the epidemic curve", meaning that the total number of cases has not reduced, but is spread over a longer period of time. As a matter of fact, COVID-19 will be with us forever, thus keeping a central registry of these deaths is mandatory. For example, according to the October 2021 Epidemiological Surveillance System for Respiratory Diseases (SISVER) in Mexico, of the total accumulated cases in health personnel by profession with COVID-19, the median age was 37 years. The most affected age group was 30–34 years. 62.6% were women and 37.4% men, with cases with 1 or more comorbidities constituting 32.77% and without comorbidities, 63.23%.²⁹

The accumulated deaths in October 2021 in health personnel were 4,484 confirmed and 125 suspected in Mexico City. The State of Mexico, Puebla, Veracruz, Jalisco, Guanajuato, Nuevo León, Chihuahua, Tabasco, and Tamaulipas are the ten Federal States with the highest number of deaths, with 64% of all deaths (68% of registered deaths correspond to men and 32% to women). Of the 4,484 deaths confirmed by COVID-19, 45% corresponded to doctors, 31% to other health workers, 19% to nurses, 3% to dentists, and 2% to laboratory technicians.¹³

The HMPMPS, being a hospital unit attached to the state health system of the State of Mexico, followed and executed the measures implemented by the

Mexican Ministry of Health, which were replicated in each state of the country. The strategy that was carried out both to counteract the pandemic and for prevention and mitigation actions in relation to HCWs, conditioned their behaviour when exposed to the virus.

With the results obtained, a COVID-19 mortality of 2.4% in HCWs was confirmed. The variables marital status, confinement, sex and age were strong enough in a regression model to be significant for survival.

Considering that there are currently variants of COVID-19, new research studies are recommended to estimate the HCWs contagion rate associated with COVID-19 and to provide evidence that will justify the implementation and monitoring of prevention programmes aimed at HCWs to reduce the rate of contagion and additionally the costs of the negative impact on the health system.

SUMMARY BOX

The highest percentage of COVID-19 infections occurred among nursing staff.

Having met confinement criteria has a prediction for mortality, being necessary to reconsider when to return to work.

Limitations of the Audit

In the population of hospital workers, the health situation of each member was not evaluated in depth.

The policies implemented to send a certain population group home could have distorted the results.

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Chewing Gum, Stress and the Occurrence of Aphthous Stomatitis among University Students

Maryam Hameed Alwan

Canker sores (recurrent aphthous stomatitis) are small, shallow painful oral ulcers that develop on the soft tissue inside the mouth. While the exact cause remains unclear, one of the triggered factors is stress. Chewing gum, on the other hand, is considered a popular habit among university students. It's a way to cope with stress. This study aimed to find out if the consumption of chewing gum among university students as a way to overcome stress could play an indirect role in decreasing the frequency of aphthous stomatitis. Methods: An online Google form questionnaire shared through email and social media platforms targeting undergraduate university students.

Results: 906 students (age ranges from 18 to 25) responded to the questionnaire. 63.8 % of students experience daily stress and 53.6% of them complained of study-related stress. However, more than half of the students used chewing gum daily or several times during the week, and 70% of them feel that chewing gum help to reduce stress level. On the other hand, 62.7% of university students have been diagnosed with aphthous stomatitis, with an increased frequency during exam periods. The Spearman correlation coefficient exposed, a negative high significant correlation between chewing gum consumption and frequency of both aphthous stomatitis (-0.114) and stress (-0.239).

Conclusion: University life is a stressful environment and students should be aware of the potential connection between stress and the occurrence of aphthous stomatitis. Using chewing gum as a stress distraction technique, students can minimize the likelihood of developing a painful canker sore.

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Aphthous stomatitis (canker sores), is a painful small, shallow ulcer that affects the oral soft tissue. Eating, drinking and speaking became an uncomfortable experience.^{1,2} The recurrent aphthous stomatitis RAS is considered multifactorial in origin and the exact cause remains unclear, several factors are thought to contribute to its occurrence, such as stress.^{3,4} Previous studies suggested that psychological disorders such as stress, anxiety and depression have a strong correlation with RAS lesions.⁵⁻⁷

The academic pressure, social relationships and personal challenges laid a lot of anxiety and stress upon the shoulders of university students. This stress impacts their overall health condition, including oral health.⁸

Chewing gum, on the other hand, has long been considered a popular habit among students. It is seen as a way to cope with stress, improve concentration and maintain good oral hygiene. Recent research suggests that it may have actual stress relief benefits for the student.⁹

Moreover, it has been found that chewing gum could stimulate the release of dopamine from the brain, a neurotransmitter which is associated with the feeling of motivation, satisfaction and pleasure. Additionally, the physical movement of chewing can help reduce tension and improve focus, which makes it a helpful tool for maintaining high concentration during long study sessions and exams.^{10,11}

The purpose of the present study was to see if the university students' consumption of chewing gum as a strategy to lower the study-related stress, can eventually lead to a diminish in the occurrence of recurrent aphthous stomatitis.

MATERIAL AND METHODS

Research design

The study was carried out in compliance with Baghdad University College of Dentistry's experimental ethical guidelines. All respondents participated voluntarily, and the principles established in the Helsinki Declaration have been followed in this research. An online Google form questionnaire shared through email and social media platforms targeting undergraduate university students from different specialities.

Sample size calculation

To determine the required sample size, we used the formula:

$$\text{Sample Size} = (Z^2 * p * (1 p)) / E^2$$

Z refers to the z score corresponding to the desired confidence level (95% confidence level)

p denotes the estimated proportion of the population with a characteristic (we assume p=0.5 for an estimate)

E represents the desired margin of error (we considered it $\pm 5\%$)

Data collection

Data collection extended over eight months, from March 2023 to November 2023. The questionnaire starts with questions about gender, age and study speciality. Then there are three sections, with four questions for the chewing gum section and three questions for both stress and aphthous stomatitis sections. [Supplemental File 1](#) summarises the elements of the questionnaire.

Statistical analysis

Statistical Package for the Social Sciences (SPSS), version 28 applied to statistical analysis of data. First, the descriptive statistic. Second, the chi-square test, to assess whether there is a difference in the trend of the proportions in the two groups. Finally, the Spearman correlation test examines whether two variables are correlated with one another or not.

RESULTS

The total number of participants in the questionnaire was 906 undergraduate college students, with a response rate of 18. %. The age ranges from 18-25 as shown in [Figure 1](#). Among the respondents were

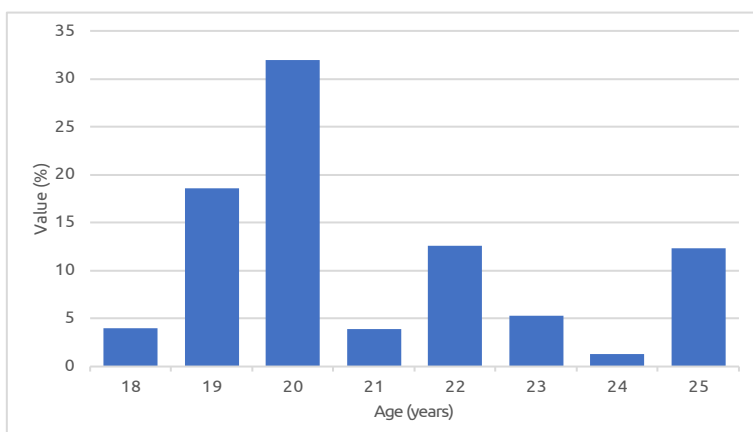


Figure 1 Age range of the participants

Table 1 Demographic characteristics of the participants

	N (%)	
Gender	Male	432 (47.7)
	Female	474 (52.3)
Study Field	Business Administration	20 (2.2)
	Medical technician	218 (24.1)
	Dentistry	358 (39.5)
	Engineering	264 (29.1)
	Other	46 (5.1)

52.3% females and 47.7% males. The students are from different specialities, as shown in [Table 1](#).

Stress, Chewing Gum and Aphthous Stomatitis

As the results revealed a high percentage of 63.8 of students experience daily stress and 57.4% have a stress level above five on a scale of ten. Besides, 53.6% of college students complained of study-related stress. However, more than half of the students used chewing gum daily and several times during the week. Additionally, the main reason to consume chewing gum was to reduce stress and anxiety. Furthermore, 70% of students feel that chewing gum helps them to reduce stress levels.

On the other hand, 62.7% of university students have been diagnosed with aphthous stomatitis, with an increased frequency during exam periods, as shown in [Table 2](#).

Correlation between variables

The chi-square test was applied to test the statistically significant relationship between variables. [Table 3](#), the frequency of aphthous stomatitis significantly correlated ($p=0.01$) with the frequency of stress. Furthermore, there is a significant correlation ($p=0.005$) between chewing gum consumption and study-related stress [Table 4](#). Additionally, a significant correlation ($p=0.04$) between chewing gum usage and the frequency of aphthous stomatitis [Table 5](#).

The Spearman correlation coefficient [Table 6](#), exposed the following, a negative high significant correlation between chewing gum consumption and frequency of both aphthous stomatitis (-0.114) and stress (-0.239).

Table 2 Stress, Chewing Gum and Aphthous Stomatitis response

Stress-related questions and answers		
Frequency of stress	Daily	578 (63.8)
	Weekly	142 (15.7)
	Rarely	174 (19.2)
	Never	12 (1.3)
Level of stress (on a scale of 10)	1	40 (4.4)
	2	44 (4.9)
	3	70 (7.7)
	4	68 (7.5)
	5	164 (18.1)
	6	92 (10.2)
	7	128 (14.1)
	8	140 (15.5)
	9	62 (6.8)
	10	98 (10.8)
Sources of stress	Personal expctations & self-pressure	118 (13)
	Personal relationships	122 (13.5)
	Study-related stress	486 (53.6)
	Family responsibilities	126 (13.9)
	More than one sources	54 (6)
Chewing gum-related questions and answers		
Chew gum consuming	Daily	218 (24.1)
	Several times during the week	283 (31.2)
	Occasionally (irregular intervals)	375 (41.4)
	Don't use chewing gum	30 (3.3)
Reason to use chewing gum	Reduced stress & anxiety	438 (48.3)
	As a distraction method	92 (10.2)
	Improve the mood	202 (22.3)
	Reduce food cravings	144 (15.9)
	Don't use chewing gum	30 (3.3)
Situations to consume chewed gum to relieve stress	While studying	104 (11.5)
	Between classes	396 (43.7)
	During an exam	140 (15.5)
	All the time	236 (26.0)
	Don't use chewing gum	30 (3.3)
Chewing gum helps reduce stress levels	Yes	634 (70)
	No	272 (30)
Aphthous stomatitis-related questions and answers		
Diagnosed with aphthous stomatitis	Yes	568 (62.7)
	No	338 (37.3)
frequency of aphthous stomatitis	Often	254 (28.0)
	Usually	98 (10.8)
	Occasionally	216 (23.8)
	Never	338 (37.3)
Increase in frequency during exams	Yes, often	252 (27.8)
	Yes, always	192 (21.2)
	Sometimes	124 (13.7)
	No	338 (37.3)

Table 3 Frequency of stress vs. aphthous stomatitis (count)

Frequency of stress	Daily	Weekly	Rarely
Often (2–3×/year)	180	32	40
Usually (>4×/year)	80	10	8
Occasionally (≤1×/year)	120	26	70

Table 4 Sources of stress vs. chewing gum frequency (count)

How often chew gum	Daily	Several times/ week	Occasionally
Personal expectations	24	42	48
Personal relationships	42	35	41
Study-related stress	122	148	200
Family responsibilities	12	42	68
More than one source	18	16	18

Table 5 Aphthous stomatitis frequency vs. chewing gum consumption (count)

Aphthous stomatitis frequency	Never	Often (2–3×/year)	Usually (>4×/year)	Occasionally (≤1×/year)
While studying	28	30	10	36
Between classes	140	108	50	98
During an exam	56	46	16	22
All the time	95	70	25	55

Table 6 The Spearman correlation coefficient

Correlations			
Use chewing gum		Frequency of stress	Frequency of aphthous stomatitis
	Correlation Coefficient	-0.239**	-0.114**
	Sig. (2-tailed)	.000	.001
	N	906	906

****.** Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

This study aimed to find out if the consumption of chewing gum among university students as a way to overcome stress could potentially play an indirect role in decreasing the frequency of aphthous stomatitis. Stress is common among university students. To cope with study-related stress, the students try different strategies. In particular, chewing gum, an available, low-cost, and popular

product can provide the necessary distraction to manage stress.¹²

The findings from this study confirm some of the results from previously published research on chewing gum and stress. Multiple studies have concluded that consuming chewing gum can reduce stress levels. A study by Scholey, et al found that as compared to non-chewing, there was a significantly high reduction in stress and anxiety in the chewing

SUMMARY BOX

- Increased chewing gum usage associated with reduced occurrence of aphthous stomatitis: The study revealed a significant negative correlation between regular chewing gum usage and the occurrence of aphthous stomatitis among university students. Those who reported consistent chewing gum use had a lower prevalence of aphthous stomatitis compared to those who did not regularly chew gum.
- Stress levels positively linked to aphthous stomatitis: The findings indicate a positive association between stress levels and the occurrence of aphthous stomatitis. Students who reported higher stress levels were more likely to experience recurrent episodes of aphthous stomatitis compared to those with lower stress levels.
- Gum chewing as a potential stress management strategy: The study suggests that chewing gum could serve as a feasible stress management strategy among university students. Participants who engaged in regular gum chewing reported lower stress levels compared to those who did not chew gum, potentially leading to a reduced risk of developing aphthous stomatitis.

condition.¹³ Another study by Smith and Woods proved that the chewing gum group showed lower stress, anxiety and depression, as well as less fatigue as compared to the non-chewing group.¹⁴

The cause of aphthous stomatitis is multifactorial, and stress is one of the triggers of its occurrence in young college students. Without a doubt, exam time is a known source of students feeling of anxiety and being overwhelmed by stress.^{15,16} The finding from this study showed a significant positive correlation exists between the frequency of aphthous stomatitis and the frequency of stress, which is supported by the findings from previous studies dealing with the same subject. Firstly, an updated study by Nurdiana et al concluded that stress is one of the etiological factors of recurrent aphthous stomatitis.³ Secondly, a recent study by Hamdani et al revealed a high-stress level correlated significantly with recurrent aphthous stomatitis.¹⁷

The role of stress as a trigger of recurrent aphthous stomatitis is still unclear. Moreover, the underlying

exact mechanism remains controversial. Huldig et al findings suggest that the stressful life events involved with the initiation of aphthous stomatitis.¹⁸

Obviously, as the stress level decreased, the incidence of recurrent aphthous stomatitis decreased. For this reason, the students depending on chewing gum as a way to reduce stress can indirectly lower the incidence of the undesired side effect related to exam time which is (aphthous stomatitis). As the current study results revealed, the participants who used chewing gum all the time and between classes, are less to suffer from the RAS. The majority of them either never complained about RAS, or have an occasional (once a year or less) incidence.

An interesting study by Choi et al concluded that oral problems are a part of stress responses.⁸ In addition, a study by Singh et al found that Yoga plays a role in the promotion of oral health, due to its role in reducing stress and improving the well-being of individuals.¹⁹

Moreover, chewing gum may also stimulate salivary flow, which can help to neutralized acids in the mouth and promote oral health. The increase in the saliva flow has a beneficial effect on the irritation and inflammation reduction in the oral cavity, which in turn contributes to RAS reduction. An exciting study by Zunt, evaluated such correlation between the salivary flow rates and the occurrence of RAS. The study concluded that the reduction in the unstimulated salivary flow rate due to hypofunction of the salivary gland correlates with the RAS.²⁰

The application of stress distraction measures could be a good strategy to overcome many stresses related to oral and general health problems, such as recurrent aphthous stomatitis.

CONCLUSION

University life is a stressful environment and students should be aware of the potential connection between stress and the occurrence of aphthous stomatitis. Using chewing gum as a stress distraction technique, students can minimize the likelihood of developing a painful canker sore. It is obligatory to optimise the overall oral health and focus on academic and personal growth without unnecessary discomfort.

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Unearthing Neglect and Safeguarding Issues in an Infant With Spina Bifida

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Background: An infant with spina bifida and a ventriculoperitoneal (VP) shunt presented with swelling over the shunt. Initial investigations revealed a depressed occipital fracture and a small subdural haemorrhage, raising concerns about potential non-accidental injury (NAI) due to inconsistencies in the parents' account of the injury. A thorough literature review was done, however, there is paucity of literature on NAI in children with spina bifida.

Clinical findings: Local protocols for investigating NAI and abusive head trauma (AHT) were followed, uncovering a metaphyseal fracture of the left femur and an old proximal right tibial fracture. The infant had missed several follow-up appointments. During the hospital stay, the mother's poor interaction and inability to provide basic care were noted, evidenced by an incident where the infant sustained a lacerated wound to the ear secondary to inappropriate garment choice and rough handling.

Conclusion: In this case, NAI was eventually excluded but there remained significant concerns about physical neglect, emotional neglect, and medical neglect. In view of these significant concerns, a Care Order was later issued for this infant. Although this case was not an NAI case, it demonstrated the subtle but serious nature of neglect, particularly in children with medical conditions like spina bifida, where clinical findings might be misattributed to the condition rather than parental neglect.

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Spina bifida encompasses a range of congenital malformations involving the failure of neural tube fusion, categorized into four types: occulta, closed neural tube defects, meningocele, and myelomeningocele.¹ The prevalence varies geographically and ethnically, with rates between 1.0 to 10.0 per 1000 live births.²

Individuals with spina bifida frequently experience osteoporosis and an increased risk of fractures. Fracture rates in children, adolescents, and adults are 10.9/1000, 5.4/1000, and 2.9/1000 patient years, respectively.³ Childhood fractures often involve the distal femur and femoral shaft, with the median age of first fracture at 7 years. Radiographic features in these patients include an absence of a fracture line, hypertrophic periosteal reaction, and sclerosis at the fracture site.⁴ Clinically, fractures in these children may present without pain, swelling, or displacement of bone fragments, attributed to osteoporosis from reduced motor activity, decreased axial load, immobilization post-surgery, suboptimal growth, and poor nutrition.⁴

There is a lack of literature on non-accidental injury presentations in children with spina bifida. This case, involving a child with spina bifida, osteoporosis, and absent pain syndrome, was investigated for potential neglect, ultimately leading to a Care Order under Section 31 of the Children Act 1989 due to significant harm and inadequate parental care.

CASE DESCRIPTION

Patient Information

Jane (fictional name), a 6-month-old girl with myelomeningocele, Chiari Type 2 malformation, hydrocephalus, and a left-sided ventriculo-peritoneal (VP) shunt, was born via C-section at 39+2 weeks to non-consanguineous parents. Post-birth, she underwent multiple surgeries for her conditions and was discharged at 4 months to live with her parents and two-year-old sister. At a regular orthopedic appointment for left hip developmental dysplasia, she presented with a head tilt, temporal swelling, irritability, and vomiting. She was referred to the paediatric emergency department (PED) directly by the outpatient orthopaedic doctor, where a CT brain was done and a comminuted depressed fracture of the occipital bone, accompanied by a small subdural haemorrhage was reported. She was admitted under

joint neuro-surgical and paediatric care for neuro charting and further investigations.

Clinical and Diagnostic Findings

History provided by Jane's mother was that two days prior, while doing physiotherapy exercises, Jane jerked back and fell head first onto the carpeted floor. Jane did not cry and seemed comfortable, so the parents did not seek medical advice. On physical examination by the safeguarding paediatrician, it was noted that she was small for her age. Despite being reported to have been feeding well, she was failing to thrive. Her birth weight was 4.23 kg (p98), on discharge at 4 months, her weight was 5.55 kg (p9-25) and on admission at 6 months of age, her weight was 5.62 kg (p2). Her sclerae were white and there were no rachitic rosary or wrist swelling. There was no family history of fractures or metabolic bone disease of note. There was a yellowish bruise over the left parietal area, around 4cm in diameter, a 1cm diameter bruise over the left elbow and a fading, 2cm x 1cm bruise over her right thigh. Her anterior fontanelle was soft and not bulging.

Blood investigations including a full blood count, renal profile, calcium, phosphate, magnesium, albumin, thyroid profile, parathyroid hormone, vitamin D, iron profile, folate, ferritin and Vitamin B12 levels were carried out. These showed a leukocytosis of $14.66 \times 10^9/L$ and a microcytic anaemia with haemoglobin of 8.7 g/dl and a mean cell volume of 73.1 fL. Folate (54 nmol/L), Vitamin B12, ferritin and iron profile were normal, implying chronic anaemia. She had a thrombocytosis of $625 \times 10^9/L$; CRP of 20.2 mg/L; Vitamin D level of 52 (normal); elevated calcium (2.65 mmol/L), normal phosphate (1.54 mmol/L) and normal coagulation profile, renal profile, thyroid profile, albumin and parathyroid hormone. The CT brain reported a comminuted depressed fracture of the occipital bone with maximum 6mm depression, accompanied with a small (5mm) subdural haemorrhage ([Figure 1](#)). An ophthalmic review was carried out and excluded retinal haemorrhages and papilloedema. Magnetic Resonance (MR) brain imaging was also carried out to exclude shearing injuries and subdural haemorrhages. The MR brain reported a small but increased amount of fluid surrounding the VP shunt tubing over the left parietal region but with preserved extra-axial spaces. A normally progressing cerebral myelination pattern was noted with cerebellar tonsillar ectopia (which was



Figure 1 CT scan of the brain showing a depressed comminuted fracture and a small subdural haemorrhage. One can also note the enlarged ventricles and subcutaneous haematoma over the left parietal area.

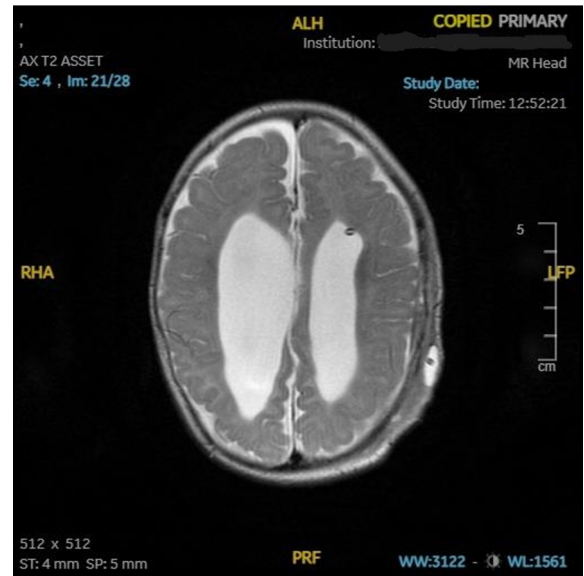


Figure 2 Magnetic Resonance Imaging of the brain showing a recent skull fracture with residual subcutaneous hematoma over the parietal area. There is no restricted diffusion to suggest a shearing injury.

noted on previous MRIs). There was no restricted diffusion to suggest a shearing injury and no significant hemosiderin deposition on SWI to suggest diffuse axonal injury (Figure 2). However, the skeletal survey reported a metaphyseal fracture of the left femur (Figure 3). An MRI of the right lower leg revealed an abnormality in the right proximal tibia, with mild marrow and periosteal signal changes. Initial findings were indeterminate due to the absence of an oedema pattern. A follow-up X-ray four weeks later showed bony changes indicative of a healing proximal tibial fracture with complete radiological union (Figure 4).

Therapeutic Interventions

Jane was managed with regular analgesics and monitored by the neurosurgical team, confirming her shunt was functioning. She was discharged with follow-up appointments with her consultants and the orthopedic and neurosurgical teams.

FOLLOW-UP AND OUTCOMES

Due to the combination of cranial and lower limb findings, non-accidental injury (NAI) was suspected. Despite consistent accounts from the parents, police involvement, and close monitoring by social workers, further evidence of neglect emerged, including multiple missed appointments, re-presentation at

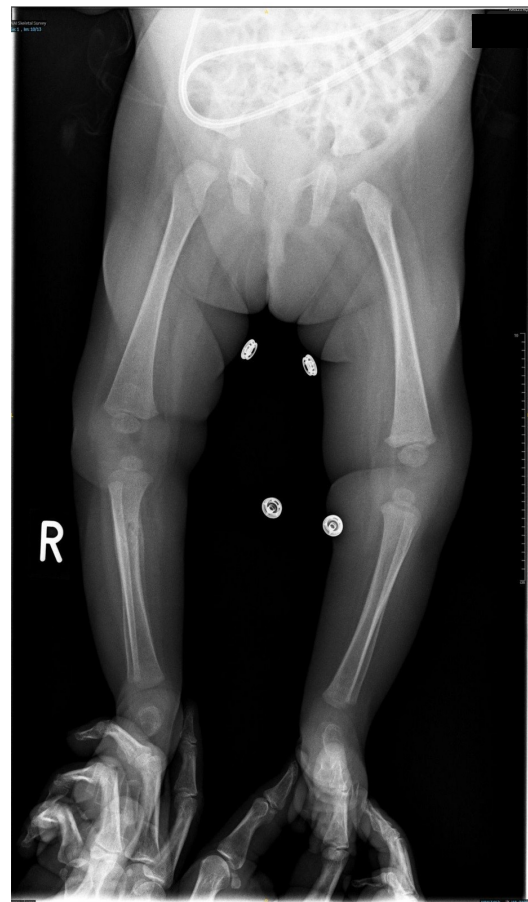


Figure 3 Skeletal survey showing a lesion in the right tibia



Figure 4 Plain XR of the right lower leg showing the presence of the bony changes with in-filling of the lucent zone and a reduction in the smooth periosteal reaction, suggesting a healing proximal tibial fracture, now showing complete radiological union.

the PED two weeks after discharge with a 7cm long post-auricular lacero-contused wound behind her ear following rough undressing and inadequate parental engagement noted by nurses in the wards and by the social workers at home. Jane was eventually taken into residential care under a Care Order, showing significant developmental and mental improvement, highlighting prior neglect.

DISCUSSION

Skull fractures in children, especially those involving the occipital bone, are significant due to their association with intracranial injury, a leading cause of traumatic death in childhood.⁵ Falls are common in children under two, and depressed fractures often result from localized external force.^{6,7} Abusive head trauma is predicted by specific variables such as respiratory compromise, bruising, and certain types of skull fractures, carrying substantial morbidity and mortality.⁸

In Jane's case, the depressed occipital fracture, along with other findings, initially suggested abusive head trauma but later investigations pointed to significant neglect. The increased weight of her head due to hydrocephalus and poor head control likely worsened the outcome of a fall. The lower limb fractures and a laceration raised concerns of rough handling. Osteoporosis and sensory deficits in spina bifida patients delay fracture diagnosis, with clinical signs often absent.⁴

The case emphasises the need for thorough safeguarding evaluations in children with spina bifida. Neglect can manifest in subtle ways, and multidisciplinary teams must be vigilant in identifying and addressing these issues to prevent harm and ensure the child's well-being.

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An unusual case of Radiotherapy-Induced Angiosarcoma with Splenic Metastases

Mark Miruzzi, Ayman Mostafa

Background: Radiation-Induced Angiosarcoma (RIAS) is a recognised clinical entity relating to a malignant vascular process affecting the skin and soft tissues in patients who have received radiotherapy. This case report presents a Maltese case of RIAS in a breast cancer patient who developed a rare site of metastasis: the spleen.

Methods: The patient's medical file, online notes and imaging reports were reviewed in order to examine the details of the case.

Other papers on the topic of RIAS were reviewed after this process to assess the pathophysiology of the condition as well as usual sites of metastasis.

Results and Conclusion: Consider radiotherapy side effects in the differential diagnosis of a patient presenting with a lump post breast cancer surgery.

- Radiation-induced angiosarcoma can cause metastases to distant atypical sites including the spleen.
- Radiation-induced angiosarcoma can present with lesions away from the breast, in this case a fungating lesion in the left axilla.
- Holistic management of the breast oncological patient requires emphasis on inter-disciplinary liaison.

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Radiation-Induced Angiosarcoma (RIAS) is a recognised clinical entity relating to a malignant vascular process affecting the skin and soft tissues in patients who have received radiotherapy as part of the management of oncological conditions such as breast carcinoma. It is a rare tumour however is being reported in the literature with increased frequency.¹ This case report presents a Maltese case of RIAS in a breast cancer patient: besides highlighting the different steps in the diagnostic and management plans, this case was of interest in view of the atypical site of metastasis: the spleen.

CASE PRESENTATION

Ms MF is a 73-year-old woman who developed an angiosarcoma with splenic and pulmonary metastases following radiotherapy administered for breast carcinoma. The patient was diagnosed with breast carcinoma in 2010 after she initially presented with a breast lump. Fine needle aspiration (FNA) cytology revealed numerous carcinoma cells, singly and in discohesive clusters, showing hyperchromatic nuclei and high nuclear-cytoplasmic ratio.

As part of triple assessment of this breast lump, mammography and ultrasound of both breasts was performed: these revealed a small spiculated lesion in the upper outer quadrant of the left breast, suspicious for malignancy. Following adequate preoperative assessment, the patient underwent Wide Local Excision (WLE) with Sentinel Lymph Node

Biopsy (SLNB) and Axillary Clearance. Histology of the surgical specimen revealed a Grade 1 infiltrative ductal carcinoma consisting of scattered small neoplastic acini set in desmoplastic stroma.

The patient was referred to Oncology: as part of adjuvant treatment, the patient underwent radiotherapy following her surgical procedure. The patient went on to develop a rare complication of radiotherapy: high-grade angiosarcoma. A fungating lesion was identified in the left axilla. Diagnosis was confirmed via a shave biopsy of a vascular nodule below the left nipple, which revealed a well-differentiated angiosarcoma. In 2021, the patient underwent left mastectomy. Ms MF passed away in October 2022 due to sepsis on the background of metastatic breast angiosarcoma.

One of the crucial investigative modalities in this case was mammography of both breasts. The patient underwent mammography prior to her wide local excision and underwent periodic mammography in the following months to monitor for any signs of recurrence. **Figure 1** shows a mammogram revealing a spiculated lesion in the left breast, suspicious for malignancy.

Another important investigation in the diagnostic workup of this patient was lymphoscintigraphy, which allowed intra-operative identification of the sentinel lymph node in order to enable resection, histological evaluation and assessment for metastases of the infiltrative ductal carcinoma.

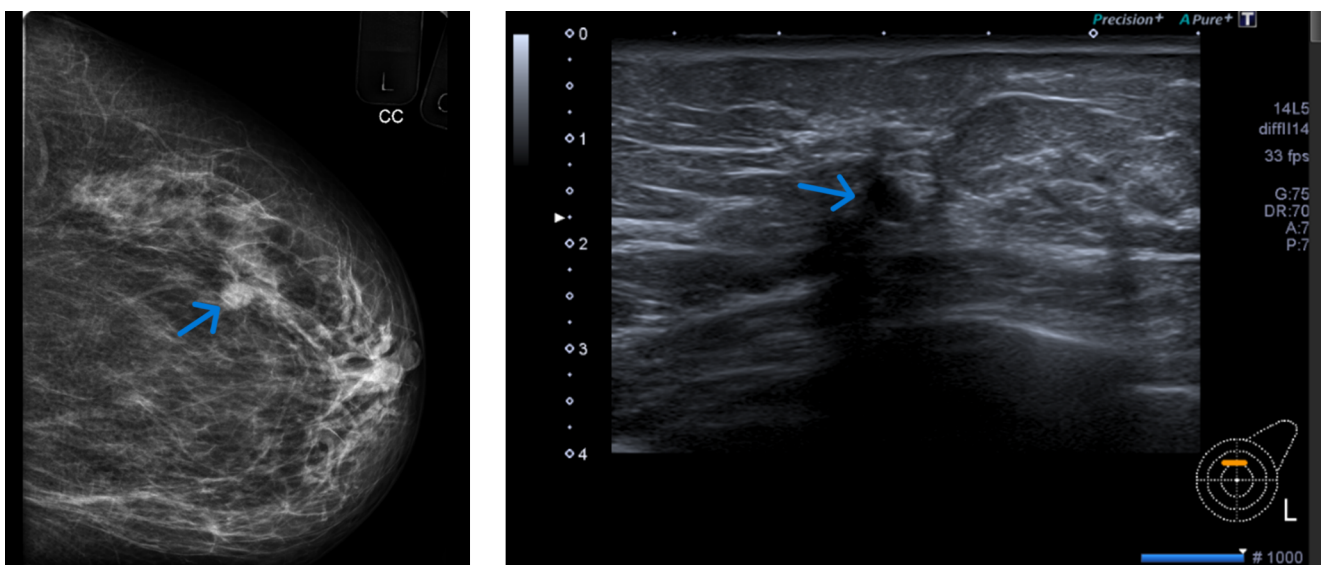


Figure 1 Imaging investigations of the left breast. Left image: Mammogram of the left breast taken in 2010 with arrow indicating lesion. Right image: ultrasound imaging showing scarring of the left areolar region secondary to angiosarcoma

CT PET Oncology served as a useful diagnostic tool in staging of the disease, to identify any metastases from the primary infiltrative ductal carcinoma of the left breast, and also to identify angiosarcoma and its possible metastases. **Figure 2** shows a PET CT Oncology performed in 2021 which showed subtle FDG uptake in the left breast tumour without evidence of FDG avid distant sites of disease.

Following diagnosis of angiosarcoma, CTPA showed multiple small nodules in both lungs suggestive of metastases. CT AP showed multiple hyperdense lesions in the liver, suggestive of metastatic deposits.

Figure 3 shows an image from a CT thorax-abdomen-pelvis: this revealed multiple new splenic lesions which appeared malignant in nature, representing splenic metastases. The spleen is enlarged and contains multiple lesions which demonstrate peripheral enhancement with central necrosis; the largest of these lesions measured 9cm.

DISCUSSION

Radiation-induced angiosarcoma (RIA) is a rare, malignant vascular neoplasm affecting skin and superficial soft tissues. Angiosarcoma accounts for less than 1% of breast malignancies, and only 307 cases have been reported in literature.² It is associated with a poor prognosis.¹ This is due to both

SUMMARY BOX

- Consider radiotherapy side effects in the differential diagnosis of a patient presenting with a lump post breast cancer surgery.
- Radiation-induced angiosarcoma can cause metastases to distant atypical sites including the spleen.
- Radiation-induced angiosarcoma can present with lesions away from the breast, in this case a fungating lesion in the left axilla.
- Holistic management of the breast oncological patient requires interdisciplinary liaison and communication between the breast surgical team, the oncologist, the histopathologist, radiologist, breast care nurses, and nuclear medicine specialists.

the locally-aggressive nature of the disease and also its tendency to metastasize to distant sites. Abraham et al's study in 2007 found that 76% of angiosarcomas investigated were either intermediate or high grade on histological analysis.³

Epidemiologically, Radiation-Induced Angiosarcoma more commonly affects women older than 70 years,

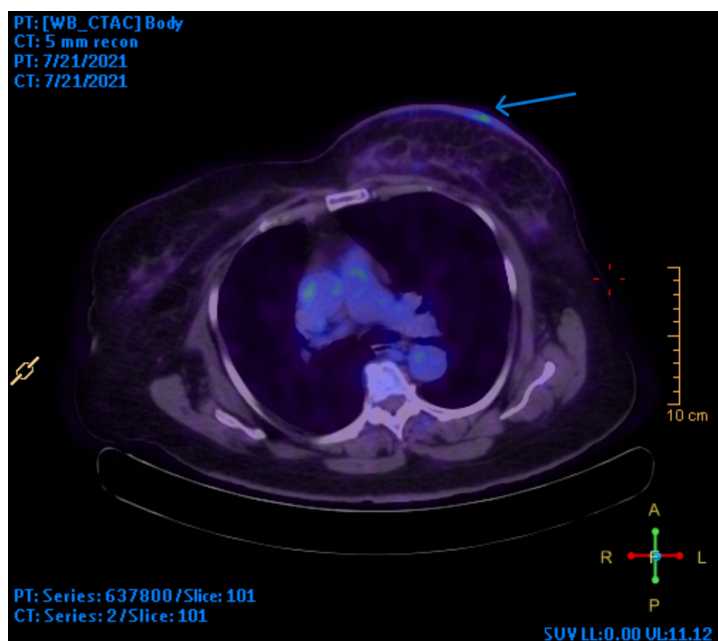


Figure 2 CT PET Oncology in 2021 showed subtle increased FDG uptake in the dermis of the left breast in proximity to the nipple where thickening was appreciated, corresponding to the known tumour, without evidence of FDG avid distant sites of disease



Figure 3 Splenic lesions on CT thorax-abdomen-pelvis. Arrow highlights area of multiple metastases

and it is typically a late complication of radiotherapy, with a mean latency period of 6 years after breast cancer diagnosis.

As described in the case report by Desira and Buhagiar in 2022, breast angiosarcoma tends to metastasise to areas such as the bone, lungs, liver, and the contralateral breast.⁴ The splenic metastases described in this case therefore represent an unusual finding.

Angiosarcoma of the breast can present a diagnostic challenge since it manifests as a skin lesion that can be a nodule, plaque or patch, and can resemble telangiectasia. MRI is the most appropriate imaging modality. As with most breast malignancies, biopsy of

the lesion is the means for definitive diagnosis. Immunohistochemical analysis of angiosarcomas shows that these tumours are positive for antigens related to CD31, CD34.

Current treatment of angiosarcoma is mainly aggressive surgical resection, typically wide local resection or mastectomy, however surgery should be combined with other oncological treatments such as adjuvant chemotherapy or radiotherapy in order to improve prognosis. The study by Depla et al in 2014 showed enhanced local recurrence-free survival (57%) when combining surgery with re-irradiation as opposed to surgery alone (34%) ($p = 0.008$).⁵

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A Resistant case of mycophenolate mofetil-induced diarrhoea

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Background: Mycophenolate mofetil is one of the standard drugs used in the prevention of rejection in solid organ transplantation. While it is usually well tolerated, it is well known that it can cause an entero-colitis, which usually responds to dose reduction or withdrawal. In a few cases the colitis persists requiring further investigation and treatment.

Case Presentation: We report a case of mycophenolate-induced colitis that persisted on withdrawal of drug and required treatment with high-dose steroids.

Conclusion: There are no established guidelines to aid physicians in the management of these resistant cases, so case reporting will help guide the management of these difficult cases.

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Mycophenolate mofetil (MMF) is one of the cornerstone drugs used in preventing rejection of solid organ transplantation, however, it may rarely be associated with entero-colitis. While often responsive to dose reduction or drug withdrawal, rare cases of persistent colitis require further investigation. We report a case of MMF-induced diarrhoea resistant to initial measures, requiring high-dose steroids for symptom remission. By elucidating the clinical course and eventual outcome in this resistant case, we aim to contribute to the understanding and optimization of care for patients experiencing gastrointestinal complications attributed to MMF therapy and add to limited literature pertaining to this rare adverse drug event.

CASE PRESENTATION

A 57-year-old gentleman underwent a deceased-donor renal transplant. His past medical history was significant for polyarteritis nodosa with renal involvement progressing to end-stage renal disease, requiring continuous ambulatory peritoneal dialysis for 3 years. Post-transplantation, he received a standard immunosuppression regimen with 1000g MMF twice a day, 0.2mg/kg tacrolimus in divided doses and 20mg prednisolone.

Ten days after initiating MMF, he experienced up to fifteen bouts of loose stools daily, accompanied by urgency and abdominal pain without bleeding or mucous per rectum. Physical examination revealed a soft abdomen with minimal, generalised tenderness and a palpable transplanted kidney in the right iliac fossa. Initial laboratory investigations showed a mildly elevated C-reactive protein at 23.4 mg/L (normal range 0-5 mg/L), a normal white cell count ($7.78 \times 10^9/L$) and normal renal function. Stool testing for cytomegalovirus (CMV) using polymerase chain reaction (PCR), bacterial enteric pathogens, parasite and ova were negative.

Despite adjustments to the MMF dosing regimen and subsequent halving of the total daily dose, symptoms persisted, prompting a switch from MMF to everolimus. While there was some improvement, loose stools persisted up to eight times daily, negatively affecting the patient's quality of life. A colonoscopy performed two weeks after cessation of MMF showed pancolitis (**Figure 1**) with histological features suggestive of infective colitis or drug-induced colitis with immunosuppressive drug therapy (**Figure 2** and **Figure 3**). Microscopy showed well-preserved crypt

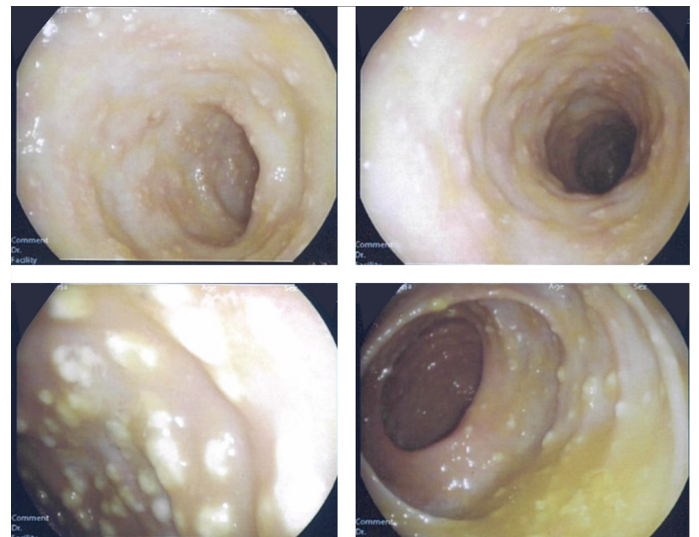


Figure 1 Endoscopy images two weeks after the onset of diarrhoea showing pancolonic oedema, erythema and inflammation with multiple small superficial ulcers with fibrin exudates

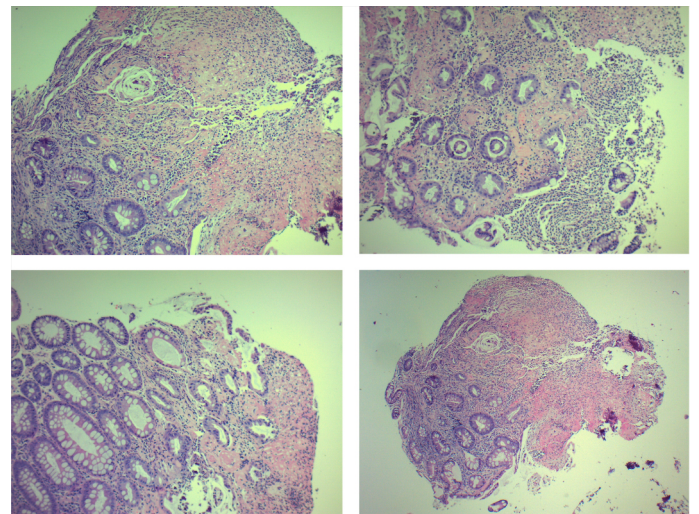


Figure 2 Right colonic biopsies showing acute ulceration, ischaemic changes and fibrin deposition within the stroma

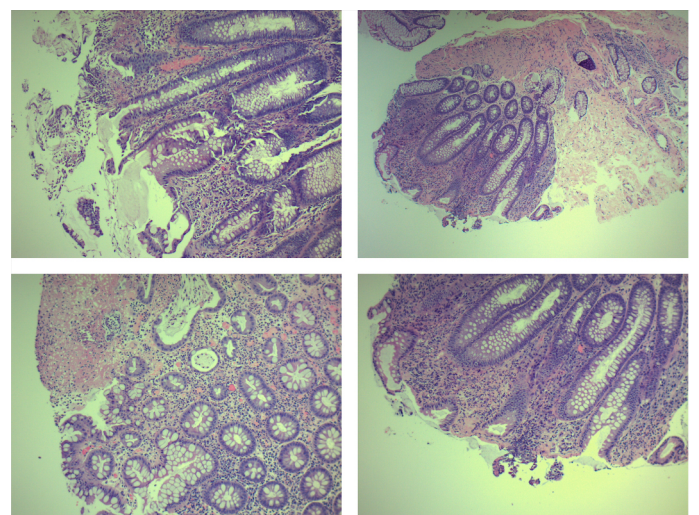


Figure 3 Left colonic biopsies showing similar features to those seen on the right

architecture with foci of acute surface ulceration and an inflammatory infiltrate in the underlying stroma. Faecal calprotectin levels were also markedly elevated at over 2000µg/g (normal range <200µg/g). Prednisolone was thus increased to 40mg daily.

Despite treatment with high-dose steroids, symptoms persisted, leading to consideration of infliximab. A repeat endoscopy performed after two weeks of high-dose steroids, showed similar histological features of severe inflammation as the previous endoscopy. It also confirmed the absence of CMV infection by a lack of viral inclusion bodies and a negative immunostain. The exclusion of infective causes and primary inflammatory gastrointestinal disorders strengthened the working diagnosis of drug-induced colitis. Symptoms improved gradually during treatment with high-dose steroids, with complete resolution at six weeks post-cessation of MMF. Clinical improvement was also reflected by biochemical normalization of inflammatory markers and faecal calprotectin levels. Steroids were gradually decreased to maintenance levels and the patient remained symptom-free on maintenance immunosuppression as per local protocols for post-transplantation patients. Infliximab infusions were withheld in view of maintained clinical response to steroid-only therapy.

DISCUSSION

Mycophenolate is an immunosuppressive medication that has been used to prevent acute allograft rejection since the 1990s. Mycophenolic acid (MPA) is available as two formulations, mycophenolate mofetil (MMF) and enteric-coated mycophenolate sodium (EC-MPS). MMF is a prodrug that enhances MPA's bioavailability, while EC-MPS aims to reduce gastrointestinal adverse effects, primarily diarrhoea, by delaying MPA release into the small intestine instead of the stomach.^{1,2} Consequently, switching from MMF to EC-MPS is typically the first-line approach when GI tolerability becomes an issue with MMF. Unfortunately, at the time of this case, EC-MPS was not available locally, and obtaining it would have taken months, making this strategy unfeasible for our patient.

Mode of action of MMF

MPA is a potent inhibitor of lymphocyte proliferation. It inhibits inosine monophosphate dehydrogenase (IMPDH) which is the rate-limiting enzyme in de novo synthesis of guanosine nucleotides in lymphocytes.³ Other fast-replicating cells in the body, like the gastrointestinal (GI) epithelial cells, partially rely on IMPDH to proliferate. While the exact pathogenic means by which MPA causes diarrhoea is unclear, it is hypothesized that MPA affects GI epithelial cells in a similar way to lymphocytes, inhibiting their proliferation, disrupting fluid absorption, leading to diarrhoea.

MMF-related colitis

In a cohort of post-transplant patients treated with a tacrolimus and MPA-based immunosuppression, diarrhoea was reported in up to 45% of patients.⁴ Post-transplant diarrhoea is a challenging symptom to treat. Possible causes include viral infections such as CMV, iatrogenic injury secondary to MMF, post-transplant inflammatory bowel disease (IBD) or ischaemic colitis. Due to the clinical overlap between the above syndromes, it is suggested that a biopsy is obtained to differentiate between the aetiologies.⁵

A wide spectrum of histological changes may be seen in MMF-associated colitis, however, important microscopic clues that point towards MMF-related colitis, include a mixed pattern of injury (typically a combination of crypt apoptosis, isolated crypt damage and architectural distortion) and possible proximal accentuation of pathologic changes. The need for clinical correlation and follow-up is emphasized by the occurrence of dual pathology in patients treated with MMF.⁶ The diagnostic hallmark of MMF-related colitis is an IBD-like histological pattern in association with increased epithelial apoptosis, while apoptotic cell death seems to be a potential pathogenetic factor of mucosal injury.⁷

There are no well-established protocols currently available on how to treat MMF-induced colitis, likely due to the overlapping and highly variable nature of the clinical syndrome. Therefore, case reports are the main body of knowledge to guide clinicians.

Case reports of previous MMF-induced colitis show that symptoms improve after decreasing the dose of

MMF or discontinuation. In a recent literature review, 12 out of 13 cases responded to such measures.⁸ The remaining case was a highly resistant colitis where an infusion of infliximab was necessary to reduce the stool frequency. A systematic review found that 98% of the cases of mycophenolate-induced colitis resolve within 20 days of discontinuation of the MMF.⁹ This contrasts to the reported case where symptoms resolved after 48 days of discontinuing MMF.

CONCLUSION

While MMF-induced colitis typically responds to simple measures like dose reduction or drug withdrawal, resistant cases can occur with an increase in the duration and severity of symptoms. In refractory cases, alternative therapeutic interventions are considered such as immunomodulatory or biologic agents. While MMF-induced colitis is the most likely cause of gastrointestinal symptoms in renal transplant patients receiving MMF, dual pathology may also occur, therefore alternative diagnoses must be thoroughly investigated. As there are no established guidelines in the management of these resistant cases, there is a need to highlight these difficult cases to aid in management and investigation, and to treat in a timely manner as symptoms can become debilitating.

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