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EDITORIAL

Editorial

Avoiding Omega

Simon Attard Montalto

The pandemic goes on – smouldering along in developed countries, Malta included, whilst still disseminating widely in other countries. Those countries that have achieved a semblance of control have done so by means of a combination of measures including social distancing, barriers to droplet spread and vaccination. The latter is, undoubtedly, the key measure whereby control of this pandemic can be achieved.[1] Nevertheless, a sizeable minority including otherwise well-informed individuals (doctors included!), continue to scaremonger against vaccination. In a nutshell, COVID 19 vaccines do have adverse effects but, in the vast majority of cases these are minor and no different from those associated with a host of other routine and widely accepted vaccines. More serious adverse events are rare to extremely rare, and no more common or slightly increased compared with naturally occurring events (such as myocarditis, reported in 4.4-12.6 cases/million with the first and second Moderna vaccines, respectively, and resulting in 1 death in every 5 million persons [2]; and thrombotic events observed in 417 cases in 24 million doses with the AstraZeneca vaccine, with 72 deaths [3]). No country can claim the accolade 'COVID-free'. Those that have achieved a respectable level of control and have relaxed restrictive lock-down measures, usually receive a wake-up call before returning to a semblance of 'normality'. In this regard, Malta was doing well, primarily as lessons from earlier over-zealous premature 'relaxation' were heeded, combined with an aggressive programme of vaccination. Credit is due to all those involved in policy decision, implementation and adherence. Unfortunately, Malta like all other countries, was not immune to Omicron and this latest variant, with its enhanced transmissibility, soon pushed the daily case-load to record figures within a space of a few weeks. Although very rigorous and, at times, draconian measures are required to achieve pandemic 'control', Omicron has highlighted how difficult it is to sustain this. Even if Malta's vaccine coverage continues to improve (it is already one of the best worldwide), this

Cover Picture:

'Early morning in the Doge's palace courtyard'

Pencil

By Alexander Manché

Alexander Manché founded the Cardiothoracic Unit in Malta in 1995, having trained in the UK and the US for almost 20 years.

He also pioneered the transplant programme, mitral valve repair and minimally invasive aortic valve surgery. He was responsible for training the new generation of surgeons.

His interests include art, music, travel and medical history.

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will still not be sufficient to keep Malta 'off the hook'.

COVID19 like other RNA viruses such as influenza and HIV, has a great propensity to multiply and mutate. Predictably, any mutations that confer a significant biological advantage will rapidly ensure that the newly mutated form will become the dominant virus type in circulation. These have been defined by WHO as Variants of Concern (VOC) and, to-date, there have been 5 major VOCs.[4,5] Hence, the acquisition of more efficient spike proteins on the B1.1.7 (*alpha*) variant that emerged in the UK in September 2020 increased its infectiousness by 50%. This variant soon took over in Europe from the originator B.1.17 virus that first emerged in Wuhan at the end of 2019. Similarly, the B.1.359 (*beta*) variant first reported in May but emerged in October 2020 in South Africa, the P.1 (*gamma*) variant from Brazil in November 2020, and B.1.617 (*delta*) variant reported in India in October 2020, all went on to become the major players in large parts of their originator country and/or continent. The delta variant was about 60% more transmissible than the original pathogen,[6] and rapidly spread pan-globally from where it emerged in India. To-date, these four main variants all demonstrate enhanced infectiousness but with variable increases in disease symptomatology, morbidity and mortality and, consequently, have resulted in mild to moderate strain on healthcare resources.[4] The same is true for the latest VOC, B.1.1.529, *Omicron*, first reported in South Africa in November 2021 that, with its multiple mutations conveying enhanced spike protein adherence, is far more transmissible.[7] Luckily, this has not been combined with increased aggressiveness and, on a background of increased population protection (through natural infection and vaccination), has not resulted in the collapse of health services.[7] However, this status quo can only be sustained provided the new variants remain vaccine-sensitive. This proviso is absolutely paramount and has been the case with, for example, the Pfizer-BioNTech, Moderna and AstraZeneca (and other) vaccines and the B.1.1.7 (UK/*alpha*) variant, where similar or slightly reduced vaccine effectiveness was reported compared with the original virus.[8] In contrast, the same cannot be said for the B.1.359/*beta* variant, where vaccine-effectiveness is reduced across the vaccine range and may be as low as 10-60% compared with the original virus.[9]

Many other variants, defined as Variants of Interest (VOIs), have been under investigation by WHO since 2020, and given the sequential Greek letters *epsilon* (B.1.427/429, USA, June 2020), *Eta* (B.1.525, Nigeria, December 2020), *Iota* (B.1.526, USA, November 2020), *Kappa* (B.1.617.1, India, October 2020) *Lambda* (C.37, Peru, December 2020), and *Mu* (B1621, Colombia, 2021).[4,10] (*Nu* and *Xi* were skipped). These variants demonstrate increased viral transmissibility with decreased neutralising antibody titres, although to a lesser degree than the five main variants and, crucially, retain susceptibility to current licensed vaccines.[4,10] The ultimate concern would be, of course, the emergence of yet another variant that is, this time, immune to current vaccines. This would throw the pandemic crisis into reverse if not free-fall once again, and although vaccine programmes would now have the advantage of pre-existing technology, they would be playing catch-up with all the negative connotations on health, health services, businesses, travel, etc. The economic and health costs of the pandemic have been estimated upwards of $375 billion per day, so that any 'pandemic-reversal' would be disastrous.

The aim must be, therefore, to prevent new strains in the first place and this will only occur if viral-replication is curtailed. Unfortunately, the global reality is just the opposite for the following reasons: some countries are still reporting exceeding low vaccination rates (some below 10% of the population), difficulties producing and distributing

vaccines, active misinformation campaigns, and persistence of multiple hot spots where large numbers of people are crowded together in poorly sanitised environments.[11-12] This scenario provides for uninhibited viral multiplication and widespread transmission amongst susceptible individuals that, as has already been observed, is rapidly transferred onto the world stage, with the ever-present risk of further mutations. Ultimately, this means that no country is safeguarded regardless of its own level of vaccine-coverage. Upping the protection of the vulnerable, however defined, by, for example administering a third booster dose as opted for by Malta is, in itself, commendable. However, this and all the good work over the past eighteen months will be futile in the face of a new, vaccine resistant VOC. There is, therefore, an urgent need to increase coverage in developing countries without delay. This must be the strongest argument in support of COVAX, and for those countries that have access to vaccines to donate significant numbers to poorer countries.[13] This needs to happen urgently before health services worldwide will have to deal with a vaccine-resistant strain. Indeed, every effort is required to avoid this eventuality, whether it may be *pi, rho, sigma* . . . or even *Omega*!

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Corinthia Group Prize in Paediatrics, 2021

The Corinthia Group Prize in Paediatrics for 2021 was awarded to Dr Sara Rapa, who obtained the highest aggregate mark over the combined examinations in Paediatrics in the fourth and final year of the undergraduate course. Whilst offering our congratulations to Dr Rapa, we would also like to congratulate all those who performed admirably during the undergraduate course in Paediatrics. In the accompanying photograph, Dr Rapa is seen receiving her prize from Professor Simon Attard Montalto, Head of Paediatrics, both complying with COVID 19 regulations! Finally, the Academic Department of Paediatrics and Medical School remain indebted and are extremely grateful to the Corinthia Group for their ongoing support.

Professor Simon Attard Montalto

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ORIGINAL ARTICLE

Safe school reopening under COVID-19 restrictions – measures implemented in San Andrea Independent School in Malta

Stefania Bartolo, Victor Grech, Elizabeth Grech

Introduction

Social distancing mandated by COVID-19, so as to slow viral spread, resulted in school closures in 2020. Reopening schools could be safe if accompanied by precautionary measures. This paper describes the events leading up to school closures in Malta with reference to San Andrea Independent School, and the measures and contingency plans created by the school during Malta's soft lockdown and summer holidays for safe school reopening.

Methods

The school's approach was summarised and almost one year of surveillance is presented.

Results

San Andrea has had 11 COVID-19 cases between March 2020 and the time of writing (March 2021). Only one of these cases was via transmission within the school.

Discussion

Schools in Malta closed in March 2021 due to a resurgence in COVID-19 cases. This resurgence was potentially partly attributed to the paediatric age group who manifest high transmission rates due to the UK variant (B.1.1.7), a highly transmissible strain. Schools have since reopened and there have not been any new significant clusters attributed to schools. Malta's ongoing rapid vaccine rollout controlled helped to restrain the pandemic.

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Introduction

COVID-19 remains a pandemic. Public health measures, including social distancing and school closures, have prevented millions of infections and deaths.[1,2] The rationale behind school closures is a precautionary principle in that many previous epidemics (e.g. influenza) were transmitted by children.[3] However, school closures have negatively impacted working parents, with economic consequences.[4]

There are equally pressing concerns regarding the impact on children's mental and physical health if children fail to return to school.[5] These include increased risks of childhood obesity,[6] and the exacerbation of wealth inequality and childhood poverty.[7]

Thus far, it has been estimated that children are circa half as susceptible to COVID-19 infection as adults and are less severely affected, often presenting with milder symptoms.[8] For these reasons, it has been suggested that reopening schools could be safe if accompanied by precautionary measures.[9]

Schools in Malta are of three types: free state schools, church schools and independent (fee paying) schools. All schools had to adapt to reopening after the summer holidays despite the possibility of outbreaks that may lead to quarantining of classes or even entire schools.[10,11]

This paper describes the events leading up to school closure with reference to San Andrea Independent School in Malta, and the measures and contingency plans created during Malta's soft lockdown and summer holidays 2020 for safe school reopening. The results vis-à-vis actual COVID-19 cases will also be presented.

Methods

School guidelines were created by San Andrea and these have been modified so as to be presented in conventional journal format.

When the first case of COVID-19 was documented in Malta, all students who had been on vacation for the Carnival holidays/mid-term were asked to self-quarantine for 14 days upon arrival. Hand sanitizers were set up around the school and students were encouraged to bring their own. Signs were placed around the school to remind both students and adults to wash or sanitize their hands, with diagrams on how to do this effectively. Teachers and the school nurse took time to show younger children how they should wash their hands and reminded them regularly to do so. Step by step instructions on how children and staff should wash their hands were placed above each sink in the bathrooms. Only disposable paper towels were made available in the bathrooms.

Software

Schools in Malta were closed on 13th March 2020. Prior to school closures, San Andrea had commenced preparations for an online learning environment with a Virtual Learning Environments Tech Team. This team provided support, coordination and drafted contingency plans due to the very fast transition to online learning. Earlier in February, Microsoft Accounts were rolled out to students and to members of staff in Senior School (ages 11 to 15), Middle School (8 to 10 years) and Early Years (2 to 8 years). Microsoft TEAMS was the obvious choice for older students. Senior students were asked to follow a timetable with hybrid lessons - live and recorded while teachers were available on TEAMS to answer any queries and to give feedback when needed. The younger pupils utilised Class Dojo since the interface of this particular software

environment suits the needs and preferences of a younger generation.

The first weeks were used to familiarise teachers and families with the software. A Microsoft-based account was given to every student from pre-nursery to Grade 7 and this gave families access to Microsoft Outlook, Microsoft TEAMS and a wide range of other free Microsoft Services (including the free Online version of Microsoft Office). Teachers started to go live and timetables were issued.

Extra Support

The transition brought many challenges. Some children struggled both academically and emotionally. Counsellors were available to support families. Support sessions were timetabled for students who were struggling in any area of the curriculum. Children who needed constant support were followed by Learning Support Educators (LSE) who worked not only with their own students but also with others who needed support. Parents of children who struggled were called regularly to monitor progress and find solutions.

Further Training

After an initial four-month period of adaptation to a new system of teaching and learning, webinars were organized for additional training in the virtual learning environment. Table 1 shows the sessions given, with emphasis on the flipped learning approach which shifts the classroom from passive to active learning, focusing on higher order thinking skills so as to further engage students in learning. Students are given opportunities to take greater responsibility for their own learning and class time focuses more on exploration, meaning and application of knowledge with teachers providing learning opportunities, and feedback.[12]

Table 1 Training webinars for educators and families in summer 2020

Training for Educators
How to create and record a lesson for a flipped learning approach
How to use various digital applications
How to present the lesson as a flipped classroom
How to apply particular apps or features in specific subjects
Dealing with misconceptions of Blended Learning
Lesson plan phase 1 & 2 – explicit instruction and modelling
Lesson plan phase 3 & 4 – skills application and feedback
How to use Teams and Class Dojo as a main repository
Q & A session – Feedback from the educators
Discussion of the way forward within the three proposed scenarios
Mindfulness – responding to and dealing with the anxieties of our students due to COVID-19
Training on MY SCHOOL – the new online system
Training on how to protect themselves and observe hygiene protocols during the upcoming scholastic year
Nurses and SMT – training on how to wear and remove protective gear
Vertical Meetings between grades to analyse and plan for continuity within the grades/departments
Training for Parents and Students
Training on Teams and One Note for Senior School
Training on Teams and Class Dojo for Early and Middle School
Training on how to use the Tablets in Senior School
Webinars discussing the struggles and anxieties caused due to COVID-19 – Preparing for the upcoming scholastic year

E-LEARNING

Parents who remained concerned about sending their children to school were given the option of E-learning with live streaming of lessons made available so that the timetable could still be followed in real time together with students physically present at the school. Students were able to hear the lesson and the whiteboard contents would be projected on their computer screens at home. Homework was uploaded and corrected. Teachers from Nursery till Grade 4 used Class Dojo while older classes operated on TEAMS. Students could return to school physically at any time. The E-learning facility allowed for flexibility which proved useful to students who needed to be quarantined during the course of the scholastic year.

Students in Grades 8, 9 and 10 in Senior School were asked to buy a touchscreen tablet with a detachable keyboard, a digital pen and a digitizer, to enable them to do their schoolwork, follow online sessions, and hand in homework, regardless of whether the students were physically at school or following from home. Students in Grade 11 and 12 were given the option of bringing their own devices from home.

Teachers scanned their booklets and were asked to create handouts and worksheets as editable PDFs. These booklets and worksheets were made available on the students' tablets, as soft copies, removing the need for purchasing them as hard copies. This has the added benefits of a lighter school bag, and a reduced amount of printed material, which was also part of the school's conscious effort to be more environmentally friendly. The school is currently also looking into purchasing the licences of digital books, so as to have school books available online in the future.

Understanding that the tablets were an added expense during these fraught times, the school reached an agreement with the local Bank of Valletta, through which the tablets could be paid in monthly instalments. In order to facilitate matters, parents could pay though the school and not have to go through banks.

The school also invested in teachers' resources. Teachers were provided with new laptops, which were compatible with the new interactive whiteboards that were installed during school closure. They were also given headsets to enable them to communicate with their students following lessons online, and graphical tablets were bought, to ease the marking of homework.

PHYSICAL PRESENCE AND E-LEARNING

The classes across the school were spacious enough to accommodate all children at a 1.5 metre distance. Floors were clearly marked to ensure that all desks remain at this distance. Perspex was installed to separate students.

Teachers were given the option of either delivering live lessons, or using the flipped classroom approach wherein the recorded lessons or explanations were sent as homework and teachers would be available online for the students during lesson time to help them with their work.

SAFETY

The objectives of the school were updated to include additional enhanced safety precautions to minimise the risk of COVID-19 spread. Public Health Advice was rigorously adhered to and adapted for the school and its opening with other schools in September 2020. This included maintaining a social distance of 1.5 metres between all persons in the school. A log of everyday activities was kept throughout the scholastic year, as well as a log of

the contacts of each and every child and staff member for contact tracing purposes.

School entry

A number of criteria for not attending school were also put in place. These included symptoms of COVID 19, a temperature above 37.2°C at school entrance, being in quarantine or in self-isolation, or having been in contact with a COVID-19 positive person within the last 14 days. If a household member travelled abroad to a country listed by public health as being in the red zone, students were required to remain at home for 15 days after the person returned from their trip. When students visited a red-zoned country, they were required to quarantine for 15 days before returning to school.

Temperature-taking also took place before students boarded school transport. Temperatures above 37.2°C and children who looked visibly unwell were not allowed on school transport. Parents who transported their children to school were asked to check their children's temperature before leaving home.

Students and staff members on antipyretics were not allowed to go to school under any circumstances. Staff members were equipped with a kit at the start of the scholastic year which included a visor, a reusable mask, hand sanitizer and antibacterial wipes.

All those entering the school were required to wear their own protective mask or visor and have their temperature checked. Children with temperatures above 37.2°C or with COVID-19 symptoms were referred to the nurse and kept in isolation until they were picked up within an hour. Staff at the door screening students upon entry were given a list of individuals who were required to present a COVID-19 free certificate upon their arrival.

Parents were asked not to crowd the public areas adjacent to the school. Students were to enter school immediately upon arrival, have their temperature checked, use hand sanitiser and proceed to their class and designated desk.

Perspex barriers were placed around desks of teachers and administration staff. Plastic curtains were installed except in nursery and grade 1, creating a protective barrier between the students in their bubble and the subject teachers who come in to deliver a lesson, thus creating a safe passageway.

Family measures

Before leaving home, families were asked to ensure that all materials brought to school had been wiped down, sanitised and contained in a single bag. Students were to bring material which was strictly needed for the day. Neither parents nor third parties were allowed into the school. Parents were asked to ensure that children had a clean mask and container to put the mask in whilst in class, as well as sanitizer, and tissues. Parents were to wash cloth masks every day. Children were to bring their own hand sanitiser. Parents were told to remind children to wash their hands frequently at school, to avoid sharing anything with friends, to cough and sneeze into a tissue or elbow and to avoid touching their face, eyes, mouth and nose.

On return from school, parents were advised to remove their children's uniforms immediately and to bathe or shower their children. This was then to be washed daily along with cloth masks. Students were given permission to wear their P.E. kit rather than their formal uniform, as it easier to clean. Parents were advised to wipe down all materials returned home, including school bags, shoes and books.

Social distancing

Two metre distancing markers were placed on the floor to remind students about social distancing. One-way traffic systems were enabled through the use of the main staircases and the fire escapes. Signs were placed strategically along the walls to remind students of these measures.

Masks

Both staff and students were expected to wear a face mask upon entry to school and on transport. Masks were to be worn at all times in corridors and common areas. Students in Early and Middle School were allowed to remove their masks in class. Students in Senior School were required to wear a mask at all times in the presence of all others.

Clinics

Three separate clinics were set up in Early/Middle and Senior School respectively. Entry to clinics required a mask.

First clinic – for minor injuries not related to COVID-19.

Second clinic – for those children who showed symptoms of COVID-19.

Third clinic – Isolation room for the children with COVID-19 symptoms. These children were to remain there until they were picked up by their parents.

Personal protective equipment (PPE) was also available for the Nurse or any member of staff in the case of a possible COVID-19 case. PPE available included gloves, masks, visors, aprons and disposable gowns. Indeed, nurses were trained in the use of single use protective clothing.

Children taking regular medication were not sent to the school clinic for administration – the school nurse went around instead. All staff had been trained on how to deal with health and hygiene protocols and how to safeguard themselves and the students under their care.

Hygiene and ventilation

Door handles, stair rails, table tops, desktops, keyboards, and other surfaces were cleaned frequently during the day. All cleaning tasks were carried out with a mask and single use gloves. The school was cleaned twice a day with an additional deep cleaning at the end of each week.

Windows were kept open to maintain adequate ventilation. Air conditioning and heating was kept to a minimum and filters were regularly sanitised.

Soft furnishings, soft toys and items which could not be easily cleaned and disinfected were banned from classrooms. Tables in Early School were changed in order to enable social distancing within the class.

Bathroom capacity was clearly marked on their entrances. Areas where social distancing could not be maintained, such as sinks, had Perspex dividers erected. Each class was allocated a bathroom to use. Teachers were also designated specific bathrooms for their use.

Children in quarantine/ill

Children in mandatory quarantine were only allowed back to school on the advice of public health authorities. When a child was noted to be ill, the teacher/LSE was asked to phone the nurse or the school management team (SMT), if the former could not be reached. The symptoms were relayed and in obvious non-COVID cases, the nurse attended to the child in class or wherever the child happened to be, in order to avoid queues at the clinic. In potential COVID-19 cases, the nurse/SMT were instructed to wear personal protective equipment before going for the student in their classroom and the child would be taken to an isolation room to

await pickup within one hour. The student was not allowed to enter the school without a negative COVID result and siblings were not allowed to return to school without public health affirmation.

Well Being

Counselling services were made available to all students. The purpose was to enhance the development of the student, to encourage personal growth, to empower them towards positive change and to see to their well-being. This service was available to individuals, groups or even a whole class. Counselling was also available indirectly through working with and supporting the parents/guardians.

Student counselling was available for students in an acute crises or planned through a referral. As the service was in high demand, the students may have been placed on a waiting list, or referred to the Personal, Social and Career Development (PSCD) teacher. Phone calls, TEAMS, Skype, Zoom and WhatsApp were the main means used for communication and they also continued to function throughout the summer holidays. From September 2020, the service continued online or face-to-face.

Students were taught accurate and updated information about COVID-19. Students were also regularly taught strategies to deal with anxiety and teachers were trained in mindfulness to teach students techniques to deal with fears and anxiety.

Support groups were also organised for parents and children who stayed home due to vulnerability. Other support groups were available for parents of children with specific needs.

Meeting staff

Meetings with members of staff were held by appointment online via agreed channels only.

Assemblies and mass activities

No physical assemblies were held in playgrounds due to social distancing issues. General assemblies were held twice weekly via TEAMS. All mass activities (Sports days etc.) were held in line with the guidelines issued by the Health authorities at the time. The library was closed; there was no book-borrowing and the library was instead used as a classroom. However, library sessions still took place the same way as other subjects (see below). The use of the 'Libby App' , a free app that allows users to borrow eBooks and digital audiobooks from public libraries, was encouraged.

Alternate day start

Classes were split into two groups and these groups were asked to attend school on alternate days for the first few days. This was done to allow each group (group A and group B) to acclimatise. Siblings were asked to attend on the same days.

Drop off

Students were to exit school transport/cars wearing masks (students aged 3+) and walk straight to their respective main entrance. Nursery children were dropped off at the nursery gate. Nursery children, teachers and LSEs entered the school premises from the Nursery gate.

Students from Grade 2 to Grade 12 were dropped off in the car park where supervisors were present to take care of them and take them in. Grade 1, Grade 2 and Grade 3 students, teachers and LSEs entered the school premises from the main door of Early School.

Grade 4 and 5 students, teachers and LSEs entered the school through the gate in the Grade 5 playground. Grade 6 and 7 students, teachers and

LSEs entered the school through the playground gate next to the offices.

Leaving school

Middle school students going home with school vans were asked to wait outside school under the canopy.

Children picked up by parents and nursery children were picked up from the same place they were dropped off. Grades 1- 3 parents were asked to collect their children from their respective classes. Four parents at a time were allowed to enter school premises. Students in grade 4 to grade 7 were to remain in their respective classrooms and the exit procedure was coordinated by the supervisors. For Senior School, students were to remain in the class of their last lesson. For those taking school transport, van numbers were called out on the school PA system. A member of staff was present in each corridor to ensure that students left the classroom in an orderly manner, keeping appropriate social distancing. Students returning home with parents were to exit at staggered classroom intervals once school transport had left. Parents were required to be punctual and were advised not to linger on school premises once they had picked up their children.

Extra-Curricular Activities and Flexible Learning Programmes

No extra-curricular activities were offered except for religious catechism lessons which took take place online. Flexible Learning Programmes (FLO) took place within the same bubble of students and in the same class. Nursery teachers conducted these sessions for their respective classes.

Evacuation Procedures

Evacuation procedures remained unchanged but students were to be staggered once they reached the assembly points.

Corridor traffic

Corridor traffic was kept to a minimum, in order to ensure that all students remained within their bubble. Masks were to be worn in the corridors. No physical contact was allowed. Social distancing was followed by floor markings. Distancing markers were placed on the floor to remind students about social distancing.

Breaks

Breaks were staggered to avoid classes meeting in the playgrounds and in the corridors. A two-minute interval between the exit/entrance of one class and the next was set up. In case of bad weather, breaks were to take place indoors in the class's respective common areas or in the classroom itself, as specifically timetabled. The staff room and canteen were available for use with social distancing measures in place. The staffroom's capacity was clearly marked at the entrance. Educators were given the option to purchase products from the canteen online and these were delivered to them. Similarly, students wishing to buy food from the canteen were to place an online order for any food that required cooking or preparation at the canteen, for first and second break. The food ordered was taken up to the students' class by canteen personnel. There was no seating available at the canteen.

Delivery of the Curriculum

Internet (Wi-Fi) was provided by the school. All students were to remain in their respective class throughout the day. The number of children per

class depended on the measures issued by the health authorities. Social distancing was respected at all times. All students had designated chairs and places could not be changed. In all classes, plastic curtains and Perspex dividers were installed to help with social distancing. No extra furniture in class apart from the teachers' cupboards was allowed.

'Full Class' Scenario

In the event of a full class scenario, all students were required to come to school. The class teacher was responsible for helping students respect social distancing at all times. The class teacher was able to live stream or record if needed.

'Digital Learning' Scenario

In the event of digital learning, teachers were to conduct live sessions on TEAMS/Class Dojo. Small group online sessions and whole class online sessions took place each and every week depending on the age of the students. As for the younger grades, groups were split up into smaller numbers. A structured time-table was issued for all students to follow in case of digital learning or a flipped classroom approach.

The following procedures apply to the two scenarios mentioned above. All educators and all students were asked to have their camera on during all lessons. Free tech auditing was given to all teachers. A graphical tablet and a stylus pen were also given to all teachers and LSEs. Attendance was taken on a daily basis. Members of the school senior leadership team were included in every class on TEAMS.

Subject Details

Students in Grade 10, 11 and 12 had core subjects, such as Maths, English, Maltese, Religion and Environmental studies delivered in their 'home class'. Some movement of students occurred during option subjects, wherein part of the class left for a practical subject, whilst another group of students had their lesson delivered in the 'home classroom'. Some students may simultaneously have listened to their option lesson online. Subject teachers carried out live sessions from their respective class and the students followed the lesson from their main classroom.

The exceptions were Art, Home Economics, PE, Science and Drama. Students sanitized their hands each time they entered and left a classroom. Students who did not follow regular lessons of Maltese but followed the Maltese as a Foreign Language programme (MFL), Italian students who followed the Italian Language and Culture course, and foreign students who had Module Sessions as an alternative learning programme to Maltese, had sessions in a separate classroom. Practical lessons, such as Chemistry, Physics, Biology and Science were held in the school laboratories. Home Economics, Art, Computing and ICT were held in their designated classrooms. Students were required to wear masks during these sessions. PE and games were held outside, in the pitch and on the track, with appropriate social distancing measures.

Classes for PSCD, Art and Home Economics were divided into two groups and given sessions simultaneously in two separate rooms. Students remained in same class bubble but in smaller groups. Students taking Art, Design or Graphical were asked to get all their material as no sharing/borrowing was allowed. PSCD lessons were not broadcasted live but teachers were available for some individual sessions with the students if needed.. All work (except for practical subjects) was handed in to teachers as soft copies via TEAMS or One Note as requested.

Students who did not take Religion as a subject were asked to remain in their home classroom and to work from there, as there was no physical space for them to move elsewhere. Grade 10 Students who did not take Maltese were taken out of class during some of these lessons and had alternative lessons by different teachers. Support teachers previously took children out of class in groups or offered support within the class. This year, students were taken out individually and were required to wear a mask during these sessions.

Results

San Andrea had 11 COVID-19 cases between March 2020 and the time of writing (March 2021). Only one of these cases was via transmission within the school. Four were in Primary School (3-9 years of age) and seven were in Senior School (10-16 years of age). Public Health authorities tackled these cases differently.

The whole class and their family members were placed in mandatory quarantine in Primary School cases. Teachers in these classes were also placed in quarantine given that they would have spent over 6 hours interacting with the children.

In Senior school, students were only placed in quarantine if they were seated less than two metres away from the index case. Hardly any teachers were placed in mandatory quarantine since their time in each class did not usually exceed 1.5 hours.

The school itself was proactive in that the school instantly and independently (from Public Health) also contacted all children and adults in contact with a positive case. Furthermore, although students were not necessarily in sufficiently close contact to mandate quarantine, the affected classes were still temporarily closed and students and their siblings followed school online.

Teachers in contact with a positive case were asked to stay home for at least five days and return to school after presenting a negative COVID swab test on the fifth day.

Any children who did not attend school for any reason were not allowed back to school without a medical note from their doctor. In the case of actual illness, they had to be symptom-free for 48 hours prior to returning to school. If children returned to school without a certificate, they were sent straight to the school nurse and the parents were called to pick them up.

Discussion

The number of children with active COVID-19 in Malta peaked on 03/03/2021, one week prior to the record number of total Malta daily cases of 510 on 10/03/2021. A partial lockdown was imposed which included school closures. In late March, over 260 children were infected with COVID-19 (10% of all active cases) and numbers started to decline slowly at most ages apart from the 0 to 5-year age group which remained constant. These continue to exhibit milder symptoms when compared to adults. It is thought that this paediatric upsurge was due to the so-called 'UK variant' (B.1.1.7) which is a highly transmissible strain.[13]

As cases declined,[14] schools reopened after a one month partial lockdown and there have not been any new significant clusters attributed to schools. The administration of an effective paediatric COVID-19 vaccine should also facilitate this. The early observation in the course of the pandemic that children are much less likely to experience severe illness than adults remains true. However, this has created an incorrect perception that children are less susceptible to infection and do not play a substantial role in transmission.[15]

It is important to note that the role of children in transmission is not yet fully understood, although the relatively small number of outbreaks reported among teaching staff to date suggests that spread of COVID-19 within educational settings may be limited.[16]

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ORIGINAL ARTICLE

A global overview of COVID-19 outbreaks in schools

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Introduction

COVID-19 remains pandemic and public health measures included school closures following a precautionary principle in that many previous epidemics (e.g. influenza) were mainly transmitted by children. This paper reviews school outbreaks to date, including in Malta.

Methods

The internet and the medical literature were searched for reports of school outbreaks of COVID-19 and measures implemented in efforts to contain school spread.

Results

Schools in several countries experienced outbreaks and some were related to insufficiently strict measures while others were due to older children and adolescents flouting restrictions. The different measures employed by different countries in their schools are displayed.

Discussion

With adherence to the usual measures, schools can open safely with minimal risk to their communities in areas of low COVID-19 transmission. Vaccination is probably the ultimate solution to pandemic control.

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Introduction

COVID-19 remains pandemic since its initial global spread in January 2020.[1] It is only public health measures, such as social distancing (which include school closures) and vaccination, that have prevented millions of infections and deaths.[2-4] School closures followed a precautionary principle in that many previous epidemics (e.g. influenza) were mainly transmitted by children.[5] This is supported by a few studies, and for example, a temporal association was found between state-wide school closure and lower COVID-19 incidence and mortality. However, some or all of these reductions may have been related to other public health interventions.[6]

These closures have greatly impacted parents, especially working parents, with significant economic consequences.[7] In addition, there are equally pressing concerns regarding the impact on children's mental and physical health,[8] including increased risks of childhood obesity.[9] Furthermore, wealth inequality and childhood poverty is further exacerbated in less privileged children who are unable to attend school.[10]

It has been estimated that children are about half as susceptible to COVID-19 infection as adults and they generally appear to be less severely affected, displaying milder symptoms than the general population, especially when compared to the elderly.[11] Furthermore, up to a short while ago, there was little evidence that children were significant COVID-19 spreaders and it had been suggested that reopening schools could be considered safe if accompanied by precautionary measures.[12]

A *Lancet* systematic review up to April 2020 included sixteen papers. The authors noted that school closures in 2003 due to the related SARS virus that spread throughout mainland China, Hong Kong, and Singapore in 2003 probably contributed very little to the control of the epidemic. They also noted that modelling studies of COVID-19 predict that school closures alone would prevent only 2-4% of deaths, a much smaller value than other public health measures.[13]

A *British Medical Journal* review from December 2019 to May 2020 included fourteen papers and these showed that 15-60% of children were asymptomatic and 75%-100% of cases were from family transmission. School transmission via children did not appear to be a driver of transmission. The study concluded that children are not greater COVID-19 transmitters than adults.[14]

At the time of writing (early 2021), Malta was in partial lockdown as were several portions of Europe.[15] This is because the easing of restrictions led to a resurgence of COVID-19 in a second wave of infections.[16] This paper will review the effects on viral surges due to school openings up to summer 2020 and the effects in Malta thereafter.

Methods

Outbreaks were located *via* an internet search in reputable news portals.

Results

Ireland pre mid-March 2020

There were no identified paediatric COVID-19 transmissions in Ireland prior to school closures on 12 March 2020.[12]

Israel May 2020

Israel completely closed all educational facilities on 13 March 2020. Schools began to reopen (kindergartens, grades 1–3 and 11–12) in small groups on 3 May 2020, with the remaining classes

reopening on 17 May 2020. Schools were required to produce daily health reports and to mandate personal hygiene, face masks, social distancing and to ensure minimal interactions between children in different classes. Students were instructed regarding preventive procedures. Just 10 days later, a high school reported a major outbreak in which the first two cases had no epidemiological relation. The district health office declared 'outbreak status' and this resulted in the closure of schools, isolation instructions and testing. The entire school was tested and 153 (13.2%) students along with 25 staff members (16.6%) were COVID-19 positive. Overall, *circa* 260 persons were infected (including relatives and friends).

The outbreak outcome was overall mild in that 43% of affected students and 76% of staff were symptomatic with fever, cough, headache, sore throat and myalgia with no hospitalisations. It is possible that the outbreak was linked to an extreme heatwave in Israel between 19–21 May (Tuesday to Thursday, all school days). The Ministry of Health exempted schoolchildren from face masks for these three days.[17]

Salt Lake City, Utah, April–July 2020

12 children (≤13 years) from three Utah child care facilities, including an 8-month-old, were infected with COVID-19 and transmission occurred to 12 others including a mother who was hospitalised. 40% of the children did not show any symptoms.[18]

UK June-July 2020

In June 20, 20,500 and 23,400 schools opened with pupil attendance increasing from 475,000 to 1,646,000 by the end of July. Outbreaks were defined as two or more linked cases in one school. 200 children and staff were infected in thirty outbreaks, equivalent to 0.01 per cent of preschools and primary schools in England.[19]

Germany August 2020

Berlin was one of the first places in Germany to reopen schools after the summer holidays. Children were obliged to wear face masks in hallways, during breaks and when they entered classrooms but masks could be removed when they sat in their places and classes commenced. Teachers did not wear masks during lessons.

COVID-19 was reported in at least 41 schools in Berlin, two weeks after 825 schools reopened. Data was scant at the time of writing but Berlin city education authorities reported that hundreds of students and teachers tested positive and quarantined. All age groups were affected including elementary schools, high schools and trade schools.[20]

Dundee August 2020

17 teachers and two pupils at a school in Dundee tested positive, along with three community contacts.[21]

Lanarkshire August 2020

One teacher and two pupils tested positive.[21]

Multiple American Universities August 2020

The University of Alabama reported that more than 550 people (students, faculty and staff) had tested positive for COVID-19 since resumption of in-person classes on August 19. Most cases were from the university's main campus in Tuscaloosa and the city's mayor shut down bars for 14 days and placed restrictions on other establishments. It was also reported that the campus had conducted >46,000 tests with positivity rate of circa 1%.[22]

The University of Southern California (USC) reported >100 positive students at the University Park Campus in Los Angeles and noted that all of these came from "off-campus living environments."[22]

The University of North Carolina at Chapel Hill cancelled in-class instruction after positive cases of COVID-19 shot up dramatically.[22]

The University of Illinois at Urbana-Champaign had one of the most comprehensive plans by a major university to prevent and suppress outbreaks. All would wear masks and the 40,000 students would take tests twice a week with quick, inexpensive saliva tests. Students could not enter campus buildings unless an app vouched a negative test. But these plans failed to account for students partying, resulting in a sudden spike of almost 600 cases in a matter of days.[23]

The *New York Times* summarised the situation in the US succinctly: "The Times has counted more than 81,000 additional cases at colleges since late July; of those, more than 61,000 cases came since late August. Thousands of new infections have been reported in recent days. Some universities just started reporting data, and The Times recently contacted others for the first time."[24]

UK September 2020

Three schools in Teesside in the north-east of England had confirmed cases of COVID: St Benedict's RC primary school in Redcar, St Aidan's Church of England primary in Hartlepool and in Middlesbrough Outwood Academy Ormesby.[25]

France September 2020

France closed 22 of its 62,000 schools after the first week of in-person school resumption. Ten were on the French Indian Ocean island of Reunion. French schools have reported circa 250 suspected virus cases per day since they started reopening.[26]

Malta

A teachers' union estimated the local effect on schools. Official government figures on 15th February 2021 confirmed 2227 cases among educators, students, and school staff since the start of October 2020 i.e. in the 140 days between 28th September (back to school date after summer holidays) and 14th February, an average of 111 school-related COVID-19 weekly cases were reported. In the same period, there was a weekly average of 847 COVID-19 cases. Thus, 14.75% of all cases emerged from schools. The percentage is actually slightly higher as Christmas holidays are not factored in and some schools reopened after the 28th September.[27]

The number of children with active COVID-19 in Malta peaked on 03/03/2021 and this occurred one week prior to the record number of total Malta daily cases (*n*=510, 10/03/2021). This resulted in a nationwide partial lockdown including school closures. In late March, over 260 children were COVID-19 positive (10% of all active cases) and numbers then started to decline at most ages, apart from the 0 to 5-year age group, a cohort that continues to exhibit milder symptoms when compared to adults. It is thought that the paediatric surge was due to the UK variant B.1.1.7 which is considered to be a more highly transmissible strain.[28]

As total cases declined over a one-month period, schools reopened and there have not been any new significant clusters attributed to schools.[29]

Schools reopened thus:

- Monday, April 12: Childcare centres, kindergartens, primary schools.
- Wednesday, April 14: Middle schools.
- Friday, April 16: Secondary schools.[30]

Discussion

WHO guidance made available on the 21st August 2020 for children and masks stated that children aged:

- ≥12 years should wear a mask.
- 6-11 years may need to wear a mask if in a high risk area or if interacting with high-risk individuals (e.g. the elderly), with adult supervision. Children should be helped to don and doff masks safely.
- ≤ 5 years should not normally wear masks.[31]

Countries and regions have thus far been inconsistent in their prevention guidelines,[32] but the concept of "bubbles" (large groups of students who although presumably socially distanced, only risk intra-bubble exposure) is increasingly mooted.

France

- No limit on class sizes, and distancing is not compulsory in situations where it would stop a school being able to fit all its pupils in.
- Masks compulsory indoors for staff and students over the age of 11, even if they manage to stay more than 1m apart.
- Schools are no longer required to prevent different classes and groups of students from mixing.
- Schools are encouraged to stagger start and finish times to prevent large groups building up.
- Floors, desks and surfaces that are touched regularly, such as door handles, must be cleaned and disinfected at least once a day.

Italy

- Students will be seated 1m apart and class sizes will be smaller.
- Students will also be divided into various learning groups
- Entry will be staggered and schools will be open for lessons on Saturdays.
- Students and teachers will have to wear masks.
- Teachers will also wear face shields.
- Lessons will be held outdoors where possible or in large spaces such theatres or museums.
- Distance learning will be available for secondary school students who live with vulnerable family members.

Germany

- All are advised to keep hands off banisters when taking the stairs.
- Masks are not obligatory and free testing is available for teachers.
- Classes have been reorganised into so-called "cohorts" of several hundred students.
- There are no social distancing rules within a cohort, but each group has its own area in the school grounds, cloakrooms and canteens.
- In some (not all) states, both pupils and teachers will have to wear masks.
- Some states are making masks compulsory in corridors and other communal areas.

Spain

- Students will maintain a distance of at least 1.5m except for younger children.
- Younger children will be allowed in bubbles of 15 to 20 pupils who will not have to distance.
- Schools will be asked to prioritise outdoor activities and stagger start, finish and break times.

- Masks will be compulsory for over-sixes on school transport.
- Masks will be required for pupils and teachers if distance of 1.5m cannot be maintained, except for children in bubbles.
- School facilities will need cleaning at least once a day, with toilets cleaned thrice daily.

Netherlands

- Students may be exempted from school if they, or somebody they live with, fall into high-risk categories.
- Some schools are mandating masks.
- Schools have been asked to ensure adequate ventilation.

Denmark

- Denmark and Norway were the first European countries to restart primary school children from mid-April and the rest reopened in mid-May.
- Arrival at schools is staggered.
- Pupils are asked to wash hands regularly.
- Children are kept in small groups with as little contact with others as possible.

Children

School outbreaks underscore the uncertainty related to the risk of infection in school settings, despite the insistence of both governments and experts that reopening schools may be safe with strict adherence to adequate precautions.

The overall consensus is that children are not super-spreaders of COVID-19 .[33] Research from Public Health England showed that in schools, two thirds of outbreaks arose from staff-to-staff or staff-to-pupil transmission; staff are therefore far likelier to transmit the COVID-19 virus than children. Outbreaks in schools were likelier in localities that had a high community transmission rate. The implications are that shops and/or bars/pubs and/or restaurants and/or other establishments may need to close in such areas so as to allow schools to reopen or to remain open.[19]

Restarting schools is an important connector of social networks in a global scenario wherein social distancing measures have deliberately disconnected such networks. It has been estimated that reopening schools, especially high schools, could increase the COVID-19 reproduction value (R) by 0.2-0.5.[34] Indeed, the UK chief and deputy chief medical officers have issued a joint statement noting that if the reopening of schools leads to a rise in overall cases and an increase in R, this could require "societal choices" as to what else needs to be restricted. Targeted and localised action may be necessary in areas with high transmission so as to control the driver for any particular outbreak.[19]

Guidelines by the World Health Organization and others have attempted to minimise risks of school re-openings.[8,35] The principles are namely:

- Reopen schools in a staged fashion.
- Incorporate social and physical distancing.
- Ensure availability of infection control measures and efficient testing and contact tracing.
- Protect teachers and vulnerable students.
- Research and evaluation.[8]

Adolescents

The pandemic situation may be exacerbated by irresponsible behaviour at any age.[36] Adolescents seem to be particularly troublesome globally, with their propensity to party.[37-39] For this reason, parties (such as "rave parties") are to be targeted with hefty fines in an effort to dampen these events.[40] It is

almost as if youths ignore the possibility that they may suffer serious morbidity from COVID-19, including multisystem inflammatory syndrome,[41] as well as further spreading the virus in school environments and among vulnerable relatives and contacts. When these youths comprise part of a university campus, the potential for viral spread is naturally multiplied and schools and universities must try to discourage this behaviour. For example, in August, Ohio State University issued >200 interim suspensions following a series of hefty parties wherein the media reported that health and safety rules were mostly ignored.[22] Incidentally, adolescents studying abroad have had educational experiences curtailed, postponed or cancelled by COVID-19.[42]

Teachers

There is also risk to teachers who may fall in one of the high-risk COVID-19 categories or who may be in unavoidable contact with individuals (such as family members) who fall in these categories.[45] One obvious category is advanced age (>55 years) and indeed, a recent study in the United States estimated that more than 18% of all public and private school teachers and 27% of all principals are in this vulnerable age demographic. Private schools are worse off with equivalent values of 25% and 44%, a situation that will inevitably lead to a school personnel crisis.[43]

Conclusion

This paper has only managed to outline the complex, tangled and sometimes contradictory advice and findings pertaining to the reopening of schools in the midst of the COVID-19 pandemic. It is hoped that the rollout of vaccines in adults will stem the spread of COVID-19 even with schools eventually reopening. Additionally, a child-appropriate vaccine will further arrest pandemic spread.[44]

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MMJ

ORIGINAL ARTICLE

The knowledge level and practices on childhood injuries and interventions among parents at home

Navin Kumar Devaraj

Background

There are many common household emergencies that may involve children. These includes poisoning, falls, burns, choking, animal bites, febrile illnesses and febrile fits. Knowledge about preventive measures to avert these accidents at home as well as being familiar with first aid measures may help in preventing further complications and may aid in recovery. Therefore, this study aims to find out the general public knowledge regarding the preventive steps and early emergency steps that can be taken upon emergencies occurring among children.

Methods

A cross sectional study incorporating a questionnaire/instrument that included brief socio-demographic data and 10 questions on common household injuries and emergencies, and either preventive steps or early interventions was used. Questionnaire was distributed among parents attending health talks at the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM) between June 2019 to November 2019. The topics covered were on poisoning, falls, burns, choking, animal bites, high fever and febrile fits.

Results

The total number of respondents was 119 parents. This study overall showed a good knowledge, attitude and practice among the parents towards common emergency inflicting children. Older aged and female parent were found to have more knowledge and positive attitude towards common emergencies among children, respectively.

Conclusion

Group identified as having a lower knowledge, attitude and/or practice should be targeted in future community education programmes to increase the knowledge as well as to inculcate positive attitudes and practices towards identifying and managing common household emergencies among children.

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Introduction

Globally road traffic accidents, fire-related burns, drowning and falls combined, contribute to the top 15 causes of mortality among children aged 0–19 years.[1] In those below five years of age, most injuries occur in the home itself.[2] Domestic accidents have been singled out as a major threat to the safety of pre-school children in many developed countries. For example, in the Netherlands these injuries caused many avoidable deaths in those under five years of age.[3] These accidents contribute to 50,000 children having to be treated in hospital yearly which equates to 6% of all children aged less than five years at the national level. Higher levels of injury morbidity and mortality occur most often among those from a poorer background.[4]

There is a dearth of studies done looking at the practice, attitude and knowledge of parents regarding common household accidents and injuries that can occur in their children such as poisoning, falls, burns, choking, animal bites, high fever and febrile fits and the possible early intervention steps that can be undertaken.

Therefore, this study aims to determines the practices, attitude and knowledge level among parents regarding common household emergencies and injuries and early interventional steps that can be taken. Any gaps identified from this research can help to design an effective educational program to address these flaws.

Methods

A cross sectional study incorporating a questionnaire/instrument that included brief socio-demographic data and a total of 10 questions on common household injuries and emergencies, and either preventive steps or early interventions was used. The topics covered were six core topics on poisoning, falls, burns, choking, animal bites, high fever and febrile fits. There was a total of 4 questions on knowledge and 3 questions each on practice and attitude, with each of topics having 1-2 question each in any of these domains.

Respondents were the general public attending health talks held by medical lecturers from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM) from June 2019 to November 2019. These can include in UPM or outside UPM sites. All attendees were eligible for inclusion, provided that they were parents and aged above 18 years. The topics covered were six core topics on poisoning, falls, burns, choking, animal bites, high fever and febrile fits. The minimum sample size calculated accounting for 20% non-respondents was 97 participants (based on the highest percentage of knowledge question that was correctly answered i.e. 94.4% based on a study by Nadeeya et al, 2016 using the following formula):[5]

$n=\pi(1-\pi)(Z/E)^2 = 0.944(1-0.056)(1.96/0.05)^2 = 81$ parents in which n is the sample size, Z is the standard normal value corresponding to the desired confidence level, π is the prevalence of interest and E is maximum error that is allowed (margin of error).

All statistical analysis was done using the Statistical Package for Social Sciences (SPSS version 23). Total scores were derived from the number of correct answers on three domains of knowledge, attitude and practice. Median scores from the three domains of knowledge, attitude and practice were used to determine the cut offs for good knowledge. Chi-square test or Fisher exact tests were used for the categories or dichotomous predictors.

All analyses were done with 95% confidence intervals (CI), and the level of significance was set at $p<0.05$. Ethics approval was obtained from the JKEUPM (Universiti Putra Malaysia Medical Ethics Committee) prior to commencement of this study.

RESULTS

Table 1 shows the socio-demographic characteristics of the respondents. The total number of respondents who were approached and agreed to participate in this study was 119 parents (100% response rate). The median age of the participants were 33 years. Majority of the respondents were female (80.7%), Malay (97.6%), and non-professional (87.4%). The median number of children were 3.

Table 2 shows the median score of the three domains of assessment. The maximum score for the knowledge, practice and attitude domains were 4,3 and 3, respectively. The median score obtained by the respondent for the knowledge, practice and attitude domains were 3,2 and 2, respectively.

Table 3 shows the factors associated with total knowledge scores. Variables that had a p value of < 0.25 in the univariate logistic regression were entered into the multivariate logistic regression to determine the predictors for higher knowledge score. It was found that being an older parent had a 1.1 time more likelihood to have higher knowledge on common childhood emergencies (95% 1.033-1.260, *p=0.009*).

Table 4 shows the factors associated with total practice scores. Variables that had a p value of < 0.25 in the univariate logistic regression were entered into the multivariate logistic regression to determine the predictors for higher practice score. Even though gender and occupational groups were significantly associated with total practices scores in univariate analysis, none of the factors were found to be significant in multivariate analysis.

Table 5 shows the factors associated with total attitude scores. Variables that had a p value of < 0.25 in the univariate logistic regression were entered into the multivariate logistic regression to determine the predictors for higher attitude score. It was found that being a male parent had a 0.07 time less likelihood to have a better attitude on common childhood emergencies (95% 0.013-0.390, *p=0.002*).

Table 1: Socio-demographic characteristics of the respondents (*N*=119)

Characteristics	Frequency	%
Age, years	Median (IQR, QI, Q3) 33.0(5,32,37)	
Gender		
Male	23	19.3
Female	96	80.7
Ethnic group		
Malay	116	97.6
Chinese	1	0.8
Indian	1	0.8
Others	1	0.8
Occupational group		
Professional	15	12.6
Non- Professional	104	87.4
Number of children	Median (IQR, Q1, Q3) 3(0,3,3)	

Table 2: Median score of the 3 domains of assessments

Domain	Median (IQR, Q1, Q3)
Total knowledge score (range 0-4)	3(1,2,3)
Total practice score (range 0-3)	2(1,1,2)
Total attitude score (range 0-3)	2(1,2,3)

Table 3: Factors associated with total knowledge scores

Characteristics	Knowledge n (%)		Univariate analysis			Multivariate analysis		
	Good (*n*=69)	Poor(*n*=50)	Odds ratio	95%CI	P value	Odds ratio	95%CI	P value
Age, years Median (IQR)	33(7.5)	33(1.25)	1.142	1.039-1.256	***0.006***	1.141	1.033-1.260	***0.009***
Gender								
Male	6(26.1)	17(73.9)	0.185	0.067-0.513	***0.001***	0.265	0.052-1.340	*0.108*
Female	63(65.6)	33(34.4)	ref		*ref*	ref		*ref*
Ethnic group								
Malay	68(58.6)	48(41.4)	ref	ref	*ref*			
Chinese	0(0)	1(100)	0	0	*1.000*			
Indian	0(0)	1(100)	0	0	*1.000*			
Others	1(100)	0(0)	0	0	*1.000*			
Occupational group								
Professional	3(20)	12(80)	0.144	0.038-0.542	***0.004***	0.528	0.070-4.000	*0.536*
Non-Professional	66(63.5)	38(36.5)	ref		*ref*	ref		*ref*
Number of children Median (IQR)	3(0)	3(0.25)	0.894	0.527-1.515	*0.676*			

Table 4: Factors associated with total practice scores

Characteristics	Practice n(%)		Univariate analysis			Multivariate analysis		
	Good (n=69)	Poor (n=50)	Odds ratio	95%CI	P value	Odds ratio	95%CI	P value
Age, years Median (IQR)	33(5)	33(5)	1.004	0.928-1.087	*0.915*			
Gender								
Male	5(21.7)	18(78.3)	0.207	0.071-0.604	***0.004***	807737478.303	0	*0.999*
Female	55(57.3)	41(42.7)	ref		*ref*	ref	ref	*ref*
Ethnic group								
Malay	60(51.7)	56(48.3)	ref	ref	*ref*			
Chinese	0(0)	1(100)	0	0	*1.000*			
Indian	0(0)	1(100)	0	0	*1.000*			
Others	0(0)	1(100)	0	0	*1.000*			
Occupational group								
Professional	5(33.3)	10(66.7)	0.445	0.142-1.393	***0.165***	0	0	*0.999*
Non- Professional	55(52.9)	49(47.1)	ref		*ref*	ref	ref	*ref*
Number of children Median (IQR)	3(0)	3(1)	0.937	0.558-1.575	*0.807*			

Table 5: Factors associated with total attitude scores

Characteristics	Attitude n(%)		Univariate analysis			Multivariate analysis		
	Good (n=69)	Poor(n=50)	Odds ratio	95%CI	P value	Odds ratio	95%CI	P value
Age, years Median (IQR)	33(5)	32.5(5)	1.028	0.910-1.160	*0.660*			
Gender								
Male	12(52.2)	11(47.8)	0.060	0.018-0.202	***<0.001***	0.071	0.013-0.390	***0.002***
Female	91(94.5)	5(5.5)	ref		*ref*	ref		*ref*
Ethnic group								
Malay	103(88.8)	13(11.2)	ref					
Chinese	0(0)	1(100)	0	0	*1.000*			
Indian	0(0)	1(100)	0	0	*1.000*			
Others	0(0)	1(100)	0	0	*1.000*			
Occupational group								
Professional	8(53.3)	7(46.7)	0.108	0.032-0.368	***<0.001***	0.993	0.170-5.810	*0.994*
Non- Professional	95(91.3)	9(8.7)	ref		*ref*	ref		*ref*
Number of children Median (IQR)	3(0)	2(2)	2.868	1.384-5.943	***0.005***	1.452	0.797-2.646	*0.223*

Discussion

Most of the respondents in this study were in their thirties, female, Malay and non-professional. This correlates strongly with the demographic constituent of a typical government institutions.

Majority of the respondent also had 3 kids. This also strongly correlates with the current national survey by the Department of Statistics, Malaysia which estimates the average household members to be around 4.2 members.[6]

In this study, respondents who were older were found to have higher knowledge scores on common childhood emergencies. This is not unexpected as those of older age may have been a parent for a longer period and may have been involved in similar incidents in the past and therefore are more knowledgeable on this topic. This is in agreement with a study by Harere R et al., which showed that that higher knowledge scores were associated with older age, having experience of previous child injuries and also additional factors such as higher monthly income and possibly having taking previous first aid courses.[7]

None of the factors had a significant association with the practice score. This indicates that most

parents will do their best in emergency situations, prioritising the safety of their child. This agrees with a systematic review which states that parents will seek emergency department help if they find even a slightest risk to deterioration in their child 's health, worldwide.[8]

Females were found to have higher positive attitude scores as compared to the male parents. As is well known, female gender tends to be more health conscious and discuss health issues more actively with their friends and relatives. This would have possibly contributed to the positive findings in this study. These findings are supported by two previous studies which state that woman are more likely to be health seekers as compared to man as well as to actively search the internet more often for health related information.[9-10]

Among the strength of this study is that it is more inclusive as compared to the previous study by Nadeeya et al that included only mothers and the large sample size that has the required power.[5] Limitations remains that only parents attending the teaching sessions were included, thus limiting the generalisation of this study's finding.

Conclusion

In conclusion, this study overall showed a good knowledge, attitude and practice among the parents towards common emergency affecting children. Older aged and female parents were found to have more knowledge and positive attitude towards common emergencies inflicting children at home, respectively.

The group identified as having a lower knowledge, attitude and/or practice should be targeted in future community education programmes to increase the knowledge as well positive attitudes and practices towards identifying and managing common emergencies among children.

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MMJ

ORIGINAL ARTICLE

The journey of Malta's public healthcare service during the first 12 months of the COVID-19 pandemic

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Background

COVID-19 was a global shock, causing challenges to many countries' healthcare services. This paper provides a summary of Malta's healthcare system journey during the COVID-19 pandemic with its initial preparedness for COVID-19 pandemic and the impact of COVID-19 on the service during the first 12 months of the pandemic.

Methods

A literature search was conducted using Google and reviewing Maltese online newspapers. A comprehensive summary of internal operations conducted at Mater Dei Hospital, the country's only acute general hospital, was provided by the Chief Operating Officer.

Results

Several infrastructural changes including the increase in bed capacity and ITU areas were instituted in preparation for the pandemic. The health system showed resilience during the first wave. However, the situation was more precarious during the second wave. The end of December 2020 saw the start of the Covid-19 vaccination rollout, with over 30 health system hubs offering this service across the islands. Simultaneously health professional's burnout is on the rise as resources and workforce are overstretched.

Conclusion

The collaborative effort between the guidance provided by the Public Health Authorities and the hospital's multi-disciplinary team have been pinnacle during the pandemic. However, the future of the healthcare system is heavily dependent on the population's behaviour, timely measures, the vaccination rollout and the type of immunity acquired through vaccination or infection.

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Background

The novel virus SARS-CoV-2 was a global shock and huge disruptor, causing huge challenges to all healthcare systems and services. Health care systems are responsible for the health of their constituents, improving, maintaining and restoring their health status. They are also responsible for the provision of a number of health care services including primary care, hospital care, prevention and control of diseases, health work planning, health promotion as well as improving the social determinants of health.[1] All of these system entities were strained as the COVID-19 pandemic ravaged the globe. Indeed, during the first Covid-19 wave (Spring 2020), a number of healthcare systems collapsed while other European countries showed resilience such as in Malta.[2-3] The second wave and its consecutive waves ravaged the globe (from Summer 2020 onwards) leading to yet another strain on many healthcare systems, including Malta's.[4] This review is aimed to provide a comprehensive summary of the national healthcare system journey during the Covid-19 pandemic with regard to (i) its initial preparedness for COVID-19 pandemic and (ii) the impact of COVID-19 on service across the first 12 months of the pandemic.

Malta's pre-COVID-19 healthcare system

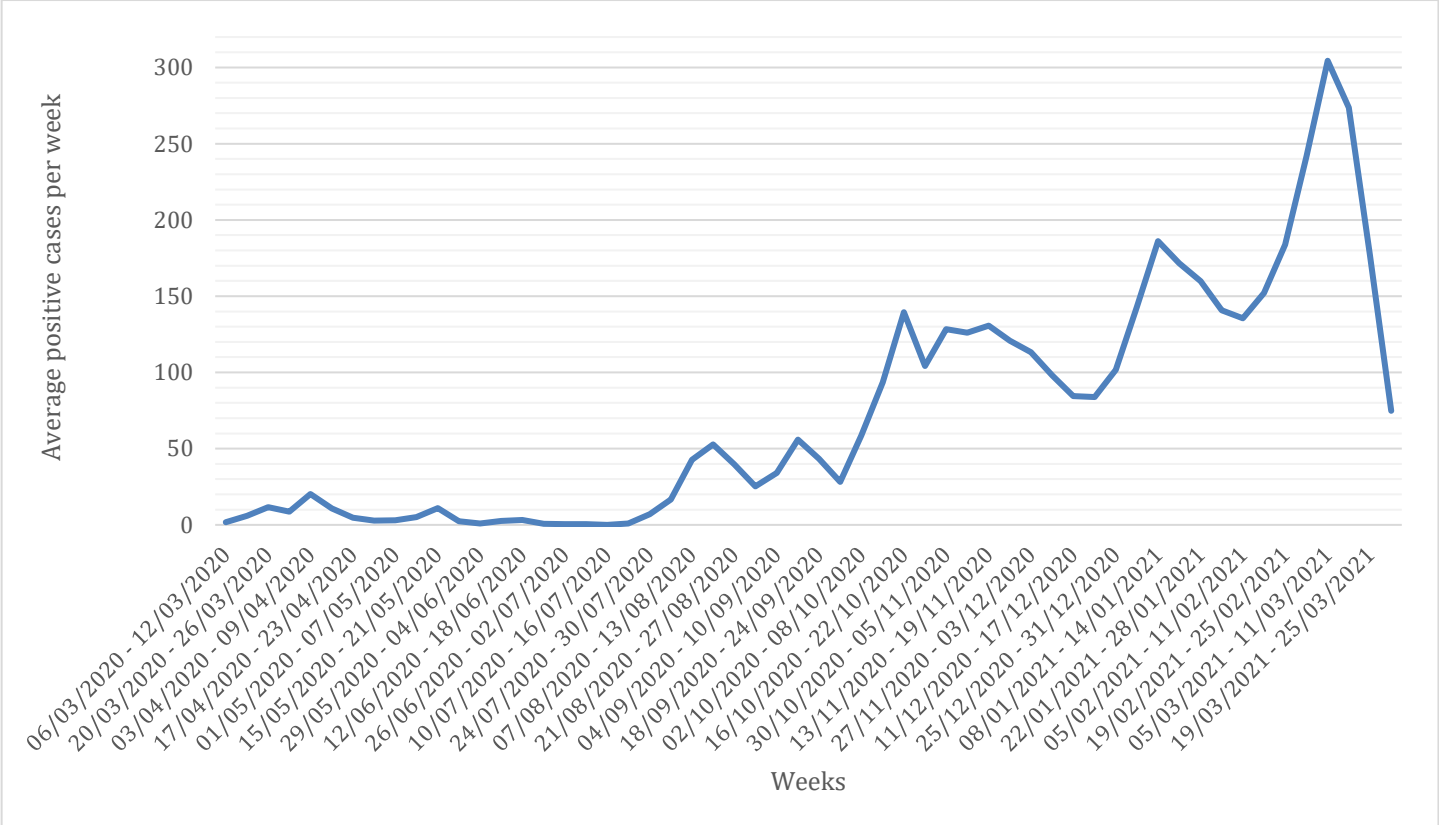
The healthcare system of Malta is a tax-financed National Health Service (NHS) available for all residents covered by social security legislation or humanitarian exemption. The main provider of public health services is the Ministry of Health, with the private sector providing complementary services especially for primary care and specialist consultations. The public health sector provides free at point of care services including inpatient hospital care along with associated medication and three day post-discharge medications.[5] The island of Malta has one state acute general hospital (Mater Dei Hospital) that caters for both secondary and tertiary care along with an acute Accident and Emergency department. The hospital caters for a total population of approximately 460,171 inhabitants.[6-7] Ten primary healthcare centres are also dispersed across the islands, and provide a comprehensive primary care service as well as outreach specialist adult and paediatric clinics, immunization, national screening services and school health service, all also free at point of care.[6]

Restructured Health Systems in Malta for COVID19

As COVID-19 hit Northern Italy in January 2020, Malta was already in direct communication with public health authorities in China, through the WHO Office, in order to prepare for a COVID-19 outbreak.[3-8] Indeed, in preparation for the potential surge in-patient admissions due to COVID-19, the hospital underwent rapid expansion of both the clinical and critical care areas following a redesigning and restructuring strategy to utilize existing spaces.[9-10] The number of intensive care unit (ITU) beds were increased from the pre-COVID-19 twenty-bedded capacity to a 100 bed capacity, by converting clinical areas into ITU beds. [11] The number of ITU beds continued to increase, with a total of six ITU areas set up, to accommodate potential high admission rates among the Maltese population (Figure 1).[12] The original pre-COVID ITU area was restructured to cater for COVID-19 patients. As part of these contingency plans, a number of non-clinical areas (such as the Medical School library, lecture and seminar rooms and the staff canteen) situated within the building of Mater Dei Hospital were converted into temporary wards. These areas underwent structural changes and were patient-ready within three weeks. The number of hospital beds and facilities to be used for COVID-19

cases rose in line with the COVID-19 recommendations by the World Health Organization (WHO) European Regional Office.[13] By the end of March 2020, more than 600 additional COVID-19 beds were available within Mater Dei Hospital and other off-sites hubs recruited from other private health care facilities.[14] COVID-19 positive patients requiring hospitalisation were treated in rooms either with their ventilation system modified to produce negative pressure with respect to the corridor or with standalone fan filter units equipped with HEPA filters. A strong room was constructed to accommodate potentially violent or criminal COVID-19 cases.[15] Donning and doffing areas for personal protective equipment complete with mirrors for self-checks were made available in all COVID-19 areas.[15] The hospital lifts were designated as COVID/non-COVID in order to prevent spread within these enclosed spaces. Considering that oxygen supply forms part of the critical management of COVID-19 patients, an increase in oxygen availability and delivery environments were created.[16] Public open areas including the main hospital's foyer and the outpatient's corridors were all equipped with oxygen points in order to set up additional beds should the need arise.[15] The coronary care unit also underwent renovations as it was equipped with high oxygen flow unit.

Figure 1: Seven day moving average of positive Covid-19 cases over a year (2020 – 2021)



All patients registered at A&E departments were swabbed for COVID-19, as were those patients requiring urgent interventions. Patients pending swab test results were housed in designated transition wards including the 'Management & Assessment of Respiratory Patient's areas' (MARPA). The theatre system also underwent infrastructural changes. Two of the pre-existing theatres were completely isolated from the rest and were to be used in the eventuality that a COVID-19 positive patient required urgent surgery. An increase in the availability of non-COVID-19 emergency theatres and trauma theatres was instituted in order to expedite patients care with an eventual earlier discharge from hospital.

Changes to healthcare services

Similar to other countries such as the Mediterranean Island of Cyprus, Malta created protocols to increase the bed capacity by outsourcing care of non-critical patients to alternative sites as well as temporary halting all nonessential healthcare services during the first Covid-19 wave.[17-18] Indeed, both elective surgery and non-urgent outpatient appointments were postponed during the first wave as a protective measure for the population while releasing more hospital staff for COVID-19 training and escalating the number of vacant beds. The hospital also temporarily suspended all visitation hours for relatives in order to continue safeguarding in-patients and staff.[3] A similar protocol was followed a year later (March 2021) due to an upsurge of cases, as part of the ongoing second wave.[19]

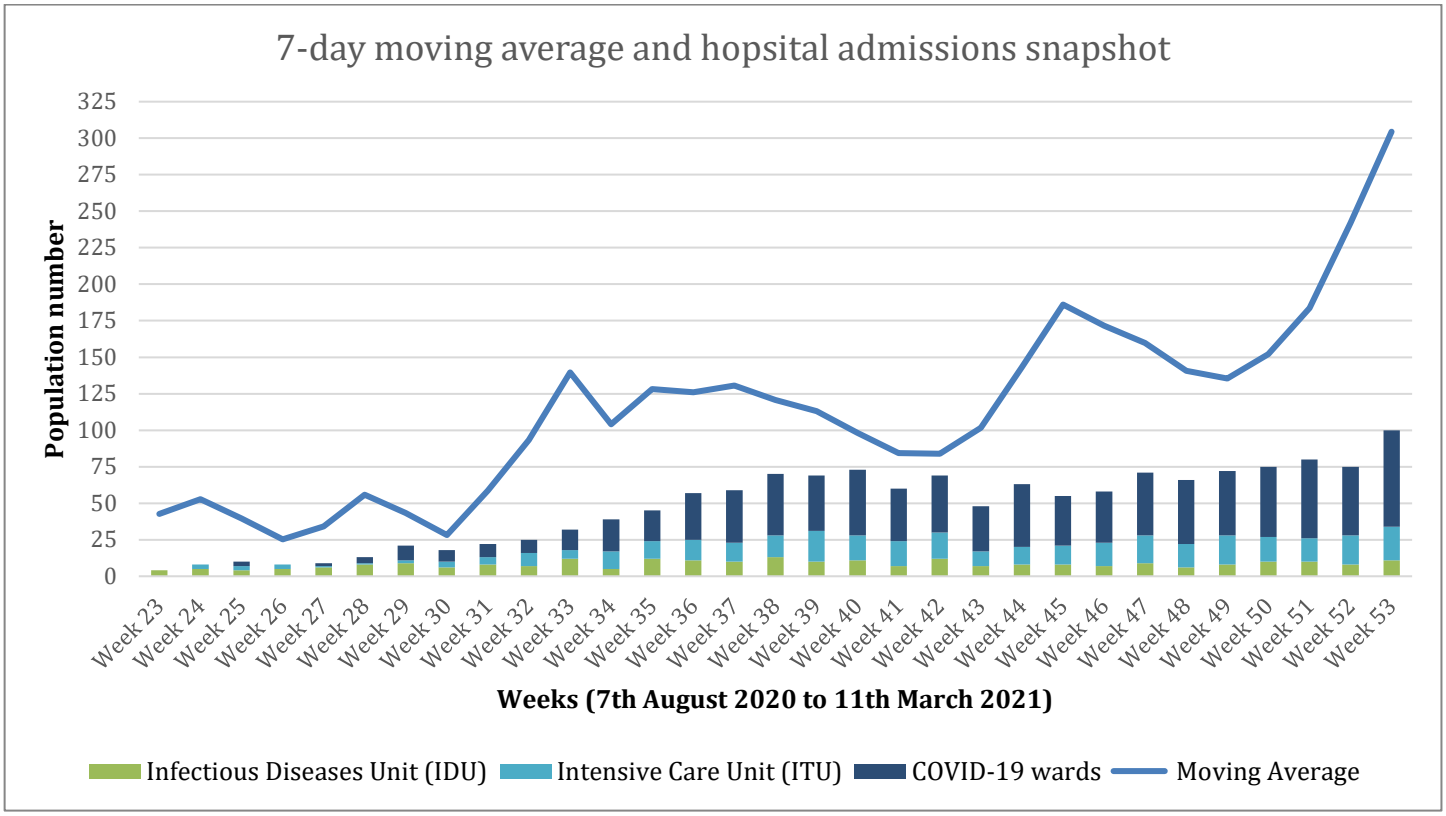
In conjunction with the processes and protocols established for the efficient running of Mater Dei Hospital, the hospital management was in direct contact with the sister island of Gozo. Gozo General Hospital, under the patronship of 'Steward Health Care', initially agreed to transfer all COVID-19 patients to Mater Dei Hospital in Malta for acute care and management. Subsequently, the office of the Medical Director of Mater Dei Hospital actively assisted Gozo General Hospital to set up of their own COVID-19 policies and care facilities for COVID-19 patients.

A quarantine protocol was instituted for the vulnerable elderly. Elderly being transferred from hospital to an elderly residential home were swabbed before leaving the hospital, then transferred to a "transit home or hospital", then transferred again to another quarantine area within the actual residential home.

The Malta COVID-19 situation

On the 7th of March 2020, the first imported case of COVID-19 was reported and was admitted for isolation at Mater Dei Hospital's Infectious Disease Unit (IDU).[3] A low positive case number was reported during the first Covid-19 wave (March to May 2020) and the transition period (May to July 2020), however the situation changed as Malta entered the second wave (August 2020 to March 2021) as shown in Figure 1. [3,20,21] Indeed, the number of admissions to various wards, including ITU, at Mater Dei Hospital increased during the second wave, as shown in Figure 2.[22]

Figure 2 Hospital Covid-19 admissions every Friday and 7-day moving average from the onset of the second wave in Malta



COVID-19 TESTING

Six designated 'Testing Centres' were set up across the island, including one at Mater Dei Hospital, with a free-to-user helpline established. The Pathology Department of Mater Dei Hospital was responsible for providing the results of all the swabs taken either at Mater Dei Hospital COVID-19 testing hub as well as the other allocated swabbing hubs situated across Malta.[3] Initially, the Pathology lab carried out an average of 300 tests daily. However, with an increase in workforce, the number of tests increased to almost 500 daily over four runs at 9am, 1pm, 5pm and 9pm. Later on, with the introduction of a robotic machine within the Pathology lab, testing went up to 800 daily, and has now exceeded 2,000 tests daily. The increase in testing was in line with the advocacy of the World Health Organization Director General that urged all countries to increase their testing capacity among the population so as to pick all positive cases as early as possible and contain hotspots.[23] COVID-19 testing results were digitally disseminated through a designated portal so that caring professionals could be able to take strategic decisions in a timely manner. A rapid test for the detection of COVID-19 antigens or antibodies had also been introduced at the Pathology Department in order to gauge the population's immunity against the virus as well as immunity in recovered COVID-19 cases.

COVID-19 VACCINATION

Covid-19 vaccination roll-out in Malta started at the end of December 2020 at Mater Dei Hospital.[24] A previously designated lecture room within the premises was transformed into the first vaccination hub. Later, selected parts of the hospital's

outpatients were transformed to vaccination hubs to expedite the vaccination process. Additionally, 31 vaccination hubs across Malta and the sister island of Gozo opened as part of the Covid-19 vaccination roll-out.[25] Till the end of March 2021 a total of 197,383 Covid-19 vaccine doses had been administered in Malta.[22]

The health system workforce

The healthcare workforce is the most important asset during this pandemic. Following the European Commission recommendations, a number of measures were taken to protect and support this community.[26] A temperature screening protocol was introduced on the 11th of March for anyone entering the hospital premises as a safeguard measure to the workforce and the hospital's patients. All hospital staff were enrolled to a compulsory training and fitting test of Personal Protective Equipment (PPE) as per acquisitions made through the Central Procurement and Supplies unit.

The health and wellbeing of all staff was imperative during these unprecedented times. Frontlines were at an increased risk for mental health issues [27]. In order to provide support to the staff, a number of support telephone lines were designated for (i) COVID, (ii) Psychological and (iii) Chaplaincy requirements. The COVID-19 staff helpline received over 2,000 calls from staff within the first 30 days of being in operation. Staff were also offered COVID-19 testing on site. The Employment Health and Wellbeing section of Mater Dei Hospital continued to offer services for all staff through remote modalities. A number of sessions were offered including (i) online mindfulness sessions for Mater Dei Hospital administrators and medical staff; (ii) online staff support sessions (iii) online circuit training sessions; (iv) online Pilates session and (v) online yoga sessions. Concurrently, motivational emails were sent out to staff who were in the process of following a weight management programme that was postponed with the onset of COVID-19. A number of motivational thoughts were regularly posted on the Employment Health and Wellbeing social media account.

Conclusion

Although Malta's healthcare system coped well during the first COVID-19 wave, the situation was more precarious during the second wave. The multi-levelled planning and execution, including the increase in the in-patient bed capacity to accommodate COVID-19 patients, an increase in the number of ventilators and ITU beds, while maintaining essential health services are continuously in action. However, the year into the pandemic have affected a number of different sectors including healthcare professionals' morale, as reported elsewhere, with low or very low morale and burnout, as the workforce and other resources are overstretched.[28] The future is unknowable but the healthcare system is heavily dependent on the population's behaviour. Timely restrictions for the population, vaccination rollout and the type of immunity acquired through vaccination or infection will help to transition the country into a new normal.

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ORIGINAL ARTICLE

Evaluation of the obstetric anaesthesia procedures at Mater Dei Hospital in 2019

Glenn Paul Abela, Benjamin Thornton, Petramay Attard Cortis, Paul Calleja

Introduction

The aim of this retrospective study was to investigate all obstetric anaesthesia procedures at Mater Dei Hospital (MDH) in 2019 to better understand the care provided by anaesthetists to parturients.

Methodology

Data was collected from the obstetric anaesthesia logbook, a paper record in which the duty anaesthetist at the Central Delivery Suite (CDS) lists all anaesthetic interventions carried out over the previous 24 hours. All procedures were entered into a spreadsheet and coded. Calculations were then carried out to work out five parameters: the Caesarean section rate, the epidural uptake rate, the regional anaesthesia rate, the anaesthetic intervention number, and the Obstetric Anaesthesia Activity Index (OAAI).

Results

There were 4040 deliveries at MDH in 2019. 1194 lower segment Caesarean sections (LSCS) were recorded in the obstetric anaesthesia logbook and the Caesarean section rate was 29.6%. A total of 966 spinal anaesthetics were carried out, 907 (94%) of which were for a LSCS. 1064 epidural catheters were inserted for labour analgesia, with a 26.3% epidural uptake rate for 2019. There were 109 parturients who required a general anaesthetic. The anaesthetic intervention number was 2350 and the Obstetric Anaesthesia Activity Index was 7.09.

Conclusion

The parameters listed above are described and compared to international guidelines and other descriptive studies. With 2350 anaesthetic interventions in obstetrics, anaesthetists were actively involved in the care of over half of all parturients at MDH in 2019 and this confirms the wide and considerable role anaesthetics has in maternal services provided at MDH.

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Introduction

Obstetric anaesthesia is one of the more important anaesthetic sub-specialties which enables the provision of high-quality care for hundreds of women every year during their pregnancy and around the time of giving birth. One in every 4 women now deliver by Caesarean section and Caesarean section rates continue to increase worldwide.[1] Moreover, many parturients receive anaesthetist-administered labour analgesia and several others require anaesthetic input in the form of pre-delivery assessment and planning, postoperative pain management, support to midwifery care and rarely treatment in intensive care units.[2] Demand for anaesthetic services is set to continue growing especially with an increasing average women's age at the time of birth, maternal preference for Caesarean delivery and epidural analgesia and increasing comorbidities like obesity.[3]

The aim of this retrospective study was to investigate and evaluate all obstetric anaesthesia procedures for 2019 and in so doing understanding the care provided by anaesthetists to women at a crucial time of their lives. This information would also help in the allocation human resources, designing training programmes for doctors and allied health professionals, comparing standards of care with those of other centres abroad and serve as denominator data for other audits.

Materials and Methods

Permission to carry out this study was obtained from the Chairperson of the Department of Anaesthesia and Intensive Care and the Data Protection Officer at Mater Dei Hospital (MDH).

Data was collected from the obstetric anaesthesia logbook, a paper record in which the duty anaesthetist at the MDH Central Delivery Suite (CDS) lists all anaesthetic interventions carried out over the previous 24 hours. This logbook has two important roles: to serve as a database of obstetric anaesthesia procedures done at MDH and to track parturients who need follow-up after delivery. All procedures listed in the 2019 obstetric anaesthesia logbook were entered into an MS Excel spreadsheet and coded. Calculations were carried out using MS Excel.

Five parameters were worked out to understand the anaesthetic workload in obstetrics for 2019: the Caesarean section rate i.e. the number of Caesarean deliveries as a percentage of all deliveries, the epidural uptake rate i.e. the number of epidural catheters inserted for labour analgesia, the regional anaesthesia rate i.e. the number of women receiving regional anaesthetic/s for all indications as a percentage of all deliveries, the anaesthetic intervention number i.e. the sum of regional procedures (spinal, epidural or combined spinal-epidural, CSE) done for labour analgesia and all obstetric operations done in an operating room (including, but not limited to, Caesarean sections, instrumental deliveries and third-stage procedures) and the Obstetric Anaesthesia Activity Index (OAAI), an index based on the number of Caesarean sections and the number of epidurals done in a year.

The OAAI was developed to be able to compare anaesthetic activity between several maternity units which may have very different Caesarean section and epidural uptake rates, and then guide staffing requirements accordingly. The formula for this index is: [(yearly number of LSCS*1.5)+(yearly number of epidurals*0.75)]/365 and assumes that on average a LSCS takes 90 minutes and setting up epidural analgesia 45 minutes.[4]

Results

There were 4040 deliveries at MDH in 2019.[5] 1194 lower segment Caesarean sections (LSCS) were

recorded in the obstetric anaesthesia logbook and this translates into a Caesarean section rate of 29.6%. 900 (75.4%) LSCS were done under a spinal anaesthetic, 191 (16%) using an epidural top-up and 103 (8.6%) under general anaesthetic. This means that 91.4% of all LSCS were done under a regional anaesthetic.

A total of 966 spinal anaesthetics were carried out. The absolute majority (907, 94%) were for a LSCS and 7 of these failed to provide surgical anaesthesia and had to be converted to a general anaesthetic. 59 (6%) were done for other procedures such as manual removal of the placenta and perineal tear repair (see table 1). 13 spinal anaesthetics (1.3%) were carried out after an epidural had already been inserted for labour analgesia but was deemed insufficient for a surgical intervention: 9 of these cases were for a LSCS and another 4 for a perineal tear repair.

Table 1: Distribution of spinal anaesthetics by surgical procedure

Procedure	Number of patients	Percentage
LSCS	907	94.0%
Perineal tear repair	40	4.0%
Manual removal of placenta	17	1.8%
Haematoma exploration	1	0.1%
Examination under anaesthesia	1	0.1%

1064 epidural catheters were inserted for labour analgesia and this results in 26.3% epidural uptake rate for 2019. 211 epidurals done for analgesia (19.8%) were used successfully to provide anaesthesia for a surgical operation, mostly (191) a LSCS (see table 2). No combined spinal epidurals were recorded for either labour analgesia, LSCS or any other operative intervention. The total number of women who received regional anaesthetics was 2017 and the regional anaesthetic rate works out at 49.9%. Very few regional techniques had to be converted to a general anaesthetic: 16 epidurals and 7 spinal anaesthetics. The conversion rate of regional to general anaesthesia works out at 1.1%. These were all cases requiring a LSCS.

There were 109 parturients who required a general anaesthetic and the absolute majority of these (103, 94.5%) were for a LSCS. In 6 cases (5.5%) a general anaesthetic was administered for other procedures (see table 3).

The number of women who received anaesthetic care stood at 2103 (52.1% of all deliveries) of which 247 (11.7%) received two anaesthetic procedures (table 4). None received more than two anaesthetic intervention. Hence the anaesthetic intervention number for 2019 was 2350. The Obstetric Anaesthesia Activity Index was 7.09.

Table 2: Distribution of epidural catheters inserted by procedure. EFL: epidural for labour; LSCS: lower segment Caesarean section; PTR: perineal tear repair; IVD: instrumental vaginal delivery; MROP: manual removal of placenta; SA: spinal anaesthetic; GA: general anaesthetic.

Procedure	Number of cases	Percentage
EFL only	824	77.44%
EFL topped up for LSCS	191	17.95%
EFL topped up for PTR	15	1.41%
EFL topped up for IVD	3	0.28%
EFL topped up for MROP	2	0.19%
EFL converted to SA for LSCS	9	0.85%
EFL converted to SA for PTR	4	0.38%
EFL converted to GA for LSCS	16	1.5%

Table 3: Distribution of general anaesthetics administered by procedure. Bakri balloon: an intrauterine device used in the management of postpartum haemorrhage by rapid providing tamponade in the uterine cavity.[6]

Procedure	Number of cases	Percentage
LSCS	103	94.5%
Manual removal of placenta	4	3.7%
Perineal tear repair	1	0.9%
Bakri balloon insertion	1	0.9%

Table 4: Distribution and description of women who received two anaesthetic procedures. EFL: epidural for labour; GA: general anaesthetic; SA: spinal anaesthetic.

Procedures	Number of cases	Percentage of women received anaesthetic care
EFL then topped up (for any surgery)	211	85.4%
EFL converted to a GA	16	6.5%
EFL converted to SA	13	5.3%
SA converted to GA	7	2.8%
Total	247	100%

Discussion

The number of deliveries in Malta has remained at just over 4000 deliveries every year since 2011. The maternal characteristics reflect a shift to an older age at the time of giving birth and the rapid population expansion due to immigration experienced in Malta recently: in 2018 36.8% of deliveries were in 30 to 34 years age group and 24.5% were non-Maltese nationals.[7-8]

The Caesarean section rate observed in this study (29.6%) is comparable to the average observed in southern Europe (30.7%).[1] At 91.4%, regional anaesthesia uptake (i.e. administering a spinal anaesthetic or topping up an epidural) for Caesarean delivery is very good and compares well to the Royal College of Anaesthetists (RCoA) and Obstetric Anaesthesia Association (OAA) standard.[9] However, the type of anaesthetics administered according to urgency of the case could not be described as this is rarely documented. Regional anaesthesia for elective LSCS (category 4) should be above 95% and more than 85% for urgent cases (category 1 to 3, which are defined as 1: threat to the life of woman or foetus, 2: no immediate threat to life of woman or foetus, 3: early delivery required).[10] The RCoA/OAA definition for the rate of conversion from regional to general anaesthesia for LSCS includes all regional anaesthetics attempted, irrespective whether or not they were used for an operation, since procedures carried out to provide analgesia should be reliably converted to provide surgical anaesthesia. This is why our conversion rate works out at 1.1%.[9]

The epidural uptake at 26.3% is similar to that observed at the MDH CDS in previous years: 26% in 2014 and 28.4% in 2017.[11,12] However, these figures were the result of studies involving data collected over a few weeks and did not take into account all epidural catheters inserted for 2014 or 2017. In contrast, this exercise included all epidurals done in 2019. Therefore, the epidural uptake rates for 2014 and 2017 could be approximations. The 26.3% uptake is also lower than rates reported abroad: 31% in UK, 37.2% in France and 65.1–73.1% in the US.[13,14,15] It must be noted that these are national averages and a great deal of variation exists between different centres within larger countries. In one European study, the epidural uptake rate

ranged from 0 to 98%, depending on the type of delivery unit, the level anaesthetic support available and the case load complexity.[16]

The OAAI was developed in Israel to address anaesthetic staffing inadequacies within maternity units. OAAIs for Israeli obstetric units in 2007 ranged from 1.97 to 24.14. Our OAAI of 7.09 roughly translates to 6 to 7 anaesthetic interventions per day and suggests a moderately busy delivery suite at MDH.[4]

There were a few limitations to this study. Data was collected for only one year, and therefore the results do not describe any trends in obstetric anaesthesia over a longer period of time. It relied entirely on one source of data, that is the obstetric anaesthesia procedures logbook, and if for some reason an anaesthetic intervention was not documented in it, then it was missed in this study and the numbers quoted above may involve a slight underestimation. In fact, the official MDH surgical activity report for 2019 lists 1220 Caesarean sections, a discrepancy of 6 such deliveries. Even though the obstetric anaesthetist is meant to record all LSCS occurring during his/her on-call in the logbook, including those carried out in the Major Operating Theatres (and therefore, outside the CDS), some of these could have been missed.[17]

Also, the level of urgency of operative cases was very rarely described in the obstetric anaesthetic logbook. This is especially true for LSCS: very few cases had their category documented. This makes it impossible to describe in detail regional anaesthesia uptake by LSCS category and the conversion of regional to general anaesthetics. Finally, this study focused only on procedures to provide anaesthesia and analgesia, however, anaesthetists contribute much more in obstetric care, including the assessment of high-risk parturients and the planning of their delivery, post-procedure reviews, management of critically ill women both in the CDS and the ICU and support with vascular access. Drawing conclusions on obstetric anaesthetic workload based on anaesthetic procedures alone, as also described by the OAAI, does not give an accurate and full description of the anaesthetist's role in a maternity unit.

This study sheds light on what other initiatives can be carried out to further evaluate and improve the obstetric anaesthesia service. Firstly, an effort should be undertaken to ascertain the quality of the data being recorded and if this matches other hospital data-collection systems such as operating theatre records. Anaesthetists should be encouraged to document cases in more detail, especially the level of urgency of the cases undertaken, as this would then give more in-depth information on the anaesthetics administered to parturients in our unit, especially the variations in practice dictated by the urgency of delivery. A joint effort between obstetricians and anaesthetists should be undertaken to categorize LSCS (categories 1 to 4). Also, a system to electronically record epidurals and the complications arising from them should be implemented. This would then make it much easier to monitor and regularly audit the epidural analgesia service. Given a comparatively low rate of epidural uptake, women's perception of epidural analgesia in Malta is another area of possible investigation, especially to see if there are any perceived barriers to access timely and safe epidural analgesia.

Conclusion

With 2350 anaesthetic interventions in obstetrics, anaesthetists were actively involved in the care of over half of all parturients at MDH in 2019. This confirms the wide and considerable role anaesthetics has in maternal services provided at

MDH and should prompt continued allocation of personnel, technical resources and regular training and audit programmes for all doctors and allied health professionals involved.

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ORIGINAL ARTICLE

The impact of part-time employment on students' health: A Georgian Case

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Objective

During the university studies, students not only acquire knowledge but are actively involved in various activities and part-time employment. Students employment may have effects on their physical or mental health as well as learning performance. The purpose of this study was to examine the relationship between part-time working, health and academic performance.

Method

An analytic cross-sectional study was conducted in Caucasus University (Georgia).

Results

The majority of the undergraduate students (61%) had part-time jobs. The average duration of the working hours was 18 hours in a week. Most of the students (76%) believed that the main reason for employment was financial necessity to earn additional income to support their families and payment of expenses incurred. Most students have chosen simple part-time jobs that did not relevance for future career. According to the students, their sleep disturbance reasons was the difficulty of combining work and study, which has a negative effect on their physical and mental health, and therefore on academic performance (44%).

Conclusion

Universities must implement flexible, accessible and targeted supporting activities in achieving their educational and career goals. Increasing awareness of mental and physical health issues could also be delivered to students to enhance their experience.

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INTRODUCTION

During the university studies, students acquire not only knowledge but are actively involved in part-time employment. Part-time employment means any additionally work, besides major activities and learning. The scale of the part-time employment of students is characterized by a growth trend. By the mid-2000s almost 50% of students in the US were employed, while in the 1970s they were only a third (34%).[1] A similar situation is observed in Europe, where the share of such students varies from 48% (in France) to 77% (in the Netherlands).[2] Studies in British universities have revealed that 70-80% of students have a paid job.[3] In Russia, according to various studies, the number of employed students is 65-85%.[4]

The part-time employment of students depends on the teaching course, the specialty, the territorial location of the higher education institution (in the capital and large cities the employment market is bigger). Students have different motives for part-time employment.[5-7] The primary motivation for part-time employment is pragmatic and is meant to satisfy their material needs. It is particularly seen in developing countries, where families have limited financial aid for students, as a result of the socio-economic crisis.[8-9] Most students work because they want to get additional resources for their own needs. In some low-income countries the main motivation of student's part-time employment is family support.[10] Part-time employment of students in European countries is mainly related to the need to get funding for higher education.[11]

By taking on occasional jobs, students which strive for career growth, recognition, prestige may gain valuable work experience and enhance their future opportunities in the labour market.[12] If related to their field of study, student employment has even a larger positive impact on labour market outcomes in the form of lower risk of unemployment, shorter job search duration, and higher wage.[13] The job gives opportunities for expanding relationships and business contacts, accumulating experience, acquiring new friends and development of communication, teamwork and time management skills.[14]

Combining academic studies with paid work also has negative consequences. According to researchers, employed students have problems with balancing the workload they take on and obligations related to their studies.[15] Employment at full-time students hinder their academic achievement and limits the time for studying.[16] They are less likely to study successfully at university because their work takes too much time and energy.[17] Secondary jobs have a negative effect on the quality of teaching, especially those students who work over 35 hours,[18] or more than 15 hours in a week.[19]

According to studies, students work-related problems affect health, cause constant stress, anxiety and social integration deficit.[20] This includes changes in energy, lack of sleep, appetite, loss of interest or pleasure in activities, difficulty concentrating, and feeling sad, empty, hopeless, worthless, or guilty.[21] Student population have significantly lower levels of mental health,[22,23,24,25] which was related to working part-time and working longer hours.[26]

The aim of the research is to analyze the student part-time employment in three aspects: demand and reason of part-time employment, health status of student in part-time employment, effects of part-time employment on students, especially on students' health and learning process.

Materials and Methods

An analytic cross-sectional study was conducted. In November 2019, the questionnaire was emailed to a representative sample of Year 2 full-time undergraduate students (*n*=700) from Caucasus University (Georgia).

The survey instrument was a semi-structured questionnaire. The questionnaire was based on a combination of literature review and specificities of students at Caucasus University. In order to access the difficulty of the questionnaire, 15 pilot interviews were initially conducted.

Survey instrument was trying to assess socio demographic profile of students (such as: age, gender, employment status, working position & working hours per week). In addition, survey instrument was constructed in a way to evaluate student's demand and reasons of part-time employment, attitude of students regarding employment. Results are summarized.

Data Collection and Analysis. After the questionnaire had been established, the information of students was collected by a convenient sampling method. Data entry and analysis were done using Microsoft Excel and SPSS.

Ethics. The study was approved by the Ethics Committee of the Health Policy Institute of Caucasus University. The protocol was in accordance with the declaration of Helsinki. Students were informed of the purpose of the study prior to administration of the questionnaire. An informed consent was taken from each participant. Those participants who did not agree to participate in the study were also excluded from the study.

Results

Three hundred twenty-two students (46%) returned questionnaires. The mean ages of the respondents are 20 for males and 19.3 for the females (range 18 years to 25 years). Fifty-six per cent (*n*=112) of respondents were female and 44% (*n*=88) were male.

Sixty-one per cent (*n*=200) of the respondents had part-time jobs, and of these 16% had more than one job. Thirty-nine percent (*n*=122) of students without a job were trying to get a job.

The duration of the working hours varied from 2 to 50 hours in a week, and the average duration was 18 hours in a week. Majority of students (57%) were working at least part-time, from 10 hours to 20 hours a week (Table 1).

Students were asked to indicate where they were working. Of those that have part-time jobs (*n*=200), the majority worked in the retail (48%) and food and drink industry (45%). A small number worked in call centres and the University (7%) (Table 2).

Students were asked to assess their reasons for working. Financial necessity (*n*=152, 76%), free for extra cash for fun (46%, *n*=92), improving personal and social skills (*n*=72, 36%) were cited as most important. Professional studies and relevance of job for future career was cited least (Table 3).

According to the majority of students, part-time work affected their academic performance (44%, *n*=88) and some had to work a night shift 3-4 times a week (*n*=144, 72%). Only 32% of students studied more than 3 hours in a day (*n*=64). Nearly a third of respondents say that they did not have enough sleep or in other words have a sleep deprivation (*n*=168, 84%). Majority of respondents agreed that their sleep disturbance reasons was the difficulty of combining work and study (*n*=88, 44%). According to study, employed students believed that sleep deprivation had a negative effect on their physical and mental health. Health problems, which are caused by sleep deprivation are: irritation and bad temper (46%), decrease concentration (52%), headache (38%),

fatigue (44%), deterioration and unpleasant feelings (32%), chronic fatigue syndrome (48%), memory impairment (40%), nervous system disorder (32%), stress (56%), pressure increase (12%), fainting (6%), lost productivity (46%) (Table 3).

Table 1: Demographic profile, employment and working position & working hours per week of students

	n=200	%
Gender		
female	112	56%
male	88	44%
Age		
18-19	36	18%
20-21	48	24%
22-23	52	26%
24-25	64	32%
Working hours per week		
10	50	25%
20	65	32.5%
30	44	22%
40	36	18%
50	5	2.5%

Table 2: Where are students working?

Retail	%	Food and drink	%	Other	%
Supermarket	18%	Bar/pub	13%	Call centre	5%
Shop	11%	Restaurant	12%	University	2%
Clothes shop	8%	Catering	6%		
Department store	5%	Hotel	3%		
Retail other	3%	Fast food	9%		
Petrol station	3%	Club	2%		
Total	48%	Total	45%	Total	7%

Table 3: The effect of part-time employment according to student reporting

The reasons for the part-time employment:	**N=200 yes**	**%**
Financial necessity	152	76%
Raising social connections	64	32%
Improving personal and social skills (soft-skills)	72	36%
Professional studies	44	22%
The job is relevant to my future career	42	21%
Free time use for extra cash for fun, going out, etc.	92	46%
Other	2	1%
Results of Part-time employment		
I work night	144	72%
I have less time for learning	132	66%
If you'll give more attention to the studies I have learned well	100	25%
I spend for learn more than 3 hours a day	64	32%
I can not complete all homework	104	52%
The reasons of employed students' sleep deprivation		
Sleeps 4-5 hours a day	64	32%
Sleeping in 6-7 hours a day	88	44%
Not enough sleep	168	84%
sleep disturbance reason is difficulty of combining work and learning	88	44%
sleep disturbance reason is work	76	38%
sleep disturbance reason is study	24	12%
do not have a similar problem	12	6%
Health problems, which are caused by sleep deprivation		
Irritation and bad temper	92	46%
Decrease concentration	104	52%
Headache	76	38%
Fatigue	88	44%
Deterioration and unpleasant feelings	64	32%
Chronic fatigue syndrome	96	48%
Memory impairment	80	40%
Nervous system disorder	64	32%
Stress	112	56%
Pressure increase	24	12%
Fainting	12	6%
Lost productivity	92	46%

Discussion

Part-time employment appears to be an essential element of the overall student experience. According to the survey, more than half of the respondents have a part-time job and the mean number of hours that students spend working per week is 18 hours. Experts recommend that students work no more than maximum of 10 hours per week,[27] which is reasonable balance between the need of students to supplement their basic income and the interests of their educations. According to these survey students are clearly working more than this recommendation. In this respect, it is more important to educate students how to manage time, to help balance both their studies and part-time work.

According to the survey, most of the students believed that the main reason for employment was financial necessity to earn additional income to support their families and payment of expenses incurred. These are similar to findings reported by other authors.[28] The survey indicated that most students have chosen simple part-time jobs (in the retail and food and drink industry) that did not relevance for future career. They do not pay adequate attention to factors such as improving professional education and soft-skills. Consequently, these types of work do not require specialized skills gained by the students at the university, and conversely, do not offer them any particular experience which could increase their employability after graduation. Lack of correspondence between the study programmes and the types of work performed by students were consistent with the results of other studies.[29-31]

Research has shown that the majority of students are very busy with part-time employment and difficulties constitute work and learning combinations. Large loading of non-teaching activities disturbs students from engaging in the learning process. Most of the respondents work in night shifts, which affects their sleep. Sleep deprivation have caused serious health problems (Irritation and bad temper, decrease concentration, headache), which has a negative impact on the learning process. Because of busy schedule, they cannot intensive relationships with friends and family. These results are consistent with the results of other studies.[32-33]

Our findings noted that part-time working have a significant detrimental effect on both mental and physical health of students. Working more hours increases the probability that a student perceives a negative effect on academic performance.

Conclusion

Universities must have an effective policy of employment and must implementing flexible, accessible and targeted supporting activities in achieving their educational and career goals. It is recommended that several measures be implemented to help students, to organize study and part-time work to best effect. This needs to be supported by training in time management skills. Increasing awareness of mental and physical health issues could also be delivered to students to enhance their experience.

The results of the research will be an important source of information for universities, governmental and non-governmental organizations which are involved in the development of employment support policies for students. Further investigation is needed to conclusively establish whether the relationships between part-time working and health exist in the wider university population.

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ORIGINAL ARTICLE

Influenza and COVID-19 vaccine hesitancy in pharmacists and pharmacy students

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Background

In the COVID-19 pandemic, vaccination was identified as being of significant importance to prevent virus spread and to move towards re-introducing normality in everyday life. As the influenza season approached in autumn 2020, the importance of the influenza vaccine was highlighted as a mitigation strategy to limit the consequences and risk of co-infection with the influenza virus and COVID-19. The aim of the study was to evaluate the degree of hesitancy of pharmacists and pharmacy students towards influenza and COVID-19 vaccines in autumn 2020.

Methods

A questionnaire was developed and disseminated online to Maltese pharmacists and pharmacy students to evaluate influenza and COVID-19 vaccine hesitancy.

Results and Conclusion

A total of 136 participants took part in the study where 54% (*n*=73) were pharmacists and 46% (*n*=63) were students. A statistically significant increase in the number of participants who intended to take the influenza vaccine in the current year compared to the number of participants who took the vaccine in the previous year was observed in both student and pharmacist cohorts. Fifty-seven percent (*n*=78) of participants were likely to take the COVID-19 vaccine once available. Reasons for COVID-19 vaccine hesitancy at baseline (prior to COVID-19 vaccines being available) included potential long term side-effects (77%), lack of knowledge (54%) and accelerated process used for the approval of the vaccine (69%).

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Introduction

The COVID-19 vaccine development process is being accelerated by regulatory bodies such as the EMA and the FDA in the US, to address this global pandemic while still meeting safety and efficacy requirements.[14-15] Measures adopted by the EMA to fast-track the approval of the COVID-19 vaccine include rolling review, whereby the EMA starts assessing data as soon as it is available, in parallel to ongoing trials, and accelerated assessment which seeks to conduct a review within 150 days instead of 210 days.[16]

The first country in the world to grant emergency approval for a vaccination for use against COVID-19 was the UK, with the authorisation of the Pfizer-BioNTech vaccine.[3] The vaccine was later approved by the US Food and Drug Administration (FDA)[4] and the European Medicines Agency (EMA).[5] Moderna,[6-7] AstraZeneca[8-9] and Janssen[10] vaccines were later approved in Europe and added to the armamentarium against COVID-19. The Moderna and Pfizer-BioNTech COVID-19 vaccinations showed an efficacy of 95% or more.[11-12] The Oxford Vaccine Trial reported an efficacy of circa 90% for the AstraZeneca vaccine.[13] The Johnson & Johnson vaccine announced that their single dose vaccination showed an overall 66% effectiveness in the prevention of moderate to severe disease and 85% effectiveness in the prevention of severe COVID-19.[14]

At the same time that pharmaceutical industry and regulatory bodies were approaching the development and evaluation of novel COVID-19 vaccines, the dilemma of how vaccine hesitancy will impact on the success of regional and international vaccination strategies to address the pandemic gained momentum. Vaccine hesitancy is ubiquitous,[15] with scepticism towards vaccination prevailing since 1853[16] and fuelled with modern day phenomena such as the world wide web[16] and via social media.[17] COVID-19 vaccine general public hesitancy levels ranged from 2–6% in China to 44% in Turkey as reported in literature.[18] Even healthcare workers are prone to vaccine hesitancy. A study found that hesitancy amongst healthcare workers worldwide for the COVID-19 vaccination ranges between 4.3% to 72%.[19] The administration of influenza vaccine is recommended for all healthcare workers. Pharmacists and pharmacy students are perceived to be hesitant about the influenza vaccine.[20-23] Vaccine hesitancy within the pharmaceutical workforce may impact on advocacy with patients on relevance of vaccines. Pharmacists play vital roles in vaccine distribution and administration in most countries, and serve as role models in their own health behaviours.[24] Pharmacists contribute to patient outreach in immunisation campaigns and are highly trusted sources of information on this topic.[24]

This study was carried out to evaluate the degree of vaccine hesitancy of Maltese pharmacists and pharmacy students vis-à-vis influenza vaccination within the context of the pandemic and of the COVID-19 vaccines in development. The study was undertaken before the authorisation of the first COVID-19 vaccine.

Materials and Methods

A questionnaire was developed to evaluate the perception of pharmacists and pharmacy students about the influenza vaccine and potential COVID-19 vaccination. The questionnaire was divided into three sections. In the first section, demographic data of participants was collected. The second section evaluated whether participants took the influenza vaccine last year and whether they intend to take it during the months of October/November 2020. Participants were asked to rate from 1 to 5

(where 1 meant that they will not and 5 that they will take the vaccine) how likely they were going to take the COVID-19 vaccine once available.

The third section evaluated the reasons why participants are unlikely to take the COVID-19 vaccine. Participants were asked to rate five statements from 1 to 5, where 1 corresponded to "not concerned at all" and 5 corresponded to "extremely concerned". The statements about the COVID-19 vaccine evaluated concerns related to not knowing enough about the vaccine, possible short-term and long-term side effects, vaccine effectiveness and due to an approval granted through an accelerated process. Participants were also asked to rate, using a five-point Likert scale, whether they are against vaccines in general.

The protocol followed the University of Malta's Research Ethics Review Procedures and abided by the University's Research Code of Practice. A self-assessment ethics form was filed in accordance with GDPR with the Faculty Research and Ethics Committee. The questionnaire was disseminated electronically using Google Forms, via social media, to a private group for Maltese pharmacists and pharmacy student, and via email to all pharmacy students at the Department of Pharmacy of the University of Malta. Data collection was conducted over a period of one week during end of October and beginning of November 2020. Participation in the study was voluntary and the responses were anonymous.

Data analysis was conducted using Microsoft Excel. Chi-squared test, chi-squared test for trend and Fischer exact test were used for statistical analysis. A p-value ≤0.05 was taken to represent a statistically significant result.

RESULTS

A total of 136 participants took part in the study where 54% (*n*=73) were pharmacists (response rate 10% from 735 pharmacists) and 46% (*n*=63) were students (response rate 41% from 155 pharmacy students). The female to male ratio was 3:1 which is a reflection of the gender distribution in the pharmacy profession. The age of students ranged between 18 to 34, where 95% (*n*=60) students were 18-24 years old and 5% (*n*=3) were 25-34 years old. The majority of the pharmacists taking part in the study were 25-34 years old (*n*=31, 42%), had 5-10 years (*n*=18, 25%) of experience, and the principal position occupied was in community pharmacy (*n*=37, 53%) (Table 1).

Influenza vaccination

When participants were asked whether they took the influenza vaccine in the previous year, only 41% (*n*=56) of the respondents answered in the affirmative, while 59% (*n*=80) did not take the influenza vaccine. However, 74% (*n*=101) of participants stated that they intend to take the influenza vaccine during October/November 2020. Table 2 shows the percentage of students and pharmacists who took the influenza vaccine the previous year, and those who will be taking it during the current year. A statistically significant increase in the number of participants who will be taking the influenza vaccine was observed in both student and pharmacist cohorts. When the number of participants taking the influenza vaccine the previous year and intending to take the influenza vaccine during the current year was correlated with age, the projected increase in vaccination rate was statistically significant for the 18-24 years, 25-34 years and the 35-44 years age groups (Table 3). When the number of participants taking the influenza vaccine the previous year was correlated to the age of participants, a statistically significant

difference (chi for trend=6.15, p=0.013) was observed, where older participants tend to take the influenza vaccine more than younger ones. No statistically significant difference was observed when the likelihood of taking the influenza vaccine during the current year was correlated against age (chi for trend=3.75, p=0.053).

Table 1: Demographics of pharmacists taking part in the study (n=73)

Demographic	Category	Frequency (n)	Percentage (%)
Age	18-24 years	2	3
	25-34 years	31	42
	35-44 years	24	33
	45-54 years	7	10
	55-64 years	8	11
	>65 years	1	1
Years of experience	Up to 5 years	13	18
	5-10 years	18	25
	10-15 years	14	19
	15-20 years	11	15
	>20 years	17	23
Principal position occupied	Community pharmacy	37	53
	Pharmaceutical administration	7	10
	Pharmaceutical policy and regulation	6	9
	Academics	5	7
	Industry	5	7
	Medical representatives	5	7
	Hospital pharmacy	3	4
	Positions unrelated to pharmacy	2	3

Table 2: Percentage who took the influenza vaccine last year, who will take it this year (p value indicates statistical significance in percentage changes), and likelihood of taking the COVID-19 vaccine by role (N=136)

	Influenza vaccine				COVID-19 vaccine		
	Took%	Will take%	Chi	p	Unlikely%	Undecided%	Likely%
Pharmacist	49.3	82.2	17.5	<0.0001	16.4	20.5	63.0
Student	31.7	65.1	14.0	<0.0001	15.9	33.3	50.8
Total	41.2	74.3	30.5	<0.0001	16.2	26.5	57.4

Table 3: Percentage who took the influenza vaccine last year, who will take it this year (p value indicates statistical significance in percentage changes), and likelihood of taking the COVID-19 vaccine by age (*N*=136)

		Influenza vaccine				COVID-19 vaccine		
Age	**n**	**Took%**	**Will take%**	**Chi**	**p**	**Unlikely%**	**Undecided%**	**Likely%**
18-24	62	33.9	66.1	12.9	<0.0001	16.1	35.5	48.4
25-34	34	44.1	79.4	9.0	0.003	14.7	23.5	61.8
35-44	24	41.7	83.3	8.9	0.003	20.8	12.5	66.7
45-54	7	14.3	57.1	Fisher	NS	14.3	14.3	71.4
55-64	8	100.0	100.0	-	-	12.5	25.0	62.5
>65	1	100.0	100.0	-	-	0.0	0.0	100.0

COVID-19 vaccination and associated perception

When asked how likely they are to take the COVID-19 vaccine once it is available, the majority of participants (*n*=78, 57%; 95% CI 49-66%) stated that they will be taking the vaccine. Table 2 shows the percentage of participants who are likely to take the COVID-19 vaccine. There was no statistically significant difference in the projected uptake of COVID-19 vaccination of students compared to pharmacists (chi 0.9). When the likelihood of taking the vaccine was correlated with age, there was no statistically significant trend in the proportion of vaccine uptake with age (chi for trend=0.4).

When the likelihood of taking the influenza vaccine was correlated to the likelihood of taking the COVID-19 vaccine, a strong statistically significant association was observed (chi=8.5, *p*=0.004; Likert scale and proportions – 1 (0.8) unlikely, 2 (1.7), 3 (3.0) neutral, 4 (3.3), 5 (5.0) likely). Participants who take the influenza vaccination are more likely to take the COVID-19 vaccine once it is available. When the likelihood of taking the COVID-19 vaccine was correlated with the years of experience of pharmacists, no statistically significant correlation was observed.

Reasons why participants are unlikely to take the COVID-19 vaccine were evaluated (Table 4). Participants expressed concerns about the COVID-19 vaccine due to having insufficient knowledge regarding this novel inoculation (*n*=52, 54%; 95% CI 43-64%), potential long-term side effects (*n*=74, 77%) and because the vaccine has been developed through an accelerated process (*n*=65, 69%). When participants who are unlikely to take the COVID-19 vaccine were asked what their perception about vaccines is in general, the majority of participants (*n*=90, 96%) were in favour.

Other reasons provided by participants regarding why they are hesitant to take the COVID-19 vaccine included concerns related to teratogenicity or fertility issues in the future (*n*=1, 0.7%), the wish to wait for feedback from people they know before taking the vaccine (*n*=1, 0.7%) and that they would like the vaccine to be ethically produced without making use of stem cell lines (n=1, 0.7%).

Table 4: Concerns and misgivings pertaining to a COVID-19 vaccine as percentages of those expressing concerns

		Participants' responses (%)				
Concern	**n**	**Not concerned at all 1**	**2**	**Neutral 3**	**4**	**Extremely concerned 5**
Insufficient knowledge	97	6.3	16.7	22.9	32.3	21.9
Short term side effects	95	26.6	37.2	16.0	5.3	14.9
Long term side effects	97	3.1	6.3	13.5	28.1	49.0
Vaccine effectiveness	95	14.9	26.6	35.1	11.7	11.7
Accelerated process	95	1.1	13.8	16.0	34.0	35.1
Generally against vaccines	95	83.0	12.8	3.2	1.1	0.0

Discussion

The uptake of the influenza vaccine by healthcare workers in Europe was reported to be low, despite suggestions for healthcare workers to take vaccine.[25-28] The percentage of pharmacists who took the influenza vaccine last year (49%) is higher compared to the percentage of healthcare workers taking up the influenza vaccine in Malta (40%)[26] in 2010 and within Europe (4% to 40%).[25,27-28] The uptake of influenza vaccine by pharmacists last year within our study is comparable to the percentage uptake amongst healthcare workers in The Netherlands (50%) and Romania (51%) and lower than in Hungary (68%).[26] In this study, a correlation was observed between the age of participants and uptake of the influenza vaccine last year, with older participants tending to be more likely to take the influenza vaccine. This study is in accordance with other studies which found age to be a contributing reason why healthcare professionals choose not to take the influenza vaccine.[21-22] Other reasons why healthcare workers may opt not to take the influenza vaccine include vaccine effectiveness, side-effects, fear of needles and perceived risk of infection and implications of infection.[22-23,28-30]

A significant increase was observed in the number of participants willing to take the influenza vaccine this year compared to last year. Studies indicated that there is the possibility of coinfection by contracting influenza with COVID-19[31-35] and that it may increase the severity of the illness and double the mortality rate.[32-33] Remdesivir was recognised as the first treatment to be approved by the FDA for COVID-19.[36] The drug remdesivir was authorised in Europe, by the EMA, for the treatment of COVID-19 patients with pneumonia requiring supplemental oxygen, in July 2020.[37] In November 2020, FDA granted fast track designation to the small recombinant fusion protein, AB201, a potential treatment of COVID-19 by ARCA biopharma.[38] The Randomised Evaluation of COVID-19 Therapy (RECOVERY) trial showed that tocilizumab and corticosteroids improved the survival and clinical outcomes of patients with hypoxia and systemic inflammation.[39] Multiple treatments were

investigated, such as the use of lopinavir with ritonavir and hydroxychloroquine sulfate.[31] Other strategies investigated include the formulation of a nasal spray which coats the virus to facilitate its elimination and prevent its propagation in the body.[40] Considering this situation, administration of the flu vaccine is of additional importance, to prevent coinfection with the influenza and COVID-19 virus and decrease associated complications and mortality.[32] The uptake of the flu vaccine by healthcare workers can also be of benefit to patients by contributing to a decrease in the transmission of the influenza virus to patients who may come in close contact, should the healthcare worker be asymptomatic or ill.[25,27-29,41] The perception of healthcare professionals towards vaccination can have an impact on the uptake of vaccines by the public due to their role as educators.[23,27,42] The uptake of the flu vaccine during a pandemic, such as the COVID-19 pandemic, is of additional importance as it decreases the need for hospitalisation and improves patient outcomes.[43-44] This decreases the burden on the healthcare system and ensures that hospitals have enough resources to address critically ill patients and decrease their risk of mortality.[45-46]

At the time of the study, when the COVID-19 vaccines were still in development, a high degree of hesitancy to take the potential COVID-19 vaccine, with 57% of the respondents willing to do so, was identified. This is in accordance with the degree of COVID-19 vaccine hesitancy experienced worldwide.[19] The main reasons why pharmacists and pharmacy students were unlikely to take the COVID-19 vaccine were lack of knowledge, potential side-effects and the accelerated process through which the vaccine will be authorised. This is in accordance with other studies which evaluated reasons why healthcare professionals and pharmacists choose not to take the influenza vaccine, whereby they found that the possibility of experiencing side-effects was one of the main reasons for their hesitancy.[22,29] It has to be emphasised that at the time of the study participants could not identify the science, the safety and efficacy of the vaccines which later became available.

It has been estimated that herd immunity for COVID-19 may be achieved when 84%-90% are immune to the virus, through full vaccination to obtain a reproduction number (R) of 0.5.[47] The severity and urgency of the pandemic situation led to the assumption that vaccine hesitancy would be overtaken by events, but substantial proportions of surveyed populations will still refuse vaccines that have passed phase 3 trials and were accepted and approved by the relevant regulators.[15,48,49] The reasons for this enduring hesitancy are multiple and vary with time and locale.[48] Key factors that positively correlate with vaccine acceptance include confidence, complacency, knowledge about COVID-19 disease, risk of COVID-19 infection, older age, history of influenza vaccination uptake, educational level and convenience.[48, 19]

Healthcare professionals serve as a role model for the general public and have a key role in addressing COVID-19 vaccine hesitancy amongst the public by recommending the administration of vaccines.[19] A high vaccine hesitancy amongst healthcare professionals can negatively affect the uptake of the COVID-19 vaccine by the public. A crucial part of the Public Health and Pharmaceutical Regulatory authorities is providing scientific information to healthcare professionals, through an educational campaign, to decrease vaccine hesitancy and aggressive planning to guarantee the readiness of both the public and the healthcare worker community for a COVID-19 vaccine.

Limitations of the study

The study was undertaken prior to the influenza and COVID-19 vaccine and did not subsequently evaluate the number of pharmacists and pharmacy students who eventually took the influenza and COVID-19 vaccine. The actual number of pharmacists and pharmacy students who eventually took the influenza and COVID-19 vaccine can be evaluated in a future study and compared to the results obtained in this study.

Conclusion

A rise in the number of pharmacists and pharmacy students intending to take the influenza vaccine during the current year was observed compared to the number of participants who took the vaccine in the previous year. There was hesitancy in the decision to take the potential COVID-19 vaccine, with concerns related to lack of knowledge, side-effects and the accelerated approval process being the main concern at the time when COVID-19 vaccines were still in development. This demonstrates the importance of empowering pharmacists with science and data of safety and efficacy, to be able to overcome hesitance and become advocates for vaccination programmes.

Summary Box

What is known about this subject?

- The uptake of the influenza vaccine by healthcare workers in Europe is low
- Age is a contributing reason why healthcare professionals choose not to take the influenza vaccine
- Flu vaccine uptake by healthcare workers can also be of benefit to patients

What are the new findings?

- Number of participants intending to take influenza vaccine this year increased compared to last year
- There was a high degree of hesitancy to take the potential COVID-19 vaccine amongst pharmacists and pharmacy students at the pre-launch phase
- Main reasons for COVID-19 vaccine hesitancy are lack of knowledge, potential side-effects and the accelerated process through which the vaccine is authorised

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MMJ

ORIGINAL ARTICLE

COVID and influenza vaccination hesitancy in Maltese family doctors

Jason Joseph Bonnici, Dorothy Zammit, Victor Grech

Introduction

An effective vaccine may help us to exit the COVID-19 pandemic. General Practitioners/Family Doctors (GPs/FDs) play a vital role in public vaccination in most countries and they also serve as role models. However, they may not always follow national vaccination policies. This study was carried out in order to ascertain the degree of vaccine hesitancy of GPs and GP trainees in Malta vis-à-vis influenza vaccination and a putative novel COVID-19 vaccine.

Methods

A short, anonymous questionnaire was emailed via the Malta College of Family Doctors.

Results

There were 123 responses from 288 GPs (33.3%) and 62 trainees (43.5%). Significantly more will take the influenza vaccine, at all ages. Almost two thirds of GPs are likely to take the COVID-19 vaccine but significantly less (a third) of trainees will. Older doctors were likelier to take this vaccine. The likelihood of taking influenza vaccination was significantly associated with that of taking COVID-19 vaccine. The majority of COVID-19 concerns pertained to insufficient knowledge and concern regarding potential long-term side effects.

Discussion

The vaccination rates for COVID-19 vaccination are less than those for influenza uptake.Vaccine hesitancy in younger doctors is a seemingly global youth phenomenon, an unwise insouchance when the possibility of long-term viral complications is considered. An information drive should be mounted with regard to COVID-19 vaccination as well as campaign to promote annual influenza vaccination.

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Introduction

While COVID-19 stalks the world, abated only by non-pharmaceutical interventions, the only real hope of controlling this pandemic is an effective vaccine. However, vaccine hesitancy is rampant,[1] abetted by social media,[2] such that for what should be a highly anticipated and avidly sought COVID-19 vaccine, hesitancy toward such a vaccine ranges from 2–6% in China to 43% in the Czech Republic and 44% in Turkey by the general public.[3]

General Practitioners/Family Doctors (GPs/FDs) play a vital role in public vaccination in most countries, and they also serve as role models in their own health behaviours.[4] In many countries, they are also the most utilised and trusted sources of information on this topic.[5]

The most commonly reported motives for GP's own vaccination were to protect themselves and their patients, while the commonest reasons for vaccine hesitancy included exposure to disease providing sufficient immunological protection, concerns regarding side effects, forgetfulness and their personal doubts about vaccine efficacy.[4]

With regard to vaccinating target patients, it is not unknown for GPs not to recommend nationally recommended vaccines. For example, a recent French study showed that 16%-43% of GPs sometimes/never recommended ≥1 vaccine to their target patients. This paper also noted that vaccines were more frequently recommended when GPs were comfortable explaining vaccine benefits and risks and trusted their official sources of vaccine information. On the other hand they failed to recommend vaccination when they felt that the risks of adverse effects were high or doubted the vaccine's effectiveness.[6] In Malta both the public and the medical profession are much more compliant with vaccination schedules with vaccination rates >90%.[7]

This study was carried out in order to ascertain the degree of vaccine hesitancy of GPs and GP trainees in Malta vis-à-vis influenza vaccination and a putative novel COVID-19 vaccine that might be provided later this year.

Methods

A short, anonymous questionnaire was sent out via email mailing list of the Malta College of Family Doctors. This email list comprises the email addresses of the membership roll. Additionally it was sent to the email addresses of the current cohorts of GP Trainees. The first mail was sent on 25/09 and a reminder was sent on 27/09. The questionnaire was available from the 25/09/2020 to the 29/09/2020. The questionnaire was hosted *via* Google forms and exported to bespoke Excel spreadsheets for analysis. It commenced with the following introduction:

Malta has been fortunate to have early allocation of a COVID-19 vaccine later this year. The vaccine will be one that is licensed and approved and will have passed through Phase 3 trials. Priority will be given to front liners and to the vulnerable, followed later by the rest of the population. This is totally anonymous and a very short, public health survey for healthcare workers, please fill completely.

The questions, formatted in tick boxes, covered demographic details including sex, faculty, role (GP/GP trainee), age bracket, whether the influenza vaccine was taken last winter and whether it would be taken this coming winter (yes/no). The following text was inserted in the questionnaire followed by several questions with a Likert scale of 1-5.

QUICK READ FOR INFORMATION: Vaccine development is a three-phase process. In Phase I, small groups of people receive the trial vaccine. In Phase II, the vaccine is given to people who have characteristics (such as age and physical health) similar to those for whom the vaccine is intended. In Phase III, the vaccine is given to thousands of people and checked for efficacy and safety. The COVID vaccine that will arrive in Malta will have gone through these Phases and will be approved and licensed.

Based on this information, how likely are you to take the COVID-19 vaccine?

- I am concerned as I don't know enough about the vaccine
- I am concerned about the short-term side effects (e.g. fever etc)
- I am concerned about possible long-term side effects
- I am concerned because I don't think the vaccine will be effective
- I am against vaccines in general

For the first question in the list above, it was assumed that scores 1 and 2 were "unlikely", 4 and 5 were "likely" and a score of 3 was taken as undecided. For the Likert questions following the first, all were allowed to tick options whatever their likelihood of taking the vaccine was.

Chi tests and chi tests for trend were used except for one two by two table with small values wherein a Fischer exact test was used. A p value ≤0.05 was taken to represent a statistically significant result.

RESULTS

Influenza

There were 123 responses from 288 GPs (33.3%) and 62 trainees (43.5%). Table 1 shows the percentage of participants who took the influenza vaccine last year, and those who will be taking it this year, by role. More will be taking the vaccine, this being a significant increase in the cohort of GPs. The projected increase in vaccination rate is significant at almost all ages (table 2).

COVID-19

Table 1 shows the percentages who are likely to take the COVID-19 vaccine. Almost two thirds of GPs are likely to take it but less than a third of trainees will. This was a significant difference (chi 23.5, $p<0.0001$) that was also reflected in the proportion likely to take this vaccine by age, with increasing age a significant predictor of vaccine uptake (chi=8.5, $p=0.003$). Males were more likely to take the vaccine than females (70% *vs* 54%) but this was not statistically significant.

The likelihood of taking the influenza vaccine was associated with the likelihood of taking the COVID-19 vaccine (chi=28.5, $p<0.0001$, table 3). The majority of COVID-19 vaccine related concerns pertained to insufficient knowledge with regard to this novel inoculation and concern with regard to potential long-term side effects.

Table 1 Percentage who took the influenza vaccine last year, who will take it this year, and likelihood of taking the COVID-19 vaccine by role

	Influenza vaccine				COVID-19 vaccine		
	Took%	Will take%	Chi	p	Unlikely%	Undecided%	Likely%
GPs	71.9	87.5	7.2	0.007	8.3	20.8	70.8
Trainees	37.0	59.3	3.8	ns	44.4	25.9	29.6
Total	64.2	81.3			16.3	22.0	61.8

Table 2 Percentage who took the influenza vaccine last year, who will take it this year, and likelihood of taking the COVID-19 vaccine by age

	Influenza vaccine				COVID-19 vaccine		
Age	**Took%**	**Will take%**	**Chi**	**p**	**Unlikely%**	**Undecided%**	**Likely%**
18-24	25.0	50.0	Fisher	ns	25.0	25.0	50.0
25-34	63.3	80.0	2.0	ns	20.0	23.3	56.7
35-44	45.8	79.2	5.7	0.02	37.5	20.8	41.7
45-54	68.0	84.0	3.8	ns	12.0	32.0	56.0
55-64	80.6	86.1	3.8	ns	2.8	16.7	80.6
>65	50.0	75.0	Fisher	ns	0.0	0.0	100.0

Table 3 Likelihood of taking flu vaccine (yes/no) by Likert likelihood of taking COVID-19 vaccine.

Unlikely to	**1**	**2**	**3**	**4**	**5**	**Likely to**
take COVID vaccine	0.5	3.0	2.0	9.3	44.0	**take COVID vaccine**

Table 4 Concerns and misgivings pertaining to a COVID-19 vaccine

Concern%	1	2	3	4	5	n
Insufficient knowledge	6.4	14.1	29.5	25.6	24.4	78
Short term side effects	32.5	26.0	16.9	9.1	15.6	77
Long term side effects	5.1	5.1	12.8	34.6	42.3	78
Vaccine effectiveness	17.1	22.4	32.9	15.8	11.8	76
Generally against vaccines	80.5	5.2	11.7	1.3	1.3	77

Discussion

This study has the typical limitation of any questionnaire – response rate and potential bias introduced therein. There is a particular risk of selection bias in that very busy practitioners who work for long hours may have elected to ignore this questionnaire. Furthermore, while most individuals in this cohort are members of the Malta College of Family Doctors, not all are and those who were not could not be contacted and included in this study.

The projected increased influenza vaccine uptake is probably related to increased awareness of respiratory disease due to COVID-19 and the very recent study which indicated that contracting influenza with COVID-19 may double the risk of death. The limitations of the study are the small numbers involved (*n*=58), but 43% of those with both infections died, compared with 26.9% of those who only had COVID-19 with the greatest risk being to those aged over 65.[8] Clearly the proportions in this cohort are lower than desirable and indeed, the rates described for GPs in this study are similar to influenza vaccine uptake by doctors in past years.[9]

With regard to COVID-19 vaccination, younger doctors and trainees were less likely to take the inoculation. Indeed, in many countries, it has been noticed that young people are less concerned with COVID-19 than the adult and elderly population, possibly because of perceived milder symptoms in their age group and their lower risk of complications.[10-11]

It could be argued that older individuals are at higher risk and therefore it is even more in their self-interest and in the interest of their family members to take the vaccine.[12] It is also possible that the younger and more social media active doctors may be more influenced by vaccine hesitant narratives.[13] This scenario is reinforced by the finding that the likelihood of taking the influenza vaccine was associated with likelihood of taking the COVID-19 vaccine, indicating hesitancy toward both vaccines. The concerns with regard to insufficient knowledge are not invalid but the country has been reassured that only vaccines that have passed through phase 3 will be purchased.

It has been estimated that COVID-19 herd immunity may be achieved at 55%-82%.[14] Since a non-trivial

proportion of the population will be ineligible for COVID-19 vaccination by virtue of age, immunological status or other pre-existing medical conditions, any significant vaccine hesitancy will hinder the attainment of this goal. Furthermore, given that a COVID-19 vaccine is unlikely to be 100% effective on all vaccinees, the population vaccinated should clearly approach totality. This is because even with vaccination efficacy of 95% efficacy, the required herd immunity level would be 63-76%.[15]

With the onset of the COVID-19 pandemic, and the clear urgency for the discovery of an effective vaccine, many assumed that this desire might well simply solve vaccine hesitancy that has vexed public health officials all over the world.[1] This has not been the case with substantial fractions of polled populations affirming that they would not take a vaccine even if it passed phase 3 trials and was accepted and approved by the relevant regulators.[6,16] The determinants of such hesitancy are composite and multiple and vary by country and temporality.[6] Confidence, complacency and convenience are perceived as key aspects for vaccine acceptance.[6] Truly, public health must extend beyond providing services and should focus its energy on tailoring narratives and polices to counteract fake news and inculcate confidence in said policies.[1] This should include vigilant planning so as to ensure the readiness of both the general public and the medical/health community for a COVID-19 vaccine.

Conclusion

Novel COVID-19 vaccine uptake in General Practitioners/Family Doctors reflect the rates of yearly influenza vaccination uptake of doctors in general.

GPs are instrumental in vaccination programs and it is crucial to commence an information campaign as soon as possible with regards to the efficacy and safety of the upcoming shot to this group of medical professionals.[5]

They will also almost certainly be involved in the eventual vaccine drive when a COVID-19 vaccine actually becomes available, and comprehensive knowledge with regard to the vaccine will empower them to bring the message across to the general public. This can be done by involving them in the vaccination program in similar fashion to the annual modus operandi vis-à-vis influenza vaccination.

Particular focus should be given to the GP Trainees who, as youths, can be role models for other youths, especially the vulnerable.

Additionally, an intense informational campaign targeted to all healthcare workers (including all doctors) should be embarked upon to promote the yearly influenza vaccination.

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MMJ

ORIGINAL ARTICLE

Adequacy of clinical surveillance of diabetic patients requiring minor foot amputations

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Background

Minor amputations of foot complications related to diabetes have become increasingly more frequent in Malta. International recommendations suggest a standardised follow-up for patients with diabetes. We aim to compare the latter recommendations with a cohort of patients who underwent a minor amputation in the years 2014-2017.

Methods

Data was collected retrospectively from 101 patients with diabetes who were admitted to Mater Dei Hospital's Diabetic Foot Ward and required minor amputation. The audit parameters included patient demographics, specifics on the type of amputation performed, trending of relevant blood investigations prior to surgery and their follow-up history.

Results

A significant proportion of patients never had Hba1c (mean 4-year percentage of 34.4%), lipid (36.6%) or renal profile (23.3%) tested in the years leading to their amputations. Furthermore, the mean total Hba1c levels (78.7mmol/mol) showed that these patients with diabetes are mostly uncontrolled. A very large proportion of these patients were not seen at local health centres or diabetes outpatient clinics (65.4%). The majority were not seen by a podiatrist (61.4%), diabetes educators (84.2%) or ophthalmic specialists (51.5%) in the years preceding their amputation.

Conclusion

Poor compliance with international guidelines for patients with diabetes is a contributing factor to the high rate of minor amputations. A co-ordinated effort to improve compliance with international standards relating to diabetes care is urgently required.

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Introduction

Foot pathology is the commonest indication for hospital admission in patients suffering with diabetes mellitus (DM). Malta, a European Union (EU) member state has one of the highest prevalence rates of DM.[1] The number of major limb amputations in Malta has decreased dramatically from a peak of 31/100,000/year in 2003 to 5.6/100,000/year in 2019. The number of minor foot amputations on the other hand remains significantly higher than in most other EU member states at between 76 - 86/100,000/year with an average of 414 minor amputations/year.[2]

There is no national diabetes register in Malta but the IDF Diabetes Atlas gives an estimate of 40,500.[3] A recent cross-sectional study highlighting the prevalence of type 2 diabetes mellitus in the Maltese Islands estimated a prevalence of ~44,400 which amounts to 10.31% of the population.[1] There is no national protocol or guideline for the follow-up of patients with DM. Primary health care is provided by local health centres which are nationally funded, and the private care service which is usually based on single general practitioners, podiatrists and other health care workers working separately and independently. There is no national foot screening programme and diabetes foot care is shared between public and private services.

Monitoring and surveillance of disease progression in patients with DM is guided by international recommendations such as the National Institute for Health and Care Excellence (NICE), the American Diabetes Association (ADA) and the International Diabetes Federation (IDF) which recommend:

- Hba1c testing every 3 months[4] and then every 6 months if levels are stable.[5]
- Patients should be followed-up regularly by a consultant endocrinologist if the desired treatment goals are not reached. Patients with stable diabetes should still be followed up but longer intervals may be set.[6]
- Podiatry follow-up is also encouraged and patients are usually stratified by risk. This includes (1) low risk with annual foot assessment, (2) moderate risk every 3-6 months, (3) high risk with no immediate concern every 1-2 months and (4) high risk with immediate concern every 1-2 weeks.[7]
- Patients with Type 2 diabetes mellitus (T2DM) should be referred to diabetes educators at the time of diagnosis and the program should be available at the primary care level.[4]
- On diagnosis, GPs should immediately refer adults with T2DM to the local eye screening service. Annual appointments with an ophthalmologist familiar with the management of diabetic retinopathy should be organised. Patients who require more urgent assessment should be seen more regularly.[6, 8]

The aim of this study was to establish the level of compliance with international recommendations on monitoring and surveillance of patients with DM requiring minor foot amputations (amputations below the level of the ankle including amputation of digits at the phalangeal or metatarsal level), to assess the level of care of diabetes in the public health service and highlight any deficiencies in follow-up.

Materials and Method

Patients with diabetes related foot complications requiring a minor amputation between January 2018 and April 2019 were selected for this project. These were identified from a hospital database obtained from the Clinical Performance Unit which focused mainly around the 'Diabetic Foot Ward' at

the main teaching hospital. Data was collected retrospectively using the local health care software system iSOFT, which allows accurate blood trending, records hospital admittance and monitors patient follow-up together with attendance. This was used to collect the following information:

- Demographics: gender, age
- Approximate date of diagnosis by noting first reported diabetes related follow-up and/or first known abnormal glucose levels. This confirmed that all patients were already known cases of diabetes.
- Blood investigation trending starting between 2014 to the date of admission Hba1c, glucose, lipid profiles and eGFRs levels and frequency of blood testing
- Patient visit history between 2014 to the date of admission including podiatry, diabetes education, ophthalmic, endocrine outpatients, community diabetes follow-up and follow-up post-amputation.
- Scheduling of follow-up up to 1 year after amputation with diabetes, vascular, podiatry, diabetes education and ophthalmic services.

Electronic case summaries were used to obtain information on hospital admittance/discharge, date and type of amputation. IBM SPSS Statistics (Version 26) was used for data analysis. Clearance was obtained from data protection office.

Mean totals and percentages were calculated to determine how many patients attended follow-up between 2014-2017. Chi-squared test was used to compare frequency of blood testing along the years. The Kruskall-Wallis test was used to compare Hba1c levels with attendance to follow-up

RESULTS

One hundred and one patients who were known cases of diabetes and underwent a minor amputation between January 2018 and April 2019 were included. Patient age ranged between 41 and 90 years. Male patients amounted to 65 (64.4%) while 36 (35.6%) were female.

A total of 119 amputations were performed, with some procedures involving amputation of more than one toe (table 1). Left foot amputations were noted to be more frequent than right foot amputations (53.5 vs 46.5%). The 1st, 2nd and 5th toes were the most frequently amputated while the 3rd and 4th toe were the least likely to require amputation. A significant proportion of patients had a 2nd toe amputation at the level of the proximal phalanx while patients with a 5th toe amputation were more likely to have surgery performed through the metatarsal.

Hba1c, renal profile and lipid profile testing levels since 2014 (table 2) indicate that a very significant proportion of patients never had HbA1c levels, lipid or renal profile checked. The proportion of patients without blood testing has decreased over the years. Hba1c levels in those patients who were tested were significantly above recommended levels in the vast majority of patients (table 3). LDL levels in the majority of patients were above the acceptable range i.e. 1.8 mmol/L (table 4). eGFR status of patients was classified according to the 2012 Kidney Disease: Improving Global Outcomes (KDIGO) guideline for chronic kidney disease evaluation [9] (table 5).

Table 1 Frequency of amputated toes and the level of amputation

Toe	Frequency (*n*=19)	Proximal phalanx	Metatarsal
1st toe	38	19	19
2nd toe	31	20	11
3rd toe	13	8	5
4th toe	15	7	8
5th toe	22	3	19

Table 2 Hba1c, lipid profile and renal profile testing frequency in the years preceeding amputation

	Testing frequency	2014	2015	2016	2017	Mean tested	Mean %	P value
Hba1c	No test	43	34	35	27	34.8	34.4	0.130
	1 test	29	33	25	27	28.5	28.2	
	≥2 tests	29	34	41	47	37.8	37.4	
Lipid profile	No test	41	40	37	30	37	36.6	0.423
	1 test	31	28	26	27	28	27.7	
	≥2 tests	29	33	38	44	36	35.7	
Renal profile	No test	32	23	22	17	23.5	23.3	0.041
	1 test	19	19	17	10	16.3	16.1	
	≥2 tests	50	59	62	74	61.3	60.7	

Table 3 Hba1c levels in the years preceeding amputation

Years prior to amputation	Hba1c levels						Yearly mean Hba1c (mmol/mol)	4-year mean Hba1c (mmol/mol)
	<63.9	63.9–84.7	84.8–106.6	106.7–129	≥129	% >63.9		
4 years	19	24	13	6	3	45.5%	78.8	78.7
3 years	18	21	16	6	6	48.5%	82.3	
2 years	22	23	15	2	3	42.6%	77.5	
1 year	27	22	16	5	3	45.5%	77.7	
0 years	17	18	12	2	4	35.6%	77.7	

Table 4 LDL levels in the years preceeding amputation

LDL prior to amputation	Category	Frequency	% >1.8mmol/L	Mean LDL (mmol/L)	4-year mean LDL (mmol/L)
4 years	<= 1.8	11	82.8	2.52	2.52
	> 1.8	53			
3 years	<= 1.8	25	59.0	2.53	
	> 1.8	36			
2 years	<= 1.8	10	85.2	2.63	
	> 1.8	52			
1 year	<= 1.8	19	73.2	2.47	
	> 1.8	52			
0 years	<= 1.8	17	76.6	2.46	
	> 1.8	36			

Table 5 eGFR levels according to KDIGO categories in the years preceeding amputation

eGFR prior to amputation	eGFR levels						% <30	Yearly mean eGFR	4-year mean eGFR
	≥90	60-89	45-59	30-44	15-29	<15			
4 years	15	30	11	8	4	7	59.4%	64	57
3 years	10	26	14	13	7	6	65.3%	58	
2 years	11	29	14	9	8	7	66.3%	59	
1 year	11	26	15	13	9	10	72.3%	54	
0 years	12	18	12	11	6	11	57.4%	54	

Only 35 (34.7%) patients were seen at least once a year in the hospital or community. Hospital attendance (24 (23.8%)) was noted to be greater than community attendance (10 (9.7%)) overall. Those who were attending hospital only and community only had approximately 1-2 visits each year. Only 2 patients (2.0%), were seen in both community and hospital (table 6).

Between 2014-2017, prior to their amputation 66 (65.3%) patients were not booked for any diabetes care appointments either in the hospital or community, 12 (11.9%) failed to turn up and 2 (1.9%) had their appointment cancelled (table 6).

There was no significant difference noted (*p=0.463*) when comparing Hba1cs in those followed up in hospital, community, both and those patients who were not being seen. (Table 7)

The majority of patients (62 (61.4%)) were not booked for podiatry visits in the 4 years preceding their amputation. Patients who were seen at least once a year (mean total of 39 (38.6%)) had ~2 visits/year between 2014-2017. Eighty-five patients (84.2%) had not been seen by the diabetes education team between 2014-2017. From those who attended, 15 (14.9%), had ~1-2 visits/year in the years preceding the amputation. A total of 48 patients (47.5%) had been seen at ophthalmology department at least once per year and 52 (51.5%) were not being followed-up by ophthalmology services (table 8).

Finally, patient follow-up scheduling up to 1 year post-operatively was also assessed as seen in table 9.

Table 6 Attendance to hospital and community follow-up in the years preceeding amputation

Attended follow-up	Hospital	Community	Both	Total seen	% total seen
2014	19	10	3	32	31.7
2015	28	9	0	37	36.6
2016	27	9	1	37	36.6
2017	22	11	2	35	34.8
4 year mean	24	10	2	35	**34.7**
No follow-up	Failed to attend	Visit cancelled	No documented follow-up	Total NOT seen	% total not seen
2014	13	0	56	69	68.3
2015	13	1	50	64	63.5
2016	9	4	51	64	63.5
2017	11	4	52	67	66.4
4 year mean	12	2	52	66	**65.4**

Table 7 Hba1c levels vs hospital/community follow-up

	Frequency	Mean Hba1c (mmol/mol)	*P value*
Hospital only	39	74.9	0.463
Community only	11	76.1	
Attended both	11	62.7	
Never attended	39	66.1	

Table 8 Attendance to podiatry, diabetes education and ophthalmic appointments in the years preceeding amputation

	Years	Attended	% total seen	Failed-to-attend	Cancelled	No follow-up	Total without follow-up	% total not seen
Podiatry	2014	39	38.6	7	0	55	62	61.4
	2015	38	37.6	4	0	59	63	62.4
	2016	36	35.6	6	0	59	65	64.4
	2017	43	42.6	4	0	54	58	57.4
	4 year mean	39	38.6	5	0	56	62	**61.4**
Diabetes education	2014	10	9.9	1	0	90	91	90.1
	2015	15	14.9	4	0	82	86	85.1
	2016	11	10.9	3	0	87	90	89.1
	2017	25	24.8	2	0	74	76	75.2
	4 year mean	15	14.9	2	0	83	85	**84.2**
Ophthalmic	2014	45	44.6	4	0	52	56	55.4
	2015	51	50.5	5	1	44	50	49.5
	2016	54	53.5	2	0	45	47	46.5
	2017	45	44.6	8	2	46	56	55.4
	4 year mean	48	47.5	4	0	46	52	**51.5**

Table 9 Follow-up 1 year postoperatively

Follow-up	Total scheduled follow-up	No scheduled follow-up	% total scheduled follow-up	% no scheduled follow-up
Diabetes	79	22	78.2	21.8
Vascular	97	4	96	4
Podiatry	96	5	95	5
Diabetes education	42	59	41.6	58.4
Ophthalmic	58	43	57.4	42.6

Discussion

This retrospective audit shows that local monitoring and surveillance of patients with diabetes who required minor amputation does not meet international recommendations.

A very significant proportion (34.4%) of patients undergoing minor amputations did not have Hba1c levels tested at all. On a positive note, improvement has been noted in HbA1c, renal and lipid profile testing between 2014 and 2017 (table 3). The majority of subjects having a minor amputation had uncontrolled T2DM with a mean total of Hba1c of 78.7mmol/mol i.e. 9.36%. This is usually associated with an increased risk of complications related to diabetes[4] (table 4). A mean eGFR of 57 shows that most patients are well below the normal level and this a strong predictor of macrovascular complications[5,10] (table 6). LDL levels were also noted to be well above the recommended level of 1.8mmol/l as set by the European Society of Cardiology (ESC) and European Atherosclerosis Society (EAS) guidelines for the management of diabetes[11] (mean total= 2.52) (table 5).

Since the selected cohort includes patients who have already developed complications it is not unexpected that their level of control falls short of international recommendations. This retrospective analysis revealed that lack of control is mainly attributed to poor patient compliance and a failure of the system to book patients for appointments in the public health service offered. In addition, the very high rate of minor amputations in Malta suggests that poor compliance with international recommendations is more widespread.

In Malta there is no established guideline for diabetes referral, however an unofficial system exists where patients with well controlled diabetes are usually followed-up in the community by a GP while patients with uncontrolled T2DM are seen in hospital by an endocrinologist. From our cohort, a mean 4-year total of only 34.7% were seen in the hospital and/or community with hospital attendance (23.8%) being most predominant. A significant proportion of patients (65.3%) were not seen at all in the 4 years preceding the minor amputation. In most cases patients were simply not followed-up in a given year (51.5%) and only a handful failed-to-attend (11.9%) or had their appointment cancelled (1.9%). Patients followed-up in hospital are more likely to be the more complex cases and more likely to have higher Hba1c levels. The results however do not support this assumption and Hba1c levels in the community (76.1mmol/mol)

are only marginally higher than those seen in hospital (74.9mmol/mol) (table 7).

International guidelines recommend regular follow-up by podiatry, diabetes education teams and ophthalmology. This retrospective analysis showed that a very significant proportion of patients were not seen by podiatry (61.4%), diabetes education (84.2%) or ophthalmology (51.5%) in the 4 years preceding their amputation (table 8). In the year after their intervention most patients had better follow-up with their endocrinologist/GP, podiatry, diabetes education and ophthalmic. This shows that the measures put in place for follow-up of patients admitted for minor foot amputation are more effective (table 9).

One of the limitations of the study is that the results may not be representative of the general population due to the small cohort size. Also, selected patients are at a higher risk of developing complications and need more intensive follow-up. However, since 2014 an improvement in frequency of blood testing has been noted (table 3) while patient follow-up has remained roughly unchanged (table 7 and 8). Furthermore, since this is a retrospective audit, this analysis does not consider whether patients were being seen in private clinics and data is only limited to the public health service.

Conclusion

This study highlights the poor compliance with international recommendations in those patients with diabetes who underwent a minor foot amputation. The data demonstrates that the very high levels of minor amputations in the country require a concerted effort to ensure that healthcare systems are put in place to improve compliance and quality of care to this vulnerable population. The fragmentation of health care provision and the lack of a national co-ordinated diabetes care service is likely to be in part responsible for the poor compliance. Further research is required to determine whether the implementation of more stringent and rigorous follow up in patients with diabetes will lead to a reduction in the number of minor amputations.

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MMJ

REVIEW ARTICLE

An evaluation of the evidence of physical activity as a treatment for anxiety

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"I found that I worked better and thought more clearly when I was in good physical condition". (Mandela 1994)

This traditional review evaluates and elucidates the role of physical activity as a form of treatment intervention for anxiety. By critically appraising the latest and most robust literature, the review identified that physical activity has an acute anxiolytic effect (small effect size) on individuals, a moderate effect size on chronic anxiety and with a some longevity effect (reported through longitudinal follow up studies). It was reported that the best 'feel good' effect from exercise resulted from moderate intensity exercise of 30 to 45 minutes duration, 3 to 5 times a week for more than 12 weeks, in adults and 60 minutes of daily exercise for children. There is some evidence to support the prescribing of physical activity as an adjunct therapy to treat generalised anxiety disorders and social anxiety, however the efficacy of phyla activity is less effective than pharmacotherapy and cognitive behaviour therapy.

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Introduction

The World Health Organisation (WHO) recommended physical activity of moderate intensity three or more times per week, being one of the five key ingredients for a person to maintain overall good mental health, the others are; good nutrition, adequate sleep, having a supportive relationship, doing something to help others.[1] However, the WHO also reported that one quarter of the world's population will suffer from a mental disorder at any one point in their lives.[1]

During the last century, WHO recognised that physical activity levels the world over were falling as a result of industrialisation, urbanisation and economic development.[2] Humans were less active than they have been for 99 per cent of their existence.[3] The US National Health and Nutrition Examination surgery reported that children and adults who spent more than 7.7 hours per day seated were considered sedentary. In the meantime, diets have increased in fat content.[4] Although the concept of healthy mind and health body has been discussed for centuries, research into the field of sports psychology only started in the late 1960s and until the mid 1980s there were only tentative associations considered between sports and good mental health. A seminal systematic review of 43 studies was the first to describe a causal strong link between physical activity and preventing a coronary heart disease.[5]

With the onset of mass sport events in the 80s such as; big city marathons, the development of school education programs and introduction of weekly timed park runs for both children and adults alike, the proportion of persons carrying out regular physical activity has increased. However, until the 1990s at least 60 per cent of the global population failed to carry regular physical activity. Inactivity contributes to an estimated 75 billion in medical costs on the USA alone. The initiative in England, titled 'Health of the Nation' in 1993 (Department of Health 1993), aimed to increase the proportion of active adults to 60% of the population within 20 years.[6]

In the past decade clear associations have been identified between regular physical activity and good mental health. The NICE guidelines depression 2009, recommended physical activity, three sessions a week (45 to 60 minutes) over 10 to 14 weeks for mild to moderate depression.[7] However, there is published literature reporting the negative effects of too much sports and associations between elite level sports and mental disorders such as depression, anxiety, eating disorders and substance misuse, which needs to be kept in mind.[8] Overall research reports that moderate to vigorous physical activity appear to reduce the risk of all causes. Moderate, but not high intensity exercise, has mood enhancing effects.[9] An 'inverted-U' relationship between exercise intensity and affect is described.[10] The chief medical officer report stated that both physical inactivity and good mental health are a public health priority.[11]

Methodology

This literature review aimed to report a short synthesis on the published literature between physical activity and anxiety. The literature search strings were conducted using Medline and PsychINFO databases, end search 10th October 2020. These included; 'mental disorder*, anxiety*, generalised anxiety disorder*, social anxiety*, 'adults' or 'adolescents*', physical activity*' or exercise*'.

Literature findings

The adolescent period is considered to be one of high risk.[12] Mental disorders are reported to be the

number one cause of ill health in YP aged 15 to 25 years.[13] 75% of mental disorders emerge before the age of 25.[14] Mental disorders in young people, are often persistent and have the capacity to 'inflict tremendous morbidity, mortality, and impairment'. Severe mental disorders, are referred to as 'the chronic disease of the younger'.[15] Globally, depressive disorders are ranked as the single largest contributor to non-fatal health loss. Suicide was the second leading cause of death among 15-29 year old globally in 2015. Department of Health estimated that 80 million days were lost due to anxiety and depression, at a cost of 5.3billion pounds.[16] Anxiety disorders are the most prevalent mental disorder, with a lifetime prevalence of 31% in women and 19 % in men. The estimated annual costs of treating anxiety and its indirect costs, is around $44 billion, equivalent to 22% spent on any DSM 5 disorder.[17]

Published literature reported a causal link between exercise and improving one's mood, of moderate effect. However, to date less is known about how physical activity and exercise relate to clinical anxiety conditions at a population level. Possibly there is a bidirectional relationship between physical activity and anxiety. A Scandinavian study *n*=20,207 used the HADS scale for depression and anxiety. When multivariate analysis was used to confirm associations depicting a reduction in anxiety and depression, only the link with depression remained significant (adjusted OR = 0.58).[18] It has also been reported that elevated symptoms of anxiety or the fear of anxiety-related sensations may reduce not only physical activity levels but also the desire to exercise. On the other hand, a prospective cohort meta-analysis reported an overall small but significant reduction in anxiety in persons who exercise.[19] The Physical Guidelines for Americans reported that moderate to vigorous physical activity reduces feelings of anxiety, improves sleep and aspects of cognitive function.[20]

A number of large scale population epidemiological studies have shown that exercise improves one's self-esteem, and a sense of wellbeing. Some postulated psychology theories for a reduction in anxiety are; sensitivity, the more one is exposed to a raised heart rate the less one fears these somatic symptoms. Another is the self-efficacy, the ability for a person to effect control over their surroundings, which lead to developing a sense of mastery.[21] Another theory postulated is 'distraction' or 'time out' from the stressful environment, in the similar way meditation helps reduce anxiety and also gives the person a sense of achievement and mastery.[22] Crew and Landers 1987 conducted a meta-analysis and found that people who exercised regularly presented with reduced reactivity to stressors, such as sympathetic physiological changes to stress and recovered faster following a stressor. The endorphin hypothesis posits that mood elevations and reduced anxiety following acute exercise are due to the release and binding of endogenous opioids to their receptor sites in the brain.

Enjoyment is an important element for motivation, particularly when physical effort might be required. Kimiecik (2001) adopted Csikzentmihalyi's approach and defined enjoyment in terms of 'flow'. Wankel discussed the importance of enjoyment during exercise as a determinant of changes in mental health outcomes. Studies have consistently shown that a period of training can reduce trait anxiety in a wide subgroups of the population. Greatest benefits are reported when training is longer than 15 weeks.[23]

The study of the anxiolytic effects of exercise, has a long history in sport and exercise psychology and has remained an area of considerable interest to researchers. In a review of exercise and anxiety, Leith (1994) identified twenty experimental studies.

Of these, fourteen (70 per cent) showed reduced anxiety from exercise, with the rest showing no change. Taylor (2000) concluded that 'single sessions of moderate exercise can reduce short-term physiological reactivity to and enhance recovery from brief psycho-social stressors'.[24]

There is quite a few good quality published papers within reporting a small but significant effect of exercise on anxiety. One of the first seminal and most cited papers in sports and anxiety was a meta-analysis which reviewed more than 100 selected articles. The pooled results reported a small but significant effect size (ES) low 0.24 to moderate/high 0.65, higher on self reported measures, and greater effects on psychophysiological measures from acute exercise. A number of moderators were identified, these included; subject, exercise, methodological characteristics that influenced the strength of relationships. ES improved with exercise duration over 40 minutes and for more than 15 weeks. Most studies focused on aerobic exercise, few on non-aerobic exercise and found no differences. Reported no additional benefits from exercise compared to other alternative therapies. Lastly the authors reported an ES 0.21 from pre-post following a single exercise session.[22]

A robust review of prospective cohort study with at least one year follow up, reported a significant reduction in anxiety with OR=0.54. This study elucidates the longevity of the anxiolytic effect by exercise on anxiety. Searches were carried out by two independent reviewers, using three databases (*n*=2,1818), the quality of selected papers was assessed using Q-Coh (moderate quality was the least accepted), data were analysed using a random-effects meta-analysis. A small but significant reduction in generalised anxiety disorder with exercise was found and this persisted through to follow up.[19]

Over the past 30 years there has been an increasing number of good quality literature on the acute effect of exercise and anxiety. One of the first studies to report a positive relationship between adherence and anxiety reduction said this effect was just time-limited.[25] A recently published meta-analysis which summarised the findings from 25 years of RCTs (*n*=36) reported the weighted mean ES to be 0.17 (small) yet statistically significant. The methodology followed the MOOSE framework, identified studies from five databases, search strings documented and independent reviewers mentioned. Data analysis employed the Cohen's d to calculate ES. Once again most included studies had methodological limitations and there was large heterogeneity between the studies. Limitations were accounted using fixed and mixed effects models to examine moderators which may have effected the outcomes. Only three studies reported findings from persons with clinical anxiety, therefore the results are not generalisable to people with severe anxiety. The authors concluded that this study replicated similar results found by Petruzzo et al in 1991, this therefore substantiates the evidence that exercise can reduce anxiety.[25]

A recent systematic review compared the treatment effects of exercise with pharmacotherapy and psychotherapy. 4134 studies were identified, the CCDAN quality assessment tool was used to ascertain the quality of the studies, eight RCTs met the study's inclusion criteria from the electronic /manual searches through six databases. These studies assessed the effect of exercise in clinically anxious adults and a significant reduction in anxiety symptoms were reported for persons' with panic disorder but exercise was less effective than SSRI treatment. Better results were found when

combining the two. Added benefits were also reported for social anxiety being treated with CBT and exercise. Causal links between exercise and a reduction in anxiety were proposed such as running being a form of graded exposure to the outdoors and to the somatic symptoms of anxiety. Only articles published in English were considered, too few studies to analyse using a funnel plot, the RCTs identified had methodological limitations.[26]

Another systematic review assessed high intensity against low intensity exercise versus waiting list in the treatment of anxiety. All participants had a diagnosis of anxiety and the exercise program had to be at least two weeks long. Three databases were searched, RCT studies only included, quality of studies assessed using Cochrane's risk of bias tools, clear data analysis plan documented. PRISMA guidelines used for selection of the papers. 15 studies met inclusion criteria (*n*=675), ten studies which assessed aerobic exercise found a low to moderate ES 0.41 between exercise and the controls. However, sample size of every study was low, and studies failed to defined the exercise intervention. High intensity exercise was shown to have better outcomes than low on anxiety, but had higher dropout rates. A key finding were the follow up results, ES of 0.33, on exercise for having an anxiolytic effect months after exercise stopped. The authors conclude, exercise can be prescribed at by general practitioners.[27] On the other hand an older meta-analysis investigating the efficacy of exercise as a treatment for clinically anxious individuals, excluded people with PTSD, reported in the sub group analysis no effect anxiety by on aerobic or non-aerobic exercise. They concluded that exercise cannot be prescribed as an adjunct treatment, furthermore, pharmacology and CBT were clinically superior to exercise.[28]

There are only a handful of studies which attempted to answer the question; whether exercise could be used to treat a particular anxiety disorder. One of the most optimistic studies recruited 56 unmedicated persons with social anxiety, randomly assigned to an eight week exercise program and they reported ES=0.51 to 0.70, and after 4 months the ES= 0.49-0.54 persisted.[29]

A small RCT who recruited 30 sedentary women, 100% completion rate, reported an improvement (NNT=3), following 6 weeks of exercise for generalised anxiety disorder. They concluded the response rate was similar to other treatments such as pharmacology and CBT for GAD.[30] A year later this same author carried out a comprehensive systematic review on the effects of exercise and anxiety, pertaining to specific disorders. Preliminary data suggested that exercise training can serve as an alternative therapy for patients with social anxiety disorder, generalised anxiety disorder, and obsessive–compulsive disorder. Anxiety reductions appear to be comparable to empirically supported treatments for panic and generalised anxiety disorders. Moderator analyses showed larger ES for participants 31 to 45 years of age compared to older participants and for an exercise frequency of 3 to 4 times per week. There exists less conclusive evidence to support the effects of exercise on CBT and PTSD.[31]

Conclusions

There are even fewer studies comparing the effect of exercise on anxiety to other alternative therapies such as yoga, ti chi, and relaxation. The results from these studies report comparable effectiveness. More studies are needed to compare the effects of exercise on treating anxiety if it is going to be made a recommendation in general practitioner clinics.

Even if the evidence for a causal relationship between physical activity and anxiety in the general population remains unclear, it would not necessarily mean that exercise training is unable to reduce at least certain symptoms of anxiety for some people. Individuals may find it harder to exercise during times of stress, such as before exams, so this is the time when counsellors could encourage people to keep up exercising. Fitness changes are not directly linked to a reduction in anxiety, but improved physical health may result in enhanced quality of life therefore indirectly reduce the anxiety associated with ageing.[32]

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CASE REPORT

An unusual presentation of Tuberculosis

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A young Somali gentleman presented to the Emergency Department with unrelated symptoms and was noted to have a large, soft pre-sternal mass. He denied cough, night sweats, lethargy or fever but on closer inspection was noted to be malnourished and had pale conjunctivae. The lump was drained and the fluid was sent to culture and sensitivity and microscopy. Lateral chest x-ray revealed a soft tissue pre-sternal mass. A CT scan was done and revealed a cavitating lesion in the left upper lobe. A diagnosis of Tuberculosis was done and he was started on standard therapy; Isoniazid, Rifampicin, Ethambutol and Pyrazinamide. The patient was discharged from hospital and was followed up at outpatients by a tuberculosis specialist.

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CASE PRESENTATION

A 29-year-old irregular migrant from Somalia presented to the Emergency Department following a fall for investigation of a suspected fracture of the hip and ankle. An interpreter accompanied him as he spoke limited English. On systemic examination he was noted to have a large (approximately 11cm by 8cm) lump over his sternum, which was soft and had no overlying skin changes, similar to Figure 1 below. The interpreter reported that this was of growing concern to the patient, as it had been growing progressively for the previous three months. While lower limb X-rays ruled out fractures, a bedside ultrasound of the lump on his chest showed it to be fluid-filled and 100ml of pus was drained using aseptic technique and sent to the lab for culture and sensitivity, as well as acid fast bacilli smear and culture (AFB) in view of his country of origin. This prompted a review of a prior chest x-ray taken 5 days before (Figure 2) which revealed nodular changes in the left upper lobe along with apical pleural thickening, highly suspicious for tuberculosis (TB). The chest x-ray taken 5 days prior was not originally reviewed because the initial presentation was that of lower limb injury, and the patient did not mention this lump, nor complained of any other symptoms, at triage.

Figure 1: Photo of a pre-sternal mass with no overlying skin changes, adapted from Saifudheen, K et al. (2010)

Figure 2: Lateral Chest X-ray taken of patient demonstrating soft tissue pre-sternal mass

The possibility of TB was further increased by the fact that he was significantly underweight with a BMI of 16.6 kg/m2, had a raised C-reactive protein (CRP) of 117 mg/l (0-5mg/L), and an iron deficiency anaemia with a Hgb of 10.9 g/dL (12.0-15.5g/dL). Thus, he was admitted to an isolation room for further investigation, and all contact precautions and appropriate nursing care protocols were initiated.

A CT scan of the thorax two days later revealed the following: a cavitating lesion in the left upper lobe with associated smaller cavitating nodules, diffuse peri-bronchial micro-nodules with tree in bud appearance in the left lobe, multiple enlarged lymph nodes in the lower neck, right axilla and mediastinum (some of which were necrotic) and a pre-sternal subcutaneous fluid collection with enhancing peripheral walls measuring 4.3cm (Figures 3, 4 and 5). This pre-sternal fluid collection was the same one which had been drained two days before in the Emergency Department. This result was assumed to be pulmonary TB and the patient was commenced on quadruple anti-TB treatment, namely Isoniazid, Rifampicin, Ethambutol, and Pyrazinamide. He was also concomitantly given Pyridoxine, Iron and calorific supplementation.

Figure 3: A cavitating lesion in the left upper lobe with associated smaller cavitating nodules

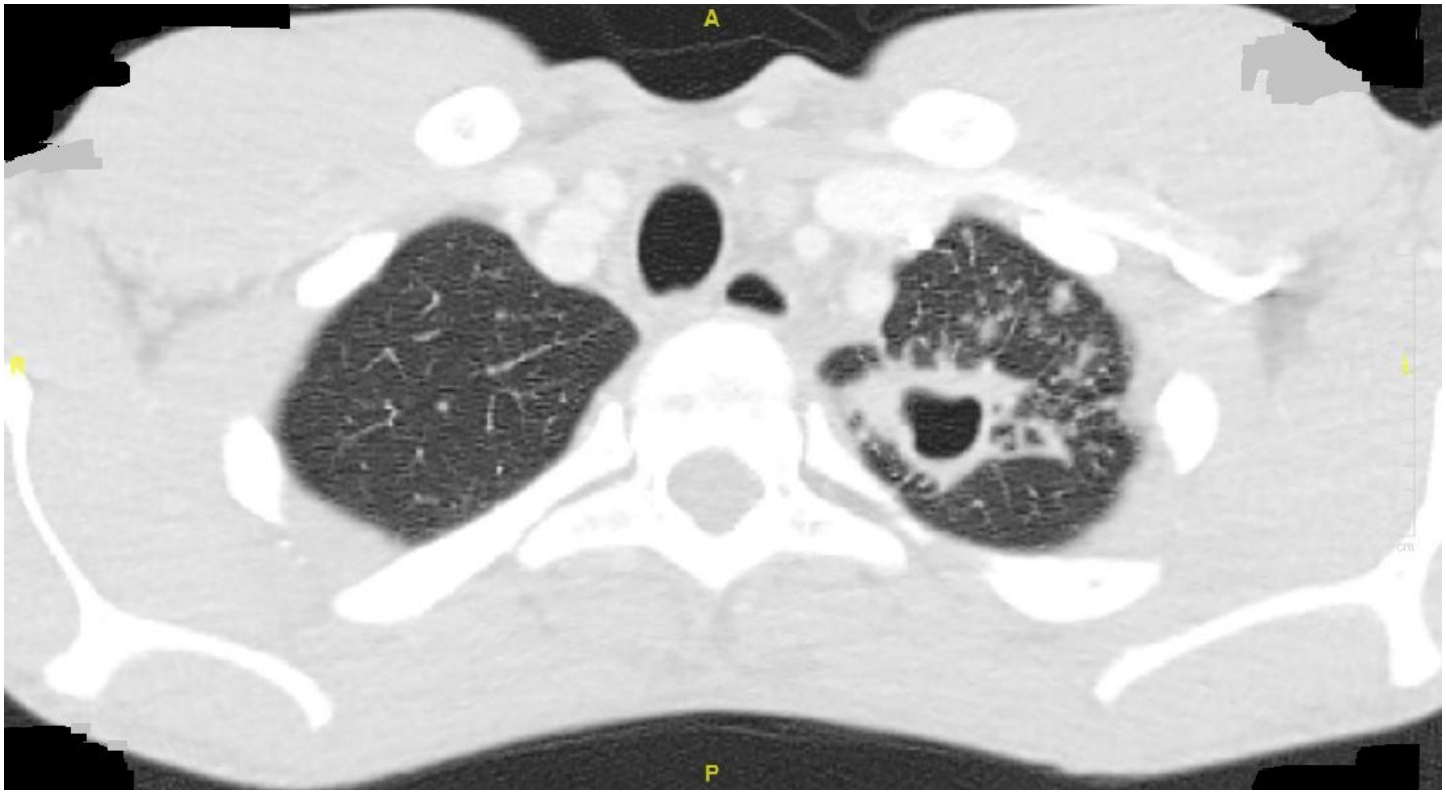


Figure 4: Diffuse peri-bronchial micro-nodules with tree in bud appearance

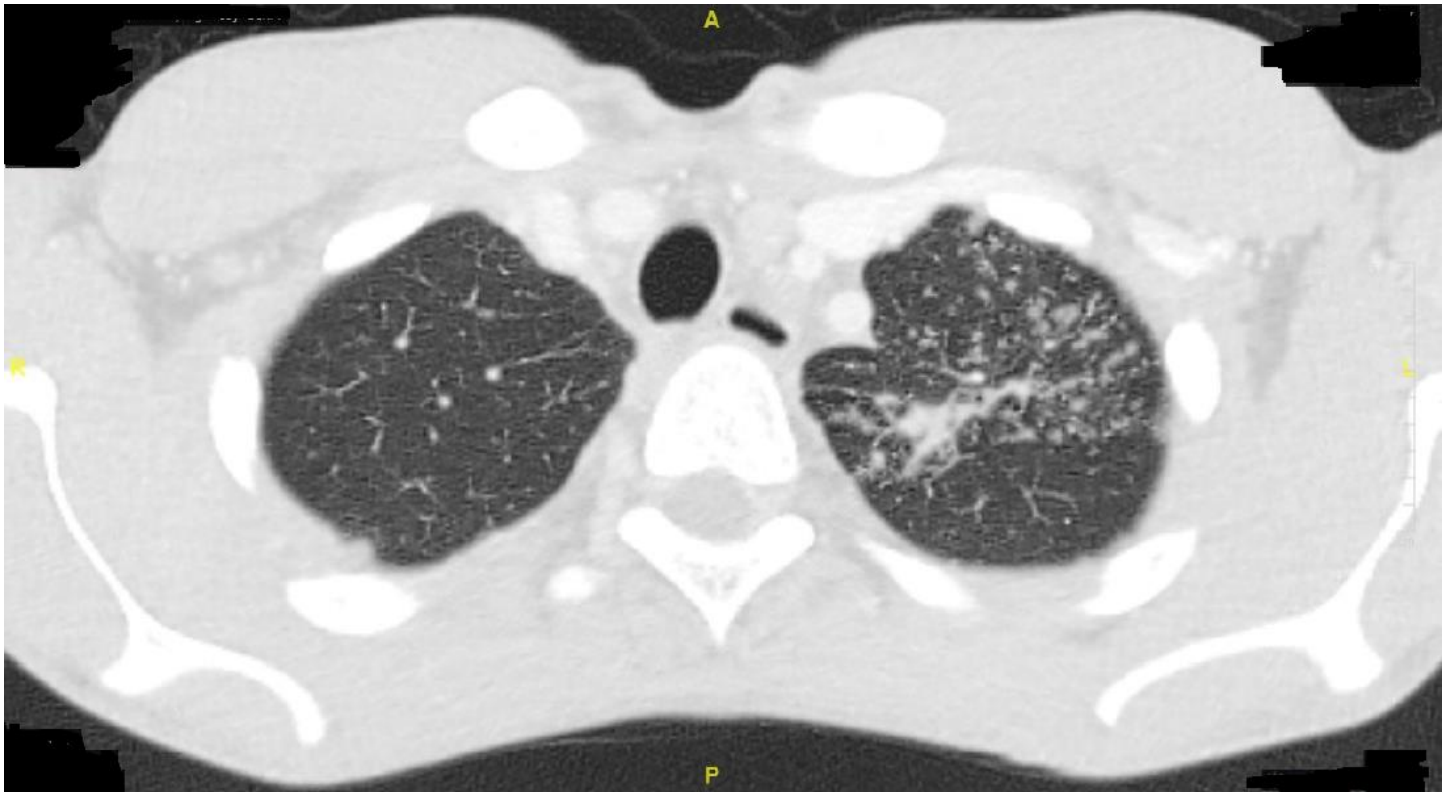
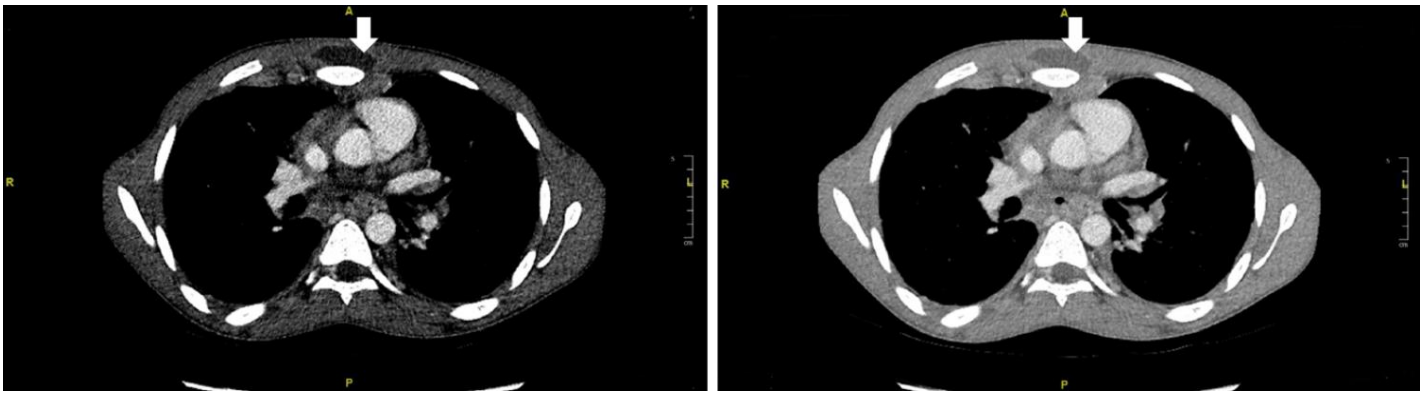


Figure 5: Pre-sternal subcutaneous fluid collection with enhancing peripheral walls measuring 4.3cm



Further samples were sent for mycobacterial investigation, including sputum, blood cultures, gastric lavage and a nasal respiratory screen. Human Immunodeficiency Virus (HIV) and Hepatitis screens were negative, while both Immunoglobulin (Ig) A and IgG levels were elevated at 6.78 g/L (0.70-4.00g/L) and 33.2 g/L (7.01-16.0g/L) respectively.

He was kept in hospital to improve his nutritional status and continue anti-TB treatment while awaiting the results of the samples taken for culture of mycobacterium. His interpreter was also unavailable (due to other commitments) during the majority of reviews by his caring firm. The language barrier was noted to have a negative effect on his mental wellbeing due to his inability to fully

comprehend what the caring physicians were telling him and the subsequent plan of action.

Over the course of his first week in hospital, the pre-sternal fluid collection was noted to be increasing in size after the initial drainage procedure performed at the Emergency Department. The general surgeons were consulted and carried out incision and drainage under general anaesthesia, revealing greenish pus-like fluid, which was again sent to the laboratory for culture. A surgical drain was left in-situ. The drain continued to drain pus and blood over the first day, but there was no further drainage on the second day and the drain was removed. The drain contents were also sent for culture and sensitivity. There were no further issues with the pre-sternal fluid collection, nor any other symptoms, and the patient's weight and treatment continued to be reviewed.

OUTCOME AND FOLLOW-UP

The patient's details were passed on to the Public Health Department for disease notification and contact tracing.

The initial pus sample taken yielded Mycobacterium tuberculosis detected on polymerase chain reaction (PCR), with no resistance to Isoniazid or Rifampicin. Sputum and all other samples of pus yielded no growth of any bacteria, with the exception of the gastric lavage samples which also cultured *M. tuberculosis*.

While the initial CT scan result prompted the caring firm to commence standard quadruple anti-TB treatment, the results of the cultures confirming the diagnosis of tuberculosis confirmed the need for such treatment, for 6 months with associated monitoring. This was continued in the community after discharge.

The patient spent a total of 18 days in hospital, and prior to discharge was educated on how he was to continue taking his antituberculous medication together with vitamin and calorific supplementation. His details were passed on to the community TB specialist for directly observed therapy (DOT). The patient was discharged once the caring firm had taken all necessary steps to handover the case to the community clinics, and the patient had improved his nutritional status. He was followed up in the community by a TB specialist.

DISCUSSION

TB is common in malnourished patients and in those who come from countries with a high prevalence such as Somalia.[7] There is very limited literature with patients exhibiting pre-sternal fluid collection as the initial presentation of TB.[4 5] Apart from the classic presentation with coloured sputum, fever, night sweats and upper zone changes on chest x-rays,[8 9] some case reports have shown TB to present as pleural effusions,[2] osteomyelitis of the sternum[1 6] and as chronic infections of the sternal wounds in patients who underwent coronary artery bypass grafting (CABG) procedures.[3 7] Anaemia is common at presentation[2] and the presence of hypergammaglobulinemia occurs in late-stage disease.

In this case, the patient did not inform a doctor of the increasing lump on his sternum and therefore this was initially not noted by the triage of the Emergency Department. It was fortuitous that he injured his leg and came to the Emergency Department and reported the symptom to the attending physician. The patient denied the usual respiratory symptoms which are seen in pulmonary TB which he clearly had radiological evidence of.

Locally, the standard protocol is for all irregular migrants to have a screening Chest X-ray. Upon further review it was noted that the patient had had 2 prior chest X-rays 1 month and 1 week prior to admission. Although the radiologist had reported them abnormal, the requesting physician was not aware of these changes. This could have facilitated an earlier diagnosis. Due to the delay in presentation there was a high probability that he was infective towards the other migrants in the same residence as these are open migrant centres, and he may have therefore spread disease.

The usual workup of TB needed to exclude HIV as a co-existing disease as this is more likely to result in multi-drug resistant (MDR) TB and would also require concurrent treatment.[10]

The delay in incision and surgical drainage was not optimal as it was ultimately needed as his abscess increased in size. Moreover, the standard duration of in-hospital stay was exceeded due to the fact that there were communication issues between the caring physicians and the patient, alongside the process of application for free TB treatment. The application had to be finalized during his inpatient stay in order for him to receive them after his discharge from hospital. Due to the increasing influx of irregular migrants who speak different languages and dialects, it is difficult to find interpreters when they are ill. Moreover, if an interpreter is found, they are not always available during the standard hours of ward rounds and patient reviews, posing a challenge to both the patient and the firm.

Conclusion

This case highlighted how occasionally TB may present in an unexpected fashion. This patient's chest lump had been present for three months but had progressively worsened. The importance of the general medical assessment must be emphasised as part of a patient's complete assessment; without it, this gentleman's chest lump may have been missed completely in the context of his presenting complaint of a fall and associated hip pain.

Learning Points/Take Home Messages

- Tuberculosis may present in a variety of ways.
- Unusual presentation. This case highlights the difficulty of diagnosing disease in patients who have a language barrier. The fact that he was residing in a local detention centre for irregular migrants who do not have easy access to medical care delayed the diagnosis.
- This patient was investigated for tuberculosis based on his origins from an endemic area.
- A number of samples should be collected for investigation of tuberculosis but few, if any, yield positive results.

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CASE REPORT

Odontogenic myxoma in the mandible - a diagnostic dilemma

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Odontogenic myxomas are slow-growing and invasive tumors comprising of 3-6% of all Odontogenic tumors, that can become very large and distend the maxilla or mandible. Here we report a case of 19 year old female patient who came with a complaint of swelling in the left side of the jaw with occasional pain since two months.

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INTRODUCTION

Myxomas can be found in various sites in the body including the skin and subcutaneous tissue, heart (mainly in the left atrium), and also in various sites of the head and neck.[1] Odontogenic myxoma (OM) is the second most common odontogenic lesion with an incidence of approximately 0.07 new cases/million /year.[2] World Health Organization has classified OM as a benign tumor of ectomesenchymal origin with or without odontogenic epithelium. It appears to originate from the dental papilla, follicle or periodontal ligament. Myxomas are non-encapsulated benign locally aggressive tumors which may occur in both the soft tissues and bone. In 1863 Virchow was the first man to describe about myxomas.[3]

CASE REPORT

A nineteen-year-old female patient had visited our department with the chief complaint of swelling on the left side of the mandible since two months with occasional dull aching pain. History revealed that the swelling was small and gradually increased in size. Patient also gave a history of extraction in the same region one year back. Medical history was non-contributory. On Extraoral examination, no gross facial asymmetry was noted. On intraoral examination there was mild expansion of the buccal cortical plates in the left mandibular premolar region (Fig 1) with no vestibular obliteration. 35 was missing. Restorations were present in 33, 34 and 36. No tenderness and parasthesia were present. No lymph node enlargement was present. Based on the history and clinical examination, Provisional diagnosis of Residual cyst was given. To confirm the diagnosis, certain radiographs were advised. Mandibular occlusal radiograph revealed multilocular radiolucency extending from 32 to 36 region with expansion of the buccal cortical plates (Fig 2). Panoramic radiograph revealed multilocular radiolucency with angular septations extending from 36 to 42. Obturating material present in 33 is extending into the radiolucency. Root resorption in seen with respect to 34,36 (Fig 3). Cone beam computerized tomography revealed irregular multilocular bone destruction with angular septations. (Fig 4)

Fine needle aspiration was negative. Differential diagnosis of Odontogenic keratocyst, Central giant cell granuloma and Odontogenic myxoma were given. For further confirmation incisional biopsy was advised. Gross sections revealed greyish white glistening, gelatinous mass (Fig 5). Heametoxylin and eosin sections showed stellate cells loosely arranged in a fibrillar stroma which confirmed the diagnosis of Odontogenic myxoma. (Fig 6). Treatment plan of segmental mandibulectomy followed by reconstruction using free autogenous graft was planned. However, the patient was lost to follow up.

Figure 1: Mild expansion of the buccal cortical plate irt 34,36 region

Figure 2: Mandibular occlusal radiograph revealed multilocular radiolucency extending from 32 to 36 region with expansion of the buccal cortical plates.

Figure 3: Orthopantomograph reveals multilocular radiolucency with angular septations extending from 42- 36. Obturating material present in 33 is extending into the radiolucency. Root resorption in seen wrt 34,36.

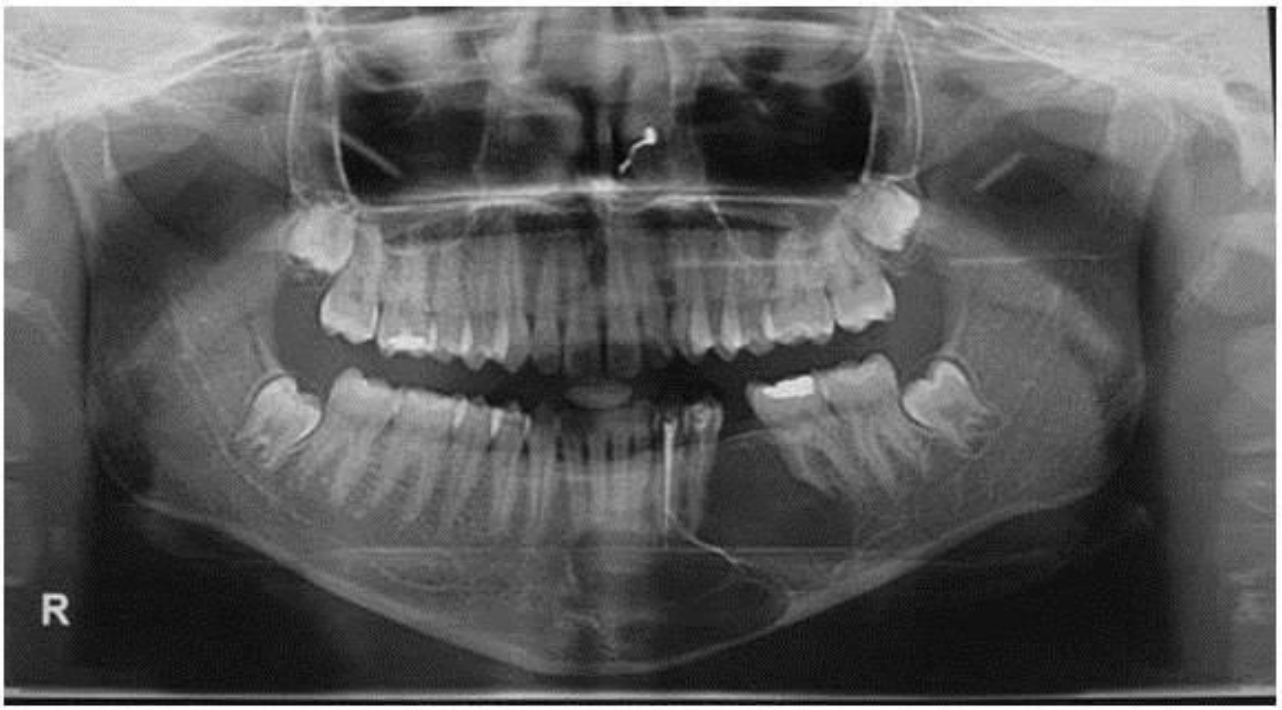


Figure 4: Cone beam computerized radiography reveals Cortical expansion, angular septations and obturative material in 33 in axial and sagittal sections respectively.

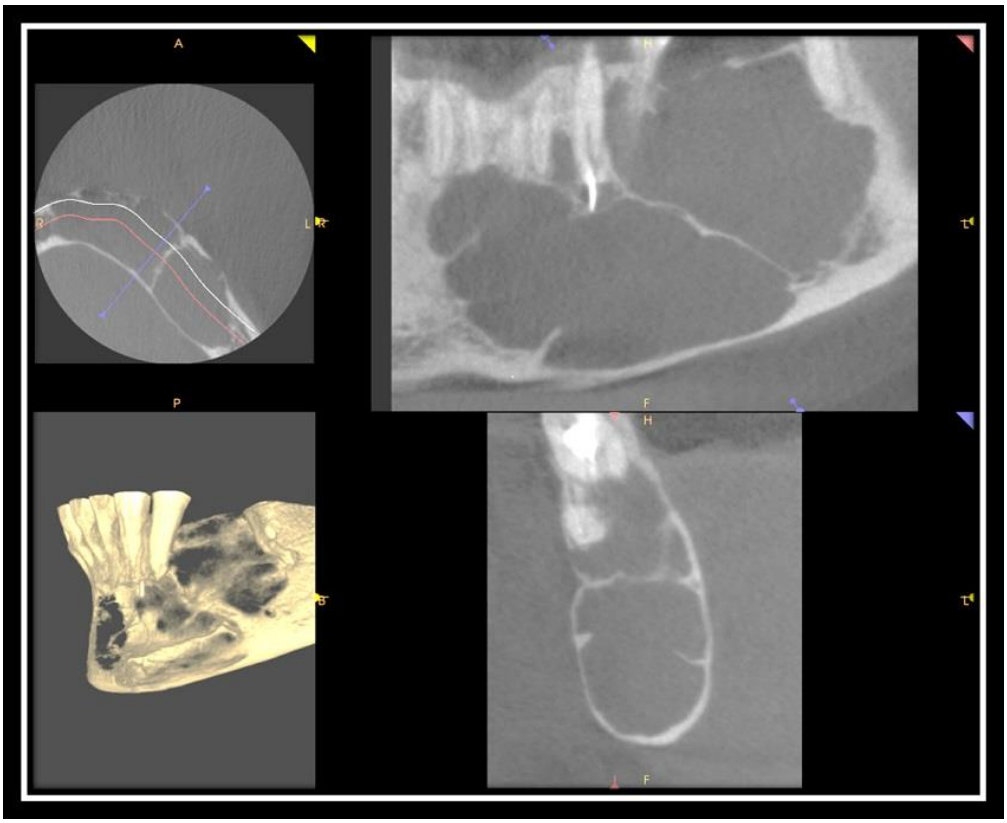
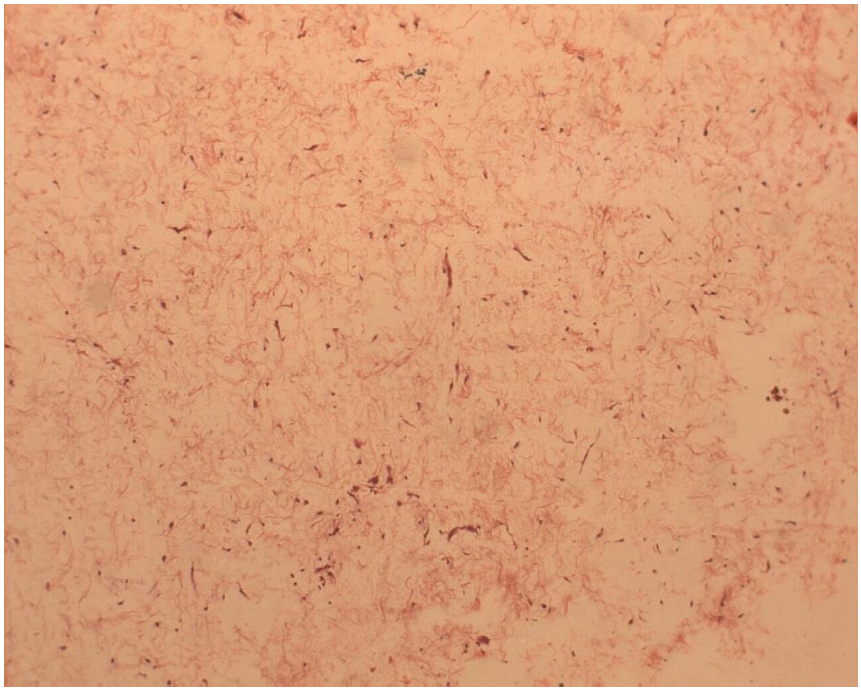


Figure 5: Gross specimen showed Whitish grey glistening gelatinous mass.

Figure 6: Haematoxylin and eosin stain showing stellate shaped cells loosely arranged in myxoid stroma.



DISCUSSION

Rudolph Virchow was the first to describe the histologic features of myxofibroma in 1863, although the lesions of jaws were not particularly mentioned. He described that these tumors resemble the mucinous substance of the umbilical cord. These tumors are most frequently seen in heart muscle. Myxomas of the mandible and maxilla are very rare. In 1947, Thoma and Goldman first described myxomas of the jaws. Since then odontogenic myxoma has been a subject of continuous scientific debate.[4]

Odontogenic myxomas (OM) are rare tumors derived from embryonic mesenchymal elements of dental anlage.[5] World Health Organization has classified OM as a benign tumor of ectomesenchymal origin with or without odontogenic epithelium.[6] It appears to originate from the dental papilla, follicle or periodontal ligament.[5]

In Asia, Europe and America relative frequencies of occurrence of odontogenic myxomas are between 0.5 and 17.7% have been reported.[7, 8-13]

Odontogenic myxomas are asymptomatic. Pain, paresthesia or asymmetries occur only when they take on larger sizes. Their growth is usually slow; however, they are locally aggressive. They may cause divergence of root, resorption, tooth shifting or movement. When involving maxilla, OM can expand inside the maxillary sinus and are then diagnosed later only after having grown to larger sizes.[14]

Radiological appearance of OM is usually a unilocular or multilocular radiolucency having well-defined or diffused margin. The size of the lesion and locularity are interrelated. OM lesions which are larger than 4 cm follow a multiloculated presentation, whereas smaller lesions seem to be unilocular in appearance and the presentation is often defined as soap bubble, honeycomb, ground-glass, or tennis racket pattern.[15] Kaffe et al reported mixed appearance in 12.5% and radiopaque appearance in 7.5% cases.[16]

On gross examination, odontogenic myxoma appears as a grayish white, nodular heterogeneous mass of variable consistency,[1] with a glistening gelatinous cut surface,[17] which was obvious in our case.

In a clinicopathological study conducted on 25 cases of odontogenic myxomas by Li et al (2006), it was seen that histologically, all odontogenic myxomas were mainly composed of spindled or stellate-shaped cells in a mucoid-rich intercellular matrix.[18]

In a review conducted by Farman et al (1977) on histochemical findings in odontogenic myxoma it was seen that the ground substance of odontogenic myxomas consist of about 80% hyaluronic acid and 20% chondroitin sulfate. Tumor cells showed slight alkaline phosphatase activity. It was also seen that the myxoid intercellular matrix stains positively with alcian blue, but PAS staining may be negative.[19]

The current recommended therapy depends on the size of the lesion and on its nature and behaviour and can vary from curettage to radical excision. Due to its locally invasive nature, OM of the jaws tends to be treated by bone resection including peripheral ostectomy and segmental mandibulectomy.[20,21] These techniques remove a circumferential margin of bone around the tumor. The lesion is not encapsulated and its myxomatous tissue infiltrates the surrounding bone tissue, accounting for a high recurrence rate of 25% with conservative treatment.[22-23] Therefore, radical resection including a margin of 15–20 mm of healthy bone seems to be the best option to prevent recurrences, especially in rapidly expanding or locally destructive lesions with cortical bone perforation.[11] These

characteristics may explain the high rate of recurrence of myxomas which ranges from 10 to 33%.[24-25]

CONCLUSION

Odontogenic myxomas are rare tumors with ambiguous behavior. Odontogenic myxoma share common features with many other odontogenic tumours which may lead to a diagnostic dilemma. The use of plain radiography and advanced imaging modalities such as Computed Tomography and Cone Beam Computed Tomography can help in determining the extension of multilocular lesions like odontogenic myxoma and its effect on the surrounding structures. Proper initial clinicoradiological diagnosis followed by histopathological examination helps in arriving at an appropriate diagnosis and helps in formulating a treatment plan with minimal recurrences.

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CASE REPORT

The iatrogenic thyroid disease treatment

Navin Kumar Devaraj

Many factors may affect the level of thyroid hormones and thyrotropin. In treating patients, various consideration including the clinical status of the patient and possible confounding factors such as infection and age needs to be considered before starting treatment for either thyrotoxicosis or hypothyroidism.

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Introduction

Diagnosis of thyroid diseases is often challenging with various manifestations that are non-specific such as lethargy, weight gain or loss, palpitations or weakness. A key factor in the diagnosis of thyroid disease such as hypothyroidism or hyperthyroidism, is accurate interpretation of thyroid hormone (TH i.e. T4, thyroxine; T3, triiodothyronine) and thyrotropin (TSH) concentrations that are commonly measured in a test called thyroid function test (TFT).[1] In a subgroup of patients, the interpretation of TFT is more challenging, either because the results appear to not correlate with the clinical picture i.e. a low TSH in patient with hypothyroid or normal TFT in patients is suspected to be strongly thyrotoxic.[1-2] In these patients, a structured approach that includes clinical reassessment of thyroid status, along with various potentiating factors [e.g. infection, stress, drug therapy] can help in identifying the possible solution to this discordant TFT. A referral to an endocrinologist is also warranted in certain cases. This is a case that correctly depicts the pitfall in the diagnosis and management of this condition.

Case Report

A 70-years old man presented with weakness for two days to the neurologist. This has been a recurrent problem for the past two years. It typically occurs in clusters of a few days.

The patient has a background history of hypertension, diabetes and hypothyroidism. Both hypertension and diabetes were diagnosed about 10 years ago. His hypothyroid condition was diagnosed two years ago based on a low T4 and correspondingly high TSH at a primary care clinic.

His current medication is amlodipine 10mg daily, metformin 500mg daily and L-thyroxine 50 microgram. He was previously on L-thyroxine 75microgram which was adjusted based on a very low TSH level (<0.01 pmol/L).

He has seen many physicians over this past two years, but his underlying weakness is not improving. In fact, he has also been investigated for weight loss of 10kg over the past 2 years with various imaging methods and blood tumour markers, but without any positive lead.

On examination, he looks cachexic. He has mild pallor but otherwise has normal vital signs. His physical examination is also unremarkable including his physical examination. His latest HbA1c is 6.3%.

A list of investigation was ordered of which the most striking case was the TFT result. While the T4 results was within the normal range, TSH was 0.1. The thyroxine medication was stopped temporarily.

He was seen six week later. His TFT level recovered to normal. His weakness also improved on which he was very grateful to the treating physician. He gained 2 kg over this period of time. The neurologist attributed his symptoms as side effects due to iatrogenic thyroxin therapy. On further questioning, it was noted his thyroxine was started two years ago while he was having some upper respiratory illness.

Discussion

A small but significant number of patients may reveal TFT results that doesn't correlate with their clinical status. In such scenarios, a careful search for confounding factors [e.g. physiological changes of age, pregnancy, intercurrent (non-thyroidal) illness or concomitant medication use] is required before jumping into further assessment is essential to avoid unnecessary waste and risk in unneeded investigation and treatment.[2] In particular, they may be a reduced physiological production of thyroid hormones and concurrent rise in TSH secondary to

age which may not need treatment as noted in this case.[2]

Thyroid antibodies such as TPO-Ab and TRAb may help in diagnosis but not in all cases. In patients with Hashimoto's thyroiditis, TPO-Ab is nearly always elevated.[3] TRAb on the other hand helps in the differential diagnosis of hyperthyroidism.[4] Only in very rare instances, acquired and genetic causes of discordant TFTs can be considered such as investigating for resistance to thyroid hormone and disorders of thyroid hormone transport or metabolism.[1,5] Looking ahead, the increasing availability of next generation sequencing will likely expand the reporting of genetic causes and disorders of TH transport, action and metabolism.[2]

The following (table 1) may help in delineating the cause of abnormal thyroid hormone levels but correlation with clinical condition is equally as important before a final diagnosis is reached.[6]

Table 1: Guide to thyroid hormone interpretation

Thyroid Function Test Interpretation			
TSH	Free T4	Free T3	Condition
Normal	Normal	Normal	• None
Low	High	High	• **Hyperthyroidism**
Low	Normal	Normal	• Subclinical Hyperthyroidism
Low	Normal	High	• T3 toxicosis
Low	High	Normal	• Thyroiditis • T4 ingestion • Hyperthyroidism in the elderly or with comorbid illness
Low	Low	Low	• Euthyroid sick syndrome • Central hypothyroidism
High	Normal	Normal	• Subclinical Hypothyroidism • Recovery from euthyroid sick syndrome
High	Low	Low	• **Primary hypothyroidism**
High	High	High	• TSH producing pituitary adenoma

Conclusion

In conclusion, the treatment of thyroid disease may need more than just consideration of thyroid hormone levels to avoid any iatrogenic effect such as extreme weight loss and weakness.

Acknowledgement

The author would like to thank the patient for his kind informed consent in publishing of this case.

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