

A quantitative analysis of patients' use of government health centres in Malta during 2020-2022

Dr Daniela MIFSUD, Dr Jurgen C ABELA, Mr Gianluca URSINO and Ms Julia ZAHRA

ABSTRACT

Background

At present in Malta, primary health care is delivered via the publicly funded health service - Primary HealthCare - and a parallel running private health system. The Electronic Patient Record (EPR) started to be utilized in Primary HealthCare in 2020.

Objective

The aim of this cross-sectional observational study was to analyze patients' use of health centres between January 2020 (which coincides with the start of use of EPR) until August 2022.

Method

Data was collected from the Electronic Patient Record which is the database used by Primary HealthCare in Malta which was then analyzed using Excel 2010. Variables collected included patient's age, gender, number of patients visiting the health centre, patient's locality, and whether it was a telephone or face-to-face consultation.

Results

The results clearly demonstrated a rise in patients making use of health centres over the period 2020-2022. Mosta Health Centre was observed to be the busiest health centre. Health centre patients' use in summer was significantly different from use in winter. Furthermore, the

female population seemed to be attending these clinics more than their male counterparts.

Conclusion

Over the years a trend was noted where telephone consultations were not popular in 2020 but as the pandemic went on patients became more aware and made use of telemedicine. The majority of patients using telemedicine were aged 70+. However, as the social distancing measures of COVID-19 were eased in 2022, the majority of patients opted for face-to-face GP consultations once again.

Keywords

Electronic health records; telemedicine; pandemics; COVID-19; primary health care

INTRODUCTION

At present in Malta, primary health care is delivered via the publicly funded health service - Primary HealthCare - and a parallel running private health system. There is no compulsory doctor-patient registration so far. The public sector is provided through ten health centres and a mix of community clinics, whilst the private sector is composed of general practitioners working through community pharmacies or their own clinics. The publicly funded primary health system is free at the point-of-delivery and delivered through nine health centres in Malta

and one health centre in Gozo. The three main health centres are located in Floriana, Mosta and Paola and are open 24 hours a day. The satellite health centres consist of Birkirkara, Rabat, Gżira, Qormi, Kirkop and Cospicua. All health centres in Malta provide a routine general practitioner (GP) service, as well as a comprehensive list of ancillary services (Baldacchino et al., 2017).

The electronic patient records (EPR) enable the storage, retrieval and modification of health data using digital means instead of paper-based recording systems within one healthcare organization (Lo Re, 2021). When properly implemented, the EPR can improve the quality of healthcare, increase guideline compliance and reduce medication errors (Takian, Sheik and Barber, 2012). The EPR was launched in Primary HealthCare in January 2020, just a few weeks prior to the COVID-19 pandemic in the Maltese Islands.

The aim of this cross-sectional observational study was to analyze the use of health centres by patients between January 2020 (which coincides with the start of use of EPR) until August 2022. The hypothesis of this study was that throughout the peaks of the COVID-19 pandemic less people made use of health centres for a medical review with a subsequent rise in patients' use of health centres as restrictions were eased. A second hypothesis of this study was that patients made more use of health centres in winter when compared to summer.

METHOD

Data was collected from the EPR which is the main database used in Primary HealthCare in Malta. It started being rolled out in January 2020, with all health centres making use of it from March 2020 except Victoria Health Centre in Gozo. The Data Protection Officer and Clinical Chairman of Primary HealthCare granted permission to time-limited access to the EPR to collect data. Ethical approval was obtained from the University of Malta Research Ethics Committee, making it a total of 3 approvals obtained prior to commencing the study.

A week in March (7-13) in 2020, 2021, 2022 as well as a week in August (3-9) 2020, 2021, 2022 were chosen for analysis. The idea behind this choice was to choose a week during the winter period and a week during the summer period. Whilst ideally more weeks were chosen throughout data collection to achieve a more representative sample, six data sets were deemed to be feasible for the authors to analyse trends in health centres use. The reason why March was the month used to represent the winter months was because, in the first year of EPR use (i.e. 2020), the earliest data uploaded on the EPR was in March. In addition, given the huge volume of data to be collected and limited human resources, two weeks were deemed to be manageable by the authors. Variables collected included patient age, gender, number of patients visiting the health centre, the patient's locality, and whether it was a telephone or face-to-face consultation. This was done for all nine health centres in Malta.

All patients who visited a health centre during the above-mentioned periods were included. Gozo health centre was excluded from the analysis (due to absence of EPR at the time periods being studied). With regards to the paediatric population, whose age was written in months, the authors opted for the age range 0-1 as there would be difficulty to analyse data based on months as well.

Data was anonymised by removing name, surname and ID numbers prior to it being inputted in Excel 2010. The quantitative data was analysed using Excel 2010. The data was handled only by the four researchers with the files being password protected and stored securely.

RESULTS

It was noted that throughout the two one-week study periods per year during 2020-2022, 25,398 patient encounters were recorded. Of these 52% of patients were female while 48% of patients were male. The commonest subgroup were patients aged 70+ (Figure 1) which was composed of 12.3% females and 10.0% males (Figure 2). Given that the accepted cut-off age between paediatric and adult population is 18 years of age, the second and third age bracket do not adhere to the 10-year interval.

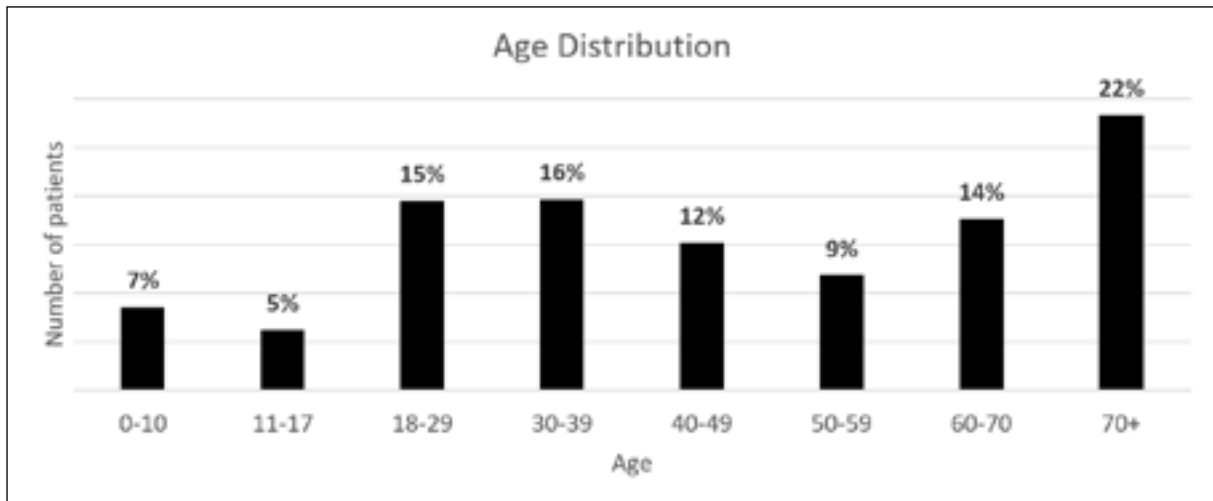


Figure 1: Age distribution (in years)

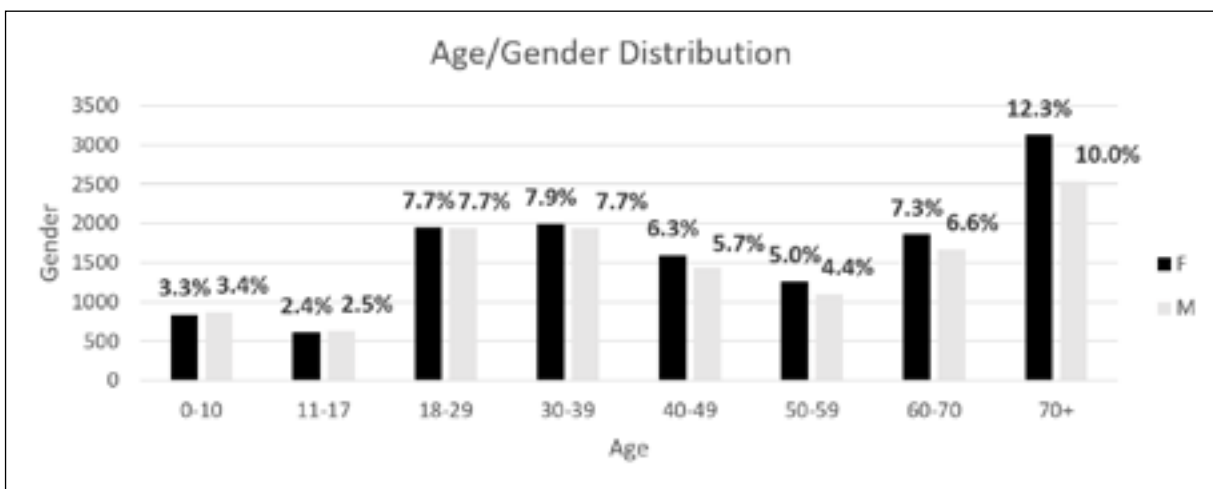


Figure 2: Age/gender distribution (F – female; M- male)

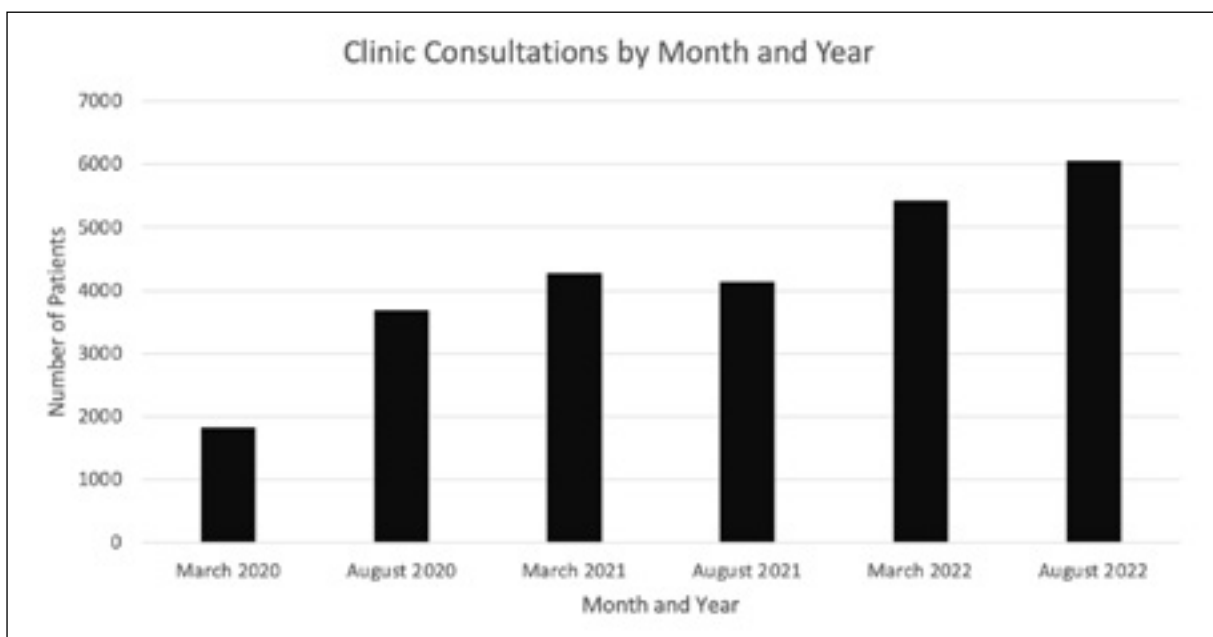


Figure 3: Clinic consultations by month and year

During the time period studied, that is 2020-2022, the face-to-face consultations increased with an all time high in August 2022, as shown in Figure 3.

To determine if the health centre use in summer was significantly different from its use in winter, a one-sided proportion test was used. Out of the 25,398 samples, 13,872 of patients visited a health centre in summer which resulted in a sample proportion of 0.55. Using the *prop.test()* function in *R*, a *p*-value of approximately zero was achieved, hence there is strong evidence that the government health centre use in summer was significantly different from the clinic use in winter.

A simple linear trend model was fitted to the number of health centre use in time, which is defined as

$$y_i = \beta_1 t_i + \beta_0 + \varepsilon_i,$$

where y_i is the number of clinic use, t_i is the time point, β_0 is the intercept, β_1 is the slope and ε_i is the error. This model can be used to determine

if the increase in the trend in health centre usage is statistically significant by estimating the slope parameter and noting if it is significantly different from zero. This is depicted in Table 1.

Table 1: Number of health centre use in time

MONTH	TIME-POINT	COUNT
March 2020	1	1828
August 2020	2	3679
March 2021	3	4272
August 2021	4	4138
March 2022	5	5426
August 2022	6	6055

Using the ordinary least square estimation from the *lm()* function in *R*, the estimates were achieved as seen in Table 2.

Table 2: Ordinary least square estimation to determine the p-value and assess for statistical significance

	Estimate	Std. error	t value	p-value
Intercept	1608.8	467	3.445	0.026
Slope	749.8	119.9	6.252	0.003

The slope parameter is estimated to be 749.8 and has a *p*-value of 0.003 which is less than the 0.05 level of significance. This means that the slope is significantly different from zero and since it is positive this means that the increase in trend in health centre use over the years is significant.

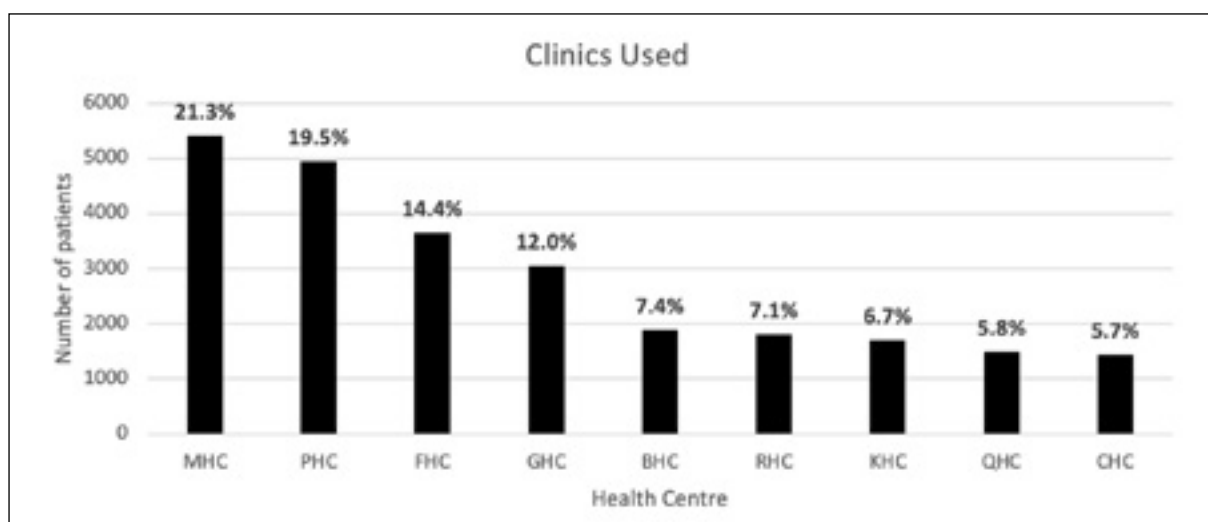


Figure 4: Patient attendance by health centre (MHC – Mosta Health Centre, PHC – Paola Health Centre, FHC – Floriana Health Centre, GHC – Gzira Health Centre, BHC – Birkirkara Health Centre, RHC – Rabat Health Centre, KHC – Kirkop Health Centre, QHC – Qormi Health Centre, CHC – Cospicua Health Centre).

The government health centre which was used mostly was Mosta Health Centre (21.3%), followed by Paola Health Centre (19.5%) and Floriana (14.4%) as depicted in Figure 4. The health centres which were used the least by patients was the Cospicua Health Centre (5.7%), followed narrowly by Qormi Health Centre (5.8%). As shown in Table 3, most patients making use

of the health centre service in Malta were from the Northern Harbour District (30.9%) followed by the Southern Harbour District (23.3%). On the other hand, patients residing in Gozo made up only 0.5% of patients using these clinics in Malta throughout the study period. The authors focused further detailed analysis on the three main health centres.

Table 3: Use of health centres and telephone consultations based on districts. (The Northern Harbour District is composed of Sliema, Birkirkara, Gzira, Ħamrun, Msida, Pembroke, Pietà, Qormi, St Julians, Santa Venera, Swieqi and Ta' Xbiex. The Southern Harbour District is composed of Valletta, Birgu, Bormla, Fgura, Senglea, Floriana, Kalkara, Luqa, Marsa, Santa Lucija, Paola, Tarxien, Zabbar and Xgħajra. The Northern District is composed of Għargħur, Mellieħa, Imgarr, Mosta, Naxxar and San Pawl il-Baħar. The Western District is composed of Attard, Balzan, Dingli, Iklin, Lija, Imtarfa, Rabat, Bahrija, Siġġiewi and Żebbuġ. The South Eastern District is composed of Birżebbuġa, Għaxaq, Gudja, Marsaskala, Imqabba, Marsaxlokk, Qrendi, Safi, Żejtun and Żurrieq.)

District	In clinic consultation	Telephone consultation	Grand Total	Percentage
Northern	3,160	1,403	4,563	17.90%
Western	2,282	1,060	3,342	13.20%
Northern Harbour	5,092	2,744	7,836	30.90%
Southern Harbour	4,081	1,835	5,916	23.30%
South Eastern	2,408	1,133	3,541	13.90%
Gozo	76	59	135	0.53%
Unknown	52	12	64	0.25%
Abroad	1	-	1	0.02%
Grand Total	17,152	8,246	25,398	100%

The EPR also provided information on whether the consultation was face-to-face or telephone based. It was noted that out of 25,398 consultations assessed in this study, 17,152 (67.5%) were face-to-face consultations whilst 8,246 (32.5%) were telephone consultations. Once again, the highest amount of telephone consultations was made within the Northern Harbour catchment area.

As shown in Figure 5, the catchment area of Gzira Health Centre experienced more telephone consultations (51%) when compared to face-to-face clinic consultations (49%). However, the overall majority of patients still preferred face-to-face consultations when compared to telephone consultations.

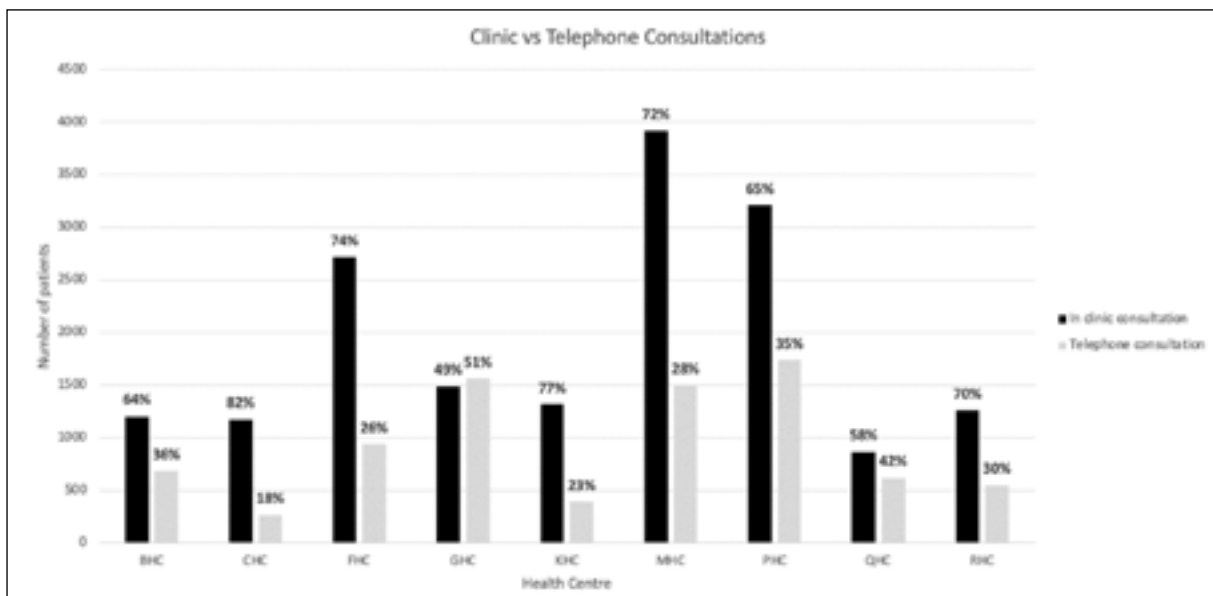


Figure 5: Clinic versus telephone consultations (MHC – Mosta Health Centre, PHC – Paola Health Centre, FHC – Floriana Health Centre, GHC – Gzira Health Centre, BHC – Birkirkara Health Centre, RHC – Rabat Health Centre, KHC – Kirkop Health Centre, QHC – Qormi Health Centre, CHC – Cospicua Health Centre).

Over the years a trend was noted: while telephone consultations were not popular initially during 2020, as the pandemic went on patients became more aware and made use of telemedicine. Thereafter, as depicted in Figure 6 below, the majority of patients opted for face-to-face consultations once again. Furthermore, it was quite interesting to note that the population subgroup that made most use of telemedicine was the 70+ group (37%) (Figure 7).

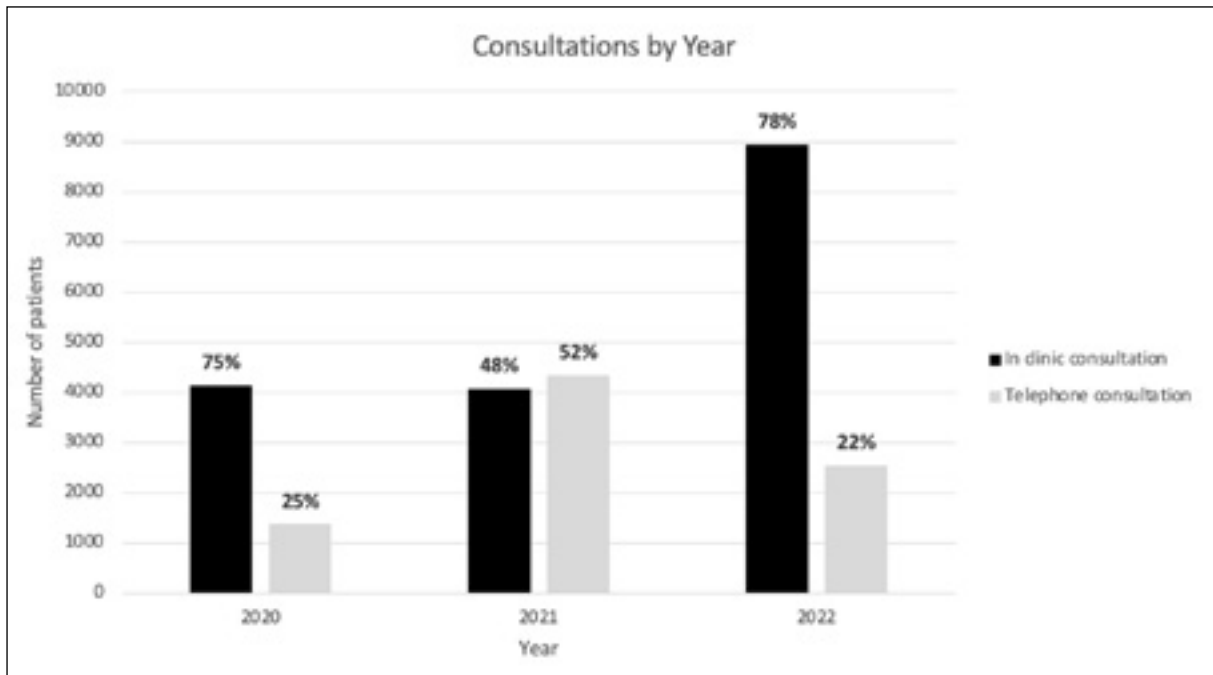


Figure 6: Clinic versus telephone consultations by year

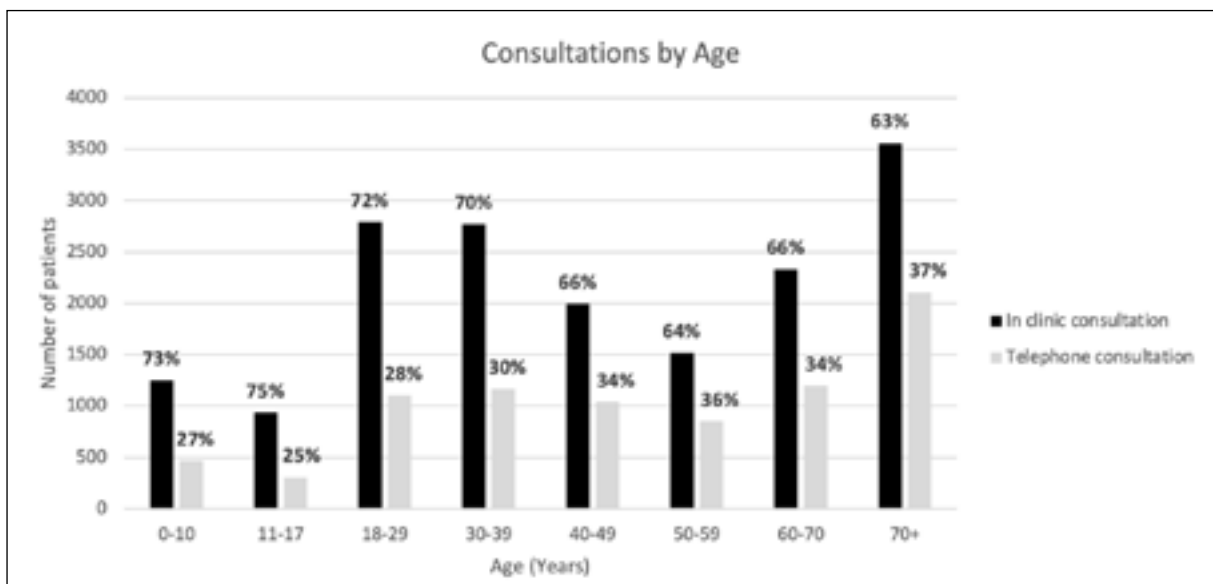


Figure 7: Clinic versus telephone consultations by age of patients in years

DISCUSSION

The primary care system is deemed to be the first line of defense and first point of contact during a pandemic. This system is able to reinforce public health messages, identify those patients in need of inpatient care and also help manage patients at home to avoid extra burden on the local hospitals (Krist et al., 2020).

Use of government clinics

The results clearly show a rise in patients making use of government health centres over the time period as restrictions related to the COVID-19 pandemic eased. Furthermore, there a statistically significant increase in use of these clinics during the summer months when compared to the winter months. This is contrary to this study's hypothesis and other studies

which noted an increase in workload during the winter months. A study carried out by Millwood, Tomlinson and Hopwood, (2021) evaluating nine GP practices in Manchester, United Kingdom noted that during the winter months there was a 61% increase in face-to-face GP consultations and an 81% increase in telephone consultations. This rather paradoxical increase could be also explained by looking at the 'greater picture' and considering part of an overall trend in increasing face-to-face consultations as time elapsed from 2020. In fact, Figure 3 shows an upward progressive increase in patient attendance for each successive period of study. Certainly, this is an interesting result, and future studies could help to shed light onto the present trend.

In line with the argumentation put forward above, there was also a statistically significant rise in the use of these clinics from 2020 to 2022. This is also the case in the United Kingdom where GP consultations increased by 89% from 2020 to 2023 (Green, McKee and Katikireddi, 2022). One possible reason to this noted trend is that patients were apprehensive to leave their households during the peak of the COVID-19 pandemic and resumed to utilizing government health centres as restrictions eased.

Mosta Health Centre was confirmed as the busiest health centre locally, this also correlates with statistics issued by the National Statistics Office as the northern region (81,859) (Regional Statistics Malta, 2022) has a higher number of inhabitants when compared to other regions in Malta. Furthermore, the female population seems to be utilizing these clinics more and this correlates with other studies done abroad (Hunt et al., 2011) and also locally (Baldacchino et al., 2017).

Telemedicine

It is also interesting to note that during this study period 32.5% of consultations were telephone based. This correlates with other studies which stated that in settings such as the US internal medicine and UK primary care, a quarter of doctor-patient interactions occur via telephone (Van Galen and Car, 2018). This was also noted in a study by Green, McKee and Katikireddi (2022)

which noted that the number of telephone consultations trebled from 2020 to 2021. Without a doubt the COVID-19 pandemic has reshaped health care services and as a response to physical distancing and vulnerable patients, the use of telemedicine has emerged. Telemedicine reduces the amount of medical consultations resulting in saving time and cost of treatment for the patient and medical practitioner. It also helps to streamline the workflow of hospitals and clinics resulting in alleviation of the burden of in-clinic consultations (Haleem et al., 2021). Of course, this type of service provision has its challenges and its perks. Indeed, as identified by Sammut et al., (2022), one of the challenges faced by GP trainees during their placement was the inability to examine patients. However, from the data collected, the number of telemedicine consultations was quite high and contributes to some off-loading from face-to-face consultations at health centres.

The pandemic seems to have acted as the catalyst required to propel telemedicine into routine practice. It was noted that in order to provide a sustainable telemedicine service the right structural framework and training to doctors need to be provided (Hasani et al., 2020). Patients aged 70+ made use of this service the most when compared to other population age groups. This correlates with a study done in Japan which also noted that both the younger population and patients aged 70+ increased their use of telemedicine during the pandemic (Miyawaki et al., 2021). However, more research is required to assess the effectiveness and appropriateness of telemedicine consultations. In addition, more research is needed to assess if the older age group of patients is able to keep updated with the ever increasing technological updates associated with such service.

According to Hajek and König (2018), with increasing age individuals become less optimistic about the treatment or may have increased perceived opportunity costs regarding doctor visits. This is contrary to findings in this study as the geriatric subgroup (70+) contributed to the largest population subgroup making use of government health centres.

Face-to-face consultations

This study revealed that face-to-face consultations increased from 2020 to 2022. This might be due to a variety of reasons but primarily, it might have been related to concerns related with morbidity and mortality of COVID-19 and attending clinics. This was also described in other studies abroad where patient consultations dipped especially in the first wave of COVID-19 (Xu et al., 2021). However, thereafter the easing of restrictions resulted in a surge in face-to-face consultations. Another reason as to why patients may prefer face-to-face consultations is that the majority of patients raise more than one issue during a single consultation and thus it might be easier to do so in person rather than via telemedicine (Baldacchino et al., 2017). Another possible explanation is that, as highlighted in a local study, hypertension is the most common comorbidity (Baldacchino et al., 2017). Therefore, patients might request more face-to-face consultations to measure their blood pressure.

Strengths, limitations and recommendation

Strengths

This is the first time that a comparative analysis is being done, as far as is known. All health centres except Gozo health centre were included in the study, thereby giving as broad a perspective as possible for the study.

Limitations

Only two weeks per year were analysed during 2020-2022 and thus, while the data gathered from this study can be useful, it cannot be deemed as conclusive. It should also be noted that in early 2020, EPR was being rolled out in various health centres, and consequently, use of such record keeping by doctors might not have been as efficient as it should be.

Recommendation

Ideally more weeks should be analysed to confirm trends observed in this study.

CONCLUSION

One hypothesis of this study was that throughout the peaks of the COVID-19 pandemic less people made use of government health centers for a medical review. The results of this quantitative analysis demonstrate a statistically significant rise in patients attending the health centres over the time period as restrictions related to the COVID-19 pandemic eased. A second hypothesis of this study was that patients made use of the government health centre services more frequently in winter when compared to summer. However, this study found a statistically significant increase in the use of health centres services during the summer when compared to winter. It was noted that throughout the study period 25,398 patient encounters were recorded.

Over the years a trend was noted where, while telephone consultations were not popular in 2020, as the pandemic progressed patients started making use of telemedicine. As the pandemic restrictions eased, patients opted for face-to-face GP service more, with telephone consultations remaining a minority. Furthermore, it was quite interesting to note that the population subgroup that made use of telemedicine most were those aged 70+.

Educating patients about the use of telemedicine and that its use can be fruitful beyond the pandemic may help reduce the burden of local health centres as a rise in use of these community clinics have been noted over the past three years. Further research is required to assess the public and general practitioners' knowledge, perspectives, and attitudes on telemedicine and whether the implementation of telemedicine has reduced the workload on Maltese health centres.

REFERENCES

- Baldacchino, M., Abela, J., Reiff, M., Grima, J., Attard, L. and Ellul, R., 2017. Patient attendance at a primary health care centre in Malta: a cross-sectional observational study. *Journal of the Malta College of Family Doctors*, 6(1), pp. 32-37.
- Green, M.A., McKee, M. and Katikireddi, S.V., 2022. Remote general practitioner consultations during COVID-19. *The Lancet Digital Health*, 4(1).
- Hajek, A. and König, H.-H., 2018. Which factors lead to frequent attendance in the outpatient sector among individuals in the second half of life? Evidence from a population-based longitudinal study in Germany. *BMC Health Services Research*, 18(1).
- Haleem, A., Javaid, M., Singh, R.P., and Suman, R., 2021. Telemedicine for Healthcare: Capabilities, features, barriers, and applications. *Sensors International*, 2, pp. 100-117.
- Hasani, S., Ghafri, T., Al Lawati, H., Mohammed, J., Al Mukhainai, A., Al Ajmi, F. & Anwar, H., 2020. The Use of Telephone Consultation in Primary Health Care During COVID-19 Pandemic, Oman: Perceptions from Physicians. *Journal of Primary Care and Community Health*, p. 11.
- Hunt, K., Adamson, J., Hewitt, C. and Nazareth, I., 2011. Do women consult more than men? A review of gender and consultation for back pain and headache. *Journal of Health Services Research & Policy*, [Online], 12(2), pp. 108-117. Available from: <http://dx.doi.org/10.1258/jhsrp.2010.009131>.
- Krist, A.H., DeVoe, J.E., Cheng, A., Ehrlich, T. and Jones, S.M., 2020. Redesigning primary care to address the COVID-19 pandemic in the midst of the pandemic. *The Annals of Family Medicine*, 18(4), pp. 349-354.
- Lo Re, V., 2021. Validation of health outcomes of interest in healthcare databases. *Pragmatic Randomized Clinical Trials*, pp. 207-218.
- Millwood, S., Tomlinson, P. and Hopwood, J., 2020. Evaluation of winter pressures on general practice in Manchester: A cross-sectional analysis of nine GP practices. *BJGP Open*, 5(1).
- Miyawaki, A., Tabuchi, T., Ong, M. & Tsugawa, Y., 2021. Age and Social Disparities in the Use of Telemedicine During the COVID-19 Pandemic in Japan: Cross-sectional Study. *Journal of Medical Internet Research*, 23(7).
- Regional Statistics Malta 2022 Edition* 2022, [Homepage of National Statistics Office Malta], [Online]. Available: [https://nso.gov.mt/en/publications/Publications_by_Unit/Documents/02_Regional_Statistics_\(Gozo_Office\)/2022/Regional%20Statistics%20Malta%202022%20Edition.pdf](https://nso.gov.mt/en/publications/Publications_by_Unit/Documents/02_Regional_Statistics_(Gozo_Office)/2022/Regional%20Statistics%20Malta%202022%20Edition.pdf) [2022, October 13th].
- Sammut, M.R., Abela, G., Abela, S., Pullicino, G. and Scerri, A.M., 2022. A review of GP trainees' evaluations of placements in hospital and community medicine during 2020-21 within Malta's Specialist Training Programme in Family Medicine. *Journal of the Malta College of Family Doctors*, 11(1), pp. 23-30.
- Takian, A., Sheikh, A. & Barber, N., 2012. We are bitter, but we are better off: case study of the implementation of an electronic health record system into a mental health hospital in England. *BMC Health Services Research*, 12(1).
- Van Galen, L. & Car, J., 2018. Telephone consultations. *British Medical Journal Clinical Research*, 326, pp. 966-999.
- Xu, Z., Fan, J., Ding, J., Feng, X., Tao, S., Zhou, J., Qian, L., Tao, K., Hambly, B. & Bao, S., 2021. The Impact of COVID-19 on Primary Care General Practice Consultations in a Teaching Hospital in Shanghai, China. *Frontiers in Medicine*, 8, pp. 28-32.

Dr Daniela MIFSUD

MD, BSc. (Hons.), PgDip SEM (UK), DipMSKMed (UK)

Foundation Year 2 Doctor, Mater Dei Hospital, Malta

Email: daniela.mifsud.1@gov.mt

Dr Jürgen C ABELA

MD, DCH(Lond.), MSc., FLCM, FMCFD, FRCGP(UK)

Principal General Practitioner, Primary HealthCare, Malta and V/Senior Lecturer, University of Malta

Mr Gianluca URSINO

BSc. (Hons.) (Melit.), MSc. (Melit.)

Data Analyst, University of Malta

Ms Julia ZAHRA

BSc. (Hons.) (Melit.), MSc. (Melit.)

Medical Student, University of Malta