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Malta Medical Journal, 34 (3): Pages (2022)
http://mmsjournals.org/index.php/mmj

Table of Contents

MMJ

Malta Medical Journal, 34 (3): Pages (2022)

http://mmsjournals.org/index.php/mmj

EDITORIAL

Editorial

The impact on health of a war in Europe

Simon Attard Montalto

No sooner than the pandemic appeared to have reached some semblance of control (barring the emergence of yet another, and potentially more aggressive variant), Russia launched an all-out invasion of its neighboring country, Ukraine. The dire impact on lives, infrastructure and property to the Ukrainian people has already been enormous and shows no signs of abating. Indeed, the possibility of this war (how else can it be described?) escalating and 'spilling over' to other adjoining countries is very real and seriously raises the spectre of yet another world war, again with its epicentre in Europe. Even without further escalation, the destabilisation of the Ukrainian population has already resulted in the greatest refugee crisis facing Europe, presently being 'managed' by the impressive rallying of support being offered by many European countries, within and outside of the EU. Unless there is a timely cessation of hostilities and the senseless loss of life and wanton destruction in Ukraine stops, this refugee crisis threatens to overwhelm the support services. Poland, geographically a direct neighbour of Ukraine and, to-date, the greatest recipient of refugees has asked other countries to offload some of its burden.[1] To-date, this has occurred, for example, for specific subgroups with special health needs such as children receiving treatment for malignant diseases who have been transferred onwards to other countries including Malta.[2] The continued disruption or total breakdown of community-based health services such as vaccination programmes in Ukraine (for now) will risk the emergence of hitherto controlled infections and encourage the emergence of new pathogens.[3] New COVID variants are certainly not exempt from this scenario.

Cover Picture:

'Autumn hues'

Oil pastel painting

By Mariella Scerri

Mariella Scerri is a teacher of English and is also reading for a PhD in Medical Humanities with University of Leicester. Painting is a newly found hobby she discovered during the COVID-19 pandemic lockdown in 2020. Her preferred medium is oil pastel drawing and she derives inspiration from landscapes and seascapes.

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Ukraine and Russia are major exporters of pesticides and crop fertilizers as well being leading wheat growing and exporting countries in the world and collapse of this crop alone is already having far reaching effects on the price of staple food products.[4] Similarly, a significant curtailment in the availability of natural gas (40-45% of imported gas is supplied to Europe from Russia, now a pariah state on whom severe sanctions have been imposed), will create a significant economic 'hit'.[5] Although Malta does not source most of its fuel directly from Russia, it relies heavily on other European countries that do. Bypassing all Russian goods and supplies and seeking alternative sources will take time to set up and take effect. In the meantime, economic recession and austerity measures may remain the order of the day for sometime to come, with inevitable knock-on effects on supplies, pharmaceuticals and healthcare in general.[6]

It is not surprising, therefore, that many champions of Healthcare such as the Royal College of Physicians, Royal College of Paediatrics and Child Health, UK, The European Resuscitation Council, The Malta Medical Association and countless others have deplored the events in Ukraine and appealed for peace and a return to normality. This is a totally unnecessary and senseless war that is resulting in a deplorable loss of life, presently in the Ukraine but one that threatens the whole of Europe. Malta, even if not involved directly in the fighting, will not be exempt at least from indirect repercussions on its economy and compromise to the standard of Healthcare that we enjoy today.

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MMJ

Malta Medical Journal, 34 (3): Pages (2022)

http://mmsjournals.org/index.php/mmj

ORIGINAL ARTICLE

Sharp increase in traffic fatalities in first quarter of 2022 in Malta

Tonio Piscopo, Jeremy Borg Myatt, Victor Grech

Introduction

Road traffic accidents (RTAs) are a leading cause of death and disease burden worldwide. Malta experienced a declining trend in RTA mortality over the past years albeit with a surge at the time of writing. This study was carried out to analyse trends in RTAs in Malta.

Methods

RTA statistics by quarter were obtained from the website of the National Statistics Office for 2013-2021. Records for Quarter1 (Q1) 2022 were compiled from media publications. Regression was used to estimate expected values for RTA fatalities for Q1 2022 and 2022 totals, particularly in relation to the targets laid out in the Road Safety Strategy Malta 2014-2024. The type of accident was also analysed from 2017.

Results

From 2013, a transient dip in annual fatalities occurred in 2014, with a steep incline to 2016, followed by a highly significant decline which was reversed sharply in Q1 of 2022. For Q1 2022, expected fatalities were <1 but there were actually 10 fatalities (13 by April 2022), when expected fatalities for all of 2022 were <8. The highest fatalities were aged 18-40 years (*n*=47), followed by age >59 years (*n*=38). In some years, up to 75% of all fatalities were motorcycle/e-bicycle riders.

Conclusion

Road safety should be a national priority until Vision Zero is reached. Better data collection and analysis should shed light on causes and solutions to prevent RTAs. The current National Road Safety Strategy, with emphasis on education, engineering and enforcement remains relevant, but there is little evidence that its targets are being achieved. More must be done to guarantee road safety to users in Malta.

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Introduction

Road traffic accidents (RTAs) are a significant cause of mortality, with over a million annual fatalities worldwide, a leading cause of death and disease burden.[1] Malta experienced a declining trend in RTA mortality over the past few years although there has been a surge in deaths at the time of writing.[2] This study was carried out to analyse trends in RTAs in Malta, particularly in relation to the targets as laid out in the *Road Safety Strategy Malta 2014-2024* published by the Ministry for Transport and Infrastructure. These targets aimed to decrease fatalities by 50% and grievous injuries by 30% over the 10-year period.[3]

Materials and Methods

RTA statistics by quarter were obtained from the website of the National Statistics Office (NSO) over the period 2013-2021[4] and records for Q1 2022 were compiled from media publications. Visual inspection revealed a declining trend in RTA fatalities from 2016. For this reason, annual totals and first quarter fatalities and grievous injuries from 2016 to 2021 were analysed using linear regression in a bespoke Excel sheet.[5] The equations derived were used to estimate expected values for RTA fatalities for Quarter 1 (Q1) 2022 and 2022 totals. The type of accident was also analysed from 2017, the year they started to be recorded.

Results

From 2013, a transient dip in fatalities occurred in 2014 (*n*=10) following which a steep upward incline in annual fatalities was registered with a total of 22 fatalities in 2016 (Figure 1). Thereafter, there was a highly significant decline in RTA fatalities by year and an almost significant decline in first quarter RTA fatalities (table 1). The linear regression equations for RTA fatalities by year and by Q1 were: fatalities=5091.09 + -2.51 × Year, and fatalities=1733.14 + -0.86 × Q1 respectively. This trend was reversed sharply in the first quarter of 2022. For Q1 2022, the expected number of fatalities was <1. However, by the end of Q1 of 2022 there were already 10 fatalities resulting from RTAs, and up to the time of this writing (April 2022), this has gone up to 13. This already greatly exceeds the expected value for all of 2022 which is 7.2 total deaths based on previous annual trends.

Figure 1 Annual RTA fatalities over period 2014-2021 (includes also Q1 2022 data)

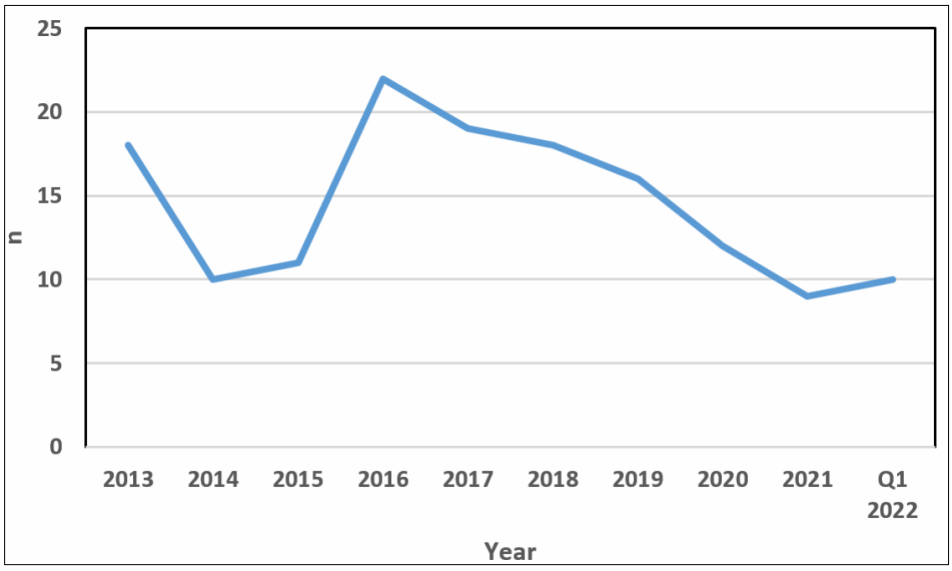


Table 1 Road traffic accident fatalities by year and for quarter 1, 2016-2021

Year	Annual	Q1
2016	22	4
2017	19	6
2018	18	4
2019	16	1
2020	12	2
2021	9	1
df	4	4
r^2	0.97	0.64
Adjusted r^2	0.96	0.55
Intercept	5091.1	1733.1
Slope	-2.51	-0.86
SE	0.92	1.34
2-tailed p	0.0003	0.055

Age-group fatalities were recorded over the period 2015-2021. The highest fatalities were registered in the age group 18-40 years (*n*=47), followed by age above 59 years (*n*=38) (Figure 2). In this same period, the type of road user fatalities (*n*=117) was recorded and a high percentage of these fatalities, 36.7% (43), were motorcycle riders. In some years, up to 75% of all fatalities were motorcycle or e-bicycle riders (Table 2).

Data by type of RTA, started to be collected by the NSO from Q4 of 2017. Analysis of this information reveals that there may be an increasing trend towards vehicle-related pedestrian accidents as the year progresses, with the highest numbers in the last quarter of each year (Figure 3). A high number of fatalities (22%) involved pedestrians from 2018-2021 (12 *n*=55). Cyclists were also regularly registered in the statistics, mostly with grievous injuries, with one fatality registered in the same period.

Analysis of data collected from 2018 regarding fatalities in the whole vulnerable cohort, namely pedestrians, cyclists and motorcyclists, revealed that these constituted 69% of the total fatalities (38/55), peaking in 2020 at 83.3% of the total fatalities (Table 2).

Grievous injuries averaged marginally less than 300 per year and remained somewhat stable over the period studied (Figure 4). A minimal decrease was registered in the COVID-19-year 2020, thereafter rising again to the highest ever (*n*=339) in 2021. Several hit-and-run accidents were also recorded since 2017. These amounted to 47 involving pedestrians and 3 involving cyclists over the 5-year period. Other important data was limited to generic accident types. Recommended important and useful information such as the dynamics of each accident or geotagging (which is more specific than RTAs just tagged to districts or localities) was not available.[6]

Figure 2 RTA fatalities by age group over period 2015-2021

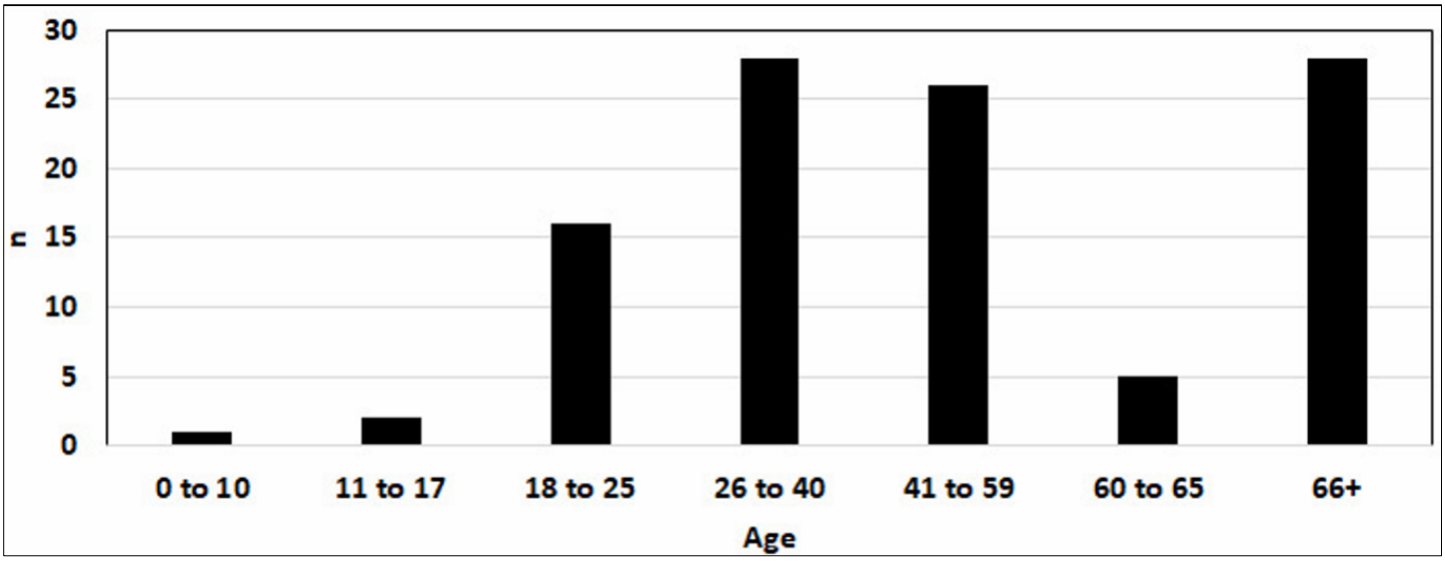


Table 2 Motorcycle and e-bicycle deaths, Annual deaths. 2015-2021 (also with Q1 2022)

FATAL	2015	2016	2017	2018	2019	2020	2021	Q1 2022
Annual Total Fatalities	11	22	19	18	16	12	9	10
Motorcycle (E- and PA-bicycles from Q2 2021) deaths	2	9	3	8	5	9	3	4
Motorcycle deaths as % of total	18.2	40.9	15.8	44.4	31.3	75.0	33.3	40.0
Pedestrian deaths				2	5	1	4	
Pedestrian deaths as % of total				11.1	31.3	8.3	44.4	
Cyclist deaths				1	0	0	0	
Cyclists deaths as % of total				5.6	0.0	0.0	0.0	
Total vulnerable users deaths				11	10	10	7	
Total vulnerable users deaths as % of total				61.1	62.5	83.3	77.8	

Figure 3 RTAs involving vehicles with pedestrians by quarter 2017-2021

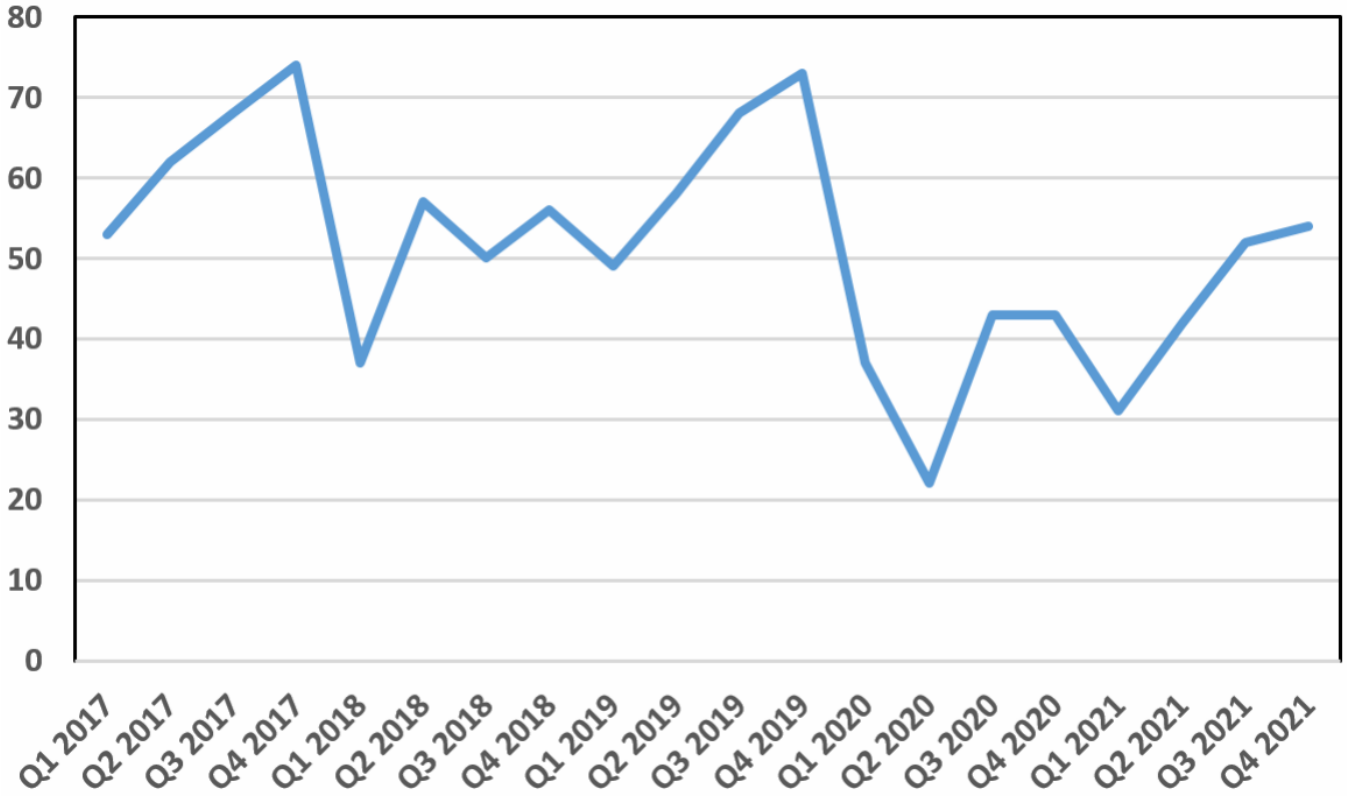
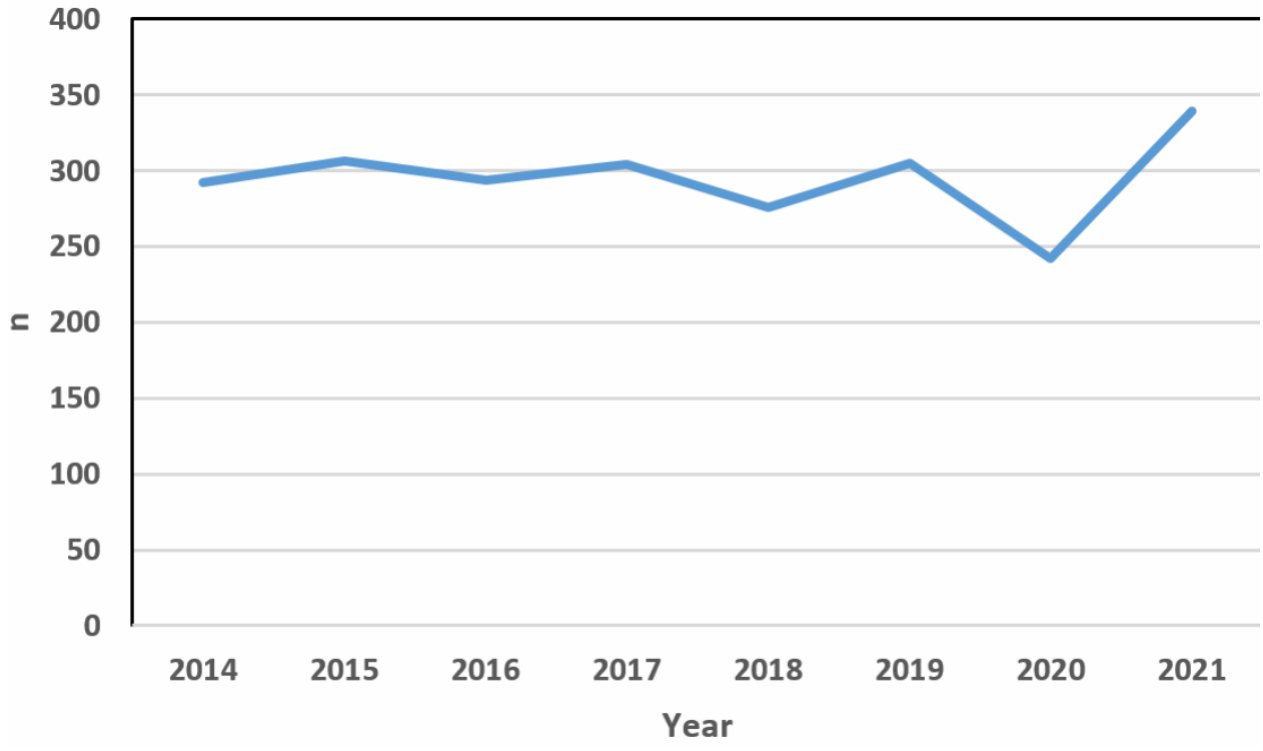


Figure 4 Annual RTA grievous injuries over period 2014-2021



Discussion

Road safety in Malta is an important topic which is increasingly coming to national attention. This is mainly the result of a combination of factors which include the immediate reporting of traffic accidents (mostly fatalities) by the media, the horrendous nature of some of these accidents, the blatant disregard for the law by some road users, as well as the establishment of institutions and organisations advocating for road safety such as the National Road Safety Council and non-governmental organisations (NGOs) like Doctors for Road Safety.

The *Road Safety Strategy 2014-2024* was an important document published in 2014 which established the Road Safety Council as an advisory body to the Ministry for Transport and Infrastructure.[3] The pillars of good road safety as outlined in the same document are education, engineering and enforcement, and the targets in the document (decrease fatalities by 50% and grievous injuries by 30% over a 10-year period) were based on improving all three.[3]

In terms of fatalities, an improvement was registered after the figures deteriorated drastically in 2016. The current status however is the same as the one observed in 2014, and in fact, is already worse at this early stage in 2022, with an alarming rise in fatal accidents in Q1 of this year.

In terms of grievous injuries, there has not even been a dent in annual statistics at all. One can argue that in terms of the actual numbers of such accidents (around 300 compared to fatalities, which usually amount to below 20 annually), these types of severe injuries produce a greater number of life-changing events for a greater number of people. Grievous injuries often necessitate frequent visits and admissions to hospital, time lost from work leading to loss of income (the effects of which snowball to include the whole family when the injured party is a breadwinner), and loss of bodily function with restriction in quality of life.

Data regarding vulnerable road users are worrying, especially for pedestrians, who are the most vulnerable. Unfortunately, available data provide no further clues as to the possible causes of accidents involving vulnerable subgroups. For example, it is difficult to compare pedestrian injury and fatality statistics with those pertaining to cyclists as no denominator data is provided on pedestrian and cyclist usage density. One possible explanation is that cyclists are usually more wary of dangers on the road and might therefore be more cautious. Furthermore, pedestrian road usage density probably exceeds that of cyclists at any given time. One also hopes that with increasing awareness, vehicle users show more respect to cyclists on the road. A local cycling NGO, Rota, is very proactive in promoting this awareness.[7]

Motorcycle riders are another worrying vulnerable group, comprising more than a third of all fatalities. In Q1 of 2022, motorcycle rider fatalities had already reached 40% of all fatalities. Little else is offered in the data however to explain these numbers.

The limitations imposed by the lack of detail of available data is of note. For example, knowing the number of pedestrians who were killed on our roads does little to point to the actual problem, as all road users, pedestrians included, have their responsibility towards safe road use, and all have the potential to use roads hazardously. It is thus of major importance that the dynamics of each accident along with the specific location are recorded in more detail so that patterns in recurrent similar accidents may be highlighted, allowing the necessary actions to be taken accordingly to then

improve accordingly on engineering, education or enforcement in each particular situation.

A potential limitation of this study is that there was less circulating traffic in 2020 and early to mid-2021 due to COVID-19 related restrictions at public gatherings, closure of social venues and a shift to work from home.[8-9] However, a review of the raw data (table 1) shows that the declining trend in these years is consonant with that of previous years. Furthermore, the hazards of extrapolation from data beyond the extant range are well known, with the possibility of significantly biased estimates if the assumed relationship does not extend into the region of extrapolation.[10] However, this study only extrapolated for one year, a very short period.

The data analysis in our study offers an insight into the current situation regarding road accidents in Malta and opens the door to potential solutions. There has been visible progress in the condition of Malta's major roads, with improvements in road engineering that have raised local standards. However, much remains to be done. Efforts to educate the public by the Road Safety Council and miscellaneous NGOs have also been registered, although a publicly funded, consistent, and professionally orchestrated educational campaign is lacking.

Enforcement is a harder nut to crack and more difficult to analyse. As a surrogate marker, one might use the behaviour of road users in relation to what they expect whilst using our roads. From random observation and common experience locally, it is evident that the average road user does not expect to be stopped by an enforcement officer whilst infringing the law. Examples of these commonly experienced infringements are the flagrant touting of laws such as altering direction without signalling, contravening carriageway markings, driving while using distractive devices such as mobile phones, contravening traffic lights, over-speeding, and careless driving in general. This observation and experience, although subjective, still says a lot.

The economic impact of road accidents is calculated by the World Health Organisation to be in the region of 1.5% of the Gross Domestic Product (GDP) in middle income countries. For Malta this would translate to a cost of just under 200 million Euro per annum.[11-12]

Several global communities and institutions, such as the United Nations, have adopted a Vision Zero approach to road safety.[13-14] This safe systems approach is based on some basic principles such as collection of reliable data, acknowledgment of the limits of the human body in relation to speed management, and acceptance of human error such that the requisite redundancy is built into systems. No death or serious injury is acceptable with this approach and the aim is to eventually achieve zero deaths on our roads.

One hopes that the Maltese authorities take up this challenge, as the health and economic benefits of improving our road safety culture are huge, while the human cost of the status quo unacceptable.

Conclusion

The issue of road safety will remain a major national concern until Vision Zero is reached. Improvements in data collection and analysis should shed more light on the causes and solutions to prevent RTAs. Significant groundwork has already been done especially with the Road Safety Strategy document with emphasis on education, engineering, and enforcement, but there is little evidence that the targets are being achieved. It seems that Malta still needs to get its act together to guarantee road safety to road users, especially the most vulnerable.

SUMMARY

What is known:

- Road traffic accidents (RTAs) are a significant cause of mortality, death and disease burden in Malta.
- Malta experienced a declining trend in RTA mortality over the past few years.
- There has been a significant surge in road traffic accident related deaths at the time of writing (beginning of 2022).

What are the new findings:

- The number of road traffic accident fatalities in Q1 2022 already greatly exceeds the expected value for all of 2022, based on previous annual trends.
- Motorcycle riders are another worrying vulnerable group, comprising more than a third of all fatalities.
- Several global communities have adopted a Vision Zero safe systems approach to road safety, with an aim to achieve zero deaths on our roads. It would be of benefit to the Maltese authorities to take up this challenge as the health and economic benefits would be significant.
- Improvements in the detail of data collection and analysis following road traffic accidents are required in order to shed more light on the causes of such accidents, so as to allow solutions to be found.

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MMJ

Malta Medical Journal, 34 (3): Pages (2022)

http://mmsjournals.org/index.php/mmj

ORIGINAL ARTICLE

Myocarditis in Malta in the COVID-19 vaccination era – a population-based study

Victor Grech, Sandra Distefano, Elizabeth Grech, Neville Calleja

Background

Vaccination against COVID-19 is crucial for controlling this scourge. COVID/vaccination deniers often rationalise their unfounded fears by citing rare vaccination side-effects. One of the most frequently cited side effects is myocarditis, especially in younger persons. Malta has very high vaccination rates. This study was carried out to ascertain whether admissions to hospital for myocarditis changed during the vaccination rollout, up to October 2021, when 83.4% of Malta's population of circa half a million had had their first 1st dose.

Methods

Malta is served by one large regional hospital (Mater Dei Hospital). Anonymous data for admissions with a diagnosis of myocarditis (ICD I40, I41, I51.4) were obtained for 01/2016-10/2021. Myocarditis discharges and 95% confidence intervals were plotted for 2016-2020. Myocarditis discharges for Jan-Oct 2021 were plotted separately.

Results

There were no outlier values for myocarditis discharges in either direction for any age for either sex.

Conclusion

Myocarditis, independent of vaccination, is commonest in young males, half resolving and some developing dilated cardiomyopathy, possibly leading to transplantation or death. The ongoing mass vaccination with novel messenger RNA vaccines resulted in reports of myocarditis in male teens, this being a rare side effect. The lack of significantly increased rates of myocarditis admission in any age age/sex group in Malta confirms that only rarely, myocarditis may be temporally associated with COVID vaccination which almost invariably runs a benign course and that this risk is very low, far lower than myocarditis due to actual COVID infection.

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Introduction

The COVID-19 pandemic continues to ravage the globe at the time of writing and non-pharmaceutical interventions,[1] a handful of treatments,[2] and vaccination,[3] appear to be the mainstays in controlling this scourge, now and in the future.[4]

COVID/vaccination deniers often rationalise their unfounded fears by citing rare vaccination side-effects. This fuels their own vaccination hesitancy as well as that of others.[5] One of the most frequently cited side effects is that of myocarditis, especially in younger persons.[6] This is defined by the Dallas criteria as an inflammatory disorder of the myocardium that is characterized by lymphocytic and monocytic infiltrates, myocyte degeneration, and non-ischaemic necrosis.[7] Myocarditis is predominantly viral induced by primary cardiotropic viruses such as adenoviruses and enteroviruses (e.g. coxsackie A, B viruses and echoviruses), although other viruses may also cause this condition and these include vasculotropic viruses such as parvovirus B19, lymphotropic viruses such as herpesvirus 6 (HHV6), Epstein–Barr virus, and cytomegalovirus. Viruses may also indirectly precipitate myocarditis by immune system activation, and these include the HIV, hepatitis C, influenza A B viruses and coronaviruses such as Middle East respiratory syndrome coronavirus (MERS-CoV), severe acute respiratory syndrome coronavirus (SARS-CoV) and SARS-CoV-2. Bacteria (e.g.,*Borrelia spp*.), protozoa (e.g., *Trypanosoma cruzi*) and fungi have also been implicated. Non-infectious aetiologies like toxins, drugs and systemic auto-immune conditions have also been described. The individual response/reaction to these agents is extremely heterogenous, making it impossible to predict the development of myocarditis after exposure.[8]

Malta is an island nation in the centre of the Mediterranean, part of the European Union and just 60 miles south of Sicily. The population is circa half a million and the country is served by one large regional hospital (Mater Dei Hospital) on the larger island of Malta and one smaller district general hospital on the island of Gozo.

Vaccination rollout has accelerated in many countries, including in Malta which has very high vaccination rates.[9] This study was carried out to ascertain whether admissions to hospital for myocarditis had changed in any way during vaccination rollout, up to October 2021.

Materials and Methods

Anonymous data for admissions to Mater Dei Hospital with a recorded diagnosis of myocarditis (ICD I40, I41, I51.4) were obtained from the Hospital Activity Analysis of Mater Dei Hospital for the period January 2016 to October 2021. Myocarditis discharges and 95% confidence intervals were plotted for 2016-2020. Myocarditis discharges for Jan-Oct 2021 were plotted separately.

Results

As vaccines became available in the last quarter of 2020 and approved by the European Medicines Authority, Malta was able to acquire sufficient vaccines to cover the entire population, purchasing vaccines from all suppliers including 830,000 doses from Pfizer and Moderna combined, one million doses from AstraZeneca and 250,000 doses from Johnson and Johnson. The manufacturer's recommended dosing schedules were strictly adhered to with second doses for Pfizer being given after 3 weeks, Moderna after 4 weeks and AstraZeneca after 10 weeks. Vaccination hubs were set up throughout the Island,[10] such that by the end

of Oct 2021, 83.4% of the population had received at least one vaccine dose.[11]

There were no outlier values for myocarditis discharges in either direction for any age for any of the two sexes (figures 1 and 2). Table 1 shows admission rates per 100,000 population by age group in acute public and private hospitals in Malta from 2016-2020.

Figure 1 Male myocarditis admissions by age for 2016-2020 (with 95% CI) and for Jan-Oct 2021

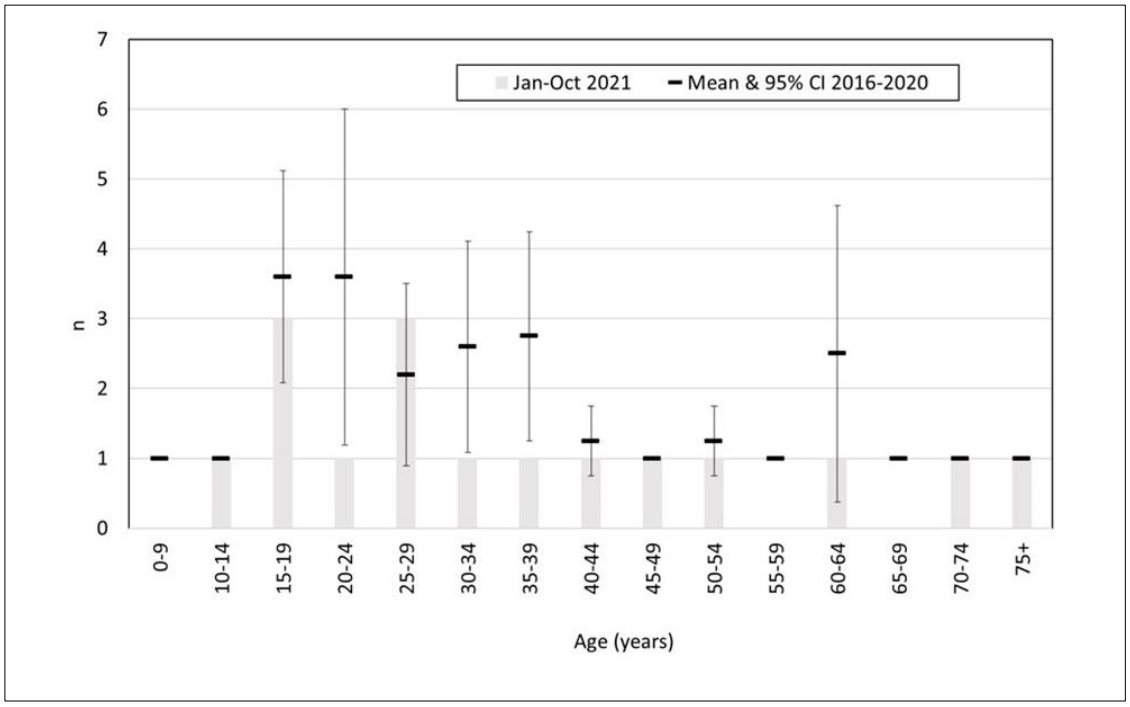

Figure 2 Female myocarditis admissions by age for 2016-2020 (with 95% CI) and for Jan-Oct 2021

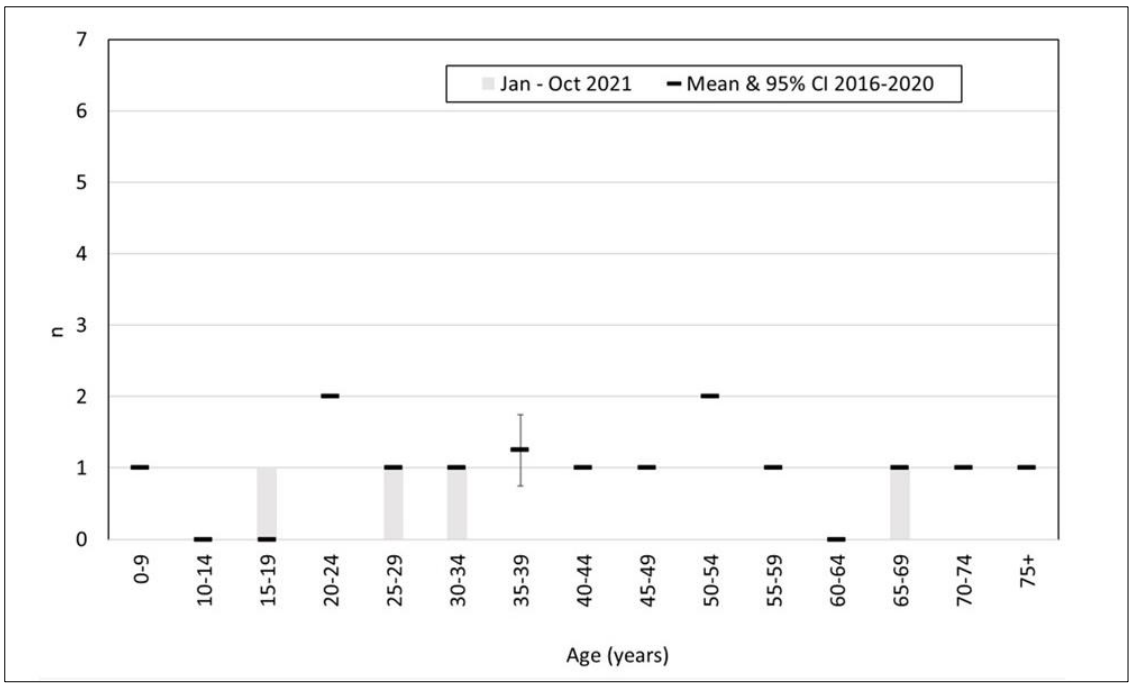

Table 1 Myocarditis Admission rates per 100,000 population by age group from 2016-2020

Age group in years	2016 Myocarditis Admission rate per 100,000 pop	2017 Myocarditis Admission rate per 100,000 pop	2018 Myocarditis Admission rate per 100,000 pop	2019 Myocarditis Admission rate per 100,000 pop	2020 Myocarditis Admission rate per 100,000 pop
0-4	0.00	0.00	0.00	4.22	0.00
5-9	4.83	4.51	0.00	0.00	0.00
10-14	0.00	4.84	0.00	4.64	0.00
15-19	8.60	21.71	8.89	17.99	22.96
20-24	10.38	16.21	3.17	6.17	28.43
25-29	15.15	5.19	4.78	4.46	8.78
30-34	15.37	5.36	4.96	9.01	4.23
35-39	12.71	8.47	7.93	4.92	11.72
40-44	3.43	6.20	2.92	8.21	0.00
45-49	3.92	0.00	3.42	3.22	0.00
50-54	3.62	10.72	7.18	7.11	3.53
55-59	0.00	0.00	0.00	6.46	6.58
60-64	0.00	0.00	3.30	12.95	3.20
65-69	0.00	0.00	3.45	3.50	0.00
70-74	0.00	0.00	3.67	0.00	7.03
75-79	6.87	0.00	7.02	0.00	5.70
80-84	9.61	0.00	0.00	0.00	0.00
85+	0.00	0.00	0.00	0.00	0.00
Total	**5.71**	**5.13**	**3.71**	**5.75**	**6.21**

Source: National Hospitals Information System, Directorate for Health Information & Research

Study Limitations

a. A proportion of pericarditis which is by far commoner to myocarditis.

b. Vaccination roll out in adolescents was far slower than in adults and this may have somewhat skewed the data as there may have been limited myocarditis cases in the younger age brackets given that they had not yet been vaccinated at the time of study.

Discussion

The precise mechanisms whereby SARS-CoV-2 affects the heart are thus far unknown.[8] It is, nonetheless, a known indirect effect of several coronavirus infections (including MERS-CoV, SARS-CoV and SARS-CoV-2) all of which have Angiotensin Converting Enzyme 2 (ACE2) affinity, thus potentially mediating myocardial injury. Studies quantifying the risk of myocarditis have varied, possibly due to the varying ascertainment of asymptomatic cases – with figures varying from 450

per million infected individuals[12] to 5% of infected individuals.[8]

Myocarditis, independent of vaccination, occurs most commonly in young males. More than half of cases resolve while some fail to recover and develop dilated cardiomyopathy, possibly leading to transplantation or death.[8] The ongoing mass vaccination with novel messenger RNA vaccines resulted in reports of myocarditis in male teens, this being a rare side effect.

Specifically, one report defined myocarditis using the Brighton Collaboration criteria and found 136 definite/probable cases of suspected post-vaccination myocarditis in >5 million vaccinees, with 95% resolving benignly and one reported death. The rate ratio for myocarditis vaccinated:unvaccinated was reported as 2.35 in Israel, with the rate in the vaccinated being 0.78 per million person-days and the baseline rate in unvaccinated being 0.33 per million person-days, the highest risk being in young males aged 16-19 years (around 5 per million person-days).[13] A second report using CDC myocarditis criteria found 54 cases in >2.5 million vaccinees and all had a benign outcome including one case who initially developed cardiogenic shock. The highest was also in young males as above, with an overall myocarditis incidence of 2.13/100,000 persons.[14] Yet another report seeking hospital admission or death from myocarditis/pericarditis/cardiac arrhythmias analysed 38,615,491 vaccine doses and compared these with 3,028,867 COVID positive individuals. The risk of myocarditis ranged from an extra 1 to 10 events per million vaccinees (varying with 1st/2nd doses and type of vaccine) versus an extra 40 myocarditis events/million for COVID positive individuals. This study also found elevated risks for pericarditis and arrhythmias in COVID positive individuals while none were found after vaccination other than an increased risk of arrhythmia following a second dose of mRNA-1273. The increased risk of myocarditis associated with vaccination was only present in those aged <40.[6]

Table 1 shows that myocarditis admission rates per 100,000 pop in 2020 for the age bracket 15-24 were rather elevated. These age groups have been traditionally associated with the highest COVID infection rates throughout this epidemic. That said, further research would be warranted to determine whether these contemporaneous events could have been associated or not.

The lack of significantly increased rates of myocarditis admission in 2021 in any age/sex groups in Malta confirms the take-home messages that rarely, myocarditis may be temporally associated with COVID vaccination which almost invariably runs a benign course and that this risk is very low, far lower than myocarditis due to actual COVID infection. It has also been averred that vaccination-associated myocarditis may reflect an adjuvant effect that promoted/reactivated/accelerated naturally occurring myocarditis due to viral/immune-mediated causes.[15] In addition, the paediatric dose is lower than the adult dose, a third in fact for the Pfizer vaccine at 10 µg instead of 30 µg,[16] and still 90.7% effective at preventing symptomatic COVID.[17] This lower dose may be behind the substantially lower risk of myocarditis reported by CDC amongst 5-11 year olds (1.1 per million doses)[18] compared even to the risk among 12-16 year olds reported 6 months ago (34 per million doses), which was already quite low.[19]

Conclusion

The authors acknowledge that further research regarding the temporal association between diagnosis of myocarditis and time of vaccination as well as the manufacturer of the vaccine is necessary. That being said, the evidence presented should allay public fear of myocarditis as a reason for vaccine hesitancy, especially among the young.

Summary

What is already known about this subject?

- Vaccination appears to be part of the mainstay in controlling COVID-19, now and in the future
- One of the most frequently cited side effects is that of myocarditis, especially in younger persons.

What are the new findings?

- There were no significantly increased rates of myocarditis admission in Malta.
- Myocarditis may be temporally associated with COVID vaccination but this risk far lower than myocarditis due to actual COVID infection.
- These findings should allay public fear of myocarditis as a reason for vaccine hesitancy, especially among the young.

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ORIGINAL ARTICLE

An analysis of the effect of educational environment on burnout: a cross-sectional observational study of trainee doctors at the Malta Foundation Programme

Marco Grech

Background

A suboptimal educational environment has been associated with effects on both patient care and trainee wellbeing. Burnout is associated with negative effects at both the personal and the institutional level. The role of the educational environment in the development of burnout has been studied in many countries. This is the first such study in a Maltese population.

Methods

The aim of this study was to analyse the effect of the educational environment on the prevalence of burnout among doctors within the Malta Foundation Programme. A cross-sectional observational methodology using Google Forms was adopted. The questionnaire was distributed to all Foundation and Extended Foundation doctors.

The Postgraduate Hospital Educational Environment Measure (PHEEM) was used to assess the educational environment as perceived by the Foundation doctors. The Copenhagen Burnout Inventory (CBI) was used to analyse burnout among Foundation doctors. SPSS v25.0 was used for statistical analysis using a threshold for statistical significance of $p < 0.05$ and 95% confidence interval.

Results

Both PHEEM and CBI showed good reliability scores. The educational environment was deemed as more positive than negative with ample room for improvement. High burnout rates were recorded. There was a highly significant negative correlation between autonomy, teaching and social support, and personal, work-related and client-related burnout. The results show that there is a significant association between the learning environment and burnout.

Conclusion

The high level of burnout identified is a cause for concern and calls for action aimed at improving the wellbeing of these young doctors. An improved educational environment can improve the quality and safety of patient care, as well as improve the mental and physical health of the trainees.

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INTRODUCTION

There is no alternative to learning when managing real patients in the clinical context.[1] A suboptimal educational environment has been associated with effects on both patient care and trainee wellbeing. Patient care may suffer when the learning environment is not optimal eg higher complication rates.[2] Trainees exposed to suboptimal educational environments are known to be at risk of deleterious consequences to their mental health and their educational achievement. Mental health issues may include stress, anxiety, depression, burnout, emotional exhaustion and depersonalization.[3]

Defining the educational environment remains a challenge mainly because of differences in existing definitions which highlight the different dimensions and elements that are taken into consideration by different authors. For example, Kilty et al.[3] describe the educational environment as encompassing "the social, cultural and material context in which residents learn while they work". On the other hand, the MACY Foundation[4] defines the educational environment as:

"social interactions, organizational cultures and structures, and physical and virtual spaces that surround and shape participants' experiences, perceptions and learning"

Attempts to measure the educational environment have led to the development of numerous instruments such as DREEM (Dundee Ready Educational Environment Measure)[5], STEEM (Surgical Theatre Educational Environment Measure)[6], ATEEM (Anaethetic Theatre Educational Environment Measure)[7] and PHEEM (Postgraduate Hospital Educational Enivornment Measure).[8] The latter is widely used and has been validated in various countries, settings and cultures.

The concept of burnout was introduced by Freidenburger[9] and Maslach[10] working independently from one another while studying volunteers working with people with social problems. Burnout has been defined as a psychological syndrome that consists of emotional exhaustion, depersonalization and reduced personal accomplishment that is directly related to caregiving activities.[11] Burnout can result in either of three dimensions: personal burnout, work-related burnout and client-related burnout. These three subscales form the Copenhagen Burnout Inventory[12], which is the burnout measure recommended for use by the British Medical Council.[13]

The consequences of burnout among physicians in practice and those in training are wide ranging. Literature shows that burnout is associated with negative effects at both the personal and the institutional level.[14] Patients may be affected by poor patient outcomes, decreased patient satisfaction and suboptimal patient care practices.[15] Burnout has also been associated with direct effects on the individuals effected – stress,[16] depression,[17] anxiety,[17] alcoholism,[18] cynicism[19] and suicide.[20]

The role of the educational environment in the development of burnout has been studied in many countries. This is the first such study in a Maltese population. The educational environment has been described as "a crucial factor"[21] contributing to trainee wellbeing and learning achievement. A significant correlation between the educational environment and the prevalence of burnout has been outlined in other studies.[22-23]

The aim of this study was to analyse the effect of the educational environment on the prevalence of burnout among doctors within the Malta Foundation Programme.

METHODOLOGY

A cross-sectional observational methodology was adopted for this study. An online Google forms questionnaire was distributed among all doctors within the Malta Foundation Programme. These were divided into 124 first-year Foundation doctors (FY1s), 133 second-year Foundation doctors (FY2s) and 113 extended Foundation doctors (extended FYs). The latter category were FYs (foundation doctors) who had completed their two-year training programme, but were in the process of being accepted into further training as BSTs (basic specialist trainees) or trainee GPs (general practitioners). This group of doctors are no longer under the responsibility of the Foundation Programme. However, they provided an opportunity of sampling trainees at the end of their two-year training programme. The other two groups were sampled at 3-months (FY1s) and one year (FY2s) of training.

FY2s and extended FYs were invited to participate in July/August 2020 whereas FY1s were invited in October 2020. The invitation was sent through the Year representatives to all FY doctors in their respective year. The questionnaire was accompanied by a covering letter and a participant information sheet. Informed consent was obtained from all respondents. All replies were online with complete anonymity of the respondents being ensured. A reminder was sent one week after the original invitation request. Data collection was completed two weeks after the reminder.

The Faculty Research Ethics Committee of the University of Malta provided ethical approval. The Malta Foundation Programme authorised distribution of the questionnaire to FY doctors.

The instruments used were the Postgraduate Hospital Educational Environment Measure (PHEEM) for the evaluation of the educational environment, and the Copenhagen Burnout Inventory (CBI) for the evaluation of burnout.

Copenhagen Burnout Inventory

The CBI is a 19-item questionnaire validated and used in many countries which include Denmark, New Zealand, Sri Lanka, Taiwan and Hong Kong.[24] It is also the measure recommended for use by the General Medical Council of the United Kingdom.[13] The CBI is made up of three distinct subscales: personal burnout, work-related burnout and client-related burnout.

The personal burnout subscales is made up of six items. It measures the level of burnout in people irrespective of their employment status. The work-related burnout subscale consists of seven items and measures a person's attribution of any experienced fatigue and exhaustion to his or her work. Client-related burnout subscale is made up of six items that measure whether a person considers any experienced fatigue or exhaustion to be related to work with client e.g. patients or students.[12]

Each item on the CBI is scored on a 5- point Likert scale as follows:

100 – Always or to a very high degree

75 – Often or to a high degree

50 – Sometimes or somewhat

25 – Seldom or to a low degree

0 – Never/almost never or to a very low degree

Postgraduate Hospital Educational Environment Measure

PHEEM was the instrument of choice to measure the educational environment as perceived by the trainee doctors. PHEEM has been validated in many countries and in different settings. Minimal changes to the wording of the instrument were made in

consultation with the original author[8] to ensure relevance to the local setting without loss of validity.

PHEEM is a 40-item questionnaire scored on a Likert scale as follows:

4 – Strongly agree

3 – Agree

2 – Uncertain

1 – Disagree

0 – Strongly disagree.

PHEEM consists of three sub-scales, each measuring perceptions of role autonomy (14 items), teaching (15 items) and social support (11 items). When interpreting the scores for each of the three sub-scales, the authors recommend the following schema:

I. Perceptions of role autonomy

0-14 – very poor

15-28 – a negative view of one's role

29-42 – a more positive perception of one's role

43-56 – excellent perception of one's job

II. Perceptions of teaching

0-15 – very poor quality

16-30 – in need of some retraining

31-45 – moving in the right direction

46-60 – model teachers

III. Perceptions of social support

0-11 - non-existent

12-22 - not a pleasant place

23-33 - more pros than cons

34-44 - a good supportive environment.

Roff et al[8] recommend the following interpretation of the overall score:

0-40 – very poor

41-80 – plenty of problems

81-120 – more positive than negative but room for improvement

121-160 – excellent

Roff et al.[8] recommend that PHEEM can be used to identify specific strengths and weaknesses of the educational environment. Each individual item can be analysed by itself and any items having a mean score of 3.5 or more would be considered as a very positive point. Conversely, any item with a mean score of 2 or less signifies a problem area. Should the mean score of any item fall between 2 and 3, that specific item within the environment could potentially be enhanced.

Statistical analyses

Data was analysed using SPSS v25.0. A Shapiro-Wilk test determined that data was normally distributed. Descriptive statistics were used to outline the demographic data of the study. Cronbach's alpha was used to test reliability of both PHEEM and CBI together with their respective sub-scales. As recommended in the literature, a score of more than 50 on any of the CBI subscales was used as a cut off point for the presence of burnout in that subscale.

One-way ANOVA was used to assess for significant differences between cohorts on the CBI subscales. An independent t-test analysis was to analyse for significant differences between genders and also for differences between those suffering from burnout and those not. Spearman correlation was carried out to assess for significant correlation between the respective subscales of PHEEM and CBI.

The threshold for statistical significance was a $p<0.05$ and 95% confidence interval.

RESULTS

Descriptive Statistics

The questionnaire was electronically distributed to 370 Foundation doctors (124 FY1s, 133 FY2s and 113 extended FYs). The responses received were from: 39 FY1s (31.5%), 33FY2s (24.8%) and 26 extended FYs (23.0%).

Most worked over the 48 hours stipulated in the European Working Time Directive as shown in Table 1.

60.2% of the respondents were female with 94.9% being single. The ages of the participants ranged between 23 and 32 years with a mean of 24.7years and a mode of 23 years. 87.8% were Maltese, 8.2% from another EU country and 4.1% from a non-EU country.

Reliability

Both PHEEM and CBI total scores and their respective subscales showed good reliability with high Cronbach's alpha values as shown in Table 2.

Table 1 Number of hours worked per week

		Foundation year 1	Foundation year 2	Extended Foundation	Total
Number of hours worked per week	**<40 hours**	0	0	1	1
	40-48 hours	2	5	4	11
	49-55 hours	8	6	4	18
	56-65 hours	20	12	10	42
	66-80 hours	9	10	7	26
Total		39	33	26	98

Table 2 reliability scores. (PHEEM- Postgraduate Hospital Educational Environment Measure, CBI – Copenhagen Burnout Inventory)

	Cronbach's α		Cronbach's α
Total PHEEM	0.912	**Total CBI**	0.929
Role autonomy	0.790	**Personal burnout**	0.828
Teaching	0.885	**Work-related burnout**	0.844
Social support	0.683	**Client-related burnout**	0.861

Analytical statistics

The Educational Environment assessment produced a mean overall score of 86.95 with a standard deviation of 20.76 (range 19-139). This means that, overall, the foundation doctors' perception of the educational environment is more positive than negative but there is ample room for improvement. The overall mean for each of the PHEEM subscales is shown in Table 3.

The results for each foundation year cohort have been presented in a separate paper (preprint).

The level of burnout is high across all stages of Foundation training in Malta. Burnout peaks midway through the two-year training period. Table 4 shows the respective mean scores for each cohort for each of the three subscales of the CBI.

A one-way ANOVA analysis for significant between group differences for foundation year cohorts showed significant differences for each of the CBI subscales: personal burnout (F:8.098, p=0.001), work-related burnout (F=10.086, p=<0.001) and client-related burnout (F=7.772), p=0.001).

An independent t-test analysis for the differences between genders, identified a statistically significant higher level of work-related burnout in males ($t_{72.94\ 1}$= -2.075=, p=0.042). Males also had a statistically significant higher client-related burnout ($t_{72.833}$ = -2.278, p=0.026).

The assessment of the subscales of PHEEM and CBI showed a highly significant negative correlation between autonomy, teaching and social support, and personal, work-related and client-related burnout. These results are summarized in table 5.

Table 3 mean scores for Total PHEEM and its subscales (SD- standard deviation, IQ – interquartile)

	Mean	SD	Median	Range IQ 25-75
Overall environment	86.95	20.56	88.00	75-101.25
Autonomy	28.23	7.58	28.50	24.75-33.25
Teaching	32.85	8.91	33.50	27-38.25
Social Support	24.81	6.24	25.00	21-29

Table 4 Mean score for each scale per cohort

	Foundation year 1		Foundation year 2		Extended Foundation	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Personal burnout	54.4017	12.49846	68.6616	16.56340	58.9744	16.77847
Work-related burnout	51.4652	12.52597	66.8831	16.37298	56.5934	15.24267
Client-Related Burnout	42.8419	14.93005	57.7020	18.22533	53.3974	16.32470

Table 5 Correlation between PHEEM and CBI subscales

	Overall environment	Autonomy	Teaching	Social Support
Personal burnout	-0.433 *p*=<0.001	-0.499 *p*=<0.001	-0.352 *p*=<0.001	-0.455 *p*=<0.001
Work-Related burnout	-0.467 *p*=<0.001	-0.524 *p*=<0.001	-0.407 *p*=<0.001	-0.482 *p*=<0.001
Client-Related burnout	-0.372 *p*=<0.001	-0.484 *p*=<0.001	-0.381 *p*=<0.001	-0.454 *p*=<0.001

Spearman correlation analysis showed that higher CBI total scores were correlated with lower PHEEM total scores (r_s=-0.463, p<0.001).

When comparing the two groups (burnout vs no burnout) no statistically significant difference was found regarding age, gender, marital status, nationality, or number of hours worked.

There was a significant difference between those suffering from burnout on any of the CBI scales (score >50) and those not suffering from burnout on the total PHEEM score. Those who scored high on any of the three CBI subscales, had a low perception of the educational environment. Table 6 depicts these results.

The differences between those suffering from burnout on any of the CBI subscales (score>50) and those not suffering from burnout on each of the three PHEEM subscales (role autonomy, teaching and social support) are explained in tables 7, 8 and 9.

Table 6 Differences on total PHEEM score between trainees with burnout and without burnout.

	Total PHEEM			
	Mean (SD) (burnout *vs* no burnout)	T	DF	p value
Personal burnout	84.22(21.26) *vs* 93.13(17.74)	2.152	62.993	0.035
Work-related burnout	81.95(20.46) *vs* 95.56(17.99)	3.429	81.076	0.001
Client-related burnout	81.25(20.74) *vs* 92.42(19.06)	2.773	94.511	0.007

(T=t-test, DF=degrees of freedom)

Table 7 Differences in perceptions of role autonomy between trainees with burnout or without burnout

	Role autonomy			
	Mean (SD) (burnout *vs* no burnout)	T	DF	p value
Personal burnout	26.91(7.91) *vs* 31.23(5.83)	3.015	74.020	0.004
Work-related burnout	26.56(7.84) *vs* 31.11(6.20)	3.167	87.045	0.002
Client-related burnout	26.06(7.74) *vs* 30.32(6.86)	2.877	93.596	0.005

(T=t-test, DF=degrees of freedom)

Table 8 Differences in perceptions of teaching between trainees with burnout or without burnout

	Teaching			
	Mean (SD) (burnout vs no burnout)	T	DF	p value
Personal burnout	32.31(9.03) *vs* 34.07(8.65)	0.914	57.81	0.364
Work-related burnout	30.95(8.53) *vs* 36.11(8.71)	2.848	72.048	0.006
Client-related burnout	31.10(8.60) *vs* 34.52(8.97)	1.925	96.000	0.057

(T=t-test, DF=degrees of freedom)

Table 9 Differences in perceptions of social support between trainees with burnout or without burnout

	Social support			
	Mean (SD) (burnout *vs* no burnout)	T	DF	p value
Personal burnout	23.93(6.45) *vs* 26.80(5.30)	2.309	66.92	0.024
Work-related burnout	23.37(6.44) *vs* 27.28(5.04)	3.328	87.634	0.001
Client-related burnout	30.95(8.53) *vs* 36.11(8.71)	2.848	72.048	0.006

(T=t-test, DF=degrees of freedom)

Discussion

Foundation doctors are at a very delicate stage of their career. They also have to face a duality of roles – that of a doctor entrusted with very sensitive situations and that of a trainee that is still learning on the go. They have to face situations that are highly emotional and stressful – death, failure of treatment, delivering bad news and dealing with uncertainty. At the same time, they also need to deal with situations at home and at their workplace that are not directly the effect of their role with patients. Trainees are also learning to improve their skills, prepare for exams, further their education and keep in touch with new knowledge in medicine. Most trainees are expected to cope well under these conditions. Some may, however, find the burden overwhelming, thereby increasing the odds for burnout.

The study was carried out during the Covid-19 pandemic. The lowish response rate (26.5%) may be a reflection of an overworked cohort who find little time to reply to lengthy questionnaires. Some of the results regarding the levels of burnout may have been strongly influenced by the changes in working practice brought about by dealing with an increased workload in a pandemic.

Extended FY doctors may also be more prone to burnout as they are in a stage in their career when uncertainty prevails. Much of their career will depend on the upcoming post which they may or may not be able to secure. Such uncertainty may increase the odds for burnout.

This study analysed the impact of the educational environment, as perceived by doctors within the Malta Foundation Programme, on burnout in these doctors. The results show that there is a significant association between the learning environment and burnout. It is the first study of its sort that has been carried out among Foundation doctors in Malta. Another local study was conducted by Camilleri[25] who after a qualitative study "Stress and Coping in Junior Doctors" concluded that, particularly in the early stages of their training, junior doctors were subjected to high levels of stress and experienced problems coping. These finding were reflected in a study by Taylor-East, Grech and Gatt.[26]

A correlation analysis showed a highly significant negative correlation between all subscales of the educational environment and all subscales of CBI. Trainees with a poor perception of the educational environment were more likely to be suffering from burnout. This negative association between burnout and a low perception of role autonomy, teaching and social support is evident in all three subscales of CBI - personal, work-related and client-related. The only exception is the association of teaching with personal and client-related burnout.

The prevalence of burnout among doctors within the Malta Foundation Programme is high. The prevalence of burnout is on the higher side when compare to that in other countries.[27-28] William et al.[29] in a literature review, reported a prevalence of burnout ranging between 27% and 75% among residents. McCray[30] also reported a prevalence between 47% and 76%. The results reported in this study fall within the higher part of these reported ranges.

The number of hours that these doctors work is well in excess of the EWTD. However, no association between the number of hours worked and the prevalence of burnout could be found in this study.

The lowish scores for all three subscales of PHEEM indicate that while, in general, the educational environment is considered positive by the trainees, considerable improvement is needed. This improvement could result in a reduction in the prevalence of burnout in these trainee doctors.

There is a negative relationship between social support and total CBI and its subscales. Previous reports have outlined this inverse relationship between prevalence of burnout and collegial support.[31] When analysing the individual items in PHEEM, it becomes apparent that the items with the lowest scores are those associated with out of hours duties (number of hours worked, catering facilities while on call, inappropriate bleeping, a blame culture, poor accommodation when on call).

Autonomy and teaching were also significantly and negatively associated with all three CBI subscales. This was also reported by Papaefstathiou in a study of Greek residents.[27] Zis et al.[32] have also reported that each additional point for autonomy was associated with a reduction in the likelihood of burnout.

The negative correlation between autonomy and burnout has also been described by Llera and Durante[22] and Eckelberry[33]. This negative correlation between autonomy and burnout is not limited to medicine but it has also been described in non-medical, service-related occupations.[34]

These findings can serve as a starting point in the setting up of curricular modifications aimed at improving the overall educational environment. Though many interventions to tackle burnout are aimed at the individual (for example, aimed at increasing the individual's resilience), burnout needs to be tackled at an organisational and institutional level too for better results.

Limitations

The low response rate despite the reminder sent is a major limitation of this study. Performing a study at the height of a pandemic was not ideal. Foundation doctors who were overwhelmed with clinical work might have been less likely to respond to a rather lengthy questionnaire.

This low response rate could introduce bias in that trainees interested or suffering from burnout may have been more inclined to reply.

A qualitative study may be indicated to analyse in depth the reasons behind the trainees' perceptions. The quantitative nature of this study does not allow for in depth analysis of these perceptions.

No study using the CBI in a Maltese population was identified. Therefore, a cut-off point of 50 used in other studies was adopted.

A repeat of this study when the pandemic is over will give a clearer picture and will identify the effect the pandemic may have had on the results of this study.

Conclusion

This study has confirmed the correlation that exists between the educational environment and burnout among early medical trainees in Malta. The high level of burnout identified is a cause for concern and calls for action aimed at improving the wellbeing of these young doctors.

At a local level, medical students receive training in stress management and in building of resilience. Postgraduate trainees in difficulty are offered help directly on an individual basis by the Malta Foundation Programme. However, cases still persist of trainees who decide to quit the medical profession as they feel they cannot cope with the burdens of the job.

Efforts need to be directed at the institutional and organizational level. Changes at this level should help in reducing the prevalence of burnout among these trainees and, as a result, improve retention rates and patient outcomes.

An improved educational environment can improve the quality and safety of patient care, as well as improve the mental and physical health of the

trainees. One has to remember that these trainees form a very important part of the medical team and that their work is invaluable to the smooth running and objectives achievement of any department.

SUMMARY

What is already known about this subject?

- A suboptimal educational environment has been associated with effects on both patient care and trainee wellbeing
- Burnout has been defined as a psychological syndrome that consists of emotional exhaustion, depersonalization and reduced personal accomplishment that is directly related to caregiving activities.
- Burnout can result in either of three dimensions: personal burnout, work-related burnout and client-related burnout.

What are the new findings?

- There is a significant association between the learning environment and burnout.
- A correlation analysis showed a highly significant negative correlation between all subscales of the educational environment and all subscales of the Copenhagen burnout inventory within the Malta Foundation Programme.
- The prevalence of burnout among doctors within the Malta Foundation Programme is high.
- The educational environment is mostly perceived as positive by the trainees but considerable improvement is needed.

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ORIGINAL ARTICLE

The effect of stopping visiting hours during the COVID-19 pandemic on loneliness and mood in patients at an intermediate care hospital

Maria Bonnici, Clarissa-Marie Zehlicke, Rebecca Ceci Bonello, Daniel Debattista, Mohamed Salem, Claire Callus, Michelle Grech, John Cordina

Background

To study how mood and feelings of loneliness in our in-patients differed before and after the re-introduction of social visits during COVID-19 restrictions.

Methods

The University of California, Los Angeles [UCLA] loneliness scale, the Hospital Anxiety and Depression Scale [HADS], and the Cornell scale were used to assess all in-patients in an intermediate care hospital who fulfilled the inclusion criteria during two separate periods between May and September 2020, prior to and after the re-introduction of limited visiting hours.

Results

45 patients were included in the 1st phase and 30 patients during the 2nd phase. 66.7% were female and 33.3 % were male. There was a significant difference in all the test results between the 1st and 2nd phase of the study (HADS-A p=0.0191; HADS-D p=0.0447; Cornell p=0.0037; UCLA p=0.0376).

Conclusion

Social visits, even when limited in nature can still have a positive effect on patient's mood and level of loneliness.

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Introduction

In March of 2020, the unabated spread of severe acute respiratory coronavirus 2 (SARS-CoV-2) throughout the world, led the World Health Organization (WHO)[1] to declare a global pandemic. As a result, governmental entities and health institutions worldwide, including Malta, adopted different degrees of isolation measures in order to decrease the spread of the virus. Stopping all social visits was a main infection control measure adopted in Maltese elderly homes and hospitals. Such a drastic measure was implemented, as infected older adults were noted to suffer from greater morbidity and mortality.

Since a good social network is regarded as a protective factor against loneliness and low mood, it was predicted that the effect of this pandemic, together with social isolation, would exacerbate existing mental health conditions or lead to new feelings of loneliness and depression.[2] Loneliness is an established risk factor for low mood and it is more prevalent in older adults, especially in those hospitalised or living in elderly homes.[3] The aim of this study was to investigate the mood and feelings of loneliness in our patients, and whether there was a difference after the re-introduction of limited social visiting hours.

Materials and Methods

This was a cohort study carried out in a rehabilitation/intermediate care hospital in Malta, between the months of May and September 2020. The hospital has a bed capacity of around 250 patients. In the most part it receives patients discharged from the acute care hospital on the island. A few patients from the community who require rehabilitation are also admitted here.

Inclusion and exclusion criteria

All patients over 65 years of age, admitted to hospital during the month of May 2020, were included. Exclusion criteria included: COVID-19 positive patients, patients less than 65 years of age, the terminally ill, recent diagnosis of a psychiatric illness or any change in psychiatric medications in the previous 6 months, and if no consent could be obtained from either the patient and/or relative.

Study Process

The study was conducted in two phases. During the first phase all social visits from relatives were stopped and therefore the patients could only contact their family and friends via telephone or video calls. This was due to the implementation of hospital protocols to minimize social contact and therefore prevent the spread of SARS-CoV-2.

During the second phase of the study, social visits had been re-introduced at a limited capacity; one family member could visit the patient for 15 minutes on alternate days, with a distance of 2 meters (this was re-introduced as part of the COVID-19 hospital strategy).

The study tools

A cognitive assessment was performed on each patient using The Montreal Cognitive Assessment (MoCA),[4] with a score of ≥26 considered as normal, scores between 18-25 as mild cognitive impairment, scores between 10-17 as moderate cognitive impairment and scores ≤10 as severe cognitive impairment.

The 20-item University of California, Los Angeles (UCLA) Loneliness Scale,[5] was used to measures the patients' subjective feelings of loneliness as well as feelings of social isolation, with higher scores indicating increased loneliness. Depressive and anxiety symptoms were evaluated using The Hospital Anxiety and

Depression Scale (HADS-A [anxiety] and HADS-D [depression])[6] with a score ≥8 indicating mild symptoms, score ≥11 indicating moderate symptoms and score ≥15 indicating severe levels of anxiety and depression. The Cornell scale,[7] was performed instead of the UCLA and HADS scales, if the patient had severe dementia or was unable to understand and answer the questionnaires. A Cornell score of ≤6 is associated with absence of depressive symptoms, a score ≥10 indicates probable major depression and a score ≥13 indicates major depression.

Besides the MoCA, all the tests were repeated on the same patients after a month of the re-introduction of visiting hours at the hospital.

Data collection using these tools was conducted by four senior geriatric medicine practitioners working at the hospital. They were trained in carrying out these questionnaires and certified in the MoCA cognitive assessment.

Analysis of Data

The collected data was recorded in a spreadsheet. Descriptive statistics were used including demographic denominators. The statistical analysis was done using the Wilcoxon-signed rank test.

Permissions and participants' consent

Permissions to conduct the study were acquired from the institution's research committee and the Data Protection Officer. Permission to use the HADS, Cornell and the UCLA Loneliness Scale was also obtained. Consent was also sought from the participants included in the study or from their guardian if they were cognitively impaired. To protect anonymity each patient was given a code and the data will be deleted a year after the study is completed.

RESULTS

Population Sample

The original sample size was of 150 patients who were admitted to hospital at the start of the study. 105 patients did not fit the inclusion criteria and therefore were excluded. In the first phase of the study the sample size was of 45 patients and in the second phase of the study the sample size was of 30 patients (see Figure 1).

Demographics

66.7% of the population were female (*n*=30), and 33.3% were males (*n*=15), with a mean age of 82 years. 26 patients were awaiting transfer to a long-term care facility and 19 were undergoing rehabilitation. 85% of the population had cognitive impairment. 55.5% of the population (*n*=25) was widowed and 97.7% (*n*=44) had living relatives living in Malta. During the 1st phase when the social visits were stopped completely, 75.5% of the participants (*n*=34), were receiving virtual calls via a tablet provided by the hospital. 91% of the population (*n*=41) had regular visitors prior to the hospital stopping social visits due to the COVID-19 pandemic.

Figure 1 Shows the original population of 150 patients. 105 patients did not fit the inclusion criteria. In the 1st phase of the study 45 patients were included. 11 of these patient were excluded from the 2nd phase of the study.

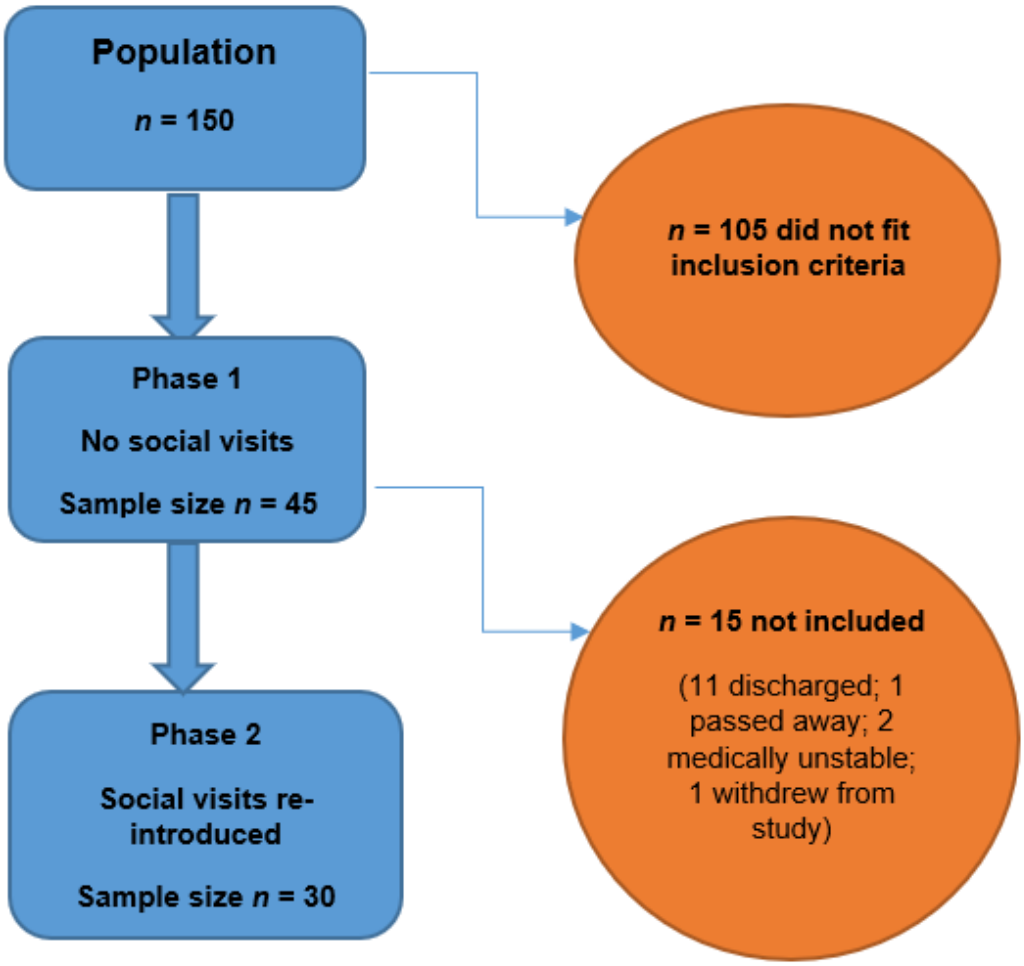

Table 1 Showing the mean scores of the HADS-A, HADS-D, Cornell and UCLA in the 1st and 2nd phase of the study. The last column shows the *p*-value which was significant in all the scores.

Mood and loneliness scores	Mean score (1st phase)	Mean score (2nd phase)	Difference between 1st & 2nd phase (*p*-value)
HADS-A	8.63	6.16	0.0191
HADS-D	5.53	3.89	0.0447
Cornell	5.81	1.73	0.0037
UCLA	15.74	11.26	0.0376

Mood, anxiety and loneliness in the population studied and the difference in these between the 1st and 2nd phase of the study.

The mean scores of the HADS-A, HADS-D, Cornell and UCLA can be seen in Table 1. The *p*-value was worked out using the Wilcoxon signed-rank test. There was a significant difference in all the tests between the 1st and 2nd phase of the study indicating that mood and anxiety levels improved. Moreover, the feeling of loneliness decreased between the 1st and 2nd phase of the study.

Discussion

When older adults are admitted to hospital or a care home, interactions with their relatives and community are limited, and this increases the risk of depression and loneliness.[8] We expected that this pandemic, together with the drastic measure to stop social visits to limit exposure of the SARS-CoV-2 in our hospital, would substantially increase loneliness and impair mental health among our patients. Prior to the COVID-19 pandemic, older adults admitted to our intermediate care hospital used to have access to approximately 4 hours of social visits per day, but during the initial preventative measures, these visits had to be stopped completely. After a few months, visits were only re-introduced within restrictions of time and social distancing.

This small study showed that when all social visits were stopped the mental health of our patients remained overall stable. Most patients suffered from mild levels of anxiety (mean HADS-A score of 8.63), whilst the majority of the population was not depressed (mean HADS-D score of 5.53 and mean Cornell 5.81). Mean depression scores were low in both cognitively intact and cognitively impaired patients. International studies[9-10] have also indicated that older adults may be less negatively affected by mental health outcomes than other age groups. This might be due to lower stress reactivity and better emotional control.[11] Moreover, having quality and meaningful relationships with loved ones might be more protective than having many insignificant social interactions.[12] Despite having no physical social contacts, 75.5% of our population maintained contact with the use of technology which could have had an effect on our results. Our hospital made sure that each ward had the technology available for video calling which both patients and their relatives could make use of.

Loneliness is more common in hospitalized and institutionalized older adults than in those living in the community.[13] It is a risk factor for physical and mental health problems, including anxiety and depression. Although the mental health of our population was not drastically affected, the high mean score (15.74) in the UCLA questionnaire showed that the majority of patients felt lonely. One must note that due to the pandemic, group activities had been cancelled and most of the patients were isolated to their respective rooms. This increases isolation and can lead to an increased feeling of loneliness.[14] After re-introduction of limited social visits, the level of loneliness significantly decreased (mean UCLA score 11.26; *p*-value 0.0376), but despite this, the mean levels were still high as social isolation within the hospital was still the norm.

After the re-introduction of limited social visits, the level of anxiety returned to normal (mean anxiety HADS score of 6.16) and a significant decrease in all the other mean scores (HADS-D, Cornell and UCLA) was also observed (see Table 1). This indicates that the re-introduction of limited social visits, might still have a positive effect on the mood and the

feeling of loneliness in our patients. An additional observation is that the cognitive wellbeing may play a role in the coping mechanism against the loneliness and the cessation of social interaction.

Study limitations

Limitations included the small sample size and the fact that loneliness could not be assessed in those suffering from severe cognitive impairment. The levels of mild anxiety found in the initial phase of the research could be not only attributed to the termination of social visits but also due to the fear, unpredictability and uncertainty related to the pandemic.[15] Moreover, the decreased level of anxiety from the first to the second phase of the study could be the result of the fact that the patients grew more accustomed to the new infection control procedures in our hospital and more knowledgeable about the disease. In addition, since patients may have had to be isolated in a single room (for example due to being a contact of a COVID-19 positive patient), this could have affected their mood and feelings of loneliness.

Conclusions

Our study showed that social visits at a reduced capacity can still have a positive effect on the mood levels and loneliness of our patients. Further studies may be required to explore, in depth, the effect of cognitive impairment on the level of loneliness of hospitalised patients. Larger studies may be required to solidify the results obtained from this study.

Summary

What is already known about the subject:

- Loneliness is an established risk factor for low mood and it is more prevalent in older adults, especially in those hospitalised or living in elderly homes.
- Good social support is regarded as a protective factor against loneliness and low mood.

New findings:

- During the COVID-19 pandemic there was significant improvement in mood and feeling of loneliness of older hospitalized patients after the re-introduction of limited social visits.
- Social visits, even when limited in nature may still have a positive effect on patient's mood and level of loneliness.

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ORIGINAL ARTICLE

Vaccine hesitancy among Maltese Healthcare workers *vis-à-vis* influenza and COVID-19 vaccination

Sarah Cuschieri, Charmaine Gauci, Steve Agius, Victor Grech

Introduction

Vaccine hesitancy is a chronic public health threat. This study was carried out to ascertain Maltese healthcare workers' hesitancy to COVID-19 vaccination and correlate this with influenza vaccine uptake.

Methods

A short, anonymous questionnaire was sent out to all of Malta's government sector healthcare workers via the service's standard email services (11-19/09/2020). A total of 9,681 questionnaires were posted electronically, with 10.4% response.

Results

The proportion of Maltese healthcare workers who "will take" the influenza vaccine increased significantly. Doctors had the highest baseline uptake and highest likely influenza vaccine uptake next winter. The likely/undecided/unlikely to take a COVID-19 vaccine were 52/22/26% respectively. Males were likelier to take the vaccine. Doctors had the highest projected likelihood to take vaccines. Likelihood of taking COVID-19 vaccine was directly related to the likelihood of influenza vaccination. Concerns raised were related to insufficient knowledge about such a novel vaccine, especially unknown long term side effects.

Discussion

The anticipated increased uptake of influenza vaccine is probably due to increased awareness of respiratory viral illness. Doctors may have higher vaccine uptakes due to greater awareness and knowledge of vaccine safety. The proportions of who are likely/undecided/unlikely (half, quarter, quarter respectively) to take a COVID-19 are similar to rates reported in other countries. The higher male inclination to take the vaccine may be due the innate male propensity for perceived risk taking. Shared COVID-19 with influenza vaccine hesitancy implies an innate degree of vaccine reluctance/hesitancy and not merely reluctance based on novel vaccine knowledge gap.

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Introduction

Hospital-acquired influenza has a high mortality, with an estimated median of 16% that rises up to 60% in high risk groups (e.g. transplant recipients and intensive care patients).[1,2] Healthcare workers who carry the influenza virus have been frequently identified as sources of hospital-acquired outbreaks.[3] Annual influenza vaccination is strongly recommended for all healthcare workers,[4] but vaccination rates remain poor,[5] despite models that show that a significant proportion of hospital-acquired burden of disease is vaccine preventable.[6]

COVID-19 vaccine development has accelerated at an unprecedented pace.[7] It was announced that in Malta, frontliners (including all healthcare workers) would be given first priority for the first batch of vaccines.[8]

An earlier study that surveyed Maltese healthcare workers with regard to influenza vaccination showed that the proportion of workers who did not take the vaccine the year before but who are likely to take the vaccine this winter halved from 41% to 21%. Doctors had the highest baseline uptake (23% refused vaccination in 2019) and the highest likely uptake in winter (6% likely to refuse vaccination in 2020).[9]

This study was carried out in order to ascertain the degree of vaccine hesitancy in Maltese healthcare workers *vis-à-vis* a COVID-19 vaccine, and correlate this with influenza vaccination uptake.

Methods

A short, anonymous questionnaire was sent out to all of Malta's government sector healthcare workers via the service's standard email services. The period for which the questionnaire was open was from 11/09/2020 to 16/09/2020. The questionnaire was hosted via Google forms and exported to bespoke Excel spreadsheets for analysis.

The questionnaire was sent to all healthcare workers in the main hospital (Mater Dei Hospital), District Primary Care Health Centres, St. Vincent de Paul Long Term Care Facility, Mount Carmel Mental Health hospital, Karin Grech Rehabilitation Hospital and miscellaneous other smaller facilities. It commenced with the following introduction:

Malta has been fortunate to have the EARLY allocation of a COVID-19 vaccine later this year. The vaccine 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 sex, occupation (medical, nursing, allied profession and other, with the latter including support staff such as in administration, ward clerks, cleaners, etc.), place of work (as above), 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 on 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 regard as undecided. For the Likert questions following the first, all were allowed to tick vaccines whatever their likelihood of taking the vaccine.

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

A total of 9,681 questionnaires were posted electronically, with 1002 (10.4%) responses (table 1).

Influenza vaccination

The proportion of Maltese healthcare workers who will take the influenza vaccine increased significantly across the board when compared to last year irrespective of sex, workplace or occupation (table 2). Doctors had the highest baseline uptake and the highest likely influenza vaccine uptake next winter (table 2).

COVID-19 vaccination

With regard to a COVID-19 vaccine, approximately half of respondents were likely to take the vaccine and a quarter each were undecided or unlikely to take the vaccine. Males were likelier to take the vaccine than females (chi=13.2, p=0.0003 – table 3). Doctors were also the likeliest group to take the COVID-19 vaccine and when compared against all others this was a highly significant difference (chi=21.8, p<0.0001 – table 3).

Table 1 Percentage response rates by workplace and occupation

Workplace	Total	Response %		Total	Response %
Health Centre	1018	0.9	Medical	1472	13.8
Karin Grech	232	2.2	Nursing	2390	13.3
Mater Dei	5708	16.0	Allied profession	1705	16.1
Mount Carmel	723	1.1	Other	495	41.4
Other	200	30.5			
SVPR	1800	0.2			

Table 2 Percentages who answered "yes" to whether they took influenza vaccine last year (2019) and whether will take vaccine next year (2020), overall and by sex, workplace and profession.

Influenza	Overall	Females	Males	Mater Dei	Rest	Medical	Nursing	Allied profession	Other
Took vaccine %	49	48	51	48	59	67	44	42	57
Will take %	69	68	70	68	80	86	64	67	63
chi	79.5	53.1	27.7	70.9	9.3	18.8	23.9	30.5	1.5
p	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.2

Table 3 Likelihood of taking COVID-19 vaccine overall, by sex and by occupation

	Unlikely%	Undecided%	Likely%		Unlikely%	Undecided%	Likely%
Female	28	27	45	Allied profession	25	23	52
Male	22	14	64	Medical	16	15	69
Total	26	22	52	Nursing	29	29	42
				Other	30	21	49

Both vaccines

An analysis by age showed that there was a significant increase in the likely uptake of the influenza vaccine at all ages (first two columns of table 4 with statistical analysis in next two columns). The COVID-19 likelihood uptake pattern was as described above except for the over 65 age group as none of these fell in the "unlikely to take" category.

The proportion of those likelier to take the COVID-19 vaccine was directly related to the likelihood of their taking the influenza vaccine (table 5: chi=246.2, p<0.0001).

COVID-19 vaccine concerns are shown in table 6. The issues raised were only very slightly related to vaccine avoidance in general but more related to insufficient knowledge about such a vaccine and any potential side effects especially those in the long term.

Table 4 Age bracket analysis of influenza vaccine uptake last year, this coming winter and likelihood of COVID-19 vaccine uptake.

	Influenza vaccine%		Influenza increase		COVID-19 vaccine acceptance%		
Age (y)	Took	Will take	chi	p	Unlikely	Undecided	Likely
18-24	33	41	99.3	0.007	25	24	51
25-34	32	41	32.1	<0.001	28	23	49
35-44	34	41	15.8	<0.002	19	24	57
45-54	32	40	17.2	<0.003	31	23	46
55-64	35	41	7.3	0.007	24	18	58
>65	33	45	Fisher	0.2	0	17	83
All	49	69	20.6	<0.001	26	23	52

Table 5 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	0.3	0.9	2.1	5.8	8.6	take COVID vaccine

Table 6 Concerns and misgivings pertaining to a COVID-19 vaccine

Concern%	1	2	3	4	5	n
Insufficient knowledge	6.3	10.7	25.3	23.1	34.7	776
Short term side effects	20.2	18.7	23.9	16.1	21.1	777
Long term side effects	4.9	6.4	14.7	22.5	51.6	783
Vaccine effectiveness	12.7	15.8	40.0	17.6	13.9	765
Generally against vaccines	57.7	16.2	15.0	4.7	6.5	773

Discussion

The increased proportion of Maltese healthcare workers who planned to take the influenza vaccine when compared to the previous year is probably due to increased awareness of respiratory viral illnesses in general in the wake of the COVID-19 pandemic. Interestingly, it is the medical profession who had the highest baseline influenza vaccine uptake and the highest likely influenza vaccine uptake the following winter and this may be due to greater awareness and knowledge of vaccine safety. The same applies for this profession with regard to the COVID-19 vaccine.

The proportions of those who are likely/undecided/unlikely (half, quarter, quarter respectively) to take a COVID-19 are similar to rates reported in other countries.[10] The higher male inclination to take the vaccine may be due to a combination of factors which could include the innate male propensity for perceived risk taking in the face of a novel vaccine.[11] The higher likely uptake of a COVID-19 vaccine in the oldest age group is unsurprising as this is the most vulnerable group and therefore most likely, in their own self-interest, to take this vaccine.

Vaccine hesitancy for COVID-19 was similar to that for influenza implying an innate degree of vaccine reluctance/hesitancy and not merely a reluctance based on the concerns discussed below.[10] However, the concerns are, to some extent, valid. There are various types of vaccines in development and these include not only traditional vaccines but also next generation vaccines.[7]

Non-vaccination and vaccine hesitancy

Our findings are unsurprising as the availability of a vaccine does not automatically equate to 100% aggregate uptake. For example, an H1N1 influenza vaccine in 2009 had a population uptake of 0.4-59% across 22 countries.[12] The low acceptance and uptake of a safe vaccine for a high risk infection is well known and has been dubbed the "pandemic public health paradox".[13] This is a strong contributor to vaccine hesitancy and is a tragic public health outcome as vaccines only protect if a sufficient proportion of the population is vaccinated.[14] Non-vaccination has been quite extensively studied and table 7 shows some of the commonest reasons for non-vaccination.[15] One specific example specifically related to this topic is the aforementioned 2009 H1N1 influenza vaccine which was initially claimed to have had associated mortality using the Vaccine Adverse Event Reporting System(VAERS) system which was eventually disproved, but not before undermining public confidence in this important vaccine.[16]

In 2019, the World Health Organization named vaccine hesitancy as one of the top ten threats to global health.[17] The reasons for hesitancy are varied and some common vaccine myths and their scientific rebuttals are summarised in table 8.[17]

Clearly, the reasons for non-vaccination are complex but misconceptions pertaining to safety predominate. Trends in hesitancy are overall not promising with a recent study showing that vaccine confidence in Europe is low compared to other regions of the world, such as Africa (strongly agreeing with vaccine safety range 19% in Lithuania to 66% in Finland). A drop in confidence trend was linked to political instability and religious extremism, with rogue leaders sometimes promoting natural, unproven and ineffective alternatives to vaccines.[18]

Table 7 Commonest reasons for vaccine non-vaccination. (xxfournet)

'The hesitant' – Those who have concerns about perceived safety issues and are unsure about needs, procedures and timings for immunizing.
'The unconcerned' – Those who consider immunization a low priority and see no real perceived risk of vaccine-preventable diseases.
'The poorly reached' – Those who have limited or difficult access to services, related to social exclusion, poverty and, in the case of more integrated and affluent populations, factors related to convenience.
'The active resisters' – Those for whom personal, cultural, or religious beliefs discourage them from vaccinating.

Table 8 Common vaccine myths and the misconceptions on which they are actually unfounded. (xxgeoghan)

Common vaccine myths	Key concepts
Too many vaccines too soon.	The number of immunologic components in vaccines have declined over time. The current 14 vaccines on the United States schedule contain 200 immunologic proteins in total, the smallpox vaccine contained 160.
Too many vaccines can "overwhelm" the immune system.	Epidemiologic data and biologic data show that cumulative increases in the number of vaccines have no effect on immune function.
MMR vaccine causes autism.	Original study making this claim contained 12 children, the paper was subsequently retracted due to evidence of misrepresented data. Multiple large scale studies, including a study of half a million children have shown no association between receipt of MMR and risk of autism.
HPV vaccine increases risk of autoimmune disease.	More than 270 million doses of HPV vaccine have been administered. Repeated well-designed studies show no association between HPV and AI disease.
Influenza vaccine given in early pregnancy increases risk of miscarriage.	A study of 2762 women showed no association between influenza vaccine and spontaneous abortion.

COVID-19 vaccine hesitancy

A representative sample of circa 1000 adults in the US questioned from 16-20 April 2020 with regard to a putative COVID-19 vaccine replied: 57.6% intended to be vaccinated, 31.6% were uncertain and 10.8% did not intend to be vaccinated. Factors independently associated with vaccine hesitancy ("no"/"not sure") included younger age, Black race, lower educational attainment, and not having received the influenza vaccine in the prior year. Reasons specified for vaccine hesitancy included vaccine-specific concerns, a need for more information, antivaccine attitudes or beliefs, and a lack of trust.[10]

Overcoming hesitancy

WHO advises a pre-emptive pro-vaccination strategy that psychologically impacts populations so as to maximize uptake when vaccines become available.[19] In the case of COVID-19, national vaccination strategies must be in place in advance of vaccine availability so as to have a plan for population prioritisation for vaccination and to reduce the incidence of fear/concern *vis-à-vis* vaccination.[20] A crucial part of the latter aspect is the countering of fake news and misinformation that already percolates (especially via social media) in this regard. [20] Suggested key guidelines/milestones are shown in table 9. [20] Segmentation of target populations is vital and consists of the identification of groups who share similar beliefs/attitudes/behavioural patterns. This goes beyond easily pigeonholed fields such demographic/epidemiological data and greatly enables public heath planners to shape intervention/s to specific segment/s. [20]

Table 9 Key guidelines for developing a proactive COVID-19 pro-vaccination strategy. (xxfrench)

	Guidelines		
Key Guidelines	**Not completed**	**Underway**	**Completed**
Behavior change planning			
Audience targeting and segmentation			
Competition and barrier analysis and action			
Mobilization			
Vaccine demand building			
Community engagement			
Vaccine access			
Marketing promotions strategy			
News media relations and outreach			
Digital media strategy			

Healthcare workers

Hesitancy already exists among healthcare workers with regard to ordinary vaccines, such as seasonal influenza vaccination,[22-4] and COVID-19 vaccine hesitancy among healthcare workers will not be different.[25-6] Hesitancy is fuelled by social media, conspiracy theories and fake news, a topic about which entire volumes have been written.[27-8]

Public Health and healthcare worker employers must do their best to ensure that the proportion of vaccinated workers is as close to totality as possible. Clinicians, legislators and even ethicists are increasingly cognisant of this aspect of healthcare, and are progressively mandating seasonal influenza vaccination for healthcare workers in some countries. This is not being envisaged for Malta. The Society for Healthcare Epidemiology has recommended that annual influenza vaccination should be a condition of employment for healthcare workers,[29] a stance endorsed almost universally by professional bodies.[5] Indeed, ethicists have averred that:

> *"given the mounting evidence for the efficacy of influenza vaccination in infection control […] the provision of health care by non-vaccinated health care workers is not merely suboptimal health care, but it is also at variance with generally accepted principles of health care ethics."*[5]

This is because medical ethics upholds the dual principles of beneficence and non-maleficence. The former infers the promotion of patients' well-being and the latter is *primum non nocere*. Therefore "practicing without vaccination is maleficent because it falls below the standard of medical care".[5] It has in fact been shown that influenza vaccination of healthcare workers reduces influenza morbidity and mortality in influenza-vulnerable populations.[30-33]

The commonest reason for healthcare worker vaccination hesitancy is insufficient knowledge about its safety profile and irrational apprehension and it has been shown that improved information about the vaccine improves voluntary vaccine uptake.[34] Our study partially supports this contention in that doctors were more likely to take the influenza vaccine, both last year and with even greater likelihood next winter, and this may be due to greater knowledge in this group of healthcare workers than in the other groups i.e. allied health professionals, nurses and others.

Conclusions

Healthcare workers should be informed about and encouraged to take influenza vaccination. The introduction of a COVID-19 vaccination "passport" may also be considered especially if it provides added benefit/s to the vaccinee.

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ORIGINAL ARTICLE

A study on the health and well-being of doctors in Malta

Marilyn Harney, Jurgen Chris Abela

Background

Doctors' health, including mental health, can impair performance and reduce the quality of patient care. The aims of the study are to document physical and psychological health behaviours, self-stigma and help-seeking behaviours of doctors in Malta, and identify possible factors in the working environment that might be barriers or promoters for positive health behaviours.

Method

A national cross-sectional study of all doctors working in Malta, through the use on an online anonymous questionnaire. The participants provided socio-demographic data, health- and work-related information and completed standard assessment tools to assess well-being. Statistical and thematic analysis was carried out on the quantitative and qualitative data respectively.

Results

There were 173 responses to the questionnaire, giving an estimated response rate of 13.7%. This represents approximately 8% of the total number of doctors registered with the Malta Medical Council. Almost 48% of doctors in Malta who replied to the questionnaire were overweight or obese, the majority of whom were males. Doctors showed higher levels of severe stress when compared to their international peers, and levels of psychological distress and burnout were higher in trainees than specialists. Female respondents reported consistently higher levels of mental ill health in all areas being reviewed (stress, burnout, compassion fatigue and secondary traumatic stress).

Conclusion

The results highlight the importance of developing strategies to improve working conditions for doctors in training and increasing their awareness of health issues (especially psychological), while training senior doctors and specialists to identify colleagues who need support and help. Interventions at various levels – personal, professional and organisational, are needed to help doctors improve and maintain their physical and mental health and well-being.

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Introduction

The World Medical Association refers to physician well-being as 'the optimization of all factors affecting biological, psychological and social health and preventing or treating acute or chronic conditions experienced by doctors including mental illness, disabilities and injuries resulting from work hazards, occupational stress and burnout'.[1] It is thought that doctor's well-being could have a positive impact on patient care; however research on this subject is limited.[2-3] It is well-known that doctors tend to delay seeking help for a number of reasons which might include concerns about confidentiality, finding it difficult to adopt the 'patient role' and feeling guilty about dedicating time for their own well-being.[3-5]

The work carried out by doctors on a daily basis has both benefits and risks for their health and well-being,[4] especially since doctors tend to deal with 'complaints' and sick patients on a daily basis as opposed to other professions, and this in itself can act as a further drain on the psyche of doctors. There also seem to be difficulties dealing with other issues such as bullying in the workplace or supporting colleagues through challenging times[3-4]

This is the first local study for which all doctors working in Malta have been invited to participate. Previous research in Malta was mainly based in primary care and focused mostly on General Practitioners' prevention and health promotion beliefs and personal behaviour, job satisfaction and job stressors.[6-9]

There are currently 2138 doctors registered with the Malta Medical Council on the Principal Register and 50 on the Temporary Register (J. Vella, personal communication, July 13, 2021).[10]

The objectives of this study are:

- To document physical and psychological health behaviours, self-stigma and help-seeking behaviours of doctors in Malta
- To identify associations between the above issues and specific factors, e.g. age, gender, marital status, specialty, career stage
- To compare findings of our study to other published studies
- To identify possible factors in the working environment that might be barriers or promoters for positive health behaviours
- To identify and suggest practical ways in which the well-being of doctors may be promoted in the workplace

Materials and Methods

The study is a cross-sectional observational study of all registered doctors working and practicing in Malta, in both public and private practice.

An online anonymous questionnaire was developed using Google Forms® after an extensive literature review. In order to assess the intended objectives, the questionnaire incorporated standard assessment tools and questions that have been used in other doctors' health studies.[4-5,11] The questionnaire consisted of 57 questions including four open comments sections.

The following is a summary of the sections in the questionnaire:

- *Demographic data (Age, Gender, Marital status)*
- *Professional Role; Education; Specialty*
- *Working conditions (working hours, night shifts, on-calls)*
- *Personal Health Access*

- *Managing Stress*
- *Diet, exercise and sleep patterns; Smoking and alcohol*
- *Self-rated health*
- *Self-stigma*
- *Bullying and harassment in the workplace*
- *Tools for assessment:*
    - ***Kessler Psychological Distress Scale*** *(K10)*[12-13]
    - ***Professional Quality of Life Scale*** *(ProQOL)*[14]
- *Free-text questions at the end of the questionnaire asked about* perceived barriers and personal strategies used to maintain a healthy lifestyle, recommendations for improvements in the workplace and any other comments.

A letter to doctors explaining the aims of the study and other important information preceded the questionnaire. At the end of the information letter, the participants had to actively click on the 'Next' button to start the questionnaire, and this was accepted as consent to participate in the study. Participation was voluntary and participants could stop completing the questionnaire at any stage. No rewards were offered. Finally, participants were offered help pathways should the filling in of the questionnaire cause undue distress.

The questionnaire was distributed through various sources to maximise its reach. Permission was initially requested, and all approached entities acceded to facilitate distribution. The link to the questionnaire, was shared via email through the Medical Association of Malta (MAM), through the Facebook® group 'Tobba Maltin' (which is a private group for doctors in Malta with approximately 1260 members at the time of distribution), as well as through a number of local medical specialist associations. Participants were also encouraged to forward the link to any doctors they felt might be interested in participating. The questionnaire accepted responses for a period of four weeks between 26th January and 23rd February 2021. A reminder was posted after 2 weeks.

Data Protection & Ethics Approval

Data Protection clearance was obtained from the Data Protection Officer of the Primary Health Care Department. Research ethics clearance was granted by the Faculty Research Ethics Committee (FREC) Faculty of Medicine and Surgery in November 2020.

Statistical Analysis

Statistical analysis was carried out using Microsoft Excel® and Statistical Package for the Social Sciences (SPSS® v 24). Thematic analysis was carried out through development of coding categories.

Results

Response Rate, demographics and Professional role

There were 173 responses to the questionnaire.

In view of the various sources of distribution used, it was difficult to accurately calculate the response rate to the questionnaire. Taking into consideration that Facebook® was possibly the most popular platform used for distribution in this case, the estimated response rate calculated from the total number of doctors in the Facebook® group Tobba Maltin at the time of distribution was 13.7%. The number of responses represent approximately 8% of the total number of doctors registered with the Malta Medical Council.

The age-sex distribution of the participants is illustrated in Figure 1. Figures 2 and 3 illustrate the professional role and specialty of the participants.

Figure 1 Sex-Age distribution of participants

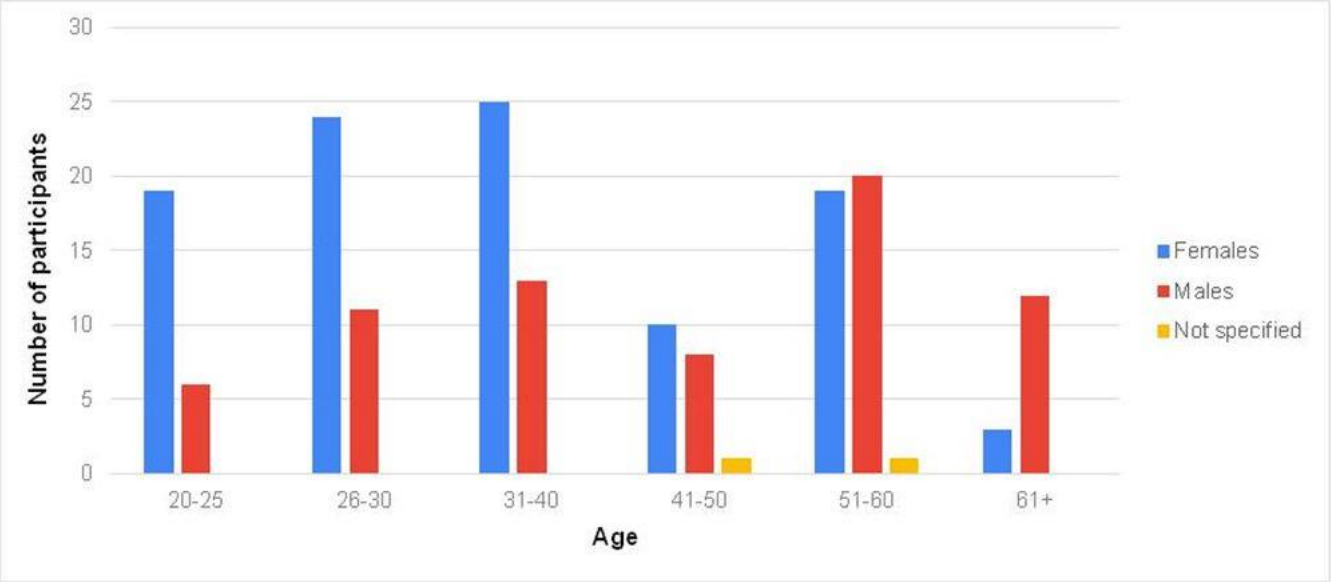

Figure 2 Professional Role of participants

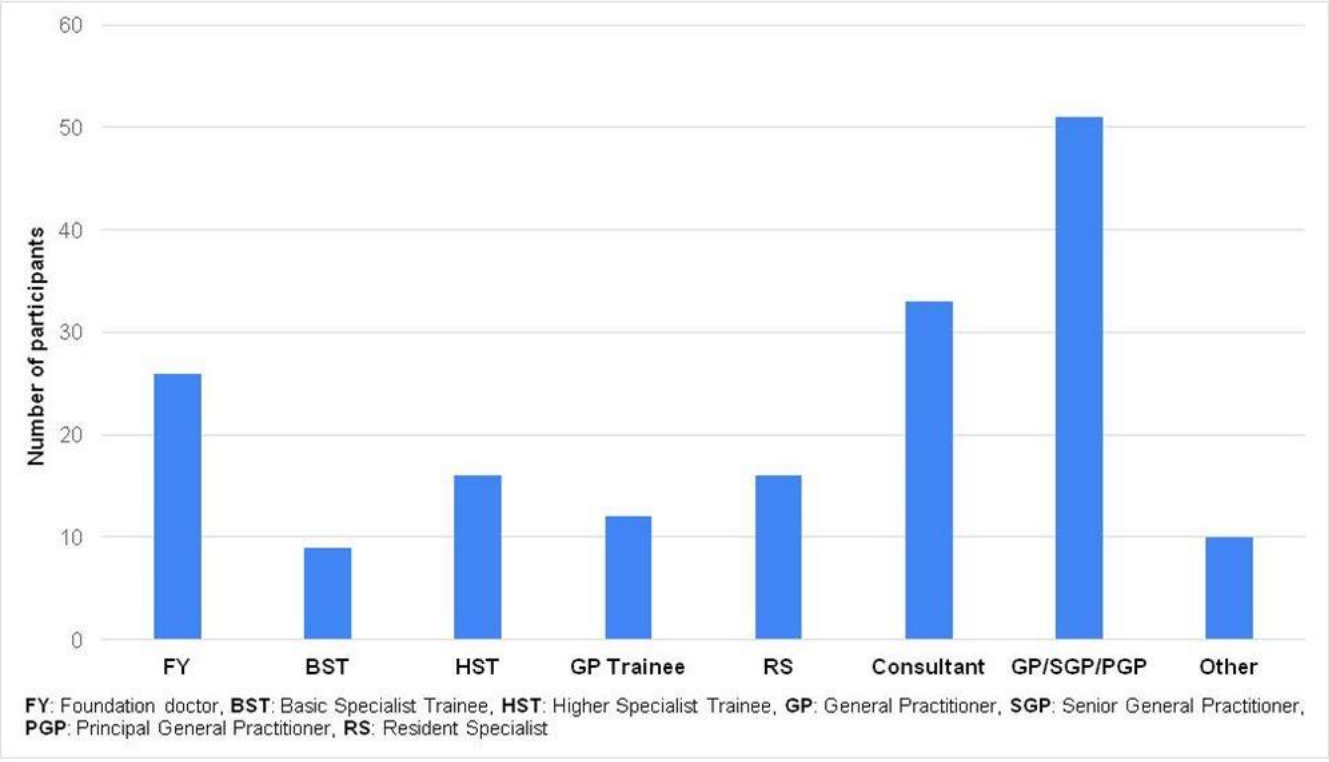

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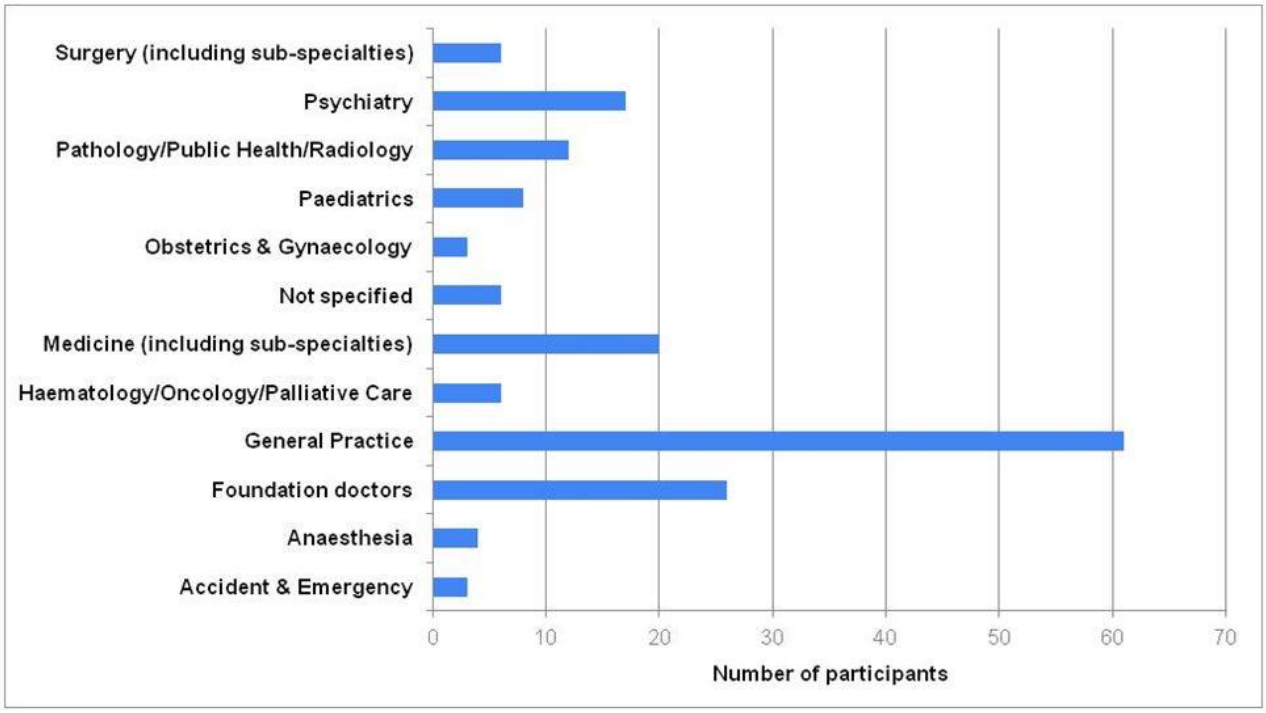
Figure 3 Specialty of participants



Work Characteristics

One hundred and twenty-one (69.9%) of the participants worked solely within the public sector, 26 (15%) worked solely within the private sector and 26 (15%) worked in both. The participants worked an average of 50.7 hours weekly and the mode was 40 hours.

There were 81 doctors who worked more than 48 hours per week (as per the European Working Time Directive). Further breakdown of this group of doctors shows that it consisted of 81% of the total FY respondents, 62% of the doctors in training (BST/HST/GP trainees) and 35% of the specialists.

One hundred and forty-five (84.3%) participants worked during weekends, and 112 (54.7%) worked on-call duties or night shifts.

Forty-seven (27.2%) participants reported that they managed to take a minimum 30-minute lunch break 'all or most of the time' while at work, compared with 49 (28.3%) who never managed to.

Personal Health

Seventy-four participants (43%) reported their general self-rated health as excellent or very good.

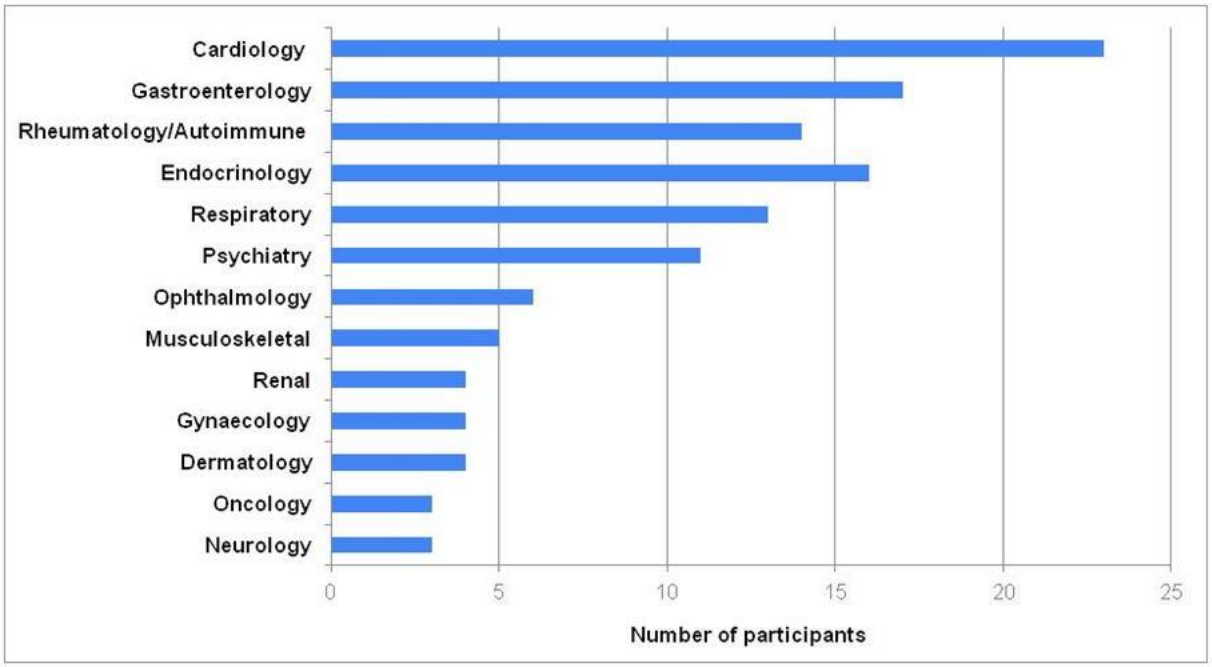
Fourteen participants (8.1%) reported that their physical health affected work 'half the time' or 'most of the time'.

On the other hand, 38 participants (22%) reported that their mental health affected work 'half the time', 'most of the time' or 'all of the time'. Twenty-four of these (63%) were doctors who were still in training (including Foundation doctors).

Health conditions

Eighty-one participants (46.8%) described themselves as having a chronic illness. Of those who answered this question and also indicated their sex, there were equal numbers of males and females. Some participants reported more than one chronic illness, and a total of 123 conditions were recorded. These are summarized in Figure 4.

Figure 4 Chronic illness categories reported by participants



Other health issues

A number of current or previous health issues were asked about specifically. Table 1 summarizes the results obtained. A total of 52 participants reported experiencing one or more of these health issues. The table also shows the gender of those participants who had specified this in their response

Table 1 Current or previous health issues in participants

	Number (*n*=52)	Male	Female
Obesity	**37**	22	14
Anorexia/bulimia	**5**	1	4
Cancer of any type	**5**	3	2
Clinically-diagnosed depression	**15**	6	9
Domestic violence	**7**	2	4
Sexual abuse	**3**	0	3

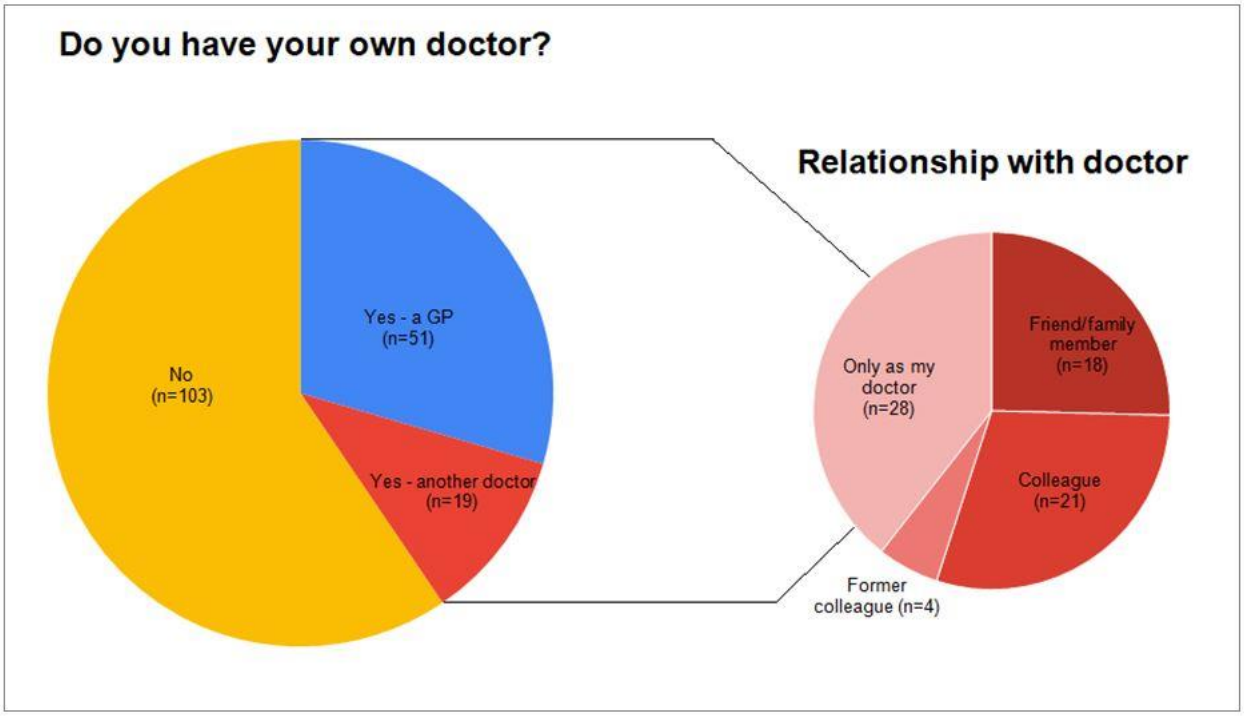
Self-stigma

Fifty-two of the participants (30%) strongly agree that they would not want others to know if they were experiencing physical health problems, in contrast with 101 (59%) when dealing with mental health problems.

Personal Health Access

One hundred and three (59.5%) doctors said they do not have their own doctor, and they provide their own medical care. The remaining 70 (41.5%) answered as per Figure 5.

Figure 5 Personal health access of participants



Immunizations

The rate of uptake of influenza vaccination in doctors increased from 66.3% in 2019 to 84.8% in 2020. An even higher number of doctors (96%) took the COVID vaccination when compared to the influenza vaccination.

Diet, Exercise and Sleep

Body Mass Index (BMI)

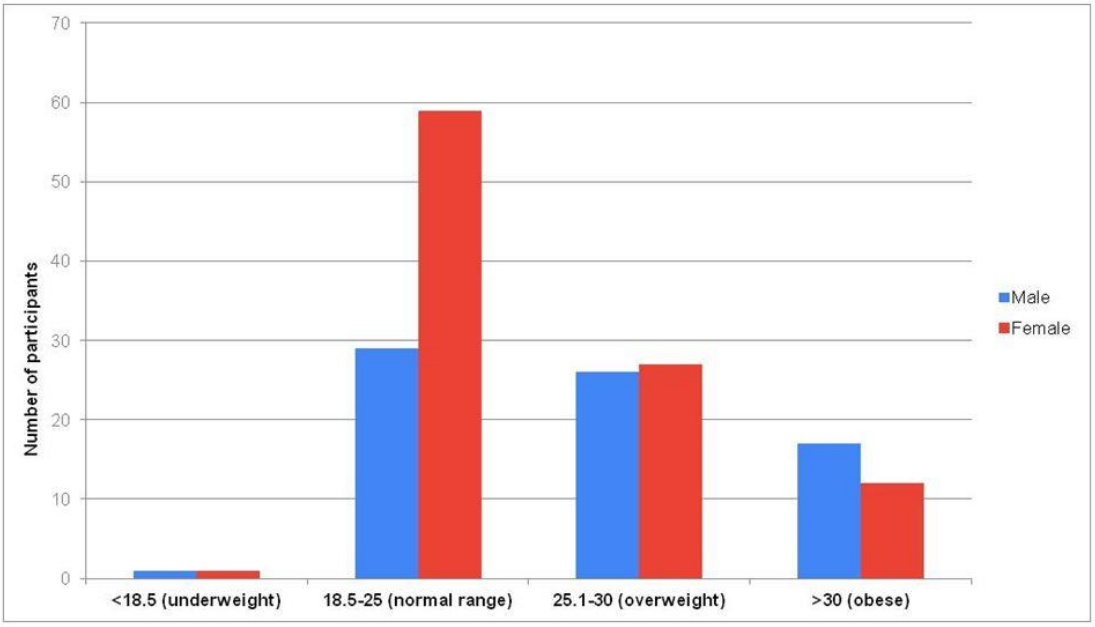
The BMI was calculated for participants who provided their height and weight. A summary of the results can be seen in Figure 6. The two participants who were underweight did not report a history of anorexia or bulimia. Eighty-two (47.7%) of the participants had a BMI in the overweight or obese range. The majority of male doctors were noted to be overweight or obese (n=43, 58.9%).

Nutrition

One hundred and nine participants (63.4%) reported having less than 3 portions of fruit daily, while 91 (53.3%) reported having less than 3 portions of vegetables daily.

Forty-five participants (26.1%) reported eating unhealthy food more than twice weekly, with the majority (*n*=61 and *n*=51) restricting this to once or twice a week respectively.

Figure 6 Body Mass Index of participants



Sleep

Participants were asked to record the number of hours they slept on the night before, with the majority (147) reporting sleeping between 6 and 8 hours, and 16 sleeping 5 hours or less.

Exercise

Sixty-two participants (37%) reported that they completed at least 100 minutes of mild exercise weekly, while only 27 (16%) performed at least 90 minutes of moderate exercise and 29 (17%) performed at least 60 minutes of strenuous exercise weekly.

Smoking and Alcohol

Sixteen of the participants (9.3%) were smokers and 22 (12.8%) reported drinking more than 3 times per week, with 11 (6.5%) reported drinking four units of alcohol or more when they drank.

Managing Stress

Table 2 summarizes the participants' responses to the different activities they use to manage stress.

Mental Health Surveys

Stress – K10 score

Higher scores on the Kessler Psychological Distress Scale indicate higher stress levels.[12,13] A total of 46 doctors recorded high and very high stress levels. Twenty-nine of these (63%) were females. Lower stress levels were associated with increasing seniority in career stage. This is clearly illustrated in Figure 7.

Burnout (using ProQOL)

Burnout is associated with feelings of hopelessness and results in difficulties dealing with work and doing ones job effectively.[15] Overall, 66 of the participants (38%) fell into the 75th centile for burnout and 39 (59%) of these were females.

Two of the participants who scored in the 75th percentile for burnout did not indicate their specialty. The rest are summarized in Table 3.

Figure 8 shows burnout at different career stages. Levels of burnout appear to decrease with advancing career stage, with doctors in the earlier stages of their career being impacted the most.

Table 2 Activities used to manage stress

Activity	Number (*n*=173)	Males	Females
Do something I enjoy	115	49	64
Spend time with family	93	39	53
Take a holiday	90	23	56
Eat more than usual	76	23	52
Take time off work	75	30	43
Spend time with friends	65	24	41
Do more physical exercise	62	30	32
Avoid being with people	49	16	33
Discuss concerns with a mentor	45	18	26
Practise mindfulness or other relaxation technique	36	10	25
Pray	35	14	20
Drink more alcohol	20	13	7
Smoke more cigarettes than usual	6	3	3
Formal debriefing	2	1	1

Figure 7 Stress levels (K10 score) at different career stages

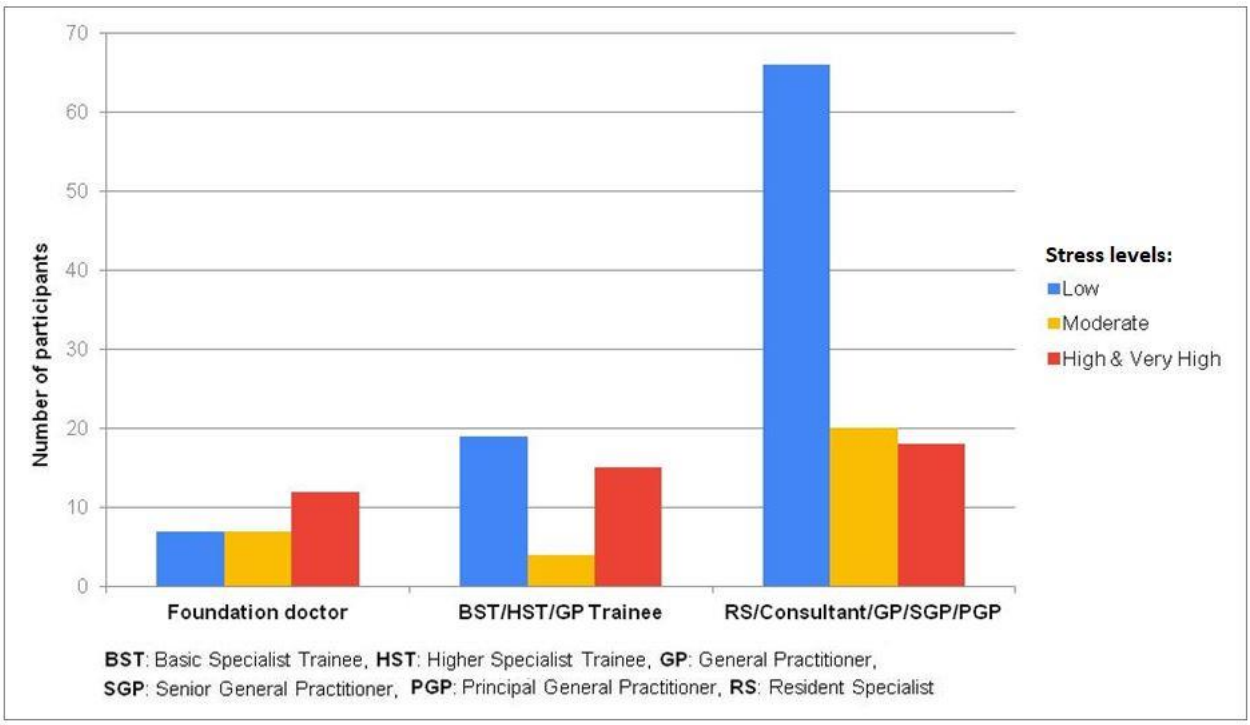
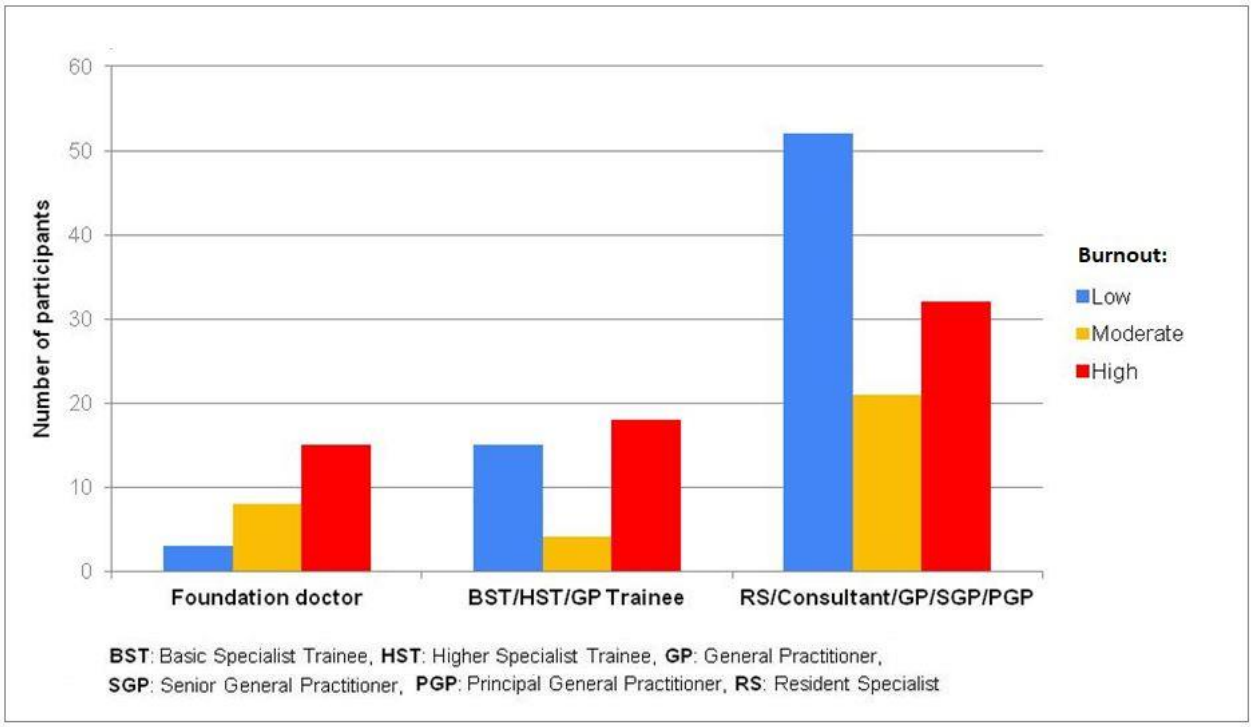


Table 3 Burnout and Specialty

Burnout (75th Percentile)		
Specialty	**Percentage of total in the specialty**	**Number (n=64)**
Accident & Emergency	66.7%	2
Foundation doctors	57.7%	15
Anaesthesia & Intensive Care	50.0%	2
Haematology/Oncology/Palliative Care	50.0%	3
Paediatrics	50.0%	4
Pathology/Public Health/Radiology	41.7%	5
Medicine (including sub-specialties)	40.0%	8
Obstetrics & Gynaecology	33.3%	1
Surgery (including sub-specialties)	33.3%	2
Psychiatry	29.4%	5
General Practice/Family Medicine	27.9%	17

Figure 8 Burnout at different career stages



Compassion Satisfaction (using ProQOL)

Compassion satisfaction gives an indication of the pleasure derived from work. Low compassion satisfaction scores point towards compassion fatigue, which is associated with low satisfaction at work, feeling more tired, and is often associated with burnout.[5]

Eighty-seven of the participants (50.3%) had compassion fatigue, scoring in the 25th centile for compassion satisfaction scores. Fifty-two (59.7%) of these were females.

Higher scores represent a greater satisfaction derived from the ability to be an effective caregiver while at work.[15] Eighteen of the participants (10.4%) had a high compassion satisfaction score, scoring in the 75th centile. Nine of these were females and 9 were males. The majority of the doctors who scored in the 75th centile for compassion satisfaction were doctors who were established in their career, as can be seen in Figure 9.

Secondary Traumatic Stress (using ProQOL)

Secondary traumatic stress is characterized by thoughts of people one has helped, and this can result in feeling trapped, on-edge, exhausted and overwhelmed.[5]

Sixty of the participants (34.7%) scored in the moderate-to-high range for secondary traumatic stress, and 38 (63.3%) of these were females. The results are illustrated in Figure 10.

Figure 9 Compassion Satisfaction at different career stages

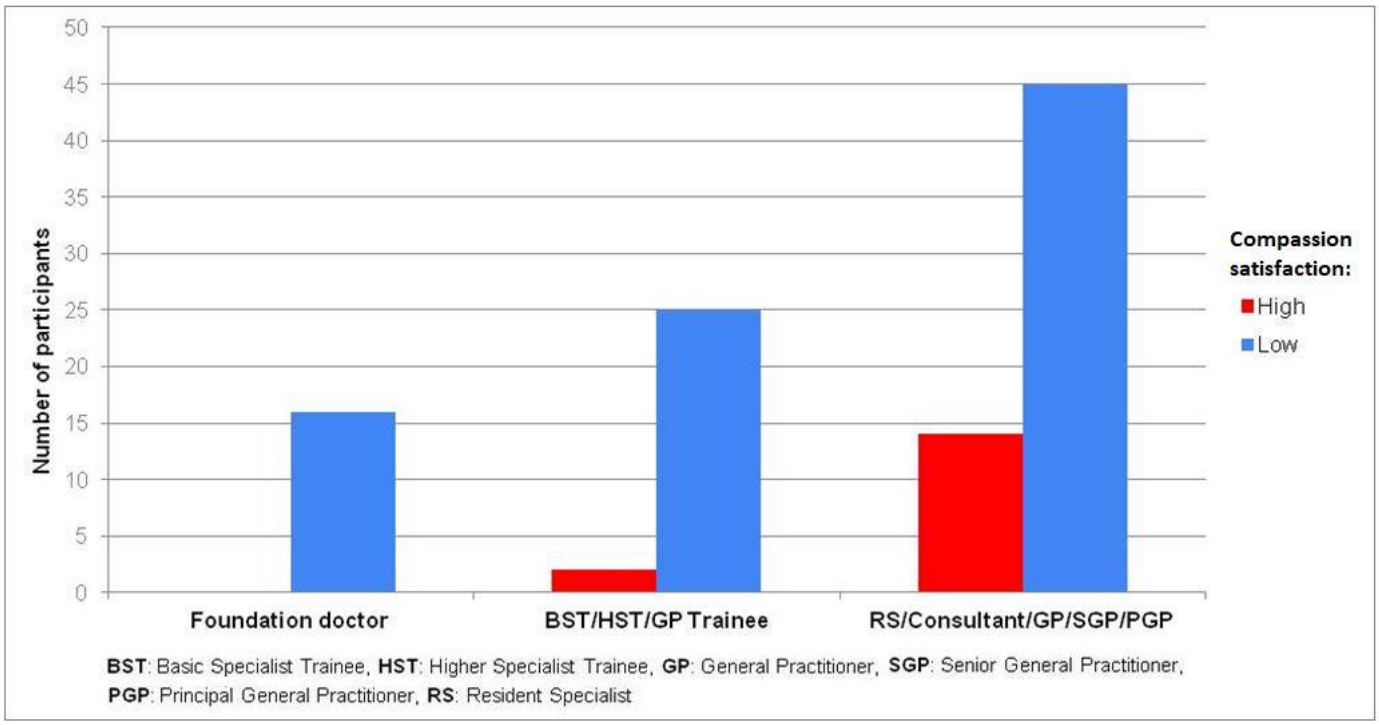
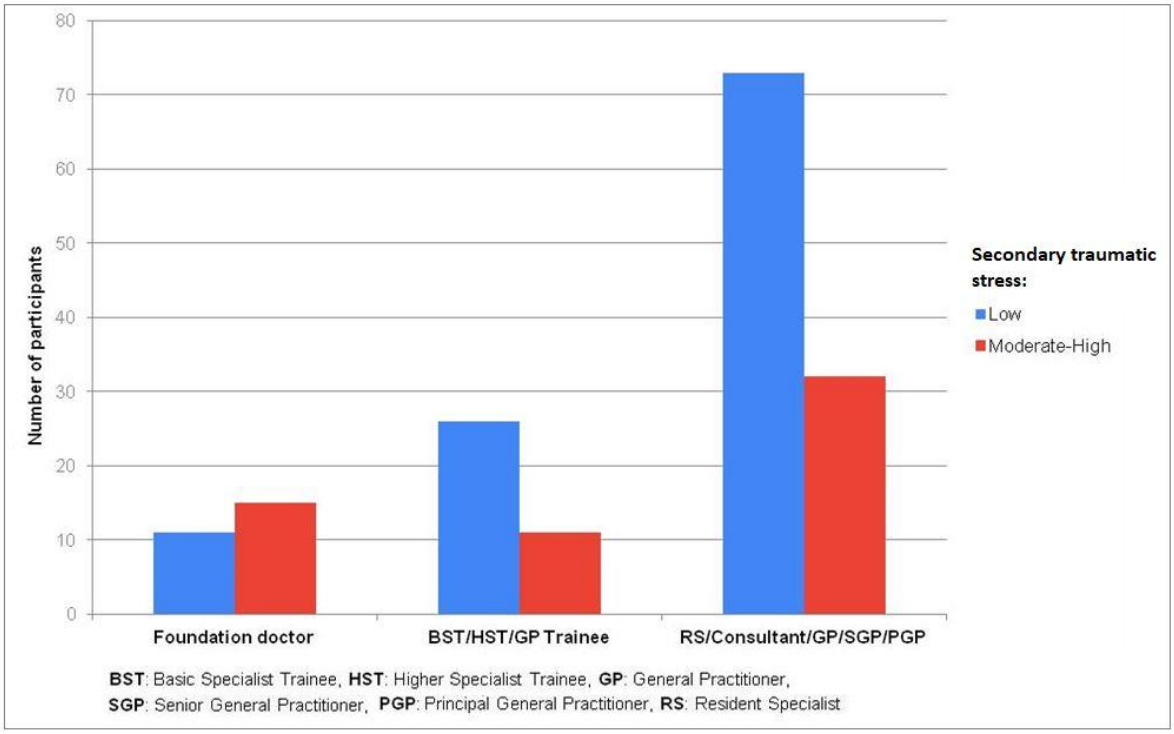


Figure 10 Secondary traumatic stress at different career stages



Belittlement, Harassment and Sexual Harassment

Participants were asked to indicate whether they experienced belittlement, harassment or sexual harassment at the workplace, and if yes to indicate the source and whether this occurred 'sometimes', 'often' or 'regularly'.

Table 4 summarizes the number of participants who marked each specific area.

From the participants who reported that they felt belittled often or regularly, 63.3% were females. From those who reported being harassed often or regularly, 55.9% were females and 80% of those who reported sexual harassment which happened often or regularly were females.

Qualitative Results

Barriers to maintaining a healthy lifestyle (n=155)

Working conditions

Most of the participants mentioned long and irregular working hours as one of the major barriers to maintaining a healthy lifestyle, in addition to the 'hospital duties' system. The high workload and pressure at work, as well as needing to study, attend lectures, carry out research and training outside working hours (often with a lack of flexibility) were also mentioned. Difficulty in taking vacation leave was also a recurrent issue brought up.

"The endless hours I have to work for duties take away time from my private life to explore new hobbies and relationships..." (HST, Medicine, 26-30 years, female)

"Having to find your own cover if you need leave..." (FY, 20-25 years, male)

"Irregular and long hours. I envy non-medical friends who meet up regularly for exercise classes etc" (GP/SGP/PGP, 51-60years, female)

Table 4 Belittlement, Harassment and Sexual Harassment in the workplace

Number of participants who felt...	Belittled	Harassed	Sexually harassed
By patients:	**109**	**88**	**33**
Often or regularly	*15*	*11*	
By senior medical staff:	**133**	**73**	**15**
Often or regularly	*31*	*23*	*3*
By administrative staff:	**95**	**64**	
Often or regularly	*28*	*15*	
By allied health professionals:	**80**	**50**	**17**
Often or regularly	*15*	*8*	*1*
By non-medical staff:	**51**	**39**	**13**
Often or regularly	*2*	*4*	*1*

Time constraints

A recurrent theme mentioned by many participants was difficulty in achieving a healthy work-life balance due to 'limited time' – limited time to exercise, to prepare healthy nutritious meals and to get adequate sleep. Several doctors, the majority of whom were females, also mentioned having to fulfil responsibilities and chores at home and taking care of family and children.

"Time. I feel there is no time to live my life. It feels it is just about work and helping patients..." (31-40 years, female)

"My lifestyle! Which includes being a mother of 2 young kids and never having time for myself!" (HST, Medicine, 31-40 years, female)

Personal attributes

Many participants mentioned the inability to unwind and switch off from work, as well as tiredness, exhaustion, high stress levels, lack of motivation and laziness as barriers to maintaining a healthy lifestyle.

"Switching off from work after hours or on weekends..." (Consultant, Paediatrics, 51-60 years, male)

"Feeling exhausted after work. Constant ruminations about work...thinking about patients and questioning one's decisions" (FY, 20-25 years, male)

'Environmental' factors

Lack of support at work, lack of teamwork and a competitive environment were repeatedly mentioned in this regard. The Coronavirus pandemic was also mentioned in terms of the changes it brought about to the way doctors are practising, loss of work for private family doctors and the inability to travel freely. A few participants

also highlighted that expensive healthy food options, the overbuilt environment, lack of green spaces and constant distractions from technology and social media also contributed to the struggle in maintaining a healthy lifestyle.

"Competitive environment, lack of support" (BST, Medicine, 20-25 years, male)

"Not working as a team at work" (GP/SGP/PGP, 61+ years, male)

APPROACH USED TO MAINTAIN OR IMPROVE HEALTH (*N*=151)

Lifestyle

Most of the participants mentioned that they try to follow a healthy diet, have regular meal preparation (to avoid eating junk food), exercise and get adequate sleep. The importance of setting priorities and planning in advance were also mentioned as being vital in carrying out the strategies mentioned above.

"Strive to maintain mental sanity and physical fitness through right priorities…" (Consultant, Dermatology, 51-60 years, male)

"Regular mild exercise, not eating too much..." (Consultant, Psychiatry, 61+ years, male)

Self-care

Many participants mentioned several self-care activities which they use to maintain or improve their health. These include relaxation techniques, meditation, mindfulness, yoga, positive thinking, regular therapy, time for oneself ('me time') and spirituality. Keeping strict boundaries and being able to switch off from work were also mentioned, alongside avoidance of excessive use of social media. Socializing, spending time with significant others, spending time outdoors, making time for hobbies, music and voluntary work were also mentioned by the participants.

"Unwind by playing musical instrument and listening to music..." (GP Trainee, 26-30years, male)

"Spend time with my family and set boundaries with my phone..." (GP, 31-40years, female)

"...pamper myself at times" (BST, Psychiatry, 20-25 years, female)

Working conditions

Reducing working hours and taking time off work were the most popular responses. Peer support was also considered an important factor in helping to improve and maintain one's health.

"Take time off from work (sick leave or vacation leave)..." (RS, Pathology/Public Health/Radiology, 51-60years, female)

"Venting with colleagues helps me a lot psychologically..." (GP trainee, 26-30 years, male)

"Sharing experiences with a mentor/friends also helps very much..." (GP/SGP/PGP, 51-60 years, female)

RECOMMENDATIONS OF CHANGES OR IMPROVEMENTS IN THE WORKPLACE (*N*=146)

Facilities in the workplace

The most common recommendations were easier access to exercise facilities at work (such as gyms, fitness classes), healthy food options, improved spaces for rest, showers, water dispensers and more ergonomic workspaces. Having designated lunch breaks and a meditation room were also mentioned.

"Gym facilities close to work that can be accessed during break time" (GP, 26-30 years, female)

"Several departments have lack of basic necessities for doctors such as changing rooms/ showers, lockers and break rooms..." (FY, 20-25 years, female)

Working conditions

Most of the participants mentioned easier accessibility of vacation leave and time off work, reducing long working hours and improving conditions and salary. The conditions mentioned include fairness at work, equality, being able to 'disconnect' when not at work and more family-friendly measures.

"Better hours/shifts. Allow better organization of leave" (GP Trainee, 26-30 years, female)

"Reduce the toxicity at work..." (31-40 years, female)

Work environment

The most common points mentioned in this area were a need for better communication, more respect, support and understanding, and feeling appreciated and valued at work. The need for improved teamwork, and organised team-building exercises was also pointed out, as well as consultation with frontline staff prior to decision-making by administration. Improved flexibility, less bureaucracy, implementation of changes in a timely manner, protection from harassment and caring more for young doctors were also commonly remarked.

"More understanding culture in the workplace..." (GP Trainee, 26-30 years, female)

"Dialogue with management and administration are crucial but sadly lacking, if not absent." (Consultant, Pathology/Public Health/Radiology, 51-60 years, female)

"We as doctors need to stick up for each other and work hand in hand together to support each other" (GP Trainee, 26-30 years, male)

"I am very pessimistic about what can be changed in the system to improve conditions for junior doctors. Administration pretends it cares about our well-being but it does not because nothing ever changes. I feel constantly exhausted after work." (FY, 20-25 years, male)

Access to well-being services

Many participants pointed out the importance of proactive psychological support for doctors. Several suggestions were made, including periodically answering a questionnaire about well-being, periodically having a feedback or evaluation (supervision) session with a mentor, debriefing sessions, doctors being obliged to having their own GP, and easier access to psychological services. Behavioural relaxation lectures and more focus in medical school and Foundation years on developing coping skills to help deal with stress in the workplace. These strategies would help create healthier resilient doctors who are more self-aware and who will be able to be more empathic towards patients and colleagues.

"Psychological support after traumatic patient experiences..." (RS, Haematology/Oncology/Palliative Care, 51-60 years, female)

"Receiving regular positive and constructive feedback..." (GP/SGP/PGP, 51-60 years, female)

"Encouraging a ...mentality whereby mistakes are corrected in private (not in front of colleagues and/or patients)" (FY, 20-25 years, female)

Other ideas, comments or suggestions (n=56)

Most participants asked for distribution of the study results, and thanked ~~us~~ the authors for the initiative of this study, which many felt was needed locally.

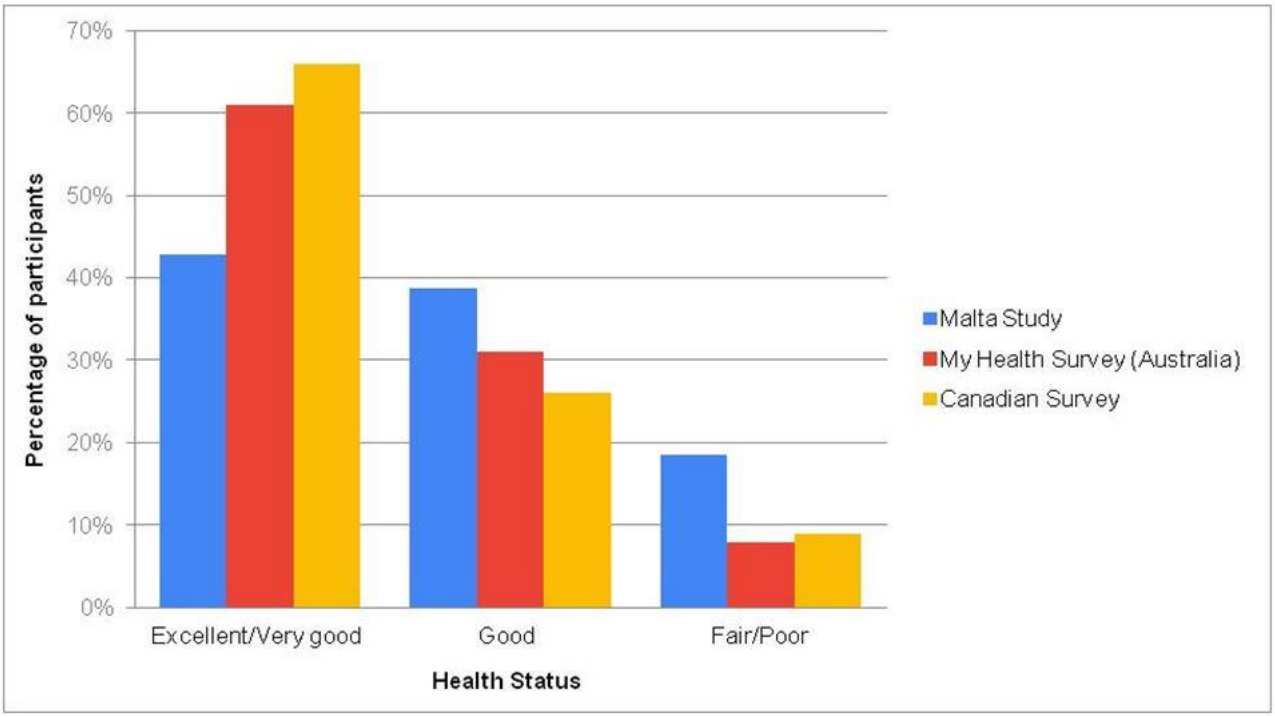
Some also pointed out that it helped them reflect on changes they need to implement in order to safeguard their well-being. Other comments relating to the questions above were included with the thematic analysis of the specific questions.

Discussion

The average number of hours worked by the doctors who participated in this study was in excess of the 48 hours requirement of the European Working Time Directive (EWTD).[16] Doctors in training, including Foundation doctors, worked longer hours when compared to specialists, which might be due to longer assigned duty hours, or to doctors working extra sessions to improve their pay or gain more experience. This finding is similar to previous studies[11] and might explain the higher stress levels and burnout experienced by younger doctors.[17] However, while such associations are relatively clear, the existing evidence shows an increased risk of percutaneous injuries and road traffic accidents, but does not allow for an established causal or 'dose–response' relationship between long working hours and mood disorders or general health.[18] It is also difficult to establish the ideal number of extra hours doctors could work while remaining safe and healthy.[18]

Overall, self-rated health was very good or excellent in 43% of participants in the questionnaire. This is lower than similar studies in Ireland, Australia and Canada.[4-5,11] Comparison with the latter two studies is illustrated in Figure 11.

Figure 11 Health Status of participants in different studies



The commonest chronic illnesses mentioned by doctors in our study were related to the cardiovascular system. This might be associated with the fact that almost 48% of doctors had a BMI in the overweight or obese range, and a very low number of doctors reported regular adequate exercise practices. The general lack of exercise and high BMI in male doctors was also evident in studies carried out in 2006 and 2014 amongst GPs in Malta.[6-7] Malta has been identified by the World Health Organization (WHO) as one of the European countries with the highest obesity prevalence, and this seems to also be reflected in the population of doctors, with males having a tendency for a higher BMI.[19] Research in 2014 showed that GPs in Malta who are obese find it harder to recommend exercise, while those who smoke find it more difficult to advise smoking cessation.[7] Thus, doctors' health and health beliefs were shown to negatively affect their advice and recommendation to patients, with subsequent adverse consequences on the health of patients.[7]

Self-stigma when dealing with mental health problems was expressed by 59% of participants. This is of particular concern, especially since 59.5% of participants also said they do not have a doctor and provide their own medical care. This stigma has been observed in previous doctors' studies and addressing this attitude in early stages of training may help to reduce barriers to care.[11] This is especially important when considering that the medical profession is associated with a high risk of mental ill health, substance misuse and suicide risk.[11]

Doctors in Malta had higher levels of severe stress (27%), when compared to similar studies carried out in Australia (13%) and Ireland (9.5%).[5,11] Levels of psychological distress and burnout were higher in trainees than specialists, as observed previously. One can argue that the expectations related to the training programmes occur more or less at the time that people start planning their family lives or actually start their family lives. These facts, coupled with an element of possible financial commitments might explain the observations.[3,11] Comparably, a reduction in stress, burnout, compassion fatigue and secondary traumatic stress was observed with advancing career stage. This observation might reflect the challenging and relatively unsupported role of doctors in training, where high demands are placed on doctors making it difficult for them to cope.[11] It might also show the tendency of doctors in difficulty to fail or choose not to progress to senior grades, therefore resulting in a cohort of specialists who represent those who survived in the challenging work environment.[11] When considering the spectrum of mental health, females reported consistently higher levels of mental ill health in all areas being reviewed (stress, burnout, compassion fatigue and secondary traumatic stress). Global research has shown that younger age, female sex, long working hours, low job satisfaction and the presence of work-home conflict were associated with an increased prevalence of burnout in doctors.[20] A higher rate of stress and burnout was evident in females in studies carried out in Canada, Ireland and United States, however studies carried out in Europe and Australia found that burnout was more prevalent in males.[4,5,11,21-22] There are a limited number of studies which analyze and report burnout data in doctors according to gender, however there is evidence to suggest that the experience of stress and burnout is different between males and females. Females are more likely to encounter gender discrimination and biases, postponed personal life decisions and barriers to career advancement, all of which may contribute to burnout.[23-25] Even though a significant improvement has been noted in recent years with

improvement of childcare facilities and local campaigns promoting the sharing of life's responsibilities between males and females,[26] female doctors, particularly those in training, possibly feel they have to juggle many other things in addition to work-related tasks, as was noted in the qualitative analysis of this study.

Harassment and sexual harassment were also noted to be experienced more by female doctors in our study. This finding has been reported previously, and was also found to be associated with a higher risk of burnout and mental health problems.[27-29] Similarly, in a study among GPs in Malta carried out in 2007, 31% of doctors felt verbally and physically used, misused and abused. This was found to be contributing to the poor job satisfaction experienced by the doctors.[8]

Recurrent themes mentioned by participants as barriers to maintaining a healthy lifestyle include working hours, conditions, workload and frustrations related to existing systems in the workplace (such as difficulty with taking vacation leave). These were similar to themes that emerged in previous studies with doctors.[3,5,20]

Strengths and Limitations of the Study

This study was innovative since it offered new information on the health and well-being of doctors working in Malta, which is indeed a poorly studied area. Doctors of all career stages were invited to participate in the study, including doctors who are still in their initial years of training and those working in both public and private sectors. This helped to get a better representation of the local situation. The tools used in this study were used in previous studies with doctors, and this was done to aid comparison.

There was a total of 173 responses to the questionnaire, and this represents approximately 8% of the total number of doctors registered with the Malta Medical Council. The small numbers were a limitation especially since it was not possible to analyze results by specialty and assess for significant associations. A number of online channels were used for distribution of the questionnaire to try and reach as many doctors as possible, including Facebook® since most people use social media on a daily basis. The authors however appreciate that not all registered doctors working in Malta were reached in this manner. It should also be noted that not all doctors in the Facebook® group and on the Medical Council registers are necessarily currently working in Malta, as was required in order to be eligible to participate in the study. Additionally, in view of data protection laws access to the email addresses of all doctors registered in Malta, which would have enabled wider distribution of the questionnaire, was restricted. Possible reasons for the low response rate include distributing the questionnaire electronically, having a long questionnaire dealing with sensitive issues, and being at a very particular time of almost one year into a worldwide pandemic. There was only one response from a non-Maltese doctor working in Malta, and therefore this subgroup was largely under-represented. Most of the participants in the study worked in General Practice, and this could have been influenced by the fact that both authors are practising GPs. The study was also limited by the fact that it is a cross-sectional study, thus susceptible to certain biases, such as responder bias, and it may also be difficult to interpret any associations identified in view of its design.

Recommendations

- Improve **facilities in the workplace** that help employees lead a healthier lifestyle (e.g. healthy food options at reasonable prices, water dispensers, exercise facilities at/close to

workplace, fitness classes, gym/sports membership fees at reduced prices, showers)

- At the **organizational level**:
  - Create a **better environment** at work – supportive and less competitive. This can be achieved through regular team-building activities, amongst other things.
  - Ensure **good working conditions** for all doctors – shared workload, manageable working hours, regular breaks, fair and equal access to vacation leave and study leave, family-friendly measures.
  - Being pro-active rather than reactive and try to prevent the onset of mental health issues through initiatives to **reach-out to doctors**, especially the at-risk category identified in this study, which are the doctors in training.
  - Develop **structures that allow for dealing with issues such as belittlement, harassment and sexual harassment** at the workplace in a confidential and effective manner.
- At the **educational level**:
  - Improving education about health and well-being of doctors, especially during medical school, foundation and specialist training years. Doctors should be aware of self-care and self-help strategies they can use, and when they should seek help. Education should focus on improving resilience through educational processes and practice-based interventions.[3]
  - Education of senior doctors and specialists is also vital in helping to identify problems with junior doctors (who might be very skilled at hiding certain issues), and how to tackle such problems and support the individuals.
- Development of a **formal national doctors' health and well-being programme**. This would have a number of roles, including:
  - Raising **awareness** about important areas of well-being through the use of emails, development of online toolkits etc.
  - Providing **access to specific activities** that can help maintain well-being, e.g. mindfulness or relaxation classes
  - Providing **easy access to confidential medical and psychological services**, specifically for doctors. This can be done through the setting up of a weekly afternoon/evening clinic, ideally outside of hospital or government health centres (to ensure privacy), where two GPs would be available. An email address can be made available for doctors to make contact or set an appointment. The GPs will make the initial assessment and be available for follow-up, or refer as needed.
  - Development of systems that will allow for **supervision or mentorship** for doctors in all specialties. This practice which is commonly used in psychiatry and psychology would possibly be extremely beneficial if implemented across all specialties; thus every doctor will know that a supervisor or mentor is available to discuss issues with periodically.
  - Co-ordinate **further research** on the subject, with a possible focus on doctors in training, different specialties and gender differences in health and well-being; as well as effective strategies that can be used to improve and maintain well-being.

Conclusion

The primary objective of this study was to shed light on the health and well-being of doctors in Malta, and any possible associated factors. In this regard, the findings of this study help in getting a better picture of the situation. Indeed, doctors in Malta who participated in this study were found to have higher levels of stress, burnout, compassion fatigue and secondary traumatic stress than their international peers.[4,5,11] These findings were more prevalent in young female doctors who were still in training. This highlights the importance of developing strategies to improve working conditions for doctors in training and increasing their awareness of health issues (especially psychological), while training senior doctors and specialists to identify colleagues who need support and help. The high percentage of doctors who are overweight or obese also emphasizes that despite their knowledge, the struggle with a healthy lifestyle is also common in doctors. Interventions at various levels – personal, professional and organisational, are needed to help doctors improve and maintain their physical and mental health and well-being.

Summary Box

Known about this subject:

- Doctors' health, including mental health, can impair performance and reduce the quality of patient care.
- Younger age, female sex, long working hours, low job satisfaction and the presence of work-home conflict were associated with an increased prevalence of burnout in doctors.
- Harassment and sexual harassment in the workplace have been found to be associated with a higher risk of burnout and mental health problems in doctors.

Findings:

- Doctors in Malta had higher levels of severe stress when compared to their international peers, and levels of psychological distress and burnout were higher in trainees than specialists.
- Female doctors in Malta reported consistently higher levels of mental ill health in all areas being reviewed (stress, burnout, compassion fatigue and secondary traumatic stress).
- Almost 48% of participating doctors in Malta were overweight or obese, with males having a higher tendency for an elevated BMI. Cardiovascular problems were the commonest chronic conditions suffered by doctors.

Acknowledgments

The authors are grateful to all the doctors who took time to complete the questionnaire and share their thoughts and experiences. ~~We~~ The authors would also like to thank all entities who kindly facilitated distribution of the questionnaire.

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ORIGINAL ARTICLE

Assessment of obstetric and gynaecology emergency service at Mater Dei Hospital

Sarah Xuereb, Maria Christina Tabone, Helga Consiglio, Marcus Pace

Introduction

Busy and overcrowded Emergency Departments (ED) are a major concern worldwide. Their ease of access results in overutilisation and inappropriate use with patients presenting with non-urgent health problems. The aim of this study was to quantify and assess the workload on the Obstetric and Gynaecology Emergency Service at Mater Dei Hospital and, by means of this data, assess what improvements could be put forward to improve the service.

Method

A retrospective analysis of patients attending Gynaecology Admission Room at Mater Dei Hospital over a period of 140 days. Patient demographics and presenting complaints were noted. Patients were divided into three main cohorts: Early Pregnancy, Advanced Pregnancy and Gyaecology cases.

Results

3357 cases seen in total over the 140 days. Therefore on average 24 cases were seen every day. 62% were gynaecology cases, 30% were early pregnancy cases and 8% were advanced pregnancy cases.

Conclusion

The Gynaecology Admission Room is a very busy unit which is currently being overcrowded with non-urgent referrals. This points towards an improvement of the primary care obstetric and gynaecology service, as well as an appropriate triage system to be put in place. The establishment of an Early Pregnancy Assessment Unit may help further to streamline early obstetric care.

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Introduction

Busy and overcrowded Emergency Departments are a major concern worldwide. According to the Mater Dei Hospital Data Officer, the Maltese Emergency Department had 140,209 attendees in 2019. In Malta, healthcare is free of charge to all Maltese and EU nationals. The ease of access of the Emergency Department results in overutilisation and inappropriate use with patients presenting with non-urgent health problems.[1]

The Obstetric and Gynaecology Emergency Service at Mater Dei Hospital is carried out in a single room, away from the Accident & Emergency Department, where all obstetric cases up to 22 weeks gestation and all gynaecology cases are seen, referred to as the Gynaecology Admission Room.

The aim of this study was to quantify and assess the workload on the Gynaecology Admission Room and, by means of this data, assess what improvements could be put forward to improve the service.

Method

This study is a retrospective analysis of all patients attending the Gynaecology Admission Room at Mater Dei Hospital over a period of 140 days from March 2019 to July 2019. Data was obtained from the Admission Book Registers after the appropriate data protection approval was acquired.

Patient demographics and the presenting complaint were noted for each patient. The patients were also divided into three main cohorts: Early Pregnancy (up to 14 completed weeks of pregnancy), Advanced Pregnancy [Early Second Trimester Pregnancy] (from 15 to 22 weeks of pregnancy) and Gynaecology cases.

Results

A total of 3357 admission room visits occurred over the 140 days, with 2814 patients, and 543 follow-up visits. Therefore, on average, 743 cases were seen at admission room every month, and 24 cases were seen every day.

Out of the 3357 cases seen over the 140 days, 62% were gynaecology cases, 30% were early pregnancy cases and 8% were advanced pregnancy cases. (Figure 1)

The patients in the Early Pregnancy cohort were most commonly between 31 and 35 years of age (40%; n=284), and 59% (n=490) were Maltese (Figures 2-3).

106 (12.7%) of the patients in the early pregnancy cohort presented at 6 weeks gestation. 197 (23.6%) had no gestation documented on the admission book registers. (Figure 4)

A vast majority of patients in the early pregnancy cohort presented to the admission room with bleeding (47%; *n*=393). Other complaints included abdominal pain (16%; n=134), miscarriage (13%; *n*=109) and not specified complaints (11.2%; n=94), such as urinary problems and respiratory symptoms. (Figure 5)

The patients in the Advanced Pregnancy cohort had an average age of 26-30 years (38.3%; n=87) (Figure 6). 65% (n=149) of this cohort were Maltese (Figure 7). 45 (19.8%) of these patients presented at 16 weeks gestation (Figure 8). The most common presenting complaint was abdominal pain (29.5%; n=67) and complaints grouped under the 'Other' category (31.3%; n=71). The 'Other' category included complaints such as dysuria

and reassurance, for example after being involved in a motor vehicle accident.

The presenting complaints for the gynaecology group were analysed. Most patients (21.3%; *n*=373) presented with abdominal pain. 355 patients (19.1%) were listed on the admission book registers as 'Gynae review', while 306 patients (17.5%) presented with abnormal bleeding. All the presenting complaints are clearly laid out in Figure 10. (Figure 10)

Figure 1 Case distribution of patients presenting to Gynae Admission Room

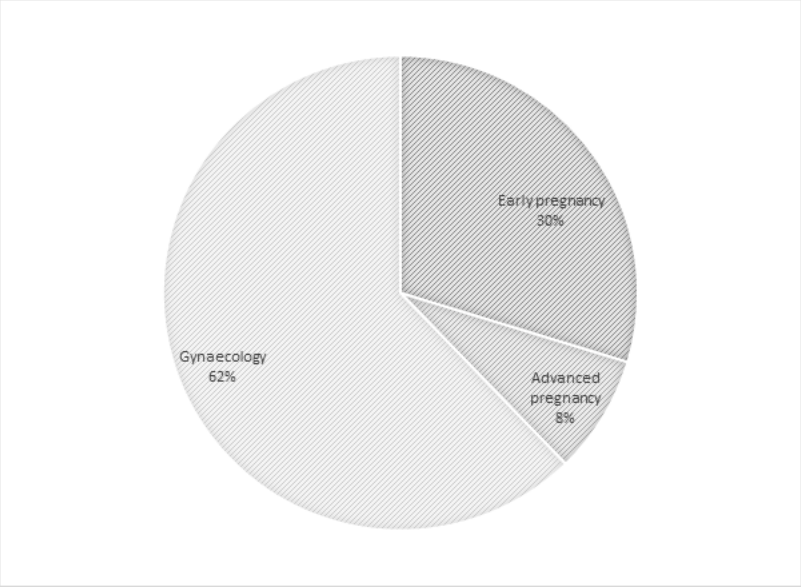


Figure 2 Age of patients in Early Pregnancy cohort

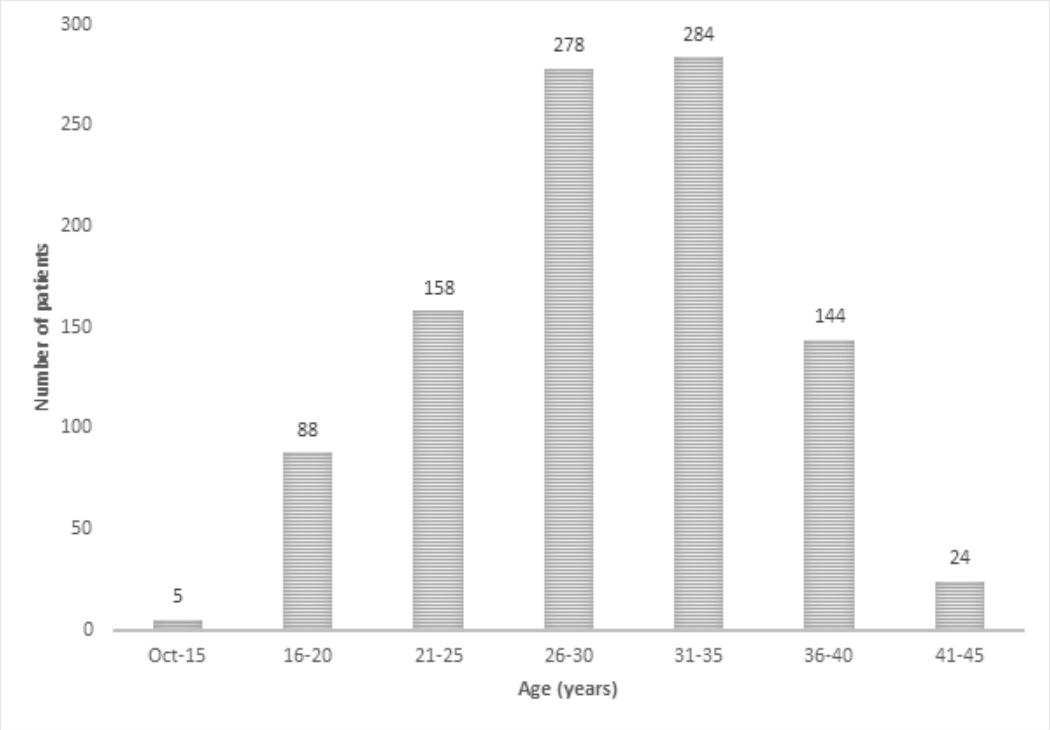


Figure 3 Nationality of patients in Early Pregnancy cohort

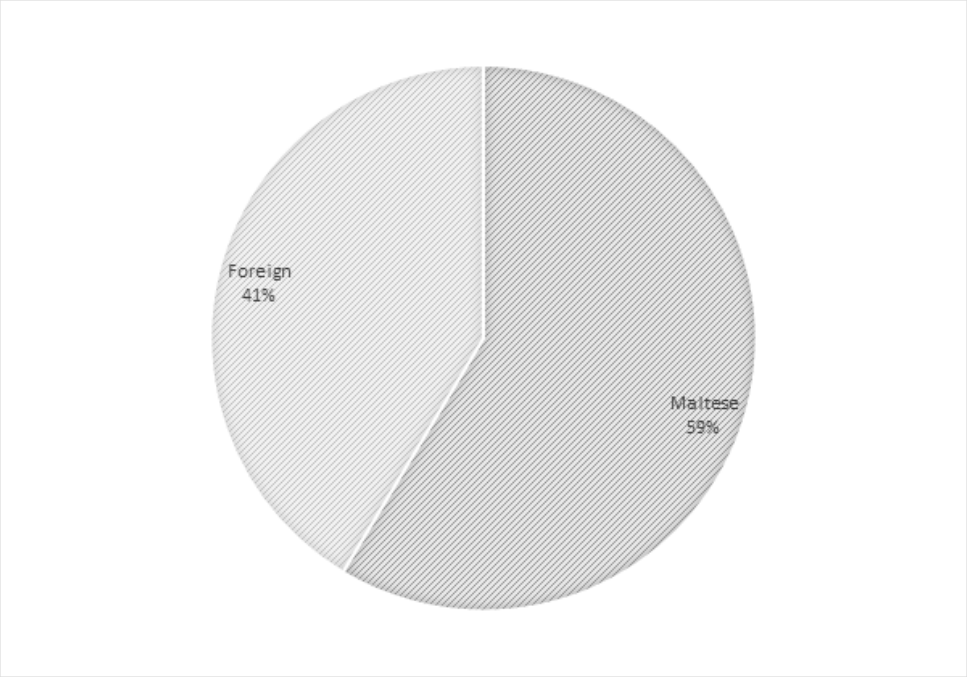


Figure 4 Gestation at presentation of patients in Early Pregnancy cohort

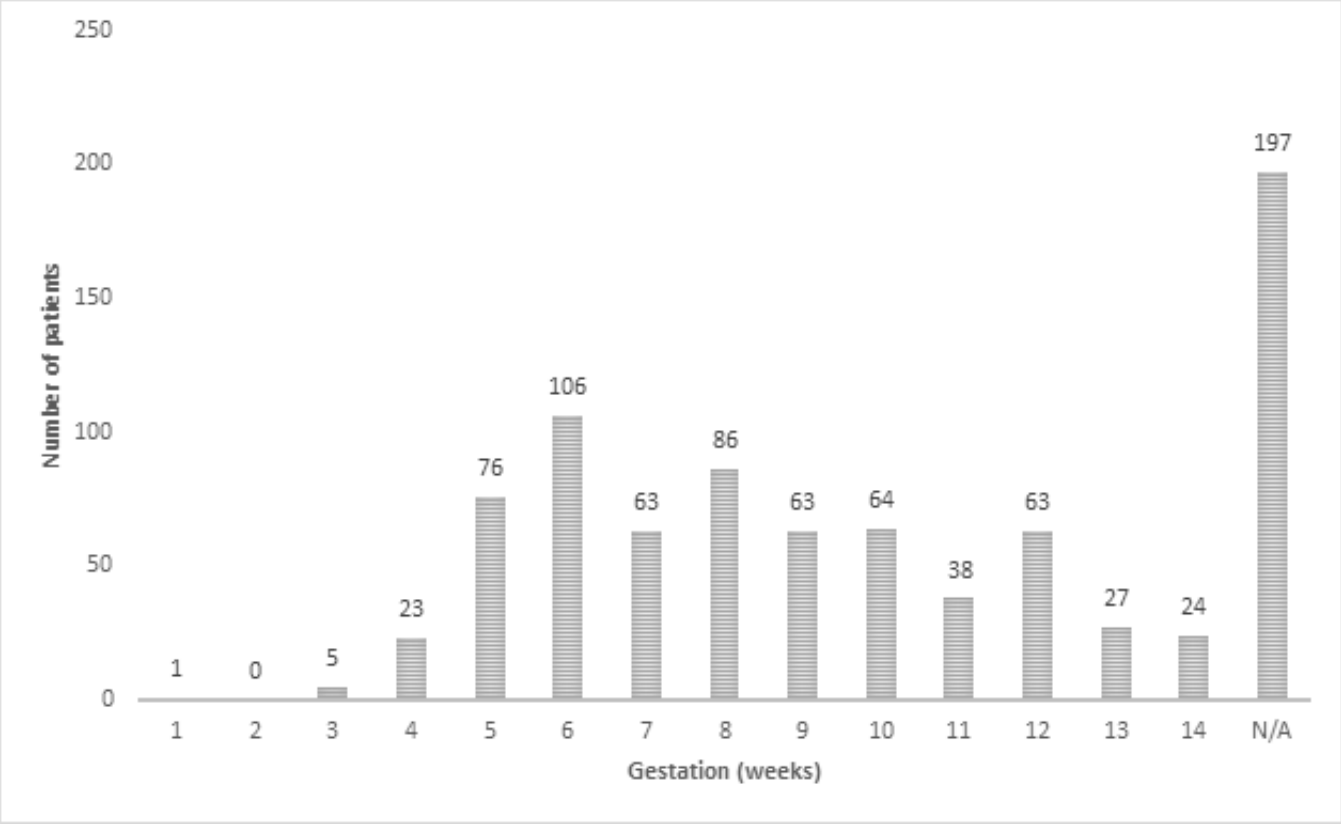


Figure 5 Presenting complaints of patients in Early Pregnancy Cohort

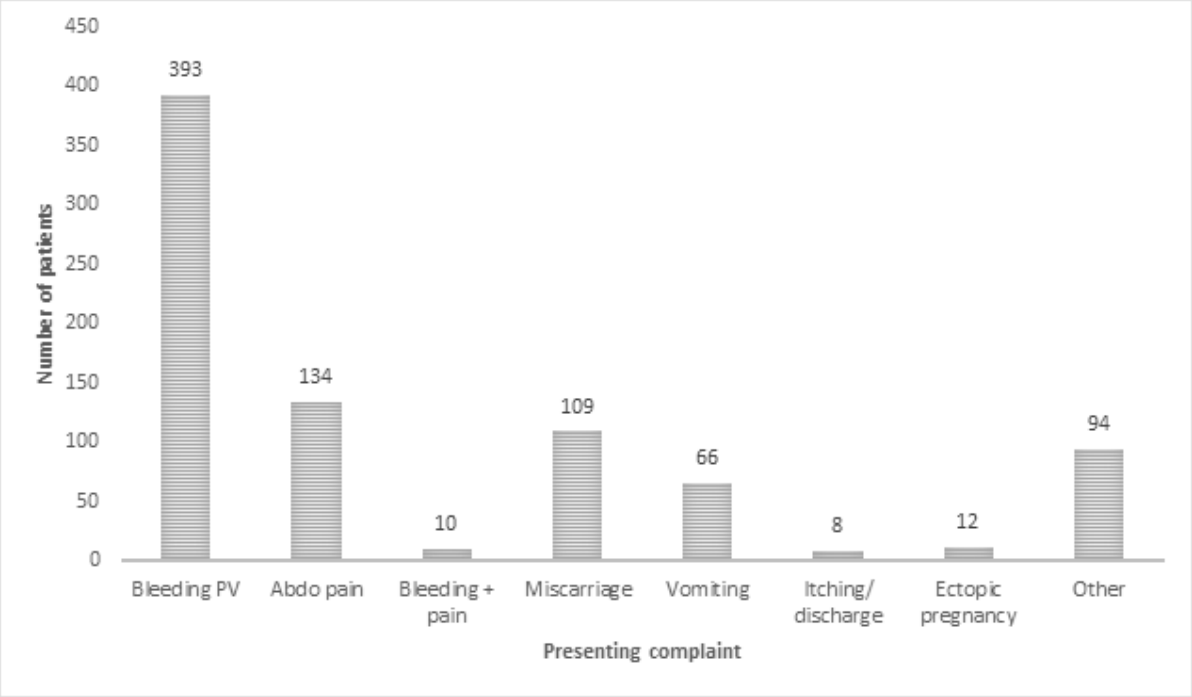


Figure 6 Age of patients in Advanced Pregnancy cohort

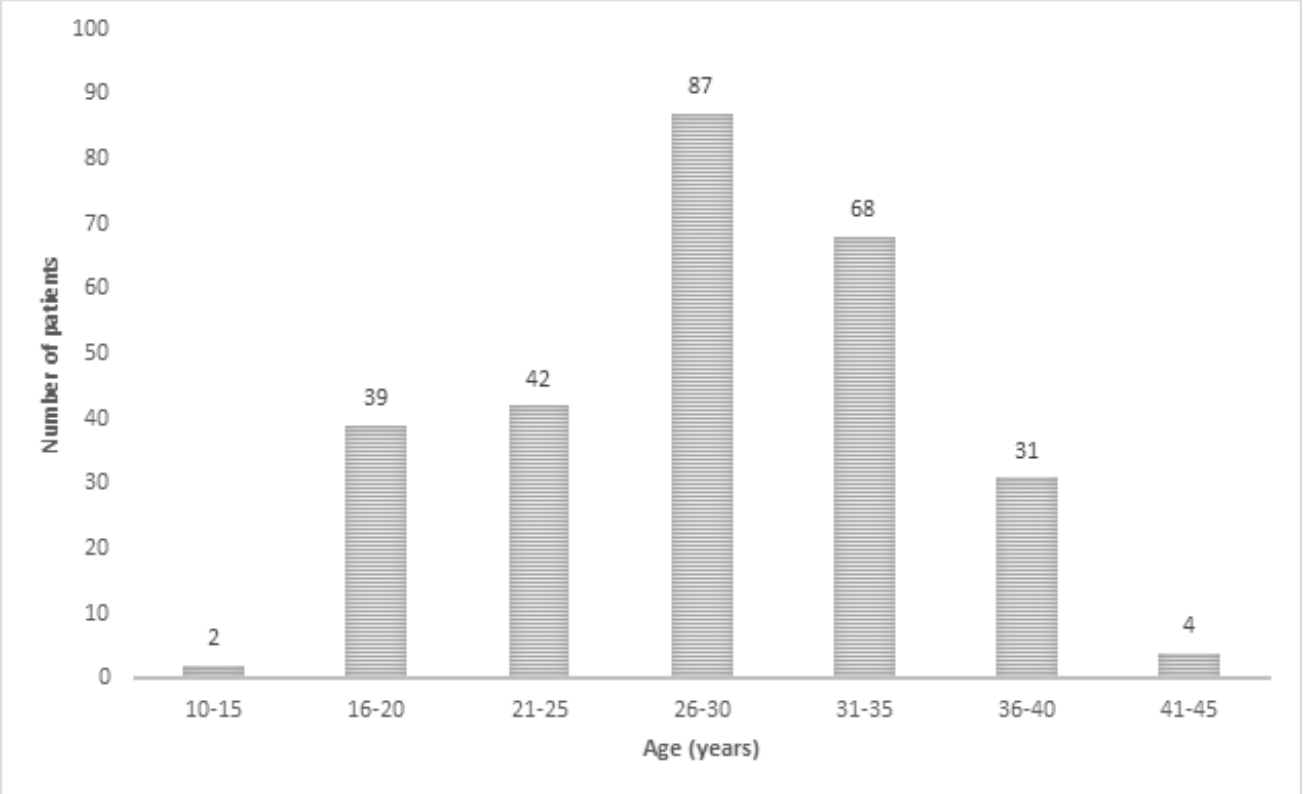


Figure 7 Nationality of patients in Advanced Pregnancy cohort

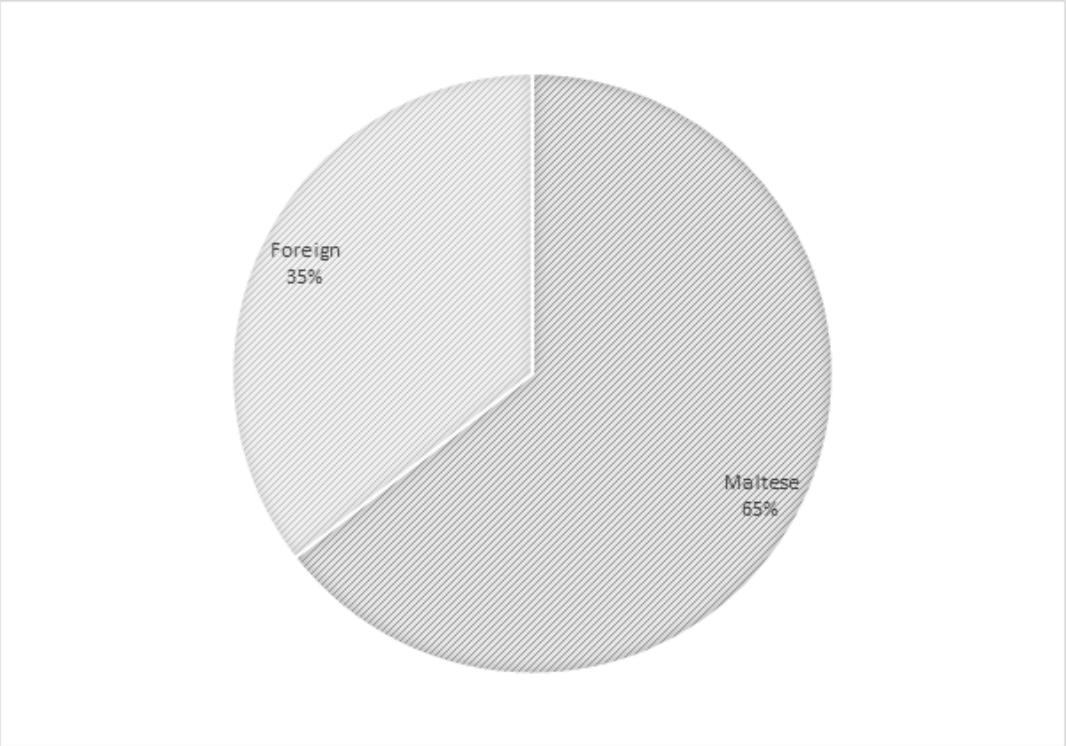


Figure 8 Gestation at presentation of patients in Advanced Pregnancy cohort

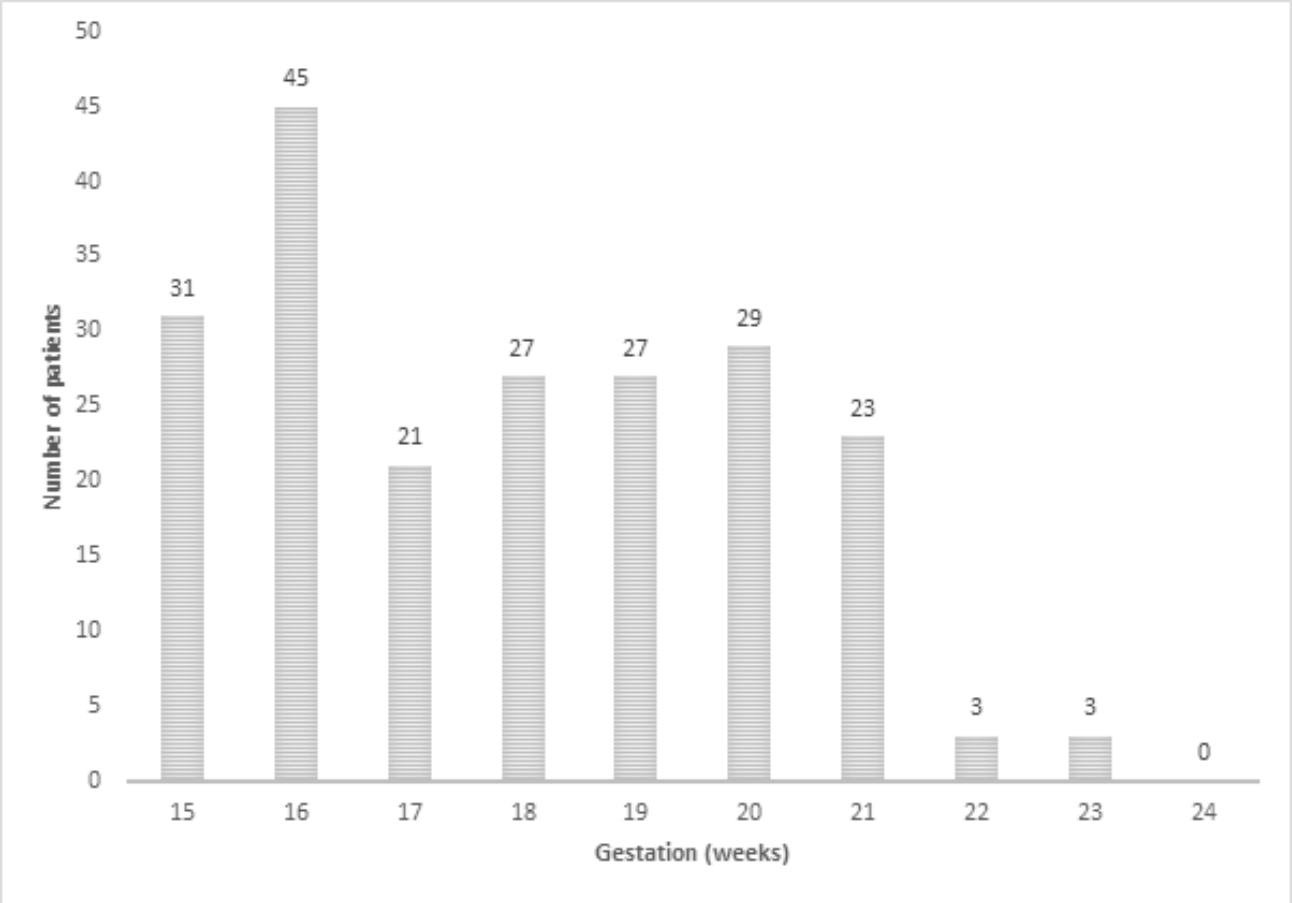


Figure 9 Presenting complaint of patients in Advanced Pregnancy cohort

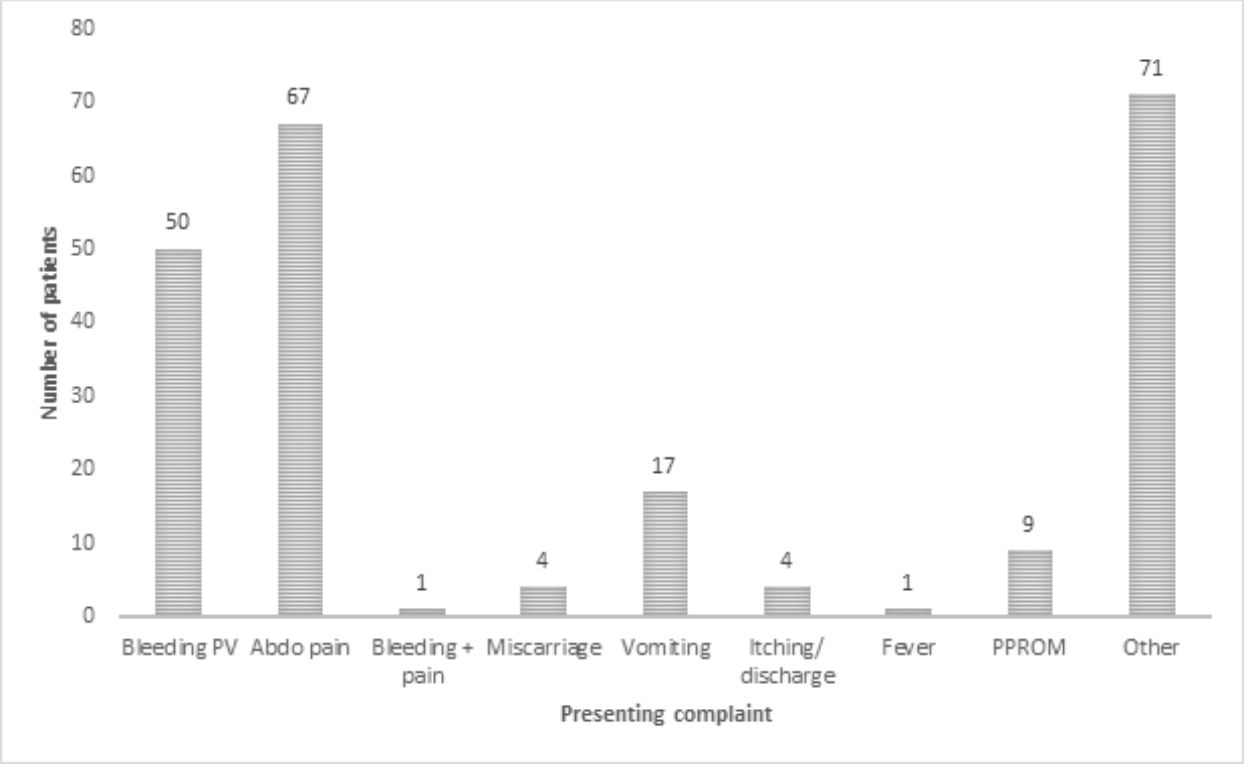
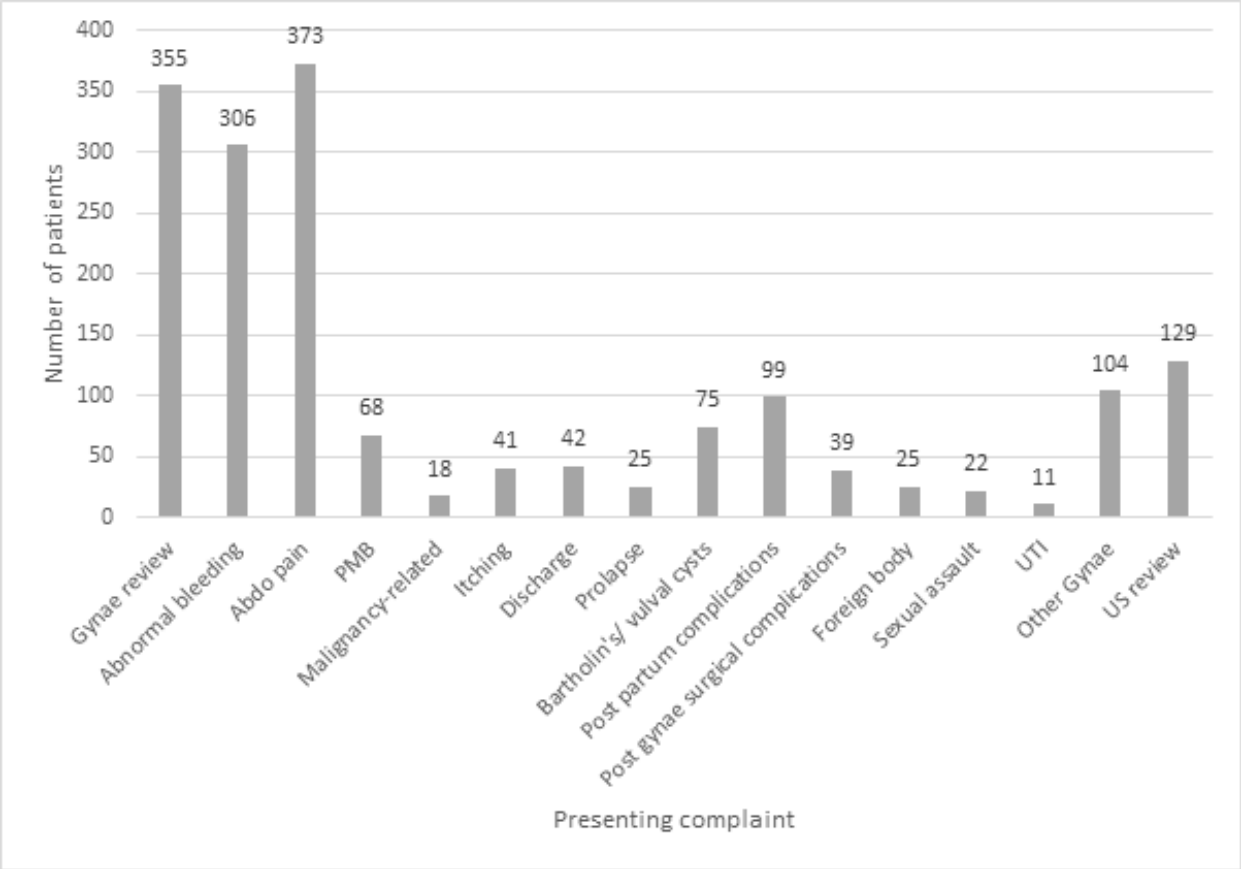


Figure 10 Presenting complaints of patients in Gynaecology cohort



Discussion

Large case load and non-urgent referrals

An Emergency Department is designed to provide "rapid, high-quality, continuously accessible, unscheduled care" for a wide range of acute conditions.[2] It is evident from our dataset that multiple patients present with non-urgent problems that may be dealt with in a primary care setting rather than an emergency room. The fact that the Emergency Department in Malta is easily accessible and free could contribute to this phenomenon. It does not, however, explain how a proportion of patients preferentially attend the ED to the more appropriate primary health care facilities.

Taking into consideration the total number of attendees to Mater Dei Hospital's Emergency Department in 2019 (140,209 attendees), we can deduce that around 10% of these patients are being referred and seen at the Gynaecology Admission Room.

The large number of cases identified in this study stresses the busy workload faced daily at the Gynaecology Admission Room. Presenting complaints such as urinary tract infections, vaginal discharge and itching in pregnancy inundate a supposed emergency room with these non-urgent health problems. Unfortunately, the rate of non-urgent visits attending our Gynaecology Admission Room could not be identified in this study, since the patient register does not include such detailed information. It is very difficult to assess and dictate the urgency of a problem purely from registers noting down basic information on a patient attending the ED. However, we can infer that a good proportion of patient contacts were non-urgent from the nature of the referrals. This assumption is congruent with several international studies.

In the United States, the proportion of patients presenting with non-urgent health problems was 37%.[3] In a paediatric Emergency Department (ED), 28 to 76% of attendees were reported to have non-urgent problems.[4] A rate of 31% of non-urgent visits was identified in a Turkish obstetric and gynaecology ED. Inappropriate ED use for non-urgent problems is thought to be the primary contributor to ED overcrowding. Inappropriate attendance makes it difficult for real emergency cases to be seen readily, resulting in a negative spill-over effect on the quality of care, and also raises costs.[1]

Non-urgent early obstetric and gynaecology problems should be dealt with in primary care. This would offload the Gynaecology Admission Room to deal with the "true" emergency cases and improve care. Increased obstetric and gynaecology training for GPs as well as increased education to the primary care sector will help in aiding this shift. Other proposals include increasing the number of 'ASAP slots' in Gynaecology clinics conducted at Health Centres.

The varied case load referred to the Gynaecology Admission Room, requires an appropriate risk stratification system, to prioritise patients appropriately, and separate the urgent from the non-urgent problems. To date, there is no formal early obstetric and gynaecology triage system in place and only one assessment room available. Nurses staffing the Gynaecology Admission Room would perform triage merely based on clinical impression. Attempts at using a triaging patient-filled questionnaire proved cumbersome, time consuming and hence ineffective. The heavy workload as well as presenting complaints lying on a wide urgency scale require a formal triaging system to be performed by an appropriately trained

individual. Triage systems are able to accurately distinguish between high and low-urgency patients, which is important in terms of patient safety and emergency room efficiency. The most common of these triage systems is the Canadian Triage and Acuity Scale (CTAS), the Manchester Triage System (MTS) and the Emergency Severity Index (ESI), the latter being the system used at the Mater Dei Hospital Emergency Department.[8]

Another change that could significantly decrease the unscheduled Gynaecology Admission Room attendance would be the introduction of an Early Pregnancy Assessment Unit (EPAU). Such services, initially established in the United Kingdom[9] have now spread to European countries such as Denmark[10] as well as Canada[11] and the United States[12]. They provide individualised care to clinically stable patients suffering complications of early pregnancy and have proven to be cost-effective[13] and to reduce emergency visits.[14,11] It is a specialist service typically run during office hours affording appropriate stream-lined management to these women. It also affords ample time to discuss very sensitive topics, unlike the Gynaecology Admission Room which is always on the go, in view of the full waiting room.

Non- Maltese Nationals

According to the NOIS Annual report in 2018, 27.6% of the births in the Maltese Islands were non-Maltese nationals.[5] In the Early Pregnancy cohort and the Advanced Pregnancy cohort an attendance of 41% and 35% respectively of non-Maltese nationals was recorded. There is over-representation of non-Maltese nationals attending the Gynaecology Admission Room, therefore listing nationality as a potential confounding factor of non-urgent ED use. Unfortunately demographic data such as nationality was not collected for the patients presenting with gynaecology problems. This is a limitation of the study, and it can only be assumed that there is an over-representation of non-Maltese nationals in this group, as an extrapolation from the obstetric group.

This over-representation of non-Maltese nationals in the Gynaecology Admission Room may be due to a number of factors. It is hypothesised that there is a decreased awareness and access to primary care in this cohort of women. Another possible reason could be a relative preference for public health care by non-Maltese nationals, or a relative preference for private health care by the Maltese women. More importantly, this raises the question of whether there is a discrepancy between Maltese and non-Maltese patients in terms of outcomes. The phenomenon of disparity in maternal and perinatal mortality related to ethnicity is well documented. No local data is available to date. Increasing awareness of health care services via social media outlets, leaflets, etc, may aid and stratify patients presenting to our ED.

Disparity in maternal deaths because of ethnicity is “unacceptable”.[6] Further analysis on patient demographics and patient characteristics is recommended. This should include, for example, preferred language, health insurance, regular antenatal care visits and prenatal care attendance. In an observational study performed by Kilfoyle et al, these characteristics were all found to be associated with non-urgent ED use in the obstetric and gynaecology department.[7]

A limitation of this study was poor documentation. “Gynae review” encompasses internal consultations from other medical specialties or from the emergency

department. The manual documentation precludes any further detail.

Conclusions and Recommendations

The Gynaecology Admission Room at Mater Dei Hospital is staffed by dedicated doctors, nurses and midwives. However, the study has highlighted how this busy unit is challenged by overcrowding and non-urgent referrals. It also drew attention to the over-representation of non-Maltese nationals in the attendees. An overhaul of the early pregnancy and acute gynaecology emergency service is due.

We Recommend

1. A triage system for appropriate prioritisation of patients with addition of a second clinic room.
2. A digitalised and coded admission process. This would facilitate auditing data in the future to improve the service and enhance patient safety.
3. The establishment of a dedicated Early Pregnancy Assessement Unit to help streamline early obstetric care and reduce unscheduled emergency visits.
4. The involvement and enhanced training of primary health care doctors to deal with non-urgent and/or non-complicated cases.

Further Research

The study suggests that patients with a non-Maltese nationality were more likely to access the ED, therefore questioning whether a discrepancy of care or outcomes exists between Maltese and non-Maltese nationals. Further study in this area is recommended.

Further evaluation of the precise rate of avoidable visits to the ED as well as a more in-depth analysis of the individual patient characteristics resulting in non-urgent attendance to the Gynaecology Admission Room is required. This may elucidate ways to deal with this problem and to improve the obstetric and gynaecology emergency service at Mater Dei Hospital.

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REVIEW ARTICLE

Preventing, reducing and treating problematic drug use with digital technology

Miguel Vella

Substance abuse disorder is a public health issue which causes significant biological, psychological, social and financial harm in families both in Malta and around the world. Although traditional interventions are well established and backed by significant amounts of literature, the relapse rate, particularly in young people, remains high. As such, technology has often been touted as an alternative to traditional therapy as well as a tool in the prevention and reduction of substance use. This paper analyses the literature surrounding some of the more frequently described examples of technology-based interventions to determine their roles and limitations in the prevention, reduction and treatment of substance abuse disorders whilst also briefly analysing COVID-19's effect on technology use in addiction treatment. As our ability to harness technology and novel forms of media in medicine increases, so too will the options for substance abuse treatment increase. Some examples of technology-based interventions discussed in this paper include online recovery groups, online forums, educational interventions, self-guided web-based therapeutic interventions, m-health and virtual reality software.

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Addressing Drug Use with Digital Technology

Around 29% of adults in the EU are estimated to have used illicit drugs at least once in their lifetime.[1] Young people in Malta are particularly vulnerable to substance misuse (figure 1) indicating that new interventions against substance abuse may be particularly useful in this demographic.[2] Some of the harmful effects associated with specific drugs can be found in Table 1.

In 2007, only 55% of the EU population had access to the internet but by 2016, this had increased to 81%.[3] In Malta, 95% of girls and 89% of boys use social media on school days and on weekends, internet use is even higher (Figure 2).[2] As such, there has been a lot of interest in expanding healthcare through innovative technology. Digital technology is already playing a very large role in various healthcare practices (Table 2).

Figure 1 Percentage of people who use specific drugs at the age of 16 or lower in Malta. Reproduced from: Arpa S, Borg P. Substance use. European School Survey Project on Alcohol and Other Drugs 2019 Malta National Report, Foundation for Social Welfare Services 2020:26-41.

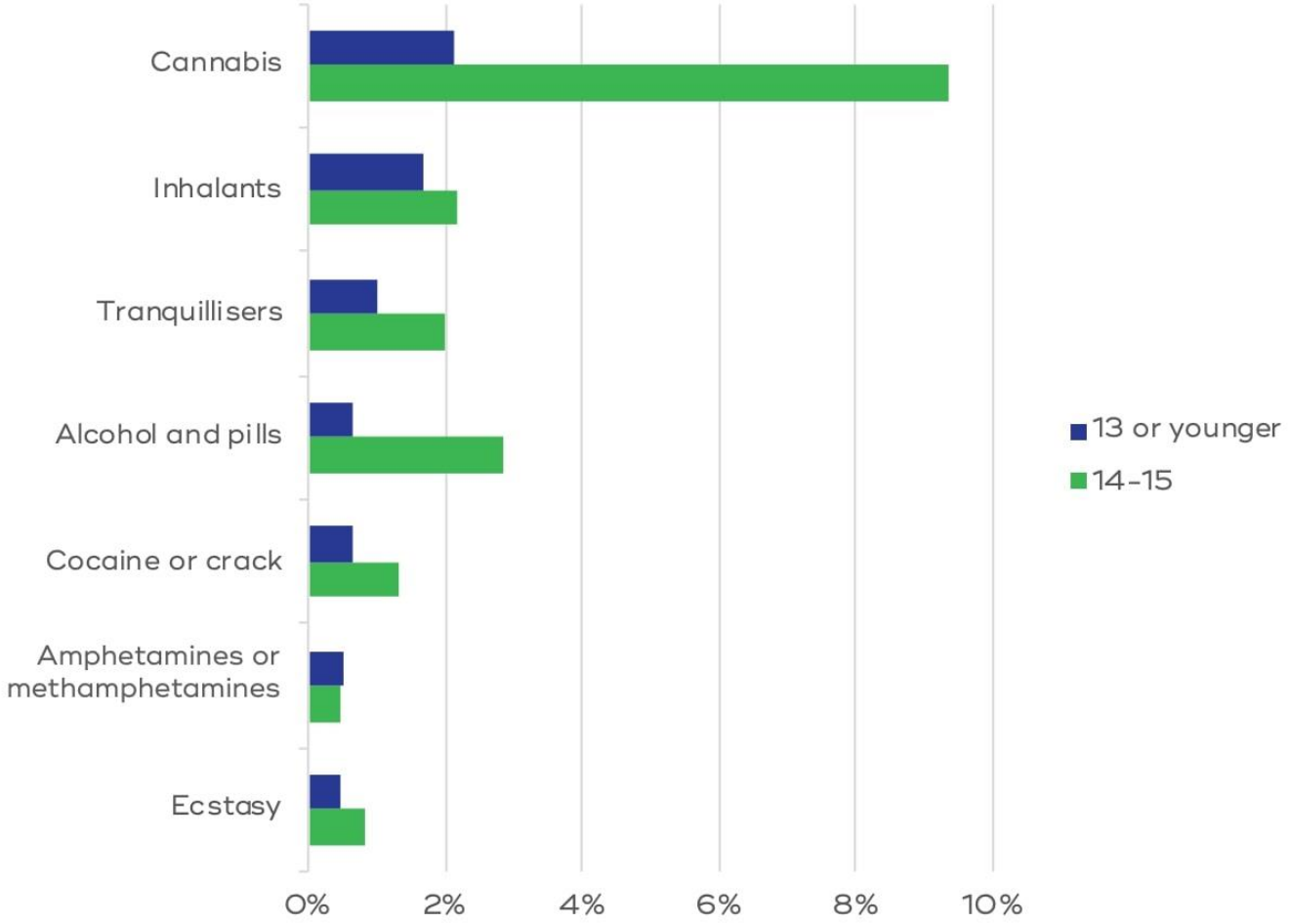


Table 1 Various figures concerning drug use in the EU

Drug	Prevalence and trends in the EU	Associated Health Problems
Alcohol	23 million people in the EU suffer from alcohol-use disorder- one of the most important predictors of morbidity and mortality.	Heart disease, liver disease, various cancers, stroke, cognitive problems including dementia.
Tobacco	The most preventable cause of death and disease. Around 28% of EU citizens smoke tobacco.	Coronary heart disease, stroke, lung cancer.
Cannabis	Most commonly used illegal drug and more commonly used by young adults, 13% of whom have taken cannabis in the last year.	Impaired memory, thinking and problem-solving- schizophrenia and psychosis especially in those who are predisposed. Also breathing problems.
Cocaine	An estimated 2.3 million young adults in the EU have used cocaine in the last year.	Heart disease, stroke, seizures, lung damage.
Heroin	Heroin and opioids are the main driver of fatal overdoses in Europe. 0.4% of European young adults are high risk opioid users.	Coma, respiratory depression.
MDMA /Ecstasy	1.7% of young adults in the EU have used it in the last year.	Impaired judgement, confusion, long-lasting damage to the brain, kidney failure, psychosis.
NPS	Mostly sold as 'legal' substitutes for illegal drugs, they include synthetic cannabinoids, stimulants, opiates and benzodiazepines. Over 790 NPS are monitored by the European Monitoring Centre for Drugs and Drug Addiction.	Vary significantly depending on the type of NPS being taken and method of ingestion.

Figure 2 Number of hours spent on social media by Maltese boys and girls in the last 7 days. Reproduced from: Arpa S, Borg P. Substance use. European School Survey Project on Alcohol and Other Drugs 2019 Malta National Report, Foundation for Social Welfare

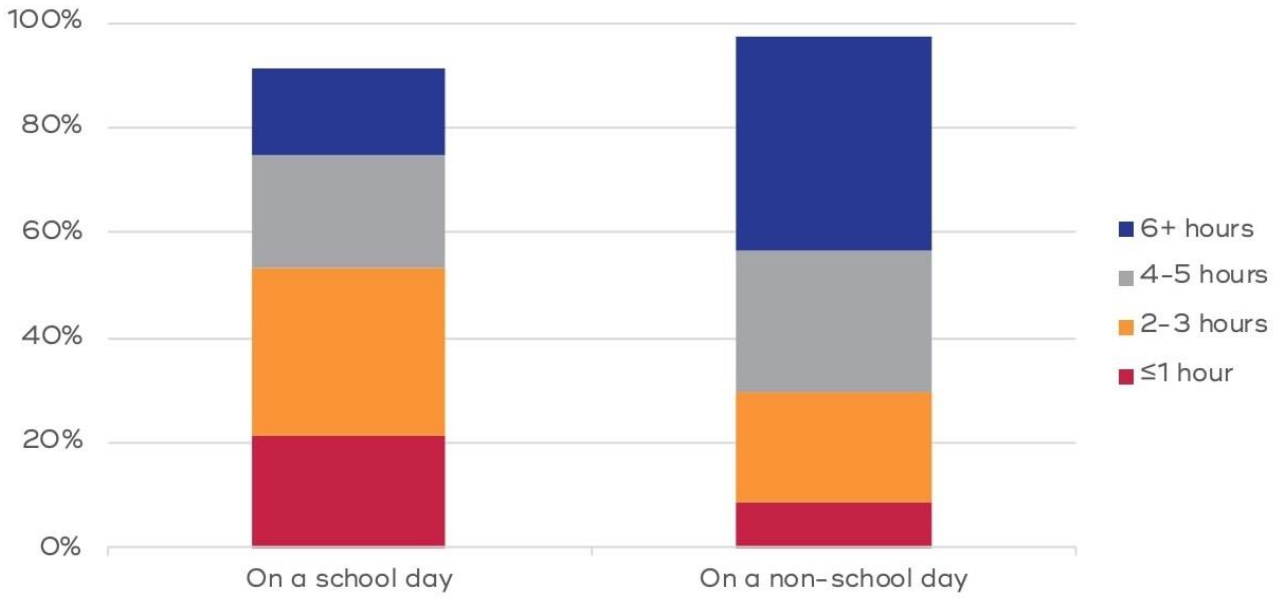


Table 2 Examples of e-Health technology and their function

e-health technology	Function
Computerised professional requests	Allows investigations and treatments to be ordered electronically and allows for results to also be received electronically.
E-Prescribing	Allows healthcare providers to securely transmit prescriptions through a computer device to a pharmacist.
Electronic health records	Allows easier access to previous records and better communication between hospitals and healthcare professionals.
Mobile-health/ m-health	Using mobile or smartphone devices as well as applications on said devices to collect patient data and provide more information to healthcare professionals etc…
Telemedicine	Diagnosis and treatments of patients at a distance.
Web-based education	Seeks to educate and inform patients about their condition as well as prevention and management without any face-to-face interaction.

Currently, around 40-60% of patients receiving treatment for substance abuse disorder relapse.[4] Although this does not necessarily indicate treatment failure, it could mean that there are improvements to be made in current protocols and treatments could be better tailored to the individual, possibly through technology. In fact, the amount of e-health interventions applied to this field of medicine have greatly increased in Europe over the past few years.[5] Some advantages and disadvantages of TBIs in drug use can be found in Table 3.[6-13]

While the effects of the COVID-19 pandemic are still being studied, preliminary studies indicate that although people are less likely to seek treatment, the amount of people suffering from substance abuse disorders has increased.[9] The pandemic has limited many traditional rehabilitation services (figure 3) and forced professionals to make use of online platforms in an attempt to mitigate the difficulties of face-to-face sessions (figure 4). Many experts have highlighted that e-medicine approaches will likely increase in use following the pandemic.[10] The COVID-19 pandemic has also affected the way people purchase illicit substances with online drug-dealing becoming more prevalent. As such, the Europol has set up a Dark Web Team and released various suggestions for policy changes to properly target online drug dealing.[14]

Table 3 Summary of some of the main advantages and disadvantages of TBI use in treatment of substance abuse disorders

Advantages of TBIs	Disadvantages of TBIs
Can be used to treat patients in remote areas or areas associated with stigma.	Computer illiteracy could generate a digital divide.
Allows for more tailored programmes.	Healthcare professionals and patients don't have confidence in e-health.
Particularly useful in young people.	Security and data protection concerns.
Possibly saves money long-term.	Possible high costs in setting up.
Information can be stored, accessed and shared between healthcare professionals efficiently.	More research required to take proper evidence-based decisions.
Very useful as an adjunct to traditional therapy.	Not recommended as a stand-alone type of therapy.
Can be accessed at any time of the day.	Not adequate in emergencies
Proven effectiveness to varying degrees especially when combined with other interactive interventions	Studies are relatively small and lack of randomised clinical trials.

Figure 3 Changes in the availability and supply of services in drug treatment in the EU and Norway due to the COVID-19 Pandemic. Reproduced from: European Monitoring Centre for Drugs and Drug Addiction. EMCDDA trendspotter briefing - Impact of COVID-19 on drug services and help-seeking in Europe. Publications Office of the European: Lisbon 2020.

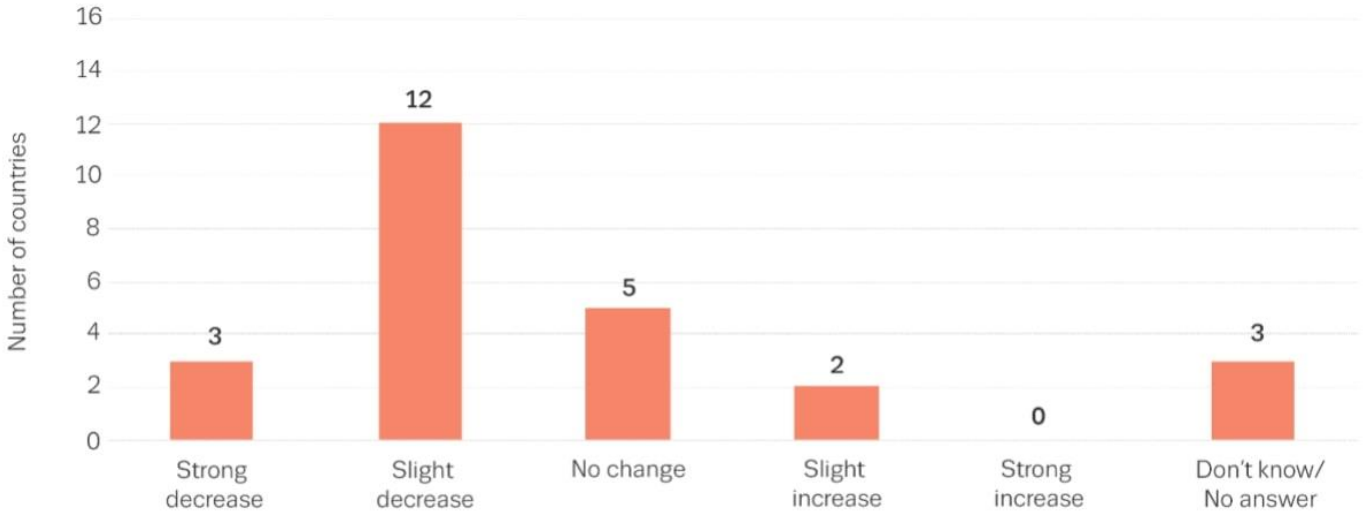
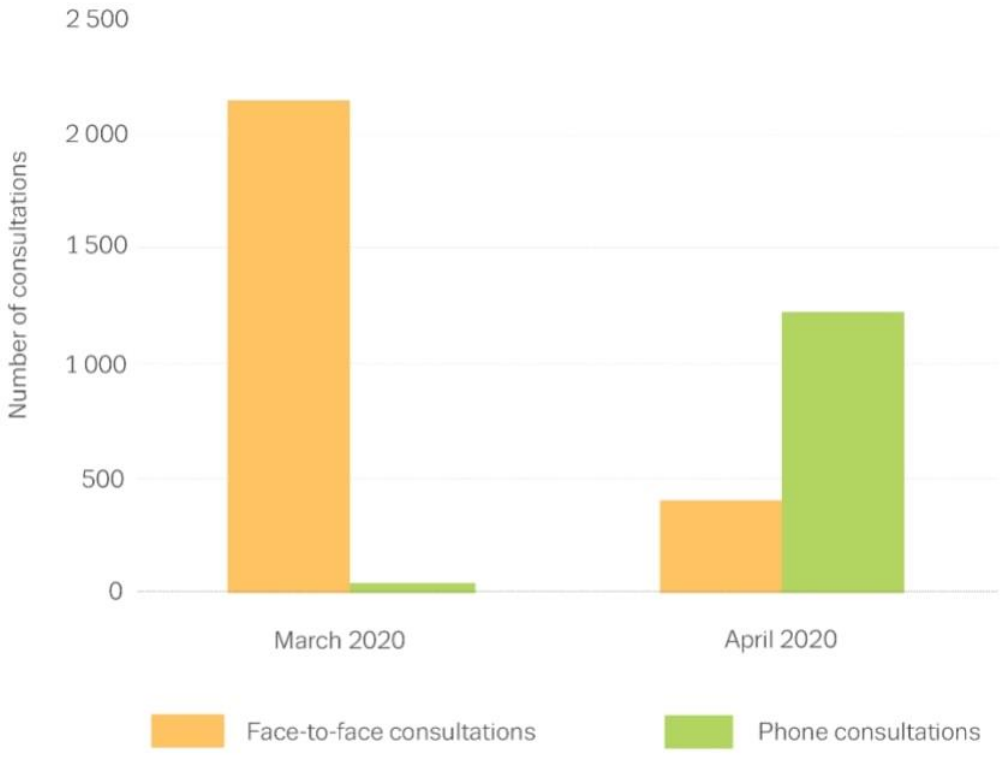


Figure 4 An example of the effect of the COVID-19 pandemic on addiction centres- in this case the numbers of face-to-face and phone consultations in the Riga Addiction Medicine Centre. Reproduced from: European Monitoring Centre for Drugs and Drug Addiction. EMCDDA trendspotter briefing - Impact of COVID-19 on drug services and help-seeking in Europe. Publications Office of the European: Lisbon 2020.



The European Brain Council[15] found that many healthcare professionals do not believe they are sufficiently informed about ICT-based interventions and few actually used TBIs in their practice with scarce infrastructure identified as the main barrier. However, there was a consensus that TBIs have a number of advantages over traditional treatment. Interviews with professionals revealed that although stand-alone ICT-based interventions may be enough for very self-motivated patients, interactive blended/combined interventions are seen as most effective improving adherence and engagement.[16]

Online recovery groups & forums

Group therapy has been a core aspect of substance abuse recovery for decades and has a proven track record of helping patients through support from peers and teaching said patients methods and behaviours they can use to maintain sobriety.[17] Face-to-face group therapy sometimes presents with problems such as dealing with social phobias and patients feeling uncomfortable sharing their stories in person. As such, online recovery groups have become an alternative to maintain patient goals/attitudes while providing resources which can be tailor-made for the patient. Online therapy can be accessed at different times of the day and so may be useful for patients who work long hours or have childcare commitments.[18] Various 12-step organisations make use of online recovery groups including Alcoholics Anonymous and Narcotics Anonymous.[19]

Online forums are similar, allowing patients to share their experiences and meet other people struggling with substance abuse disorder, obtaining support and learning behaviours that may have helped others maintain sobriety. While this can be helpful, lack of regulation by healthcare professionals may be problematic. An example of an online forum is 'Soberistas' although Facebook and Twitter groups may also serve as platforms for online forums.[19] A study found that forums are the most accessed type of online resource for substance abuse disorder. Patients engaging with online forums often felt a "sense of connectedness and belonging".[19] While literature is relatively consistent in that such systems are good supplements to promote rehabilitation, such therapy generally requires offline support and physical contact for full recovery and is not recommended as solitary treatment.[20]

Web-based self-help interventions

Self-help is when patients engage in interventions for self-improvement thereby helping in rehabilitation. Various different types of online self-help interventions exist.[21]

1: Web-based education interventions: Such programmes provide easy-to-understand information concerning problems like triggers, management etc... whilst often guiding patients towards professional help and self-help checklists.[22] Though such interventions are not inherently therapeutic, therapeutic information is sometimes provided too e.g. properly applying breathing control therapy.[23] A study found the best educational interventions are hands-on giving patients the liberty to navigate the system at their own pace. Overall, it was found that educational interventions promote increased performance of self-care behaviour during the rehabilitation phase.[24]

Such interventions may also be used in prevention, promoting education for at-risk patients such as those with mild alcohol use disorders (who may not perceive a need for treatment). Web-based education also has the potential to target children thus preventing

drug use from ever becoming a problem in their lives.[25]

2: Self-guided web-based therapeutic interventions: Such programmes go one step further providing personalised therapeutic feedback helping the patient learn about the causes of their behaviour and what they can do to self-improve.[21] One example is the Overdose Risk-Information Tool (ORION) for those at risk of drug overdose which asks questions to the user to assess overdose risk. Following the assessment, users are able to change their answers to see how it affects their risk allowing for self-help and facilitating discussion with doctors. In a study, 52% of ORION users learned something new about overdose, 48% considered changing drug use and 83% thought the tool was useful.[26] Another example is www.downyourdrink.org.uk.[27]

3: Human-supported therapeutic web-based intervention: Such interventions also ensure human contact (from professionals or peers) for support or therapy as human support can strongly support rehabilitation. This contact can come in many forms through emails, videos and so on.[21,28]

Internet/ technology-mediated therapy

Psychotherapy allows patients to learn skills and integrate better into society. Recently, many have attempted to emulate this online be it synchronous/real time (e.g. live video) or asynchronous (e.g. email). The clinician is usually at the centre of such interventions moving the subject towards specific treatment goals. Such therapy has been found to be effective in drug abuse treatment although proper training is recommended for professionals.[29] Studies are beginning to show that online Cognitive Behavioural Therapy specifically is also a durable treatment.[30-31] However, such therapy virtually eliminates nonverbal signals exchanged[32] and it is therefore avoided in severe psychiatric disorders. The therapist should also make sure that the patient is computer-literate and be aware that some patients may not be able to express themselves through a screen.

Ecological Momentary Assessment

The repeated sampling of data concerning real-time behaviour and experiences from patients is known as Ecological Momentary Assessment (EMA) and is typically carried out through an electronic diary. This is especially relevant for substance abuse, since drug use in itself is episodic and related to the mood and context of the user.[33] EMA asks individuals to initiate an entry or complete an assessment either at random times when not using drugs or when they engage in drug use allowing professionals to study both relapse and ongoing drug use.[34] One study with homeless crack-cocaine addicted individuals found compliance to be high.[35] EMA can also be used by the patients themselves for self-help by allowing them to correlate instances of cravings with maladaptive behaviours.[36]

M-Health

Mobile-health involves all technology that utilises a smartphone to promote good health. M-Health may involve SMS-based systems, apps or other devices like smartwatches.[13,37]

SMS-based interventions involve daily/weekly personalised messages to educate the patient, support change and generate automated feedback on drug consumption/wellbeing.[38] In one study, participants received texts throughout the week querying drinking plans and goals and tailored feedback was then delivered. It was found that such an interactive

system was effective in reducing drug consumption.[39]

Some applications educate users by providing information on different drugs whilst offering quizzes to test the knowledge learned (e.g. KnowDrugs). By targeting vulnerable groups, such apps can also prevent drug use in the first place. However, not all apps are set up by people who have a background in medicine, leading to concerns surrounding the reliability of the information provided especially about New Psychoactive Substances (NPS).[37,40]

Other apps make use of drug consumption diaries allowing users to monitor their consumption and set goals.[37] 'Quit the Shit' (QTS) is tailored for cannabis withdrawal in adolescents featuring an interactive diary while providing users with a counselling team for tailored weekly feedback. More than 90% of users have given the app positive feedback and studies have shown that QTS significantly reduces cannabis consumption over control groups.[41]

The 'miDOT' app by EMOCHA enhances patient-doctor communication while decreasing costs. It allows patients to report their symptoms and record asynchronous videos for directly observed therapy. This keeps addiction at bay and ensure doses are not abused. Moreover, clinicians have the ability to review the progress of their patients and quickly communicate with them should the need arise. Emocha has reached a 95% adherence rate compared to 50% without it.[37]

M-Health can also utilise sensor technology monitoring live data (including blood pressure, heart rate and substance concentration levels in blood) while also possibly sending it to providers at a distance thereby alerting them when patients are at risk of health consequences.[42] For example, researchers in Europe are investigating the use of electronic wristbands in heroin addiction. By monitoring heart rate, they can alert nearby healthcare professionals or family warning them of potential drug overdose.[43] Geospatial technologies including GPS and Wi-Fi can also collect real-time location and environmental data. Since the environment plays a significant role in addictive behaviour, healthcare professionals can determine where and when certain behaviour is occurring while possibly providing the location of nearby healthcare centres.[44] GPS technology can also be used in public health studies to quantify at-risk populations and focus services on such groups.[45] Such data can be combined with other EMA data collected allowing for a deeper understanding of the patient's behaviour and history.[46] Naturally these methods raise many questions concerning privacy and security. This applies especially for spatial data as the patient's home, work location and location of their peers may be inferred from such data. Therefore, healthcare professionals must exercise caution, ensuring that the personal data of their patients is protected and that they give proper informed consent for their data to be used in treatment.

Artificial intelligence and virtual therapeutic software

Sometimes healthcare professionals may find it necessary to use other advanced forms of technology for intervention. These practices offer promising adjuncts to traditional therapy but require technical expertise from both the patient and healthcare professional.[13]

Games and virtual 3D systems: By simulating a new online environment, patients can meet others and gain support while accessing information, blogs and more. Some games may also help train the impaired neurocognitive

circuits in patients with substance abuse disorder. These games help train inhibitory control and act as an add-on to more traditional therapy. Participants are encouraged to not only play the games but share and discuss strategies in order to complete as many trials as possible. A study found that such games can improve executive function and help with complete rehabilitation.[21]

Virtual Reality: Virtual Reality (VR) could allow healthcare professionals to simulate specific environments, triggers and social interactions allowing for a more accurate representation of the patient's natural environment whilst ensuring that in actuality, the patient is in a safe space and can practise their newly found skills. It may especially be useful in training patients to control their cravings.[47] MindCotine uses VR to simulate cue-exposure therapy to quit smoking. This is still very much in its infancy and more research is required, particularly in order to better simulate the range of emotions and sensations that often accompany cravings and triggers.[48] In order to help in such rehabilitation programmes, some have touted the possibility of combining VR with Non-Invasive Brain Stimulation. NIBS can help modify cortical pathways and plasticity in the cerebral cortex be it through transcranial magnetic stimulation or transcranial electric stimulation. Initial studies have given positive outcomes in the treatment of phobias and PTSD though more studies are needed.[49]

Discussion

When analysing the literature, it becomes increasingly clear that there exists a role for technology in the prevention, reduction and treatment of drug use. A consistent finding in research is that technology works as a great add-on to traditional therapy, supplementing it and keeping the patient motivated even outside of the clinical setting. Technology provides a medium for patients to find support, communicate effectively with healthcare professionals and learn to adopt healthy behaviours. Through data analysis and new online education methods, such programmes can also be used to stop people from using drugs in the first place. Even social media, through various online campaigns can duly inform entirely new audiences of the harms of drug use. By pushing services online, the COVID-19 pandemic has highlighted even further the importance such interventions can play in the treatment of substance abuse disorder.

Despite some very encouraging progress and promising data, technology-based interventions are still far from becoming commonplace in routine practice. Though evidence supporting the use of TBIs is increasing, the evidence is currently insufficiently developed to draw final conclusions on their effectiveness. Lack of evidence also exists as to which TBIs are the most effective and many doctors are not sure how to properly protect the data and privacy of their patients through these new interventions. Another issue is that most current research focuses on alcohol, tobacco and cannabis so more research is needed focusing on other drugs of abuse.

As such, a proper national and international strategy must be put into place to ensure those suffering from substance abuse disorder in the future are able to get the help they need, even if the optimal treatment is technology-based. More resources need to be invested in research so as to increase the amount of randomised control trials. Furthermore, resources should be pooled in to increase

digital literacy among both healthcare professionals and the general public through proper technical support and training. The current infrastructure and hardware should be upgraded too (e.g. increased bandwidth may make TBIs more viable in emergency situations). Proper standards for data collection, privacy and security must also be highlighted better through new legislation.

All in all, the possibilities of technology in the treatment of substance abuse are only just beginning to become clearer. As technology improves with time, so too will the health benefits of TBIs. VR technology could become more realistic, more closely emulating the real-life sensations that accompany cravings and addiction. Live sensors may be eventually programmed to deliver actual immediate treatment to patients (e.g. by delivering a dose of naloxone to people with dangerously high levels of heroin in their bloodstream). As such, new advances in technology should be followed closely by healthcare professionals working in the field of substance abuse and they should seek to harness and make use of new technology rather than avoid it.

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CASE REPORT

When three is not a magic number – a case of native triple-valve endocarditis caused by *Streptococcus agalactiae*

Darren Borg, Dillon Mintoff, Jeremy Fleri Soler, Tiziana Felice, Maryanne Caruana

We present a case of a 47-year-old female who presented with septic shock and a hyperosmolar hyperketotic state, accompanied by episodes of unresponsiveness. As part of the extensive investigations which took place, a transoesophageal echocardiogram (TOE) revealed infective endocarditis of the tricuspid, pulmonary and aortic valves. Blood cultures showed evidence of bacteraemia with Streptococcus agalactiae.

After an initial improvement on intravenous antibiotics, the patient's condition deteriorated following multiple septic emboli to the lungs from the pulmonary valve vegetation, leading to urgent referral for valve replacement. A mechanical aortic, tissue pulmonary and tricuspid valve replacements were performed in a tertiary centre in the United Kingdom. The postoperative course was complicated by recurrent infections of the sternotomy wound with eventual wound dehiscence and overwhelming sepsis.

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Introduction

Infective endocarditis (IE) is a rare condition associated with a high mortality, with a global incidence of between 1.5 to 11.6 cases per 100,000 people.[1] Multiple valve involvement in IE is associated with higher risk of heart failure, perivalvular complications and need for surgical intervention.[2] Multiple risk factors are associated, however the most recognised include intravenous drug use (IVDU), valvular heart defects and valve prostheses.[3]

Case Report

A 47-year-old female, who was known to suffer from Type II Diabetes Mellitus, obesity hypoventilation syndrome and poor dental hygiene, originally presented with haemodynamic compromise secondary to sepsis, as well as a hyperosmolar hyperketotic state. There was no history of valvular/structural heart disease or IVDU. The hyperosmolar hyperketotic state was controlled after optimisation of insulin treatment and the blood glucose was kept in tight control all throughout hospital stay.

The patient was noted to have episodes of unresponsiveness, leading to investigations to exclude a cardiogenic cause, including a transthoracic echocardiogram which revealed multiple valvular vegetations. A subsequent TOE confirmed a large vegetation on the pulmonary valve (Figure 1) resulting in severe pulmonary regurgitation, infective involvement of the tricuspid valve with a torn chorda (Figure 2) resulting in a flail septal leaflet and severe tricuspid regurgitation, as well as infection of the aortic valve resulting in cusp retraction and severe eccentric aortic regurgitation. Blood cultures cultivated *Streptococcus agalactiae*, which was sensitive to Ceftriaxone and Vancomycin. Despite treatment, multiple episodes of septic embolization to the lungs occurred, causing a fluctuating clinical course.

Figure 1 TOE showing the pulmonary valve vegetation

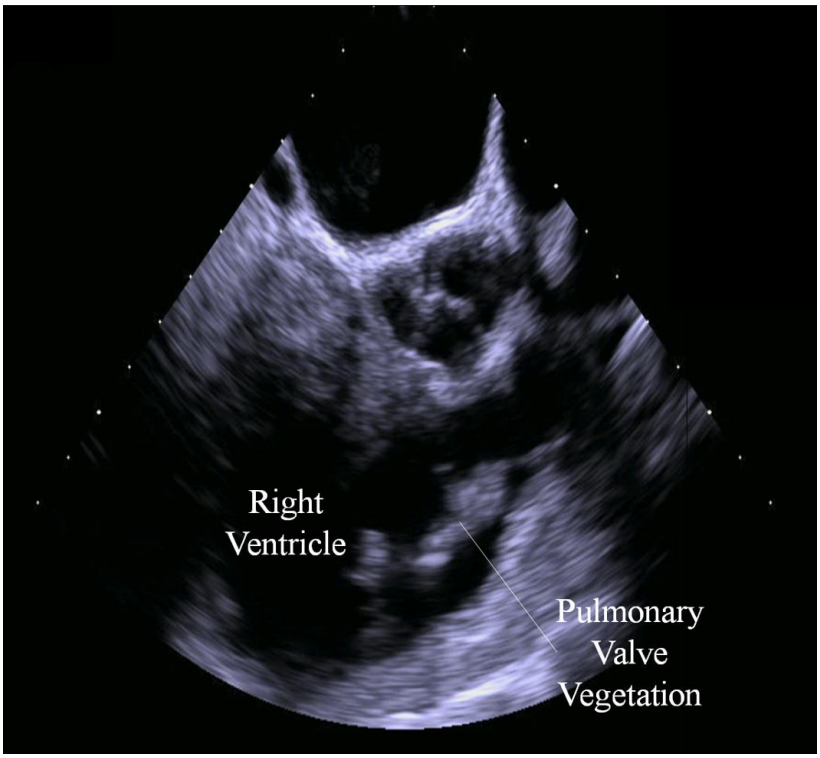
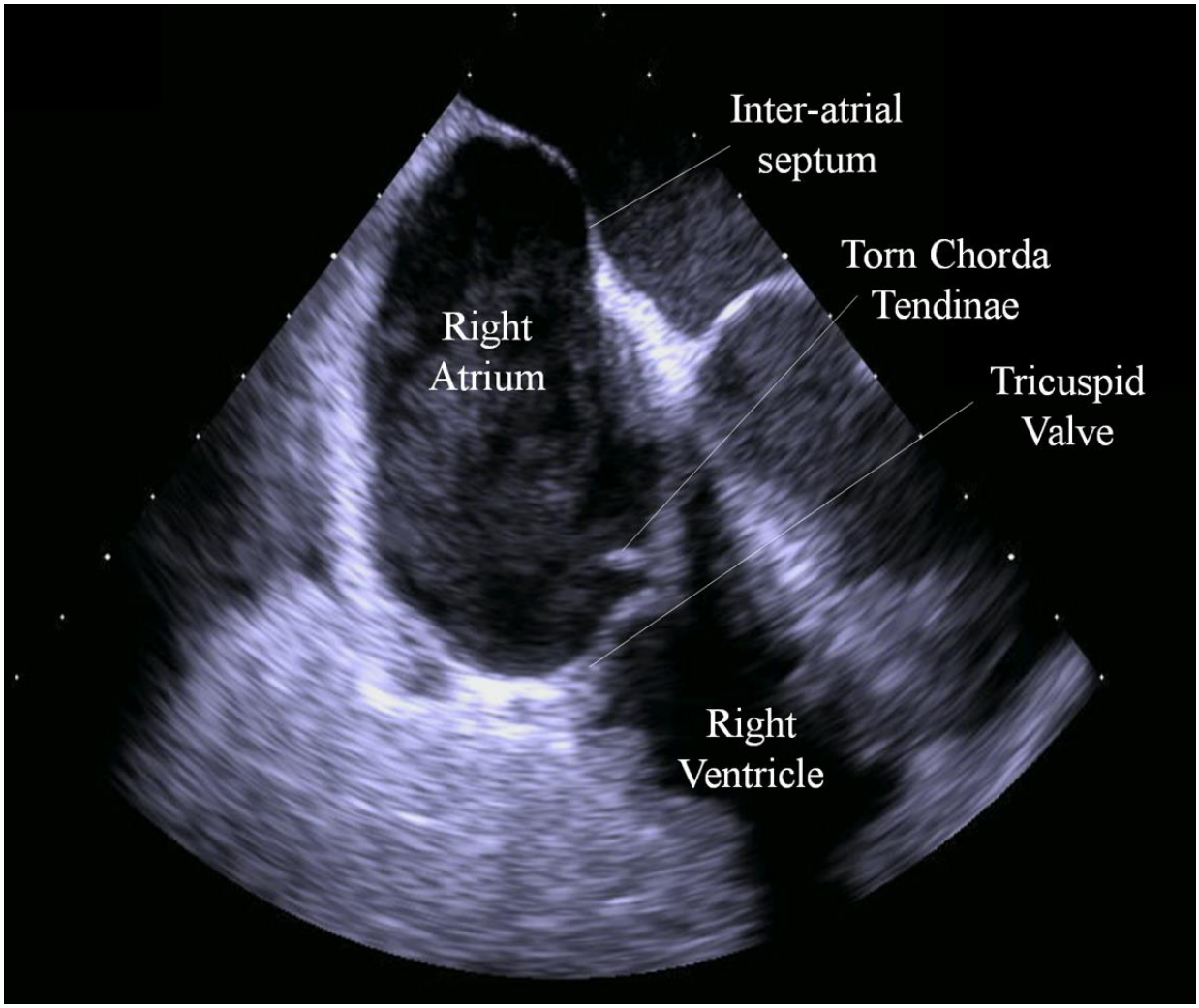


Figure 2 TOE showing torn tricuspid valve chorda tendinae



The patient was transferred to a tertiary centre in the United Kingdom for mechanical aortic, tissue pulmonary and tricuspid valve replacements. Intra-operatively, debridement of an area adjacent to the atrio-ventricular node took place. Implantation of a dual chamber pacemaker was performed in view of postoperative complete heart block.

After arrival back to Malta, following a short period of stability, recurrent infections of the sternotomy wound led to wound dehiscence, in turn leading to septic shock with disseminated intravascular coagulation and acute kidney injury which led to the patient's death.

Discussion

Incidence and Aetiology

Multivalvular IE accounts for approximately 15% of all IE cases.[4] The majority (70%) of multivalvular IE patients require surgical intervention,[5] with the most common indications being heart failure, uncontrolled infection despite antibiotic treatment, large and mobile vegetations, abscess formation and embolisation events. The main risk factors for multivalvular IE are IVDU (or chronic intravenous access), previous history of IE, history of invasive procedures, endocardial devices (such as pacemakers), congenital heart disease or pre-

existing valvular disease;[3] none of which were present in our patient's history.

Microbiology

Staphylococci spp., *Streptococci* spp., and *Enterococci* spp. are the causative agents in over 80% of all IE cases.[3] In our patient's case, *Streptococcus agalactiae* was the culprit organism. *S. agalactiae* is a Gram-positive coccus (Group B Streptococcus) which commonly affects neonates, pregnant patients and those with immunosuppression (cancer, patients on active chemotherapy, cirrhosis and also those with diabetes mellitus). IE is however not a common presentation of infection by this organism. In *S. agalactiae*-associated IE, there is a significant mortality and morbidity from complications, as well as an increased risk of septic embolization,[6] as was demonstrated in our patient. *S. agalactiae* endocarditis is associated with a mortality rate as high as 56%.[7]

CONCLUSION

As demonstrated by our case, multivalvular IE is associated with high morbidity and mortality, which tend to persist even after successful surgical valve replacement.

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CASE REPORT

Spontaneous esophageal cancer perforation managed with Fully Covered Self Expandable Metallic Stent (FCSEMS)

Faeid Othman. Ikhwan Sani Mohamad, Wan Mokhzani Wan Mokhter, Syed Hassan Syed Aziz, Sabrina Jane Dass

Esophageal cancer is one of the 7 most common cancers in the world. It usually presents with dysphagia, persistent vomiting, weight loss, loss of appetite and anorexia. However, 1% of esophageal cancer might perforate causing severe abdominal pain. We present the case of a 30-year- old man with sudden onset of epigastric pain for one day duration. He had a history of progressive dysphagia, vomiting, weight loss and loss of appetite for the past three months. CT thorax and abdomen revealed a circumferential mass at the lower esophagus with the presence of pneumomediastinum and pneumoperitoneum suggestive of esophageal perforation. The patient was successfully treated endoscopically by using a Fully Covered Self-Expandable Metallic Stent (FCSEMS) to maintain lumen patency and cover the area of the perforation.

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Introduction

Esophageal cancer is one of the 7th most common cancers in the world.[1] In 2007 there were more than 17 000 people diagnosed with esophageal cancer in the United States and more than 1 200 cases in Malaysia.[1] This cancer usually occurs in patients over the age of 40 and is more common in men compared to women with a ratio of 7: 1. Despite treatment, the estimated 5-year survival rate among those with this disease is still low, in the range of 16-18%.[1] These patients usually present with dysphagia, persistent vomiting, weight loss, loss of appetite and anorexia. Various modalities can be used to investigate this cancer including endoscopy, barium swallow and CT scan. There are various modes of esophageal cancer treatment including a conservative approach, endoscopy and surgery. Esophagectomy is the standard procedure for cure. However, 1% of esophageal tumors present with perforation.[2] This condition is also closely related to high mortality and poor prognosis. The use of Self-Expanding Metallic Stent (SEMS) needs to be considered in managing such a condition before subjecting the patient to oncological treatment.[3]

Case presentation

A 30-year-old gentleman, presented with sudden onset of epigastric pain for 1 day. It was associated with progressive dysphagia, recurrent vomiting, weight loss dan loss of appetite for past three months. On clinical assessment, patient looked cachexic, dehydrated, lethargic and was having generalized abdominal pain mostly at the epigastric region. CT thorax and abdomen revealed a circumferential mass at the lower esophagus with the presence of pneumomediastinum and pneumoperitoneum with liver metastases. The mass was located at the level of T10 vertebral body down to the gastroesophageal junction with a length of 5cm and a thickness of 2.5cm. The patient underwent diagnostic laparoscopy with peritoneal lavage and on table oesophagogastroduodenoscopy (OGD) under general anaesthesia. Diagnostic Laparoscopy showed presence of mass at the lower esophagus, extending to the upper part of the stomach and to the lesser curvature. Pus was noted surrounding the mass with no obvious perforation seen. Multiple liver nodules were also seen. The peritoneum was washed with distilled water and a 19Fr Blake drain was inserted. Meanwhile, the OGD revealed a lower esophageal mass obstructing the lumen with the presence of pus surrounding the lesion. Multiple biopsies were taken. The length of the stricture was 8 cm measured using the water soluble non-ionic contrast via fluoroscopy. The site of perforation was identified 2cm above the esophageal gastric junction during the fluoroscopy study. After that Controlled Radial Expansion (CRE) balloon dilatation was used to expand the narrowed area. A guidewire was then introduced and advanced beyond the stricture into the stomach (Figure 1). The length of the stent measured 4 cm longer than the stricture area to reduce the risk of migration and ensure the area of perforation was fully covered. A Fully Covered Self Expandable Metallic Stent (FCSEMS) of 12 cm length was then deployed (Figure 2 & 3). This technique helped to maintain the opening of the lumen and cover the area of perforation. Histopathology from the biopsies taken showed adenocarcinoma. The patient was allowed home on day 5 postoperatively and was subjected to chemotherapy as palliation. Unfortunately, this patient presented again fourteen days

later with septic shock secondary to community-acquired pneumonia and succumbed after three days.

Figure 1 The guidewire passed the constrictive lesion at the distal esophagus

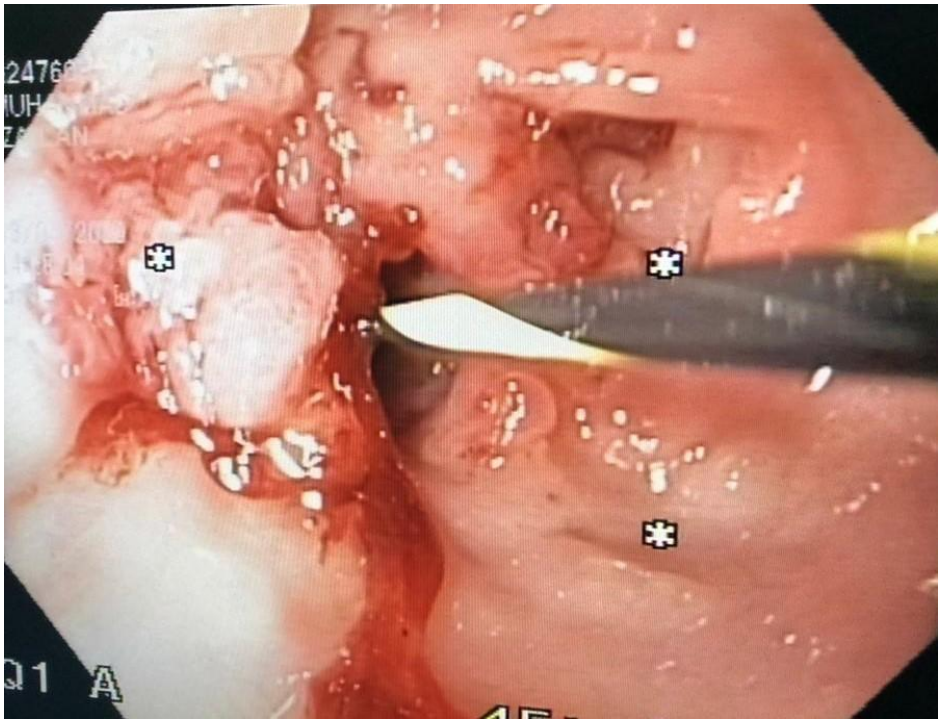


Figure 2 The Fully Covered Self Expandable Metallic Stent was placed at the distal esophagus

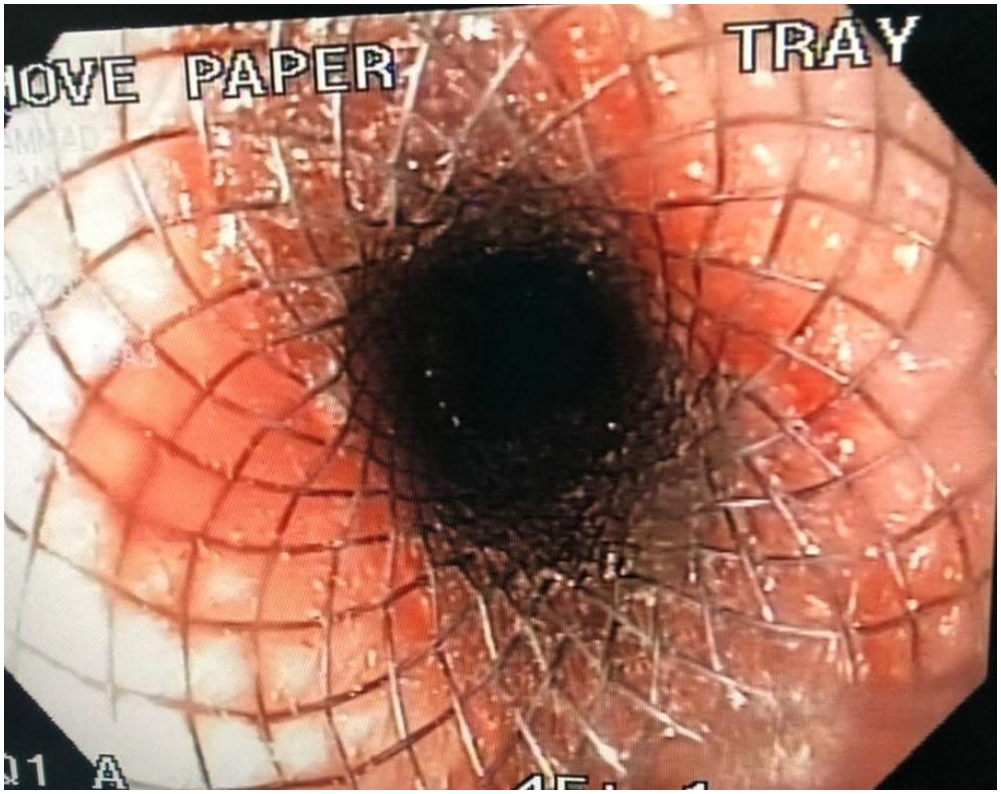
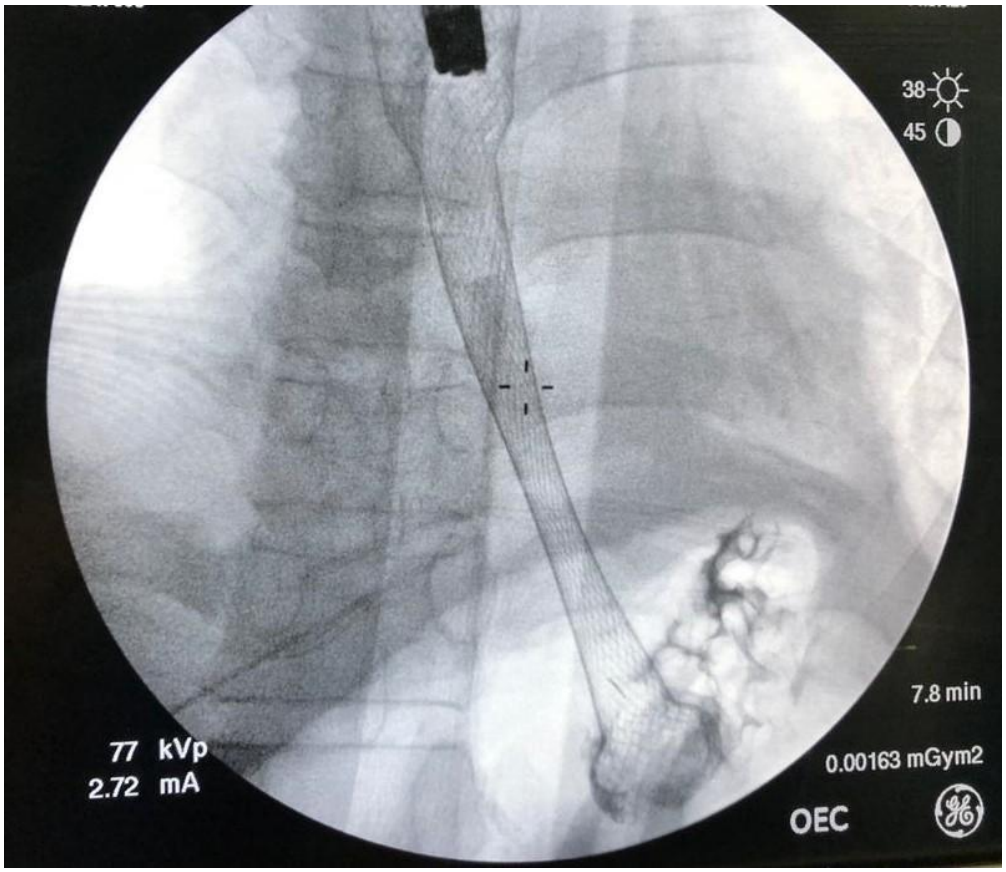


Figure 3 The position of FCSEMS confirmed by plain radiograph



Discussion

The various treatment modalities that exist for the treatment of esophageal perforation illustrate the occurrence of heterogeneity in etiology (benign versus malignant) and diversity in the clinical course of esophageal perforation. The variety of surgical techniques proposed for the management of esophageal perforation include simple drainage (abdominal with left chest tube drainage), repair with or without autologous tissue, esophageal exclusion, resection with diversion and esophagectomy with primary anastomosis. In the case of a small and non-cancerous esophageal perforation, non-operative treatment is the best and most effective way of dealing with the condition.[1-2]

However, the most effective treatment for perforation caused by locally advanced or advanced esophageal cancer still yet to be determined. Poor healing process, local or systemic tumor load, the general condition of the patient before and after surgery and prognosis of the disease are the things to be considered before deciding on the best treatment option.[3]

Surgical resection in esophageal cancer perforation is one of the most definitive treatments. Surgical resection can remove mediastinal contamination and the tumor simultaneously. However, the decision to perform resection depends on the general status of the patient and the extent of the tumor. In addition, the uncertainty in the oncological consequences of esophageal perforation leads to the lack of clear guidance

on the outcome of the surgery. This is not the same as perforation in colon cancer where this is a predictor of poor survival of the disease. Palliative esophagectomy are avoided in view of high morbidity and mortality. Therefore, the role of emergency palliative esophagectomy in patients with advanced disease and sepsis is still questionable.[1-3]

In such cases, less invasive procedures are among the best solution. Self-Expanding Metallic Stent (SEMS) is generally used to treat dysphagia due to malignant obstruction and has been successful in treating this condition.[4] Recently, several authors have studied the use of Self-Expanding Metallic Stent (SEMS) to address esophageal tumor perforation. *Morgan et al.* 1997 reported on the use of covered SEMS in 19 patients with iatrogenic esophageal perforation during dilatation of malignant stricture. Immediate successful sealing was successfully achieved in 18 of those patients.[5] The use of a second SEMS for overlapping purposes may also be used if persistent leakage is still present. We propose that the use of SEMS be considered in spontaneous perforated esophageal cancer, especially in patients with advanced disease and sepsis.

CONCLUSION

FCSEMS may be considered as an option for perforated esophageal cancer especially in cases where sepsis is uncontrolled and when the primary tumor is unresectable.

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CASE REPORT

Nephrocalcinosis in a 13-year-old girl with type 1 diabetes mellitus complicated by Mauriac syndrome

Rebecca Borg, Veronica Bartolo, Nancy Formosa, Valerie Said Conti, John Torpiano

Mauriac syndrome is a rare complication of poorly-controlled type 1 diabetes mellitus (T1DM) characterised by hepatomegaly, short stature, and pubertal delay. We report the case of a 13-year-old girl with T1DM who presented to our hospital with hyperglycaemia and hepatomegaly, and was also found to have bilateral medullary nephrocalcinosis. It is hypothesised that chronic hyperglycaemia resulting from long-term insulin under-dosage led to chronic acidosis which caused hypercalciuria and consequently, nephrocalcinosis. Poor glycaemic control, Mauriac syndrome and nephrocalcinosis, may be associated with socio-economic difficulties. Both medical optimisation and psychosocial support should be provided to reach optimal glycaemic targets, reverse the features of Mauriac syndrome, and prevent worsening of nephrocalcinosis that could potentially lead to chronic renal impairment.

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Introduction

Pierre Mauriac first described a syndrome of growth failure, delayed puberty, and hepatomegaly in children with poorly controlled type 1 diabetes mellitus (T1DM) in 1930.[1] With improved diabetes care, Mauriac syndrome has become less prevalent, but may still be encountered from time to time. The exact underlying pathogenesis remains unclear, although a genetic enzyme defect of glycogen metabolism has been proposed.[2] Conditions predisposing to Mauriac syndrome include insufficient insulin (be it through poor adherence or sub-optimal insulin regimen) and a diet with severe caloric restriction.[3] Other reported associated features include raised serum transaminases, dyslipidaemia, and Cushingoid features. [4-5]

We report the case of a 13-year-old girl diagnosed with Mauriac syndrome and having the additional feature of nephrocalcinosis, which to the best of our knowledge has not been reported before.

Case Presentation

A 13-year-old, North African refugee girl, rescued at sea whilst crossing the Mediterranean in a ramshackle boat in search of asylum in Europe, presented to our hospital with hyperglycaemia and dehydration. The criteria for diabetic ketoacidosis were not fulfilled, and she was initially managed with subcutaneous insulin and intravenous rehydration fluids. She had been diagnosed with T1DM at the age of 5 years in her home country. Details of her initial presentation at diagnosis and her clinical course over the years were not available, but glycaemic control had been sub-optimal due to a combination of limited access to insulin and poor adherence to treatment. Furthermore, during her sea-crossing she had been rationing her dwindling supply of insulin and food and, a few hours before her rescue, had even lost her last remaining insulin cartridge in the sea.

On examination, she was noted to have soft, tender hepatomegaly (10 cm below right costal margin) and to be prepubertal (Tanner stage 1). Significant lipohypertrophy was noted at insulin injection sites below the umbilicus. There was no palpable splenomegaly, free fluid in the abdomen, or clinical signs of chronic liver disease. Auxological measurements revealed a height of 146.9 cm (-1.3 SDS), weight of 37 kg (-1.24 SDS), and body mass index of 17.1kg/m^2.

Initial laboratory investigations showed a glycosylated haemoglobin of 11.70% (104 mmol/mol), an elevated serum alanine transaminase (ALT) of 104 units/L (reference range: 5-33units/L) and an elevated gamma glutamyl transferase (GGT) of 210 units/L (reference range: 5-36 units/L), but normal serum alkaline phosphatase, bilirubin and albumin, as well as normal serum concentrations of urea, creatinine, sodium, potassium, chloride, normal full blood cell, and venous pH and bicarbonate.

Further investigations for hepatomegaly were taken. A viral screen for hepatitis B, hepatitis C, Epstein Barr virus, cytomegalovirus, rubella, and herpes simplex was negative. Toxoplasma antibodies were negative. Iron studies and a lipid profile were also normal. An ultrasound of the abdomen revealed hepatomegaly (measuring 4 finger breaths below the costal margin and extending at least 3 cm below the lower pole of the right kidney), with steatosis. There was no intra- or extra-hepatic biliary duct dilatation, and normal hepatopetal flow was seen within the portal vein. The spleen was slightly enlarged for patient's age (measuring 12cm) but demonstrated normal echotexture. Hyperechogenicity of both renal medullae suggestive of bilateral medullary

nephrocalcinosis was noted (Figure 1). There was no nephrolithiasis or hydronephrosis.

Serologic testing for coeliac disease and thyroid function tests, performed routinely as screening for auto-immune conditions associated with T1DM, and also because of the patient's short stature, were all normal.

At this point, Mauriac syndrome was suspected based on the findings of hepatomegaly, short stature, pubertal delay, and elevated serum ALT, in a patient with poorly-controlled T1DM.

Further investigations were performed to elucidate the cause of the nephrocalcinosis seen on ultrasound. Repeated measurements of serum calcium showed concentrations consistently within the reference range (corrected calcium 2.17-2.36mmol/L; reference range: 2.05-2.60mmol/L). Serum phosphate, magnesium and bicarbonate were also normal. Serum parathyroid hormone concentrations were within the reference range.

To assess for hypercalciuria, a random spot urine for calcium, as well as a 24-hour urine collection, were performed. The spot urine calcium/creatinine ratio was borderline high at 0.55 (mmol/mmol; normal < 0.56). However, the 24-hour urine collection for oxalate, calcium, phosphate, citrate and creatinine showed results that were within the respective reference ranges. The urinary calcium excretion rate was normal at 3.02mg/kg/day (normal: < 4mg/kg/day), equivalent to 0.07mmol/kg/day (upper limit of normal: 0.1mmol/kg/day). Urine albumin/creatinine ratio was normal at 16.44mg/g (reference range: 1-20mg/g), and there was no microalbuminuria (result: 5.90mg/L; reference range: 3-20mg/L). Urine pH was also normal.

The insulin regimen was adjusted and insulin doses were titrated to improve glycaemic control. Diabetes education was offered to both the child and her parent. A balanced, healthy diet was introduced and encouraged. An exercise programme was also set up whilst the patient was hospitalised. In view of the poor socio-economic background and the dramatic entry into the country, social work input was also sought and it was ensured that the child would be discharged to a safe environment, with proper access to medication, food and regular medical review.

As glycaemic control gradually improved, the hepatomegaly and associated tenderness also regressed. Two months after presentation, the serum concentrations of GGT and ALT had normalised. Glycosylated haemoglobin had also improved to 9.2% (77 mmol/mol). There was also a weight gain of 12.5 kg (+0.35 SDS; Figure 2) and the initiation of bilateral breast development (Tanner stage 2). This clinical improvement that occurred once glycaemic control was restored, strengthened our initial diagnosis of Mauriac syndrome.[4-5]

A repeat ultrasound abdomen was planned for six months' time from presentation, but the patient relocated to another country after five months.

Figure 1 Ultrasound images of both kidneys showing hyperechogenicity of the renal medullae indicative of medullary nephrocalcinosis

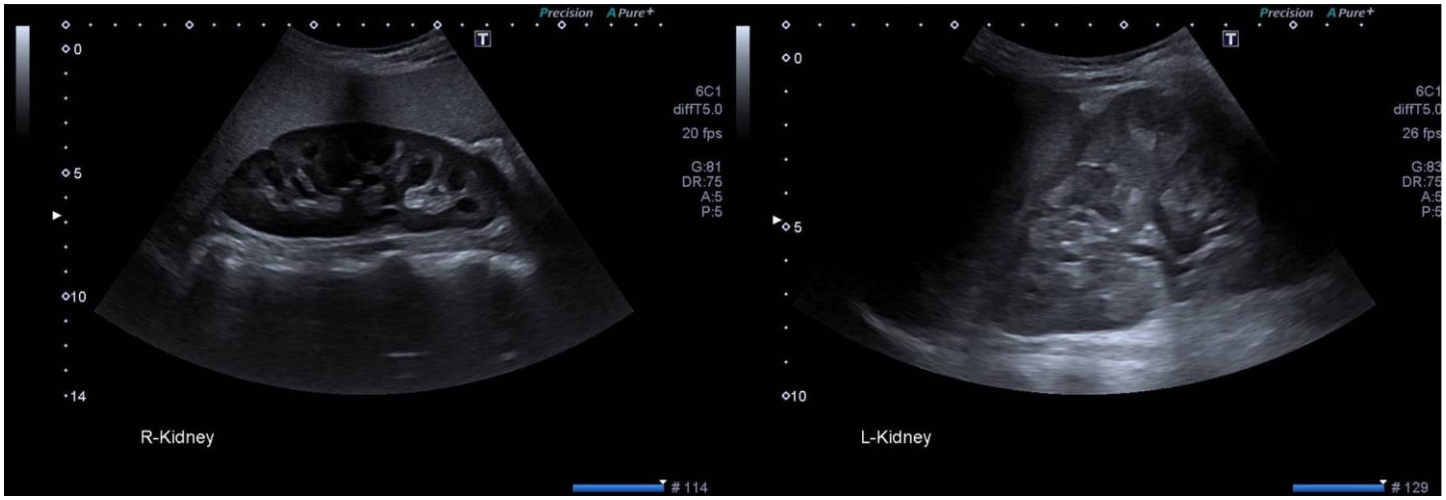
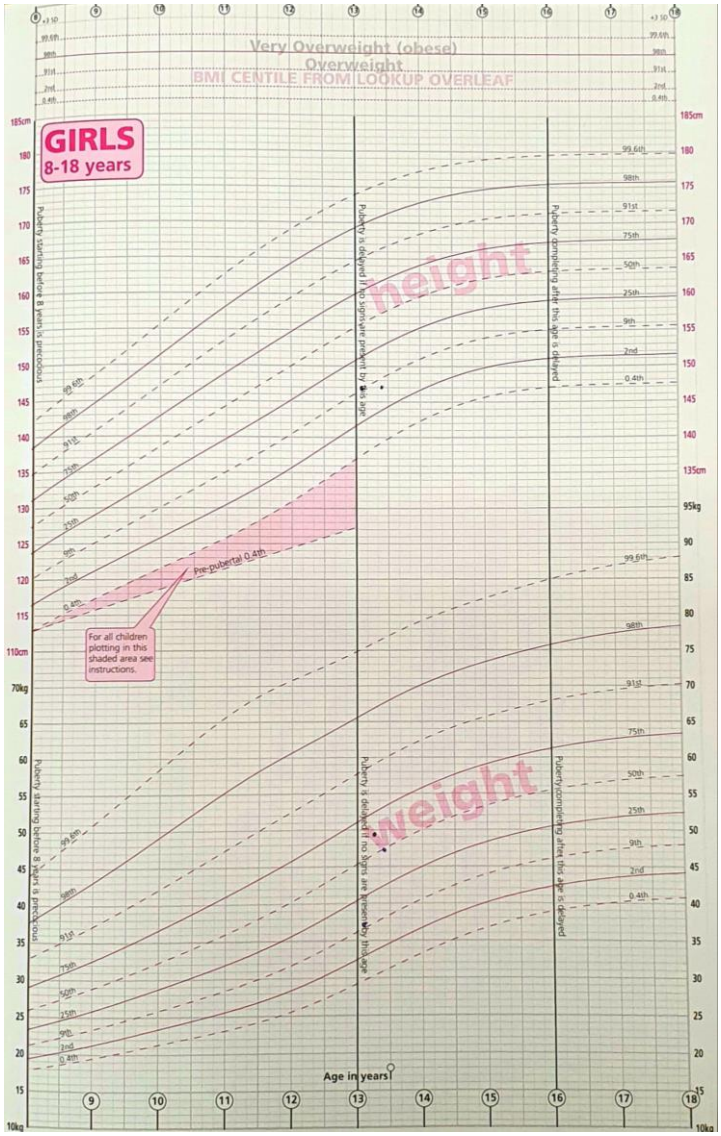


Figure 2 Patient's growth chart



Discussion

This case demonstrates the main characteristics of Mauriac syndrome. Nephrocalcinosis, however, is not a recognised feature of Mauriac syndrome. Investigations to determine a cause for the nephrocalcinosis were within normal limits, and there was no relevant family history that could point towards renal tubular acidosis or a tubulopathy, as well as no evidence of bone disease. It was thus deduced that the nephrocalcinosis was secondary to chronic uncontrolled T1DM.

It is hypothesised that long-standing hyperglycaemia leads to chronic acidosis which can cause hypercalciuria (and subsequent nephrocalcinosis) in various ways. Chronic acidosis results in increased osteoclast action and decreased osteoblast action. The net effect is increased calcium efflux from bone leading to hypercalciuria. Increased hydrogen ions in the circulation displace calcium bound to albumin, leading to increased serum ionised calcium concentrations and, thus, also to hypercalciuria. Acidosis also alters the renal absorptive capacity of calcium by direct inhibition of calcium transport in the nephron.[6]

Whether nephrocalcinosis can be considered a feature of Mauriac syndrome or whether it is purely a complication of long-standing uncontrolled T1DM is not possible to determine from this single case. Renal impairment due to microangiopathy has long been associated with poor glycaemic control of diabetes, but nephrocalcinosis itself has only rarely been reported. Also, unlike the case described by Kodama et al.[7], renal function was normal in our patient, despite the clearly evident nephrocalcinosis on ultrasound.

Nephrocalcinosis can damage the distal nephron resulting in distal renal tubular acidosis or nephrogenic diabetes insipidus. Progressive renal impairment is usually rare unless obstructive nephrolithiasis supervenes. Once present, the nephrocalcinosis is unlikely to be reversed (despite normoglycaemia and resolved acidosis and hypercalciuria), and management is aimed at preventing deterioration.[8] This can be achieved by preventing further hypercalciuria from chronic acidosis due to poor glycaemic control.

The clinical features and biochemical derangements associated with Mauriac syndrome regress with optimised glycaemic control, but great care has to be taken as too-rapid improvements can lead to deterioration of retinopathy and nephropathy.[4]

With poor glycaemic control, and indeed in most reported cases of Mauriac syndrome, there are often associated socio-economic difficulties.[4, 5, 9, 10] Both medical optimisation and psychosocial support have to be provided to improve glycaemic control, and thus reverse the features of Mauriac syndrome, ensuring optimal growth and development, and prevention of long-term diabetes complications, as well as, in our case, worsening nephrocalcinosis. Recognition of Mauriac syndrome in T1DM is also important to avoid misdiagnosis[7] and thus invasive investigations (such as a liver biopsy).

A final learning point exemplified by this case is to recognise (and thus manage) the difficulties and health inequities of migrants at various points of their journey, especially those suffering from chronic disease requiring treatment, such as T1DM.

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HISTORICAL ARTICLE

Early 19th century reports of the *Spedale Maggiore dell' Ordine de SS. Maurizio e Lazzaro*

Charles Savona-Ventura

In line with the increasing practice of compiling and analysing hospital admissions and mortality reports, the *Spedale Maggiore della Sacra Religione ed Ordine Militare de SS. Maurizio e Lazzaro* in Turin published a series of reports covering the period 1821-1844. These reports provide important information relating to the workings of the hospital allowing for better planning and resource distribution, and also providing a nosological picture of the patterns of disease in the population served by the institution.

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Introduction

By the end of the eighteenth century, the medical profession had come to appreciate the importance of statistical reviews of the patterns of disease in the community it services. These reviews included attempts at the nosological breakdown of the presenting disease state along with mortality rates. In the early 19th century, the system in general use was based on the *Synopsis nosologiae methodicae*, published by William Cullen of Edinburgh in 1785. [1] The practice of regularly analysing hospital admission information was quickly introduced to allow or better the assignment of resources. The present work reviews the hospital admission and nosological reports pertaining to the *Spedale Maggiore della Sacra Religione ed Ordine Militare de SS. Maurizio e Lazzaro* in Turin covering the period 1821-1844.

The *Spedale Maggiore* in Turin had originally been set up in 1573 on the initiative of Duke Emanuele Filiberto, grandmaster of the Military Order of Sts. Maurice and Lazarus. Throughout the centuries, extensions to the edifice were carried out to better meet the needs of the community, the most significant being those performed in 1688 and 1780 that brought the hospital bed capacity to fourteen. In 1831, the Council of the Order approved a new significant extension that was carried out between 1837 and 1843. This 16th century hospital continued to serve the needs of the city right through the centuries and was only closed down in 1885 when the medical services were transferred to a new edifice – Mauriziano Umberto I Hospital – constructed by King Umberto I. The 16th century edifice was pulled down in 1888 leaving only the old pharmacy block.[2]

Primary Sources

In line with the increasingly adopted practice of maintaining management audits, the Turin hospital administrators, during the third and fourth decade of the nineteenth century, regularly drew up and published reports that included a nosological analysis giving an insight to the disease conditions managed by the institution. Six reports cover the period 1821-1844.

- Bernardino Bertini. *Statistica Nosologica dal 1821 al 1833 e rendiconto medico per il 1834 del Venerando Spedale Maggiore della Sacra Religione ed Ordine Militare de SS. Maurizio e Lazzaro*. Torino : Giuseppe Pomba, 1835.
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- Bernardino Bertini. *Seconda Statistica Nosologica del Venerando Spedale Maggiore del Sacro Ordine Equestre de' SS. Maurizio e Lazzaro dal 1833 al 1839*. Torino : Alessandro Fontana, 1839.
- Carlo Francesco Bellingeri. *Prospetto Clinico del Venerando Spedale Maggiore della Sacro Ordine Equestre dei SS. Maurizio e Lazzaro nel bienno 1839-40*. Torino : Cassone e Marzorati, 1841.
- Bernardino Bertini. *Terza Statistica Nosologica del Venerando Spedale Maggiore del Sacro Ordine Equestre dei Mauriziano per il bienno 1841-1842*. Torino : Enrico Mussano, 1843.
- Carlo Francesco Bellingeri. *Statistica Nosologica del Spedale Maggiore dell' Ordine Mauriziano per il bienno 1843-44*. Torino : Botta, (1845).

THE AUTHORS

The majority of the reports are authored by **Bernardino Bertini** (b.1786; d.1857). Bertini is described as serving as dean emeritus and councillor of the College of Medicine of the Medical Faculty, president of the *Societa Medico-Chirugica*, senior doctor of the *Spedale Maggiore della Sacro Ordine Equestre dei SS. Maurizio e Lazzaro*, and doctor of the Judicial Prisons, of the *R. Ergastolo* and of the *Corpo dei Carabinieri Reali*. He was a corresponding member of the *Reale Accademia d'Agricoltura*, of the *Direzione per l'Associazione Agraria dei R. Stati*, and of a number of scientific European societies including Belgium, France, Germany, Italy and Switzerland. He served as one of the vice-presidents of the Section of Medicine in the *Congresso scientifico di Lione* in 1841, and first vice-president general of the *Congresso Scientifico di Strasborgo* in 1842. [3] Besides the four nosological hospital reports, he is the author of a number of at least seventeen other publications (Appendix 1a) including two works on the medicinal waters of the Kingdom of Sardinia and in Germany.

The second contributor to the series of nosological reports for the Turin hospital was **Carlo Francesco Bellingeri** (b.1789; d.1848). Bellingeri completed his medical studies at the University of Turin submitting his thesis on quinine substitutes. He subsequently was appointed professor of psychiatry at the Faculty of Medicine of the University of Turin, eventually being appointed dean of the Faculty. He served as a doctor and later consultant of the *Spedale Maggiore della Sacro Ordine Equestre dei SS. Maurizio e Lazzaro*. He was a member of the *Accademia delle Scienze di Torino* and corresponding member of numerous Italian and foreign scientific academies. In Italy, he is considered as one of the first scholars in neurology, publishing a number of scholarly works in the field. [4] Besides his two nosological hospital reports, he is the author of at least twenty-one other publications (Appendix 1b) generally dealing with subjects related to neurology.[5]

METEOROLOGICAL OBSERVATIONS

In line with the belief that prevalent climatic conditions influenced the development of disease states, the reports detail the meteorological observations prevalent in Turin during the period, including observations related to temperature, barometric pressure, dominant wind direction, atmospheric conditions, and rainfall statistics. The importance given to climate conditions in relation to prevalent seasonal disease states by 19th century medical practitioners has been previously discussed.[6]

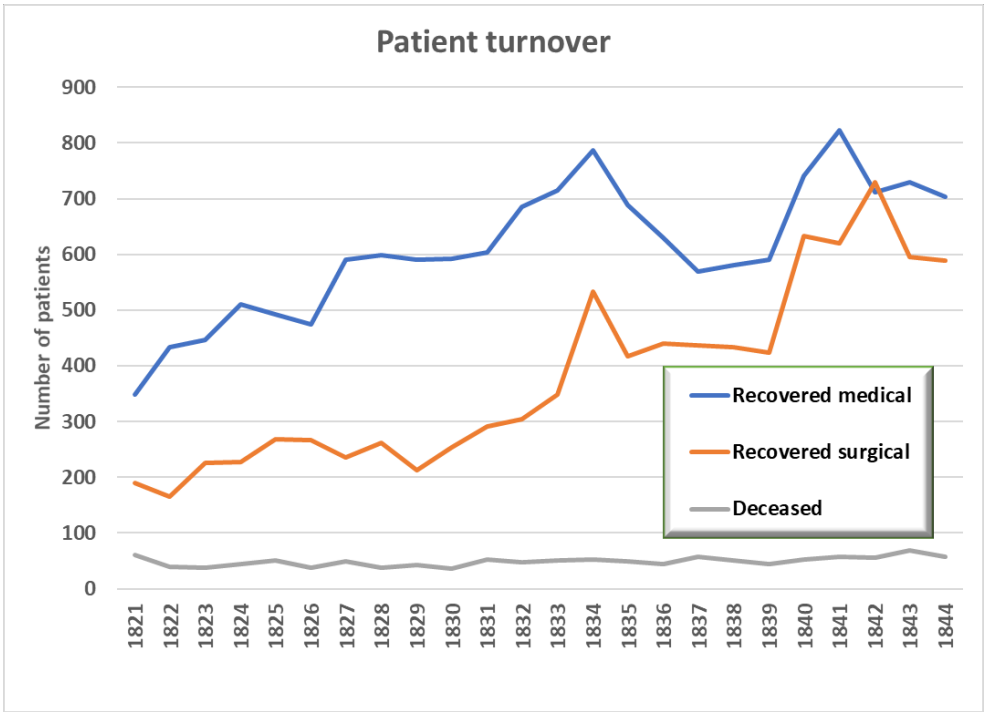
HOSPITAL ADMISSIONS AND MORTALITY: 1821-1844

The average total number of admissions during the period was about 1038 cases annually. The hospital was reserved for individuals of the male gender and did not cater for women. There was however a gradual increase in the number admission throughout the period from an annual total of 599 cases in 1821 to a total of 1351 cases in 1844 (Table 1 / Figure 1). The figure suggests out-of-trend peaks in cases in 1834 and in 1840-1843.

Table 1 Hospital Admissions and outcome: 1821-1844

Year	Recovered medical	Recovered surgical	Total recovered	Deceased	ADMISSIONS
1821	348	190	538	61	599
1822	433	166	599	39	638
1823	447	226	673	37	710
1824	510	227	737	44	781
1825	492	269	761	51	812
1826	474	267	741	38	779
1827	591	236	827	49	876
1828	598	261	859	37	896
1829	590	212	802	42	844
1830	592	254	846	36	882
1831	603	292	895	52	947
1832	685	305	990	48	1038
1833	715	349	1064	51	1115
1834	786	534	1320	52	1372
1835	688	417	1105	49	1154
1836	629	440	1069	45	1114
1837	569	436	1005	57	1062
1838	580	433	1013	51	1064
1839	591	424	1015	44	1059
1840	741	633	1374	53	1427
1841	822	620	1442	58	1500
1842	711	730	1441	55	1496
1843	730	596	1326	68	1394
1844	704	589	1293	58	1351
Average annual	**610**	**379**	**989**	**49**	**1038**

Figure 1 Patient turnover: 1821-1844



The average number of patients who died after admission was about 49 cases annually. With the exception of the outlier high number of deaths in 1821, the deceased case number appeared to gradually increase throughout the period reflecting the increase in the number of admissions, ranging from 39 cases in 1822 to 58 cases in 1844 (Table 1). There was however a gradual decrease in mortality rate following the sharp drop in 1822 (Figure 2).

The majority of admissions (31.3%) occurred in the third trimester (July-September) of the year; the other three trimesters of the year accounted for an average of about 22.9% each. The relative increase in admission during the third trimester was reflected by a markedly lower mortality rate at 3.80% when compared to the other three trimesters which averaged 5.53% (Table 2).

The age distribution of the medical cases over the period with the age-specific mortalities is outlined in Figure 3. The data, which excludes the cases admitted in 1839-1840 that are unrecorded in the respective reports, suggests that the majority (52.3%) of medical admissions were aged under 30 years. Only 7.3% were aged 60 years or more. The mortality rate from medical conditions increased progressively with increasing age from 3.2% in those aged <30 years to 26.5% in those aged 70 years or more (Figure 4).

The majority of admissions (54.3%) to the institution over the period in question belonged to the working-class community of the population mainly manual and menial workers of all types. Admissions of individuals belonging to the white collar and middle-upper class professions accounted for only 1.3% of the total. Military personnel made up 8.6% of admissions. The remaining 35.6% of admissions were not specifically identified as to profession (Table 3). The occupation-specific mortality rate was highest at 12.3% of admissions in the 'civil & ecclesiastical' profession category.

Figure 2 Mortality rate (% admissions): 1821-1844

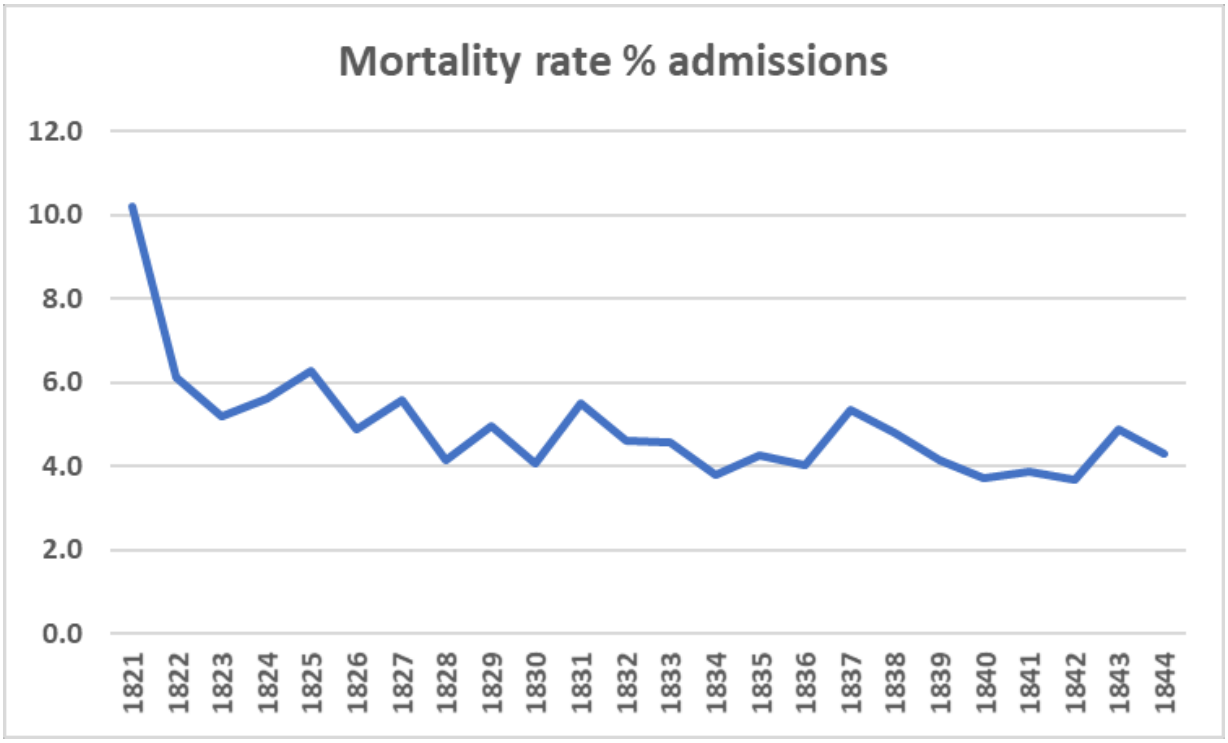


Table 2 Hospital Admissions and outcome by trimester

Trimester	Recovered	Deaths	TOTAL	Mortality rate
January-March	3468	208	3676	5.66
April-June	3976	211	4187	5.04
July-September	5260	208	5468	3.80
October-December	3874	243	4117	5.90

Figure 3 Age-specific medical admissions and mortality

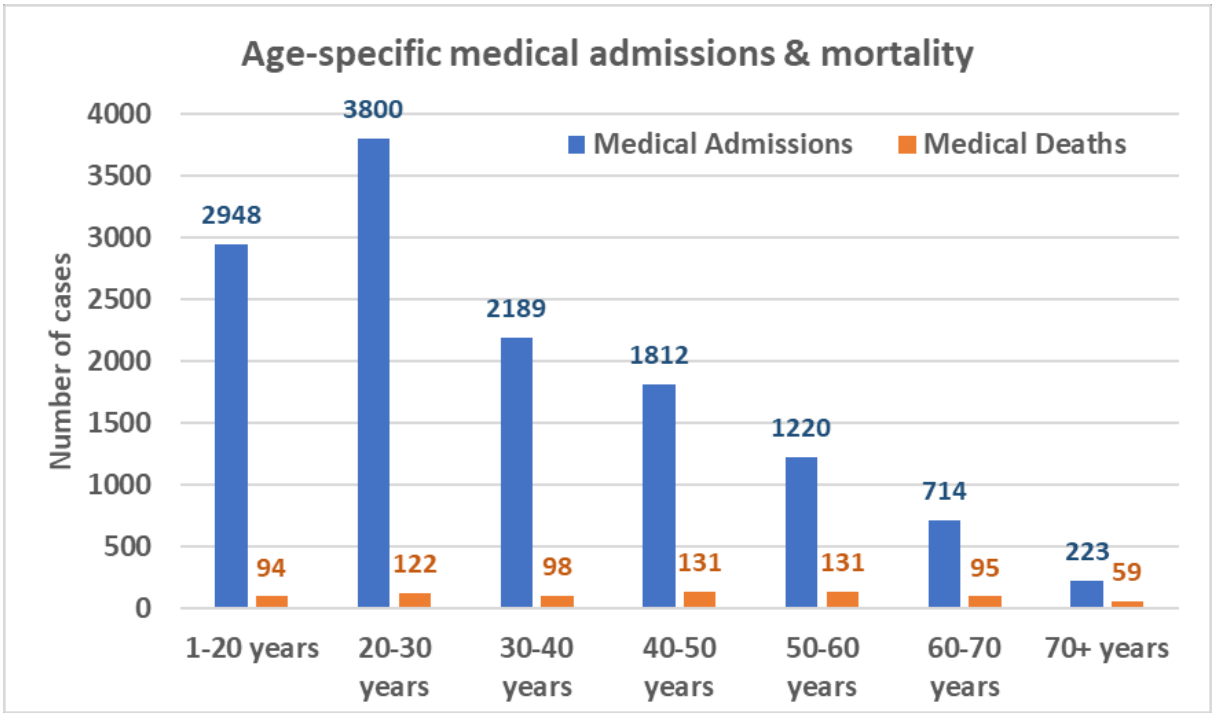


Figure 4 Age-specific medical case mortality rate

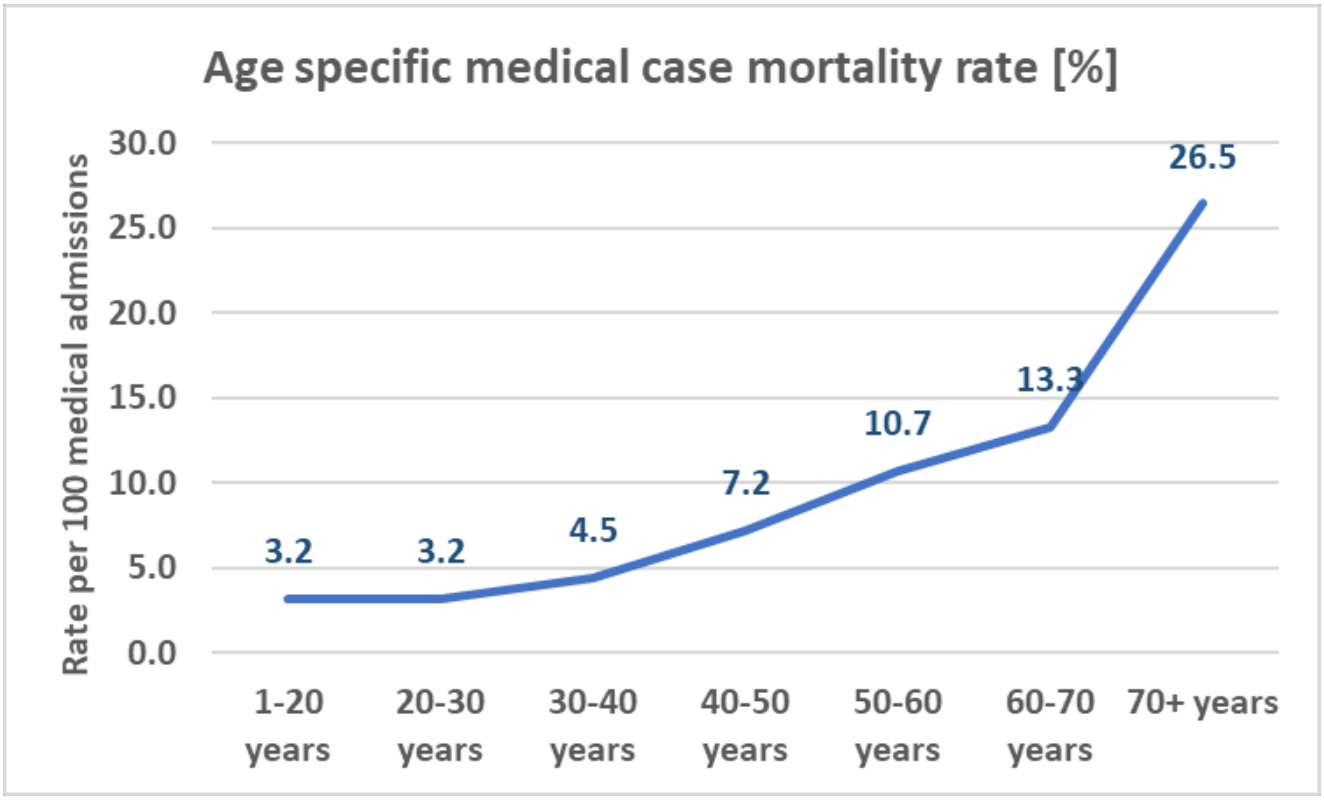


Table 3 Hospital Admissions and outcome: 1821-1834/1842-44 by occupation (data for period 1835-41 missing)

Patient occupation	TOTAL RECOVERED	TOTAL DEATHS	% Admissions	Occupation-specific mortality rate % admissions
Military personnel	843	52	8.6	5.8
Civil & ecclesiastical profession	121	17	1.3	12.3
Farmers, gardeners	631	29	6.3	4.4
Coachmen, porters, shoe cleaners	662	48	6.8	6.8
Shoemakers, cobblers, weavers	623	22	6.2	3.4
Colourists, whiteners, painters	146	9	1.5	5.8
Tanners	201	12	2.0	5.6
Blacksmiths, founders, metal workers	457	26	4.6	5.4
Carpenters	561	24	5.6	4.1
Stone masons	1173	50	11.7	4.1
Cooks, bakers, barmen, coffee makers	955	43	9.6	4.3
Other occupations	3466	247	35.6	6.7
TOTAL	**9839**	**579**	**100.0**	**5.6**

MEDICAL CONDITIONS REQUIRING ADMISSION

A number of attempts had been made during the eighteenth century to produce a systematic classification of diseases. In the early 19th century, the system in general use was that published by William Cullen in 1785. The authors of the nosological reports for the Turin Hospital apparently preferred a different classification of diseases when compiling their reports, preferring to follow the classification of disease developed by the German physician Giuseppe P. Frank who in 1828 published an Italian translation of his work entitled *Epitome di Medicina Pratica* in Naples [p.25-29]. [7]

The majority of admissions (43.7%) involved cases related to febrile disease including intermittent, continuous or eruptive fevers. These overall were associated with a mortality rate of 0.94%. Inflammatory conditions accounted for another 41.1% of admissions with an overall mortality rate of 9.42%. The conditions associated with the highest mortality rates included those associated with oedema (34.53%) and cachexia (25.0%) (Table 4).

Table 4 Turin Hospital – Medical conditions (data for 1835-38 missing)

Medical Condition	Recovered	Deceased	Mortality Rate by cause
Intermittent fevers	2163	16	0.73
Continuous fevers	3315	33	0.99
Exanthemata (Eruptive fevers)	206	5	2.37
Inflammation - Nervous System	317	51	13.86
Inflammation – Vascular System	440	59	11.82
Inflammation – Oro-pharyngeal	448	10	2.18
Inflammation – Respiratory System	2135	278	11.52
Inflammation – Abdominal System	1004	104	9.39
Inflammation - Muscular	400	2	0.50
Inflammation - Joints	151	5	3.21
Neurosis - cerebral	184	27	12.80
Neurosis - thoracic	45	0	0.00
Neurosis - abdominal	191	2	1.04
Glandular conditions	193	7	3.50
Haemorrhages	143	10	6.54
Hemormesis	114	0	0.00
Profluvii sierosi (Fluxes)	194	12	5.83
Oedema	91	48	34.53
Cachexia	3	1	25.00
Local / Other conditions	60	5	7.69
TOTAL	**12462**	**675**	**5.14**

The reports further detail the noted pathological features as noted at autopsy of individuals succumbing to different disease conditions. The reports also describe the clinical features and treatment provided for the different disease conditions managed in the hospital.

Discussion

Statistical analysis of hospital activity is an essential part of good management practice allowing for accurate planning and correct allocation of available resources. The report published in 1835 for the Turin Hospital managed by the Order of Sts. Maurice and Lazarus appears to be the first published hospital activity report with the report further reviewing the statistics of the previous years. The publication of these reports was made obligatory by a regulation which came into effect of the 1st March 1835. The retrospective data was recovered and compiled from the available hospital registers [p.15]. During the period 1821-1834, the hospital saw an augmentation in bed capacity and resources. This described augmentation in services was linked in the report to the noted increase in hospital admissions during the period. During the early part of the period 1821-1827, the maximum bed

complement was forty – of these 20 beds were reserved for medical cases, 10 beds were reserved for the *Guardie del Corpo di Sua Maestà* (the latter never having been utilized), and five beds were reserved for incurable cases. In 1827, the medical beds were augmented to 25, while the surgical beds were augmented to 20. In 1832, the sixty beds in the large ward were equally designated to receive medical and surgical cases; while two other wards were reserved for the *Guardie del Corpo di Sua Maestà* and for persons with a civil status. Throughout the period, the hospital also improved and ameliorated its backup services [p.4-5].[7] In 1834, an out-of-trend peak in cases managed in the hospital was noted. This was linked to the different meteorological conditions prevalent during that year [p.69]. No condition was identified as particularly contributing to the observed increased number of hospital admissions. There was however, during 1834, a smallpox epidemic affected the population causing 'so many victims [to be] taken to the tomb in Piedmonte' [p.76].[7] The out-of-trend peak for the period 1840-1843 was attributed to the marked rise in both medical and surgical admissions from the total of 1015 in 1839 to 1326-1442 during the period is question. 'The reason for this increase is that, following the opening of the new wing of the building on May 15, 1840, twenty beds were added in the infirmary, sixteen of which were intended for the treatment of surgical diseases' [p.39].[8]

In Malta, the first evidence of an attempt at maintaining a record of disease patterns appears to have been made by Dr Joseph Demarco practicing in the latter part of the 18th century (died 1793). [8] A similar register of medical certificates presented to the Health Authorities and the Gozo Law Courts during the period 1813-15 was kept by Dr Calcedonio Speranza.[9] Statistical records for admissions to the *Sacra Infermeria* of the Order of St John in Malta have as yet not been identified. The *Libri mortuorum* volumes registering the deaths at the *Sacra Infermeria* during the period 1677-1855 did not include the cause of death other than those dying violent deaths. [10] A report about admissions and deaths in the *Hôpital militaire* (previously the *Sacra Infermeria*) for the period 1798-1801 was drawn up by Dr. Claude Robert.[11-12] Case histories and postmortem reports of cases admitted to the Lazaretto in Malta for quarantine during the period 1739-1801 have been described.[13]

The first hospital nosological report from the Maltese Islands was prepared and published by Dr Thomas Spencer Wells and pertains to the cases managed at Bighi Naval Hospital during the period 1842-1844.[14] The regular maintenance of admission registers for the various Maltese Government Charitable Institutions was formalized by the 1851 Charitable Institutions regulations.[15] Previous to these regulations, the Civil Hospitals had probably already adopted the practice of maintaining an admissions register that included a clinical diagnosis. The earliest example of such an early civil hospital register known to the author pertains to the Hospital of St John the Baptist at Rabat-Victoria, Gozo covering the period 31st December 1841 to 31st August 1851.[16]

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7. Bernardino Bertini. Statistica Nosologica dal 1821 al 1833 e rendiconto medico per il 1834 del Venerando Spedale Maggiore della Sacra Religione ed Ordine Militare de SS. Maurizio e Lazzaro. Torino : Giuseppe Pomba, 1835.
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9. Horatio C.R. Vella. Introduction: Joseph Demarco – On the passage of air from the lungs into the blood system, Montpellier, 1746. Malta: University press, 1999, xxii-xli.
10. Paul Cassar. The practice of a surgeon in Gozo in 1813-1815. It-Tabib tal-familja - Journal of the Malta College of Family Doctors, 1996, 10:5-8.
11. Paul Cassar. A note on three Libri Mortuorum of the Holy Infirmary, the Civil Hospital of Valletta and the Central Hospital of Floriana (1677-1885). Proceedings of History Week 1981 (ed. Mario Buhagiar). Malta : Historical Society, 1982, 86-93.
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14. Paul Cassar. Clinical case histories and post-mortem reports from the Malta Lazzaretto in the 18th century. Medi-scope, 1989, 13:9-13.
15. Charles Savona-Ventura. The naval career of Sir Thomas Spencer Wells in the Mediterranean: 1842-1853. Maltese Medical Journal, 1998, 10(2): 41-46.
16. Establishments of the Government Charitable Institutions of the Islands of Malta and Gozo. Malta : Government Printing Office, 1851, p.10.
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APPENDIX

a. Publications by Bernardino Bertini

- *Idrologia Minerale ossia descrizione di tutti le sorgenti d'Acqua Minerali note sinora negli stati di S. M. Il Re di Sardegna .....* 1st edition, Carlo Bocca, Torino, 1822; 2nd edition, Torino : Enrico Mussano, 1843.
- *Lettera sulla vertu febbrifuga dell'ilicina*. Fodratti, Torino, 1833.
- *Viaggio medico in Germania nella state del 1837*. Torino : Cassone, Marzorati e Vercellotti, 1838.
- *Della Medicina Idropatica in Germania*. Torino : Cassone, Marzorati e Vercellotti, 1838.
- *Congresso scientifico di Lione e materie trattate nella sezione di Médicina*. Torino : Cassone & Marzorati, 1841.
- *Congresso scientifico di Strasborgo nell'autunno 1842*. Torino : Cassone e Marzorati, 1842.
- *Caso di gravissima metrorragia guarita: coll'estratto emostatico preparato dal signor Bonjean chimico farmacista di Chambery*. Torino : Mussano, 1843.
- *Relazione dell'undecimo congresso scientifico francese tenutosi in Angers nel settembre 1843*. Torino : Mussano, 1844.
- *Articolo estratto dal giornale delle scienze mediche*. Torino : Mussano, 1844.
- *La duodecima adunanza degli Scienziati di Francia che, per decreto dell'undecima, doveva tenersi in Monpellieri, ebbe luogo, per circostanze particolari, in Nimes, città Capo luogo del dipartimento del Gard*. Torino, 1844.
- *Della statistica medica in Italia: considerazioni*. Torino : Enrico Mussano, 1844.
- *Duodecimo Congresso scientifico di Francia tenutosi in Nîmes nel settembre 1844*. Torino : Enrico Mussano, 1845.
- *Relazione del XIV congresso scientifico francese tenutosi in Marsiglia nel settembre 1846*. Torino : Enrico Mussano, 1847.
- *Sul manicomio di Mareville presso Nancy*. Torino, 1850
- *Relazione del XVII Congresso Scientifico francese tenutosi in Nancy nel settembre 1850*. Torino : G. Favale e Comp., 1850.
- *Relazione del XVIII. Congresso scientifico francese tenutosi in Orleans nel settembre 1851*. Torino : G. Favale, 1851.
- *Congresso di Statistica tenuto in Brusselle nel Settembre 1853*. Torino : G. Favale e Comp., 1853.

b. Publications by Carlo Francesco Bellingeri

- *Dissertatio inauguralis, quam ... defendebat in regio Athenaeo, anno 1818. (De physico-chemicis albuminis proprietatibus. De nervis faciei. Quinti, et septimi paris functiones. De neuralgia faciei. Cura neuralgiae faciei. Specimen remediis nervinis)*. Augustae Taurinorum : Favale, (1818).
- *Esperienze ed osservazioni sul galvanismo*. *Mem. d. R. Accad. d. Scienze di Torino,* XXIII, 1818, pp. 143-191.
- *Sull'electricità del sangue nelle malattie*. *Mem. d. R. Accad. d. Scienze di Torino,* XXIV, 1819, pp. 107-140.

- *Sull'elettricità dei liquidi minerali. Mem. d. R. Accad. d. Scienze di Torino,* XXIV, 1819, pp. 141-159.
- *Memoria sull'elettricità dell'orin.*, *Mem. d. R. Accad. d. Scienze di Torino,* XXIV, 1819, pp. 459-478.
- *Sulla proprietà elettrica dei solidi animali. Mem. d. R. Accad. d. Scienze di Torino,* XXV, 1820, pp. 1-12.
- *In electricitatem sanguinis, urinae, et bilis animalium experimenta. Mem. d. R. Accad. d. Scienze di Torino,* XXXI, 1827, pp. 295-318.
- *In electricitatem salivae, muci et puris simplicis, et contagiosi experimenta. Mem. d. R. Accad. d. Scienze di Torino,* XXXIII, 1829, pp. 199-230.
- *Ragionamenti, sperienze ed osservazioni patologiche comprovanti l'antagonismo nervoso esposti, e raccolte*. Torino : G. Balbino, 1833.
- *De medulla spinali nervisque ex ea prodeuntibus annotationes anatomico-physiologicae*. Augustae Taurinorum : Typ. Regia, 1823.
- *Experimenta in nervorum antagonismum*. Turin : Tip. Reale, 1824 (reprinted in *Mem. d. R. Accad. d. Scienze di Torino*, XXX (1826), pp. 35-44, 293-313)
- *Annotationes anatomico-physiologicae*. *Mem. d. R. Accad. d. Scienze di Torino*, XXVIII (1824), pp. 123-250
- *Storia delle encefalitidi che furono epidemiche in Torino nell'anno 1824 con considerazioni sopra di esse e sulla encefalitide in generale*. Torino, 1825.
- *Experimenta physiologica in medullam spinalem*. Turin : Tip. Reale, 1825 (reprinted from *Mem. Accad. Sci. Torino*, vol. XXX).
- *Ragionamenti, sperienze ed osservazioni patologiche comprovanti l'antagonismo nervoso esposti, e raccolte*. Torino : G. Balbino, 1833.
- *Storia di nevralgia sopra-orbitale curata col taglio e successiva cauterizzazione del nervo : con osservazioni fisio-patologiche sopra la medesima*. Bologna : Nobili, 1834 (extracted from *Opuscoli della Societa Medico-Chirurgica di Bologna* Vol. IX p. 246).
- *De medulla spinali nervisque ex ea prodeuntibus annotationes anatomico-physiologicae / auctore Carolo Francisco Bellingeri*. Augustae Taurinorum : Typ. Regia, 1823 (read before the *Regia Scientiarum Academia Taurinensis* in 1822 and 1823 and published also in v. 28 of the Academy's publication).
- *Karl Franz Bellingeri's anatomisch-physiologisch Untersuchungen über das Rückenmark und seine Nerven / Deutsch bearbeitet von Herrmann Kaulla ; mit einem Vorworte von W. v. Ludwig*. Stuttgart, 1833.
- *Della fecondità e della prefazione dei sessi nella nascita degli animali vertebrati e mastologia con considerazioni anatomo-fisiologiche sul numero e posizione delle mammelle*. Torino, 1840.
- *Della influenza del cibo e delle bevande sulla fecondità e sulla prefazione dei sessi nelle nascite del genere umano*. Torino, 1840.
- *Memorie originali delle febbri tifoidi che corsero in Torino nell'autunno 1842*. Torino, 1843.

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HISTORICAL ARTICLE

Healing the Body and the Soul during the Cholera Pandemic of 1837 in Malta: the role of church and clergy

Joseph Galea

The Church in Malta has played a pivotal role in the life of the Maltese for a millenium. When the cholera pandemic attacked the archipelago in summer 1837 the church was crucial in the efforts to fight the pestilence and its devastating effects. The Bishop issued pastoral letters during the pandemic urging the faithful for prayers, suspending orders of abstinence from meat on specific days and following public health orders with regards to mass gatherings and burial arrangements. The parish priest in the pulpit was the main medium delivering notices from the Government Health Authorities to the mainly illiterate public. Many diocesan priests and the religious from monastic orders especially the Capuchin fathers tended to the sick and the dying. In situations like these the Catholic Church distinguished itself as the ultimate protector of the Maltese population.

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The Church in Early 19th Century Malta

The Clergy in Malta played a dominant role in the insurrection against the French and in establishing the aftermath. In fact, the prelate Canon Francesco Saverio Caruana was co-leader of this insurgence. Also, the respect to the catholic faith featured importantly in the text of the *Declaration of Rights* drawn by the Congress in protest against the Treaty of Amiens (1802). The declaration stated that:

i. The King is the protector of our holy religion and should uphold and protect it.

ii. Reference on spiritual matters shall only be had to the Pope and to the respective Generals of the monastic orders.

iii. Freemen have a right to choose their own religion. Toleration of other religions is therefore established as a right; but no sect is permitted to molest, insult or disturb those of other religious professions.

British rule in Malta was confirmed by the Treaty of Paris in 1814 and this led Malta to become a British Fortress in the Mediterranean. The British would not let anything jeopardize their fortress and forming an alliance with the Roman Catholic Church hierarchy in Malta was very important to buttress it. This led to a strange relationship between the Protestant colonizer and the colonized Catholic. However, this relationship between the Maltese Church and the Colonial Government was quite strained. Attempts at proselytism in the first decades of the 19th century with the Bible Society of London circulating a Maltese version of the Bible translated by Dr Cleado Naudi were met with emphatic protests by the Maltese Catholic Church. In 1830, Governor Ponsonby decided to proceed with a revision of the Criminal Code of Malta but was delayed because of issues related to the acknowledgement of the Roman Catholic Church as the 'dominant religion.[1]

In the first decades of the nineteenth century leading to and including the year under focus (1837), the British Government had gone out of its way to keep the Maltese Catholic Church and its bishop happy. Before 1831, the British Government was insisting that the Maltese Church becomes separated from the Palermitan Archbishopric which separation happened on June 1831. As a result, Francesco Saverio Caruana was appointed Bishop of Malta after the British Government's proposal.[2]

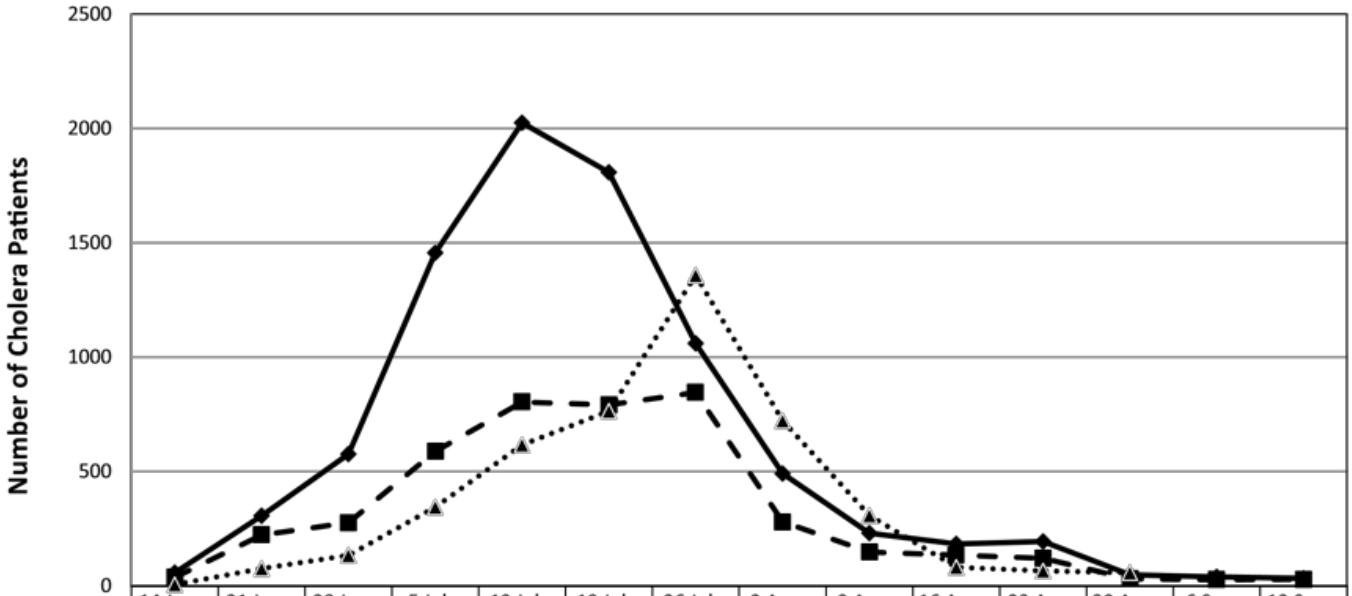
The Colonial Government realized that the hierarchical structure of the church from bishop to the local priest had a lot of influence on the Maltese population. In some respects, the church had a decentralized system of administration with the parish as the basic social and territorial unit. There was no local government, therefore, by default, the parish priest became the spokesman for his parishioners in both spiritual and secular affairs. The church was therefore a great asset to the British Government in implementing its policy provided it did not go against the church's wishes. Hilda Lee's summary of a note in the Colonial Office shows that in 1825 the tranquillity of the island is seen as a consequence of the British policy of non-interference in religious affairs.[3] In the 1830s, the protestant population did not exceed 700 (excluding the garrison), of the remaining 120,000 inhabitants, 1020 were clergymen and the rest staunch Catholics. On the islands, there were 17 male convents, 5 nunneries and over 250 churches and chapels. The ecclesiastical establishment was supported independently by the Government. The life of the people was centred around their church:

they began the day's work by hearing mass and their main recreation centred around religious festivals.[1] It comes as no surprise that when the cholera epidemic struck, the British Government and their predominantly Catholic subjects turned to the church leaders, the clergy and the religious orders for help. The faithful looked to the church for both spiritual and material help.

The Second Cholera Pandemic strikes a poor and ailing Malta

The second cholera pandemic (1829-1837) spread from Asia to Europe and across the Atlantic Ocean to North America killing millions of people. In spring 1837 it affected Southern Italy and Sicily[4] and by summer it reached the Maltese shores. The first cases of cholera in Malta broke out at a hospital for the elderly and the infirm, the Ospizio in Floriana on 9th June 1837, reached a peak in the week between 12 July to 18 July and dwindled by the end of August 1837 (Figure 1). The epidemic saw a death toll of 4252 from 8785 registered cholera cases [a case fatality rate of 48.4%]. The Maltese population at the time was 120,000 [incidence rate of 3.54 per 100 population].

Figure 1 Graphical representation of the number of new cases, deaths and recoveries from epidemic cholera in Malta in 1837 (Source: Malta Government Gazettes 5th July to 11th October 1837).



	14 Jun – 20 Jun	21 Jun – 27 Jun	28 Jun – 4 Jul	5 Jul – 11 Jul	12 Jul – 18 Jul	19 Jul – 25 Jul	26 Jul – 1 Aug	2 Aug – 8 Aug	9 Aug – 15 Aug	16 Aug – 22 Aug	23 Aug– 29 Aug	30 Aug – 5 Sep	6 Sep – 12 Sep	13 Sep – 19 Sep
New Cases	57	306	576	1456	2025	1808	1060	491	230	183	194	48	39	33
Died	37	222	276	588	803	791	845	280	147	134	120	30	26	28
Recovered	5	75	133	344	616	764	1358	722	307	81	65	57		

In 1837, the socio-economic circumstances of the Maltese people were generally poor. The Royal Commissioners John Austin and George Carnewall Lewis sent by the British Government to assess the economic and social situation of the Maltese islands in 1839 reported that the Maltese were living in abject poverty. Over 12% were poor without any means to sustain themselves and their families and another 30% were labourers, many of whom only worked during the summer season. People were miserable and hungry and this led to the theft of field produce and farm animals, especially in the winter months when work was scarce.[5] The malnourished and underfed population was prone and susceptible to ill health and disease. The vast majority of the population was uneducated and ignorant.

When cholera struck the islands in June 1837, the local administration was unprepared, the population was scared and terrified[6], and the doctors were split amongst themselves arguing about the infectivity potential of the illness.[7]

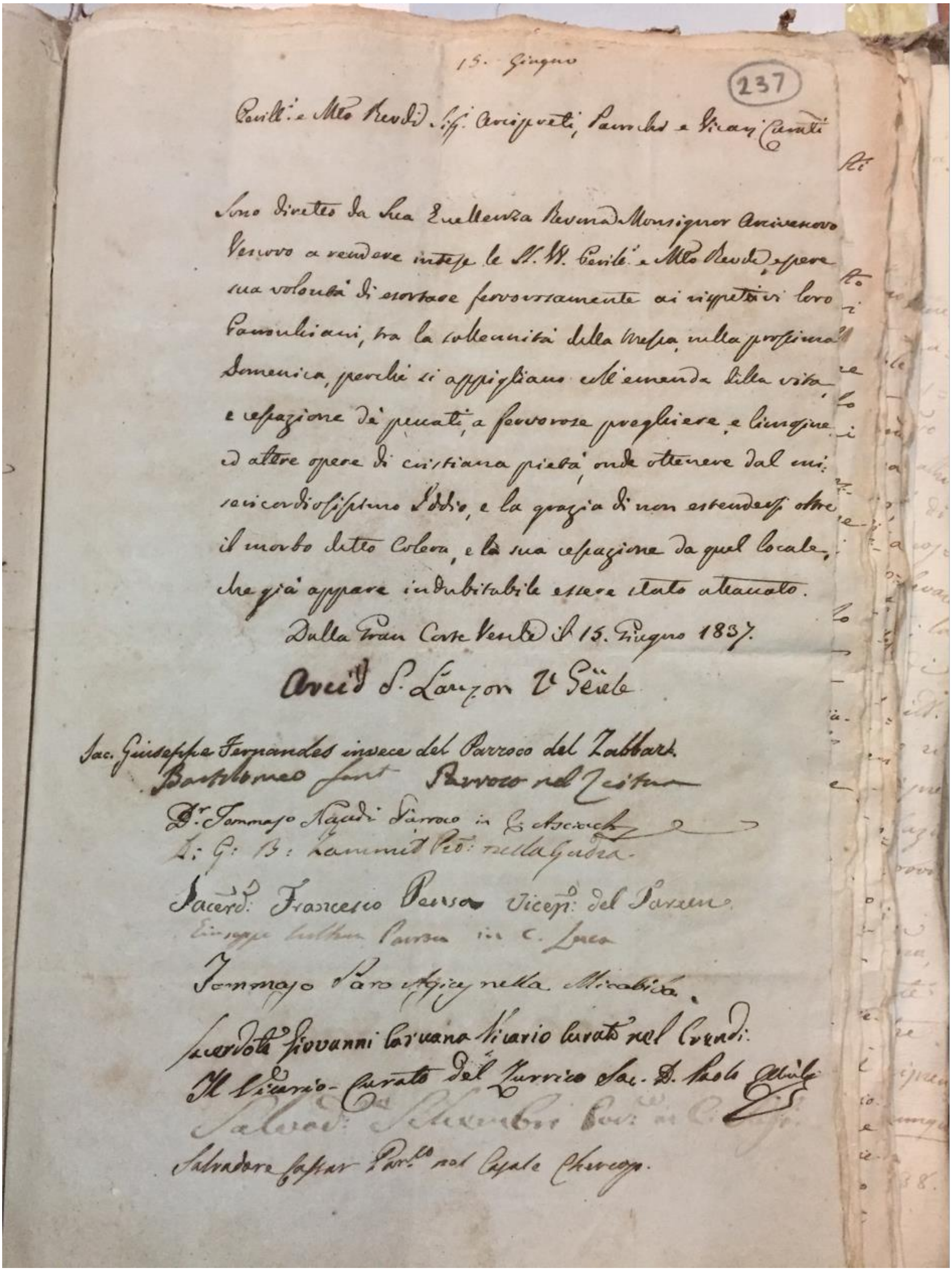
Bishop Edicts and Letters during the Pandemic

The local Church authorities, led by Bishop Francesco Saverio Caruana (1759-1847) since 1831, pre-empted the Governor by four days and issued a pastoral letter on Thursday 15 June 1837 to be read to the faithful during the following Sunday Mass. The faithful were informed that cholera had hit our shores and they were asked 'to pray, fast and perform other Christian pieties so that God would have mercy on us, forgive our sins and steer away cholera from our shores'[8] (Figure 2).

Four days later, on 19 June, Bishop Caruana issued another pastoral letter wherein he temporarily removed, until further directives were given, the obligation of the faithful to abstain from partaking meat on Friday and Saturday (Catholics had the obligation not to eat meat on Fridays and Saturdays). Doctors had advised him that eating fresh healthy meat helped prevent the onset of cholera. He ordered that instead of abstinence from meat, the faithful should pray, give charity to the poor and needy, and perform other pious deeds However, the obligation to abstain was retained for the eve of the approaching feasts of St John the Baptist (23 June) and St Peter and St Paul (28 June). (Figure 3). He also prayed to 'Our Father, the Glorious Apostle St Paul (patron saint of the Maltese) and the other patron saints that protect us, to intercede with the Lord to stop this devastating malady'[9] (Figure 4). He instructed that this letter was to be published immediately.

Bishop Caruana issued another Pastoral Letter on 22 June wherein he asked the parish priests of the diocese to promote prayers by the faithful to stop the scourge of cholera that was affecting parts of the island of Malta. [10] He ordered '*la decantazione delle Litanie Maggiore ad ostium tabernaculi da farsi giornalmente la sera alle ore sei e mezza puntualmente, e cosi' precendentemente alle benedizione in tutte le Chiese Sagramentali'* (the chanting of the Major Litanies with the Host in the open Tabernacle, was to be performed daily at exactly six-thirty before the benediction at all the Sacramental Churches) (Figure 5). The following day, the Bishop issued a notification whereby permission was given to confessors to absolve reserved sins such as the procurement of abortion[11] (Figure 6). However, the relationship of this letter to the on-going cholera epidemic is not established.

Figure 2 Bishop Francesco S Caruana's letter to Maltese Parish priests on 15 June 1837. (Floriana, Malta, Bishop's Curia Archives, Bishop's Pastoral letter).



15. Giugno

237

Perill.i e M.to Rev.di Sig.i Arcipreti, Parrochi e Vicarj Curati

Sono diretto da Sua Eccellenza Reverendissima Monsignor Arcivescovo Vescovo a rendere intese le SS. VV. Perill.i e M.to Rev.de essere sua volontà di esortare fervorosamente ai rispettivi loro Parrocchiani, tra la solennità della Messa nella prossima Domenica, perchè si appiglino all'emenda della vita e espiazione de' peccati, a fervorose preghiere, e limosine ed altre opere di cristiana pietà onde ottenere dal misericordiosissimo Iddio, e la grazia di non estendersi oltre il morbo detto Colera, e la sua espiazione da quel locale, che già appare indubitabile essere stato attaccato.

Dalla Gran Corte Vescovile il 15. Giugno 1837.

Arcid. S. Lanzon V. Gen.le

Sac. Giuseppe Fernandes invece del Parroco del Zabbar.
Bartolomeo [illegible] Parroco nel Zeitun
D.r Tommaso Nagdi Parroco in [illegible]
D. G. B. Zammit Pro. nella Gudia.
Sacerd. Francesco [illegible] Vicep. del [illegible]
Giuseppe [illegible] Parroco in C. Luca
Tommaso [illegible] nella Mirabita.
Sacerdote Giovanni Caruana Vicario Curato nel Crendi.
Il Vicario-Curato del Zurrico Sac. D. Paolo [illegible]
Salvad. [illegible]
Salvadore [illegible] Par.co nel Casale Chircop.

Figure 3 Pastoral letter dated 19 June 1837 page 238[v] (Floriana, Malta, Bishop's Curia Archives, Bishop's Pastoral letter).

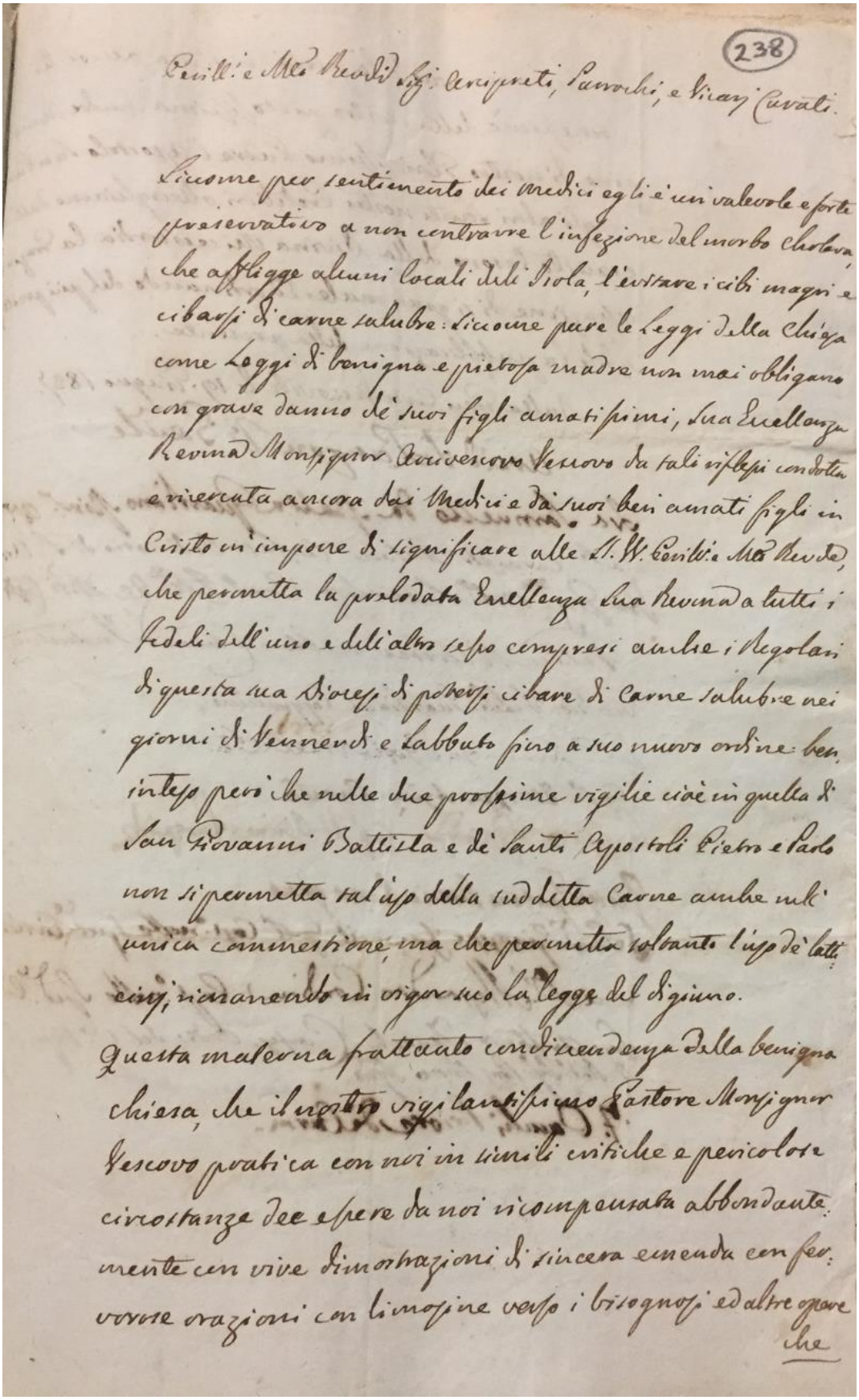


Figure 4 Pastoral letter dated 19 June 1837 page 238[r] (Floriana, Malta, Bishop's Curia Archives, Bishop's Pastoral letter).

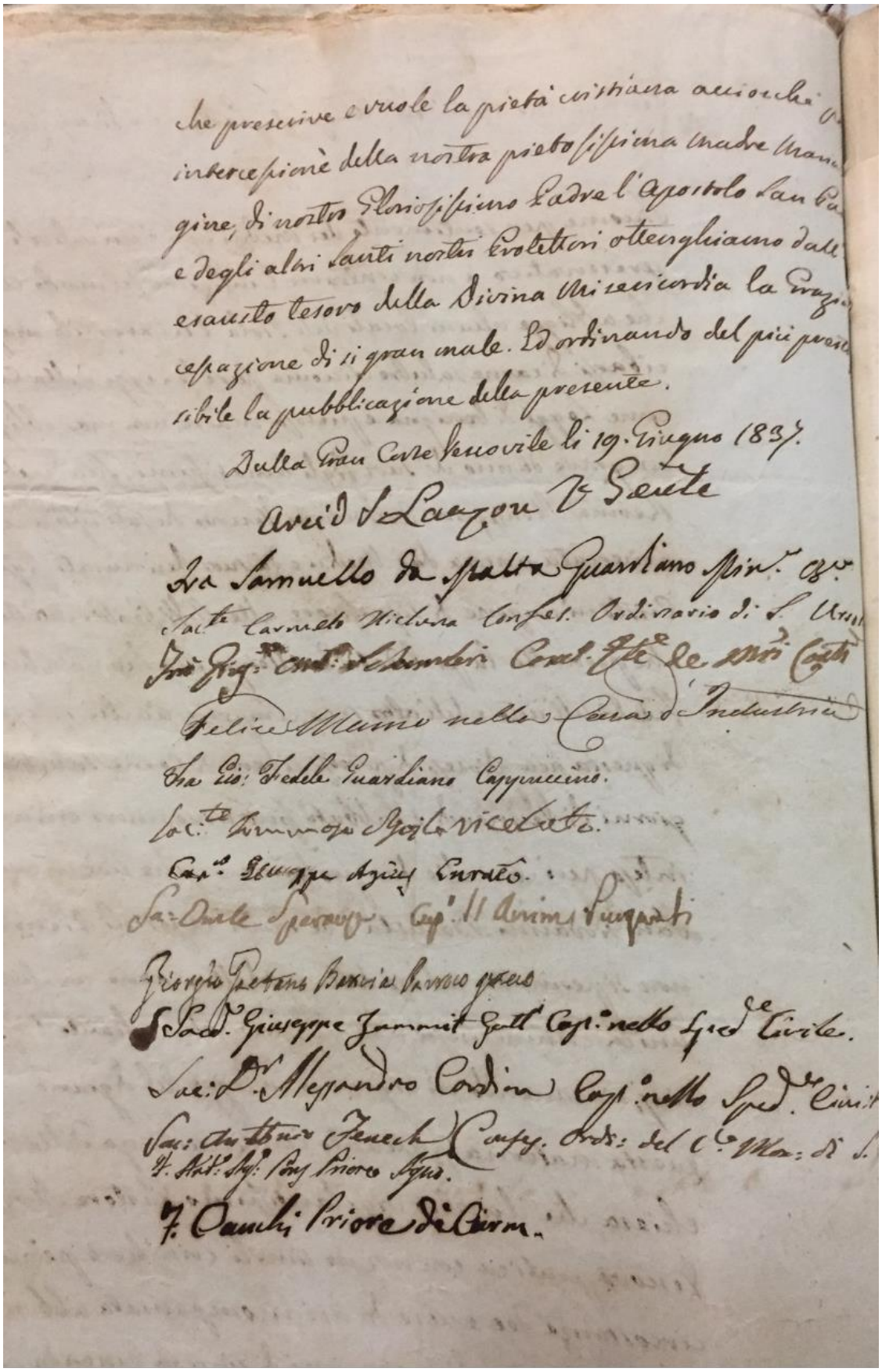


Figure 5 Pastoral Letter dated 22 June 1837 (Floriana, Malta, Bishop's Curia Archives, Bishop's Pastoral letter).

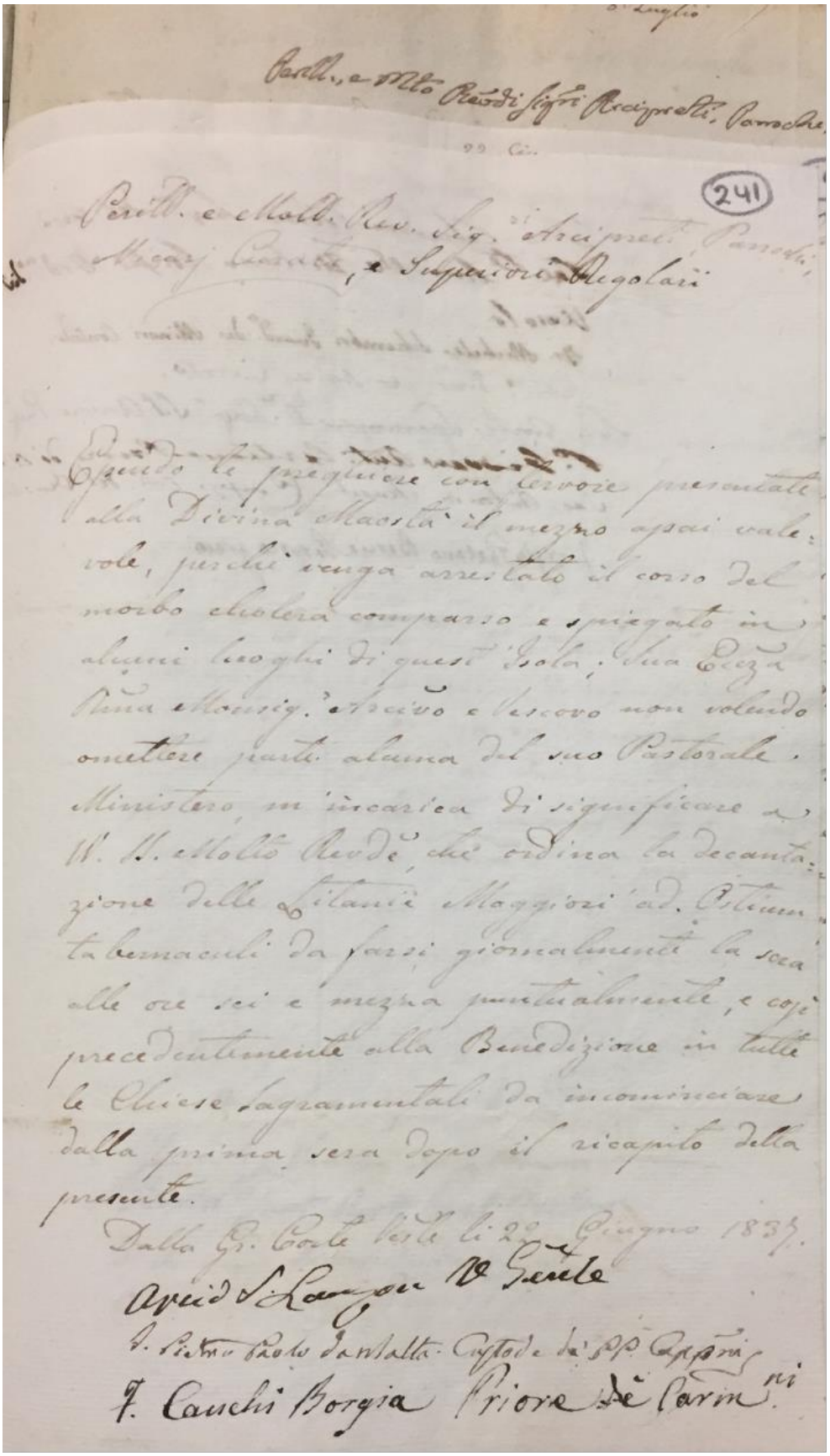
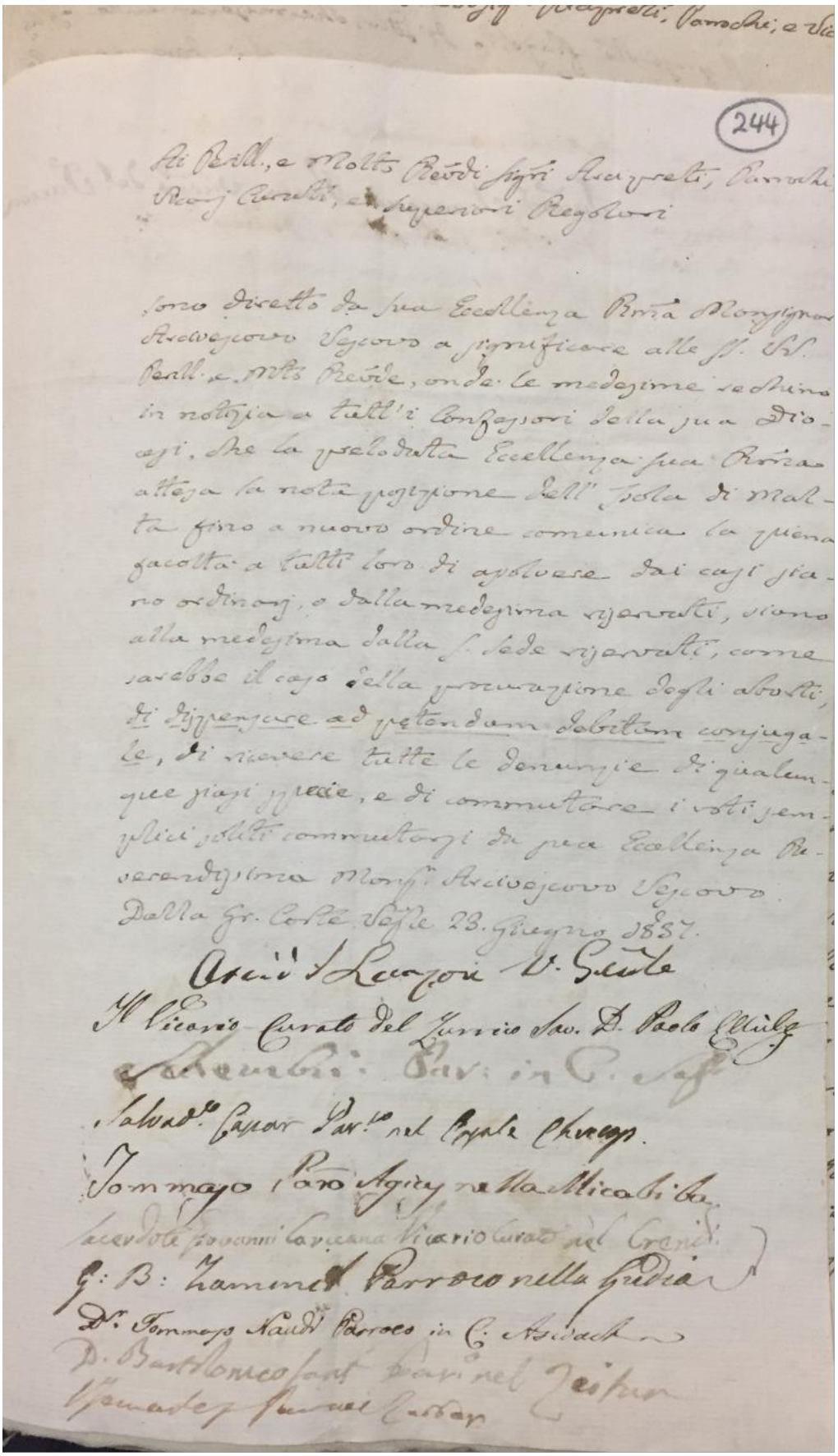


Figure 6 Pastoral Letter dated 23 June 1837 (Floriana, Malta, Bishop's Curia Archives, Bishop's Pastoral letter)



Beside transmitting directives from the ecclesiastical authorities, the parish priests also disseminated instructions issued by government bodies such as the Malta Medical Committee for the prevention and treatment of cholera which issued instructions for the treatment of the disease on 22 June.[12]

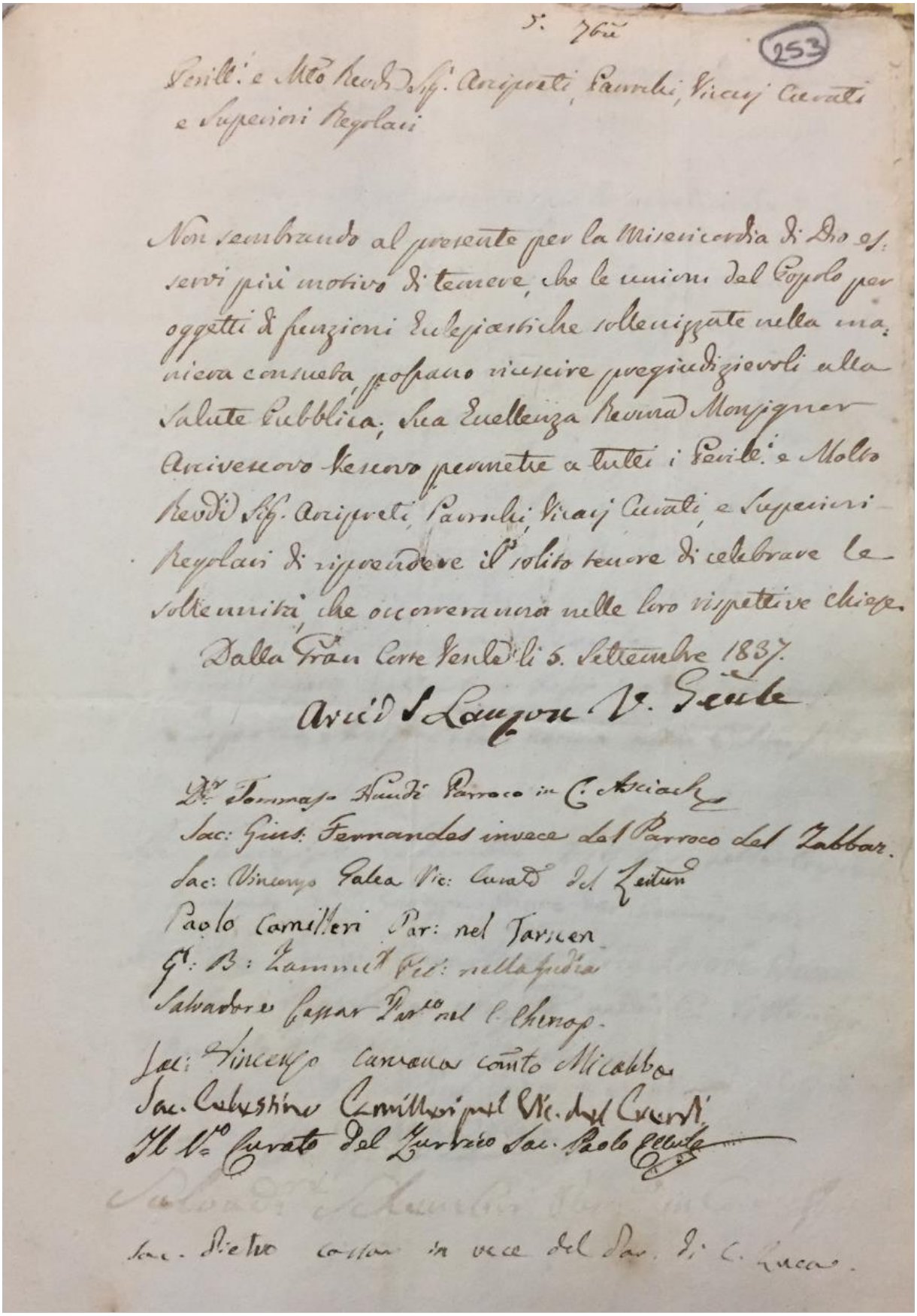
In a subsequent letter dated 8 July, the Bishop ordered that the poor and miserable dead from cholera should be given proper Roman Catholic funerary rites, free of charge if necessary, He, however, also instructed the parish priests to be very attentive to ensure that the relatives of the dead person were not pretending that the dead person was poor to avoid paying their dues to the Parish.[13]

When the Government Gazette on 19 July 1837 reported a marked increase in cases, Bishop Caruana issued a new Pastoral Letter (dated 21 July) wherein he wrote that it has become more necessary to pray '*presso il trono Della Divina misercordia per ottenere la grazia della cessazione di questa maligna infezione, atteso che le preghiere speciali si ascoltono piu da Dio*' (kneeling in front of the throne of the Divine mercy to gain the grace of cessation of this malignant infection, with the expectation that special prayers reach more the ears of God). He suggested that special masses should be adapted to various situations and ordered that on the 24 July '*una messa cantata solenne – Pro vitanda Mortalitate – in paramenti violace senza Gloria con Credo in tutte le chiese sacramentali, applicando il frutto del Santo Sacrificio*' (a Solemn Sung Mass – Pro-Vitanda Mortalitae – in purple vestements with the recitation of the Creed but not the Gloria in all the Sacramental Churches, applying the fruit of the Holy Sacrifice) will be celebrated for the needs of the population and the suffrage of the souls in Purgatory. The Bishop wrote that 'we are giving them (souls in Purgatory) a chance again so that they can prove themselves yet again during the present affliction.' Apart from this, he directed that *la Colletta – Pro vitanda Mortalitate* – be said every day including days in which First Class feasts are celebrated[14].

On 3 August 1837, the Bishop decreed that after discussions with the doctors and the need for people to eat salubrious meat during the cholera epidemic, its consumption was permissible on the eve of St Laurence's feast (9 August) and on the eve of the Assumption of Our Lady (14 August) as a once only concession[15]. On 18 August he repeated the order for the eve of St Bartolomeo (23 August) also as a once only concession[16].

On the first days of September, as the cholera cases decreased to single figures, the Bishop distributed a pastoral letter (on 5 September) stating that since 'it seems at present and '*per la misericordia di Dio*' (for the mercy of God) there was no reason to fear (cholera) any longer, gatherings of people for solemn Eucharistic functions could resume in the usual manner'. Bishop Caruana further urged the parish priests and superiors of convents to recommence celebrating all the usual solemnities that occurred in their respective parishes[17] (Figure 7). In a decree signed on the 14 September 1837, the Bishop stated that although the cholera epidemic was by then in decline and at its tail end, one could not confidently say that it had finished completely and therefore after consulting with the doctor who advised in this matter, the Bishop decided to renew the permission for people to eat salubrious meat on Fridays, Saturdays and eves of feasts.[18]

Figure 7 Pastoral Letter 5 September 1837 (Floriana, Malta, Bishop's Curia Archives, Bishop's Pastoral letter).



The Church authorities compelled doctors to perform post mortem caesarean sections in pregnant women and this was in force during the cholera epidemic.[19] This followed an edict published on 14 June 1788 by Bishop Fra Vincenzo Labini (1780-1807) to enforce the obligation to perform post-mortem Caesarean sections [20]. During the cholera epidemic of 1837 Dr G.M. Stilon never neglected to perform Caesarean sections on dead pregnant women,[21] while Dr Tommaso Chetcuti recorded the extraction by Caesarean section of three living foetuses "who were immediately baptised by the chaplain"[22]

On the 17 October 1837, when the cholera had abated completely, the Bishop wrote a long pastoral letter where he thanked God and the intercession of Our Lady and St Paul Our Father "for listening to our fervent prayers' that led to the cessation of cholera that had been raging for 4 months. He ordered special prayers of thanksgiving to be said at the Mdina Cathedral, St. John's Church in Valletta, the churches of Vittoriosa, Senglea and Cospicua on Monday 23 October 1837. The parish priests from country districts were to hold these prayers the following Sunday (29th) in their respective churches. There was to be joyous church bell ringing on the eve of the day of thanksgiving at Ave Maria and on the morning of the day itself. The day was to be celebrated by a votive solemn mass of thanksgiving with singing *'Pro gratiarum actione con Gloria, Credo and Prefazio'* (thanksgiving with singing of the Gloria, Creed and Preface) followed by the incantation of the *Te Deum* during the procession. The Bishop added that a requiem mass for those who perished from cholera would be celebrated on Saturday 21 October at the Mdina Cathedral, in Valletta and other harbour area churches, and on Friday 27 October in the countryside churches. At the end of the letter, the bishop reversed the special decrees he had ordered during the epidemic such as those given on 23 June 1738 to the confessors regarding reserved sins[23] and presumably introduced the obligation not to eat meat on Fridays, Saturdays and eve of feasts.

Untrumpeted Service of the Clergy during the Pandemic

The Governor visited Fort Ricasoli Hospital on Sunday 25 June and he was satisfied with the medical and religious arrangements for the inmates. The Governor '*si compiacque esprimere la sua sodisfazioni per le disposizioni mediche, che si erano date per la cura degli ammalati e per lo zelo con cui i due cappellani dello stabilimento avevano disimpegnato i loro spirituali doveri: essi ora sono assistiti da' PP Capucchini. Nessuna delle vittime della malattia mori' senza i conforti della consolazione religiosa ne' suoi ultimi momenti*'[24] (was pleased to express his satisfaction with the medical provisions, which had been given for the care of the sick and for the zeal with which the two chaplains of the establishment had carried out their spiritual duties: they are now assisted by Cappuchin fathers. None of the victims of the disease died without the comforts of religious consolation during their last moments of life)

Many religious men and women did their duty with love and compassion towards the sick and the dying. John Stoddart, the Chief Justice in Malta during that fateful summer of 1837 wrote:

'When I mention a good man (Dr Stilon), however who was engaged in this great work (heading the Cholera Hospital), I must not forget another whose self-devotion ought to render his memory dear to his countrymen, and to every friend in humanity. There was a Roman Catholic priest, named Teuma, who no sooner heard that there was a large hospital opened for the reception of cholera

patients, many of whom would infallibly die, than spurning the danger of contagion in which most of his countrymen firmly believed, he took his bed with him into the hospital, and there remained day and night, so long as the epidemic lasted; for the sole purpose of administering to the dying those sacraments, which smooth with them the awful entrance into the valley of the shadow of death. Whether this heroic man has since been recompensed by any earthly distinction, I know not; but surely, he may expect the infinitely higher reward – "Well done, thou good and faithful servant! Enter thou into the joy of thy Lord."[25] One could not have been given a better commendation than that!

Sarah Austin in her essay on 'Cholera in Malta' stated that although there were clergymen who were frightened and the panic was general and overpowering, there were priests who reacted honourably. 'The Capuchin friars never shrank from their duty and endured great fatigue […] The Cappellano of the Dominicans was unwearied.' The latter suffered from epileptic fits but he attended to the sick and dying day and night without experiencing a single fit. He attributed this freedom of fits as a Divine favour for his compassion and he kept going without receiving any assistance. Austin reported that the work of the priests increased by ten times because very often all the doctors could do when faced with the sick was to order the viaticum.[26]

In addition, the superiors of the convents in Valletta promptly offered their co-operation by making wholesome soup to be given out to the most necessitous poor at their district. The first distribution was made on Friday 14 July 1837 and during the four days from 16th to 19 July, 1800, 200 and 1200 daily portions were distributed to the poor of Valletta, Floriana and Vittoriosa-Senglea respectively.[27] This relieved some of the suffering and helped check the disease especially in those who were poor and destitute in the cities of the harbour area. There were also plans to extend this service to the 'country districts' but no evidence is available to confirm that this ever materialized.

The Conventual Franciscans and the Capuchins were requested by Bishop Caruana to help provide services to some parishes because: '*Alcuni Parrochi intimoriti, ed altri indisposti di diversi Casali, si ritiranno ed i preti non volevano amministrare i Sagramenti […] ed i nostri furono per amministrare i Sagramenti in Casal Lia, nel Nasciaro, in Casal Asciac, in Birchircara e nel Vallone di detta, chiamato Misida o Pietá*'[28] (Some frightened parish priests, and others who were indisposed from different villages will retire and the priests did not want to administer the Sacraments [...] and (therefore) ours (the Franciscans) were to administer the Sacraments in Casal Lia, in Nasciaro, in Casal Asciac, in Birchircara and in the Valley called Misida or Pietá). This was acceded to and Fr Anton Salvatore Spiteri assumed the post of vice-parish priest in Birkirkara, Fr Serafin Agius helped in Cospicua, and Fr Giovanni Battista Mifsud gave his services to the Msida parish. On 6 July 1837, the ailing parish priest of Casal Lia Francesco Saverio Galea requested the bishop to substitute him since he was very weak and he could not perform his parish duties since '*giacché nessun prete vuol mettersi assolutamente*' (none of the priests wants to present himself absolutely). This led to two Franciscan monks replacing him immediately and another monk joining later. Their contribution was acknowledged by the bishop on 13 September 1837.[29]

The Oratorians of St. Philip Neri in Senglea made their church and convent available to serve as a quarantine hospital during the epidemic. It was subsequently used as a

communal kitchen to serve the poor.[30] The parish priest of Senglea Mons Leopoldo Fiteni, on 30 June, remarked that there had been so many deaths in the parish that only nineteen empty graves remained and that he was considering opening the ancient plague burial grounds[31]. Later on, he praised the priests of his parish and remarked that they have attended to the cholera sufferers with great zeal and devotion, with Canon Jaochim Audibert receiving special mention.[32]

In a panegyric delivered on 2 July 1837 on the titular feast of the church annexed to the Oratorio of St Philip Neri, Fr Francesco Saverio Baldacchino preached about 'the great love the Virgin Mary has towards humanity. It is the love of a mother towards her children that drives Her to intercede with her son Jesus Christ to save us from the affliction.'[33] Cholera is not mentioned by name during the sermon, but the priest from Senglea would have had received the circular from the Bishop on 15 June and by the 2 July, there were already deaths from cholera reported in Senglea. Also, in the manuscript *Memorie Diverse* written by the same Francesco Saverio Baldacchino, he reports that he delivered the panegyric which was supposed to be given by Fr Ludovico Mifsud. Mifsud 'did not do it because he had left with his family to Livorno to escape the perils.'[34] It is interesting to note that Fr Baldacchino gave the same panegyric he had given at the same feast during the plague epidemic of 1813.[33]

It was in situations like the cholera epidemic that the Catholic Church distinguished itself as the ultimate protector of the Maltese population. The government did help with some relief funds but it was church organisations that came all out to aid the afflicted. The parish priests throughout the country strived to relieve the sufferings of the poor and destitute in their parishes. Despite that the majority of the population were dreading the cholera onslaughts, it was the Capuchin fathers, in particular, who showed the heroism of Christian Charity.

Some parallels may be drawn between the church's role during the cholera pandemic of 1837 and the Covid-19 pandemic of 2020-2021. The Maltese bishops followed the doctor's advice to protect the elderly in the church's nursing homes. They stopped mass activities such as feasts, and removed the obligation to attend mass on Sundays and other days of obligation. For a time, the churches were closed. The Bishops invited the Maltese population to pray for the sick, the souls of the dead and the carers. The church through Caritas provided hundreds of daily meals to the old, poor and vulnerable and psychological and material help to those in need.

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