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ORIGINAL ARTICLE

An Audit on the Provision of Telemedicine in Primary Care in Malta during the COVID-19

Caroline Vassallo, Alexia Scerri Harney, Sonia Abela

Background

Telemedicine is defined as the use of wireless technology to exchange medical information, and is assuming an increasingly central role in the provision of primary healthcare. The aim of this audit is to provide an overview of the teleconsultation service being provided from a Telemedicine centre on the Mediterranean island of Malta (EU).

Methodology

Data was gathered using the Electronic Patient Records (EPR) system on all documented teleconsultations conducted from 1st-14th November 2021 by GPs/GP trainees (n=2,625). Reasons for consultation and outcomes were noted. Data was transferred to a spreadsheet and analysed using Microsoft Excel™.

Results

Adult (17-64 years) calls comprised 51.5%, elderly (65+ years) 38.7% and pediatric (0-16) 9.8% of all teleconsultations. Calls averaged 375 per day, with Mondays and the morning (8am-1pm) shifts being the busiest. Calls related to clinical problems comprised 62.5% of all teleconsultations; 23.5% were for advice on COVID-19 or influenza vaccines, 8.5% were of an administrative nature (e.g. booking appointments), and 5.5% were for treatment-related advice. Around 2 out of every 3 clinical-related calls comprised COVID-19, respiratory or gastrointestinal problems, in all age groups. Importantly, 75% of all calls did not require further action by the GP beyond the teleconsultation.

Discussion & Key Recommendations

The telemedicine service relieved pressure off district health centers, allowing the latter to focus on those cases requiring more urgent face-to-face clinical assessment. Recommendations: encourage more widespread use of telemedicine service; ensure EPR documentation of all telecalls by all GP/GP trainees; increased use of video-conferencing; replicate audit on a longer timeframe.

Dr Caroline Vassallo
MD
Department of Psychiatry
Mount Carmel Hospital,
Attard, Malta

Dr Alexandra Scerri Harney
MD, MMCFD, FHEA,
MSc (Family Medicine, pgCAP
Primary HealthCare
Floriana, Malta

Dr Sonia Abela
MD,MMCFD, FHEA pgCAP
Primary HealthCare
Floriana, Malta

Primary Health Care (PHC) plays a central role in national healthcare systems worldwide.[1] It promotes patient-centered care, is often the first point of contact for patients seeking medical advice, and acts as a gatekeeper for access to secondary care.[1] Telemedicine, which is broadly defined as the use of electronic communication in order to consult and exchange medical information in the form of a voice message, image or video-call,[2] is assuming an increasingly central role in the provision of PHC. On March 11, 2020, the World Health Organisation (WHO) declared the outbreak of coronavirus disease 2019 (COVID-19), a novel respiratory infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a pandemic.[3] In a scenario in which social distancing is key to limit viral spread, the development of telemedicine has been greatly accelerated since it provides an ideal way of communication between physician and patient whilst limiting physical human interaction.[4-6] Widespread use of telemedicine is key to counter the sharp increase in preventable, out-of-hospital deaths observed as a result of the corresponding decline in the number of face-to-face consultations.[7] More broadly, telemedicine guarantees patients' well-being by facilitating access where barriers exist, thus ensuring improved quality of care, better patient engagement and reduces the inequalities in accessing healthcare services.[8-10]

Malta is the largest island of the Maltese archipelago (total area 67 km^2), located in the central Mediterranean, and comprises a population of around 516,000 when estimated in 2020. Telemedicine in Malta was introduced as a separate entity in March 2020, within the context of the National Primary Health Care service. The telemedicine service is run by a cohort of primary care General Practitioners (GPs) and younger GP trainees, on a 24/7 basis from Monday to Sunday. The centre adopts a multidisciplinary approach – it houses client support agents, nurses, doctors and a speech language pathologist. The doctors' work includes: giving safe clinical advice, offering medical guidance, following up of COVID-19 positive patients in a domiciliary setting, and vetting of home visits and emergency situations through liaison with GPs in PHC.[11]

Central to the provision of primary care via telemedicine is the Electronic Patient Records (EPR) system, wherein doctors keep an electronic record of every patient tele-consultation. This provides an accurate and complete track record about patients' healthcare and follow-up, is securely shared with other clinicians and allows for an overall improved patient-and-provider interaction.[12]

Aim

The primary aim of this audit was to undertake a preliminary review of the tele-consultation service provided by The Telemedicine Center in Malta during the COVID-19 pandemic, and to quantitatively assess the clinical outcomes of such a service. Thus, patient and clinical data were gathered using the EPR system on tele-consultation calls received from the 1st to the 14th November 2021 across Malta. Data was analyzed to look at trends in: (i) tele-consultation demographics, based on calls by gender, age and nationality, (ii) day-to-day and diurnal variations in tele-consultations, (iii) the reason/s for tele-consultations, and (iv) outcome of tele-consultations.

In summary, the audit represents a pilot quantitative study that will help inform on evidence-based decisions for better implementation and incorporation of the telemedicine services into routine PHC.

MATERIALS AND METHODS

Study Design And Data Extraction

Data was gathered retrospectively using the EPR system on all tele-consultations received at the Telemedicine Centre from all catchment areas in Malta between the 1st to the 14th November 2021, both dates included (14 days). All telephone consultations were effected by a qualified GP (Specialist in Family Medicine) or a GP trainee (qualified medical doctor undergoing GP specialization training). Data extracted included: date and time of call; age, gender, nationality and locality of the person for whom the GP tele-consultation was being requested. Time was categorized into the different time-shifts in line with the doctors' working shifts; i.e. 08:00-12:59, 13:00-16:59, 17:00-19:59 and 20:00-7:59. Ages were grouped into: pediatric (0 - 16 years), adult (17 - 64 years), and elderly (65+ years). Calls received from long-term care or rehabilitation homes were noted separately. The data was transferred to a spreadsheet and analyzed for statistics using Microsoft Excel™.

The patients' *reasons for consultation* were grouped into four main categories: i) "Clinical", ii) "Treatment advice" iii) "Vaccine advice" and iv) "Administrative".

The "Clinical" calls were subdivided according to the International Classification of Primary Care, Second edition (ICPC-2),[13] with the following modifications: due to the low call numbers related to Urological (U), Female Genital (X) and Male Genital (Y), these were grouped together under a single category named

"UXY"; a separate "COVID-19" category was created to include confirmed COVID-19 positive patients who either called in view of their COVID-19 symptoms, or were flagged up and being followed up by the COVID-19 follow up team.

"Treatment advice" included telephone consultations on medication indications and contraindications, dosing, timing, intervals, interaction and side-effects.

"Vaccine advice" mainly included individuals asking for advice regarding the influenza and COVID-19 vaccines, e.g. vaccine timing, side-effects, interactions, contra-indications and treatment of post-vaccine symptoms (namely fever, erythema, arm pain and headaches). However, enquiry was also made about other vaccines such as the herpes zoster and human papilloma virus vaccines.

"Administrative advice" comprised requests for sick leave or death certificates, application for free medicinal, to make a health center or vaccination appointment, to cancel, reschedule or expedite appointments, to chase blood, urine, stool and imaging results and order blood, urine and stool results. There were also tele-consultations regarding quarantine protocols, COVID-19 vaccine certificate issues and to enquire when a COVID-19 swab is warranted. Patients also asked how to operate a blood pressure machine, HGT machine and a branded Insulin pen, and there were also tele-consultations on how to apply for community care services.

Calls related to children (<16 years) were classified separately but using the same classification system as for adults, i.e. "Clinical", "Vaccine advice", "Treatment advice", and "Administrative". Pediatric vaccine advice included advice regarding the diphtheria-tetanus-polio vaccine, MenACWY vaccine, mumps, measles and rubella vaccine, human papilloma virus vaccine, influenza and COVID-19 vaccines. Pediatric treatment advice involved discussing pain relief options, dosing and timing of medications as well as enquiry regarding interactions between different medications. Pediatric administrative issues also comprised breast-feeding advice including timing and intervals.

The *outcomes of consultation* were grouped into the following five categories: i) telephone consultation sufficient and no further action was needed from the GP's point of view, ii) referred to a district health center, iii) referred for an urgent home visit by an on-call GP, (iv) referred to a community outpatient clinic and v) referred to emergency department of either the only general NHS hospital in Malta (Mater Dei Hospital) or the main psychiatric NHS hospital (Mount Carmel Hospital).

Exclusion Criteria

Only the telephone consultations with a 'Finished' status on the EPR system indicating a completed entry by the consulting GP were considered for the study, whereas consultations which had incomplete documentation were not included in the data analysis.

Ethical Approval Of Study And Data Protection

The study was officially approved by the Department of Primary Health Care (PHC), Ministry of Health, Malta. The Principal General Practitioner responsible for Data Protection within the PHCD also approved the study.

RESULTS AND DISCUSSION

The total number of calls registered in the EPR system across all catchment areas between the 1st November and 14th November (14 days) was 3,746. Out of these calls, 70% (*n*=2,625) had sufficient documentation with a complete GP entry in EPR ('Finished'), and thus taken into consideration for the present audit. Documentation of all teleconsultations is critical for continuity of care, and is also of medico-legal importance. Therefore, the findings of this audit suggest that doctors should be reminded of the legal importance of logging in and completely documenting every teleconsultation on EPR, however trivial it may seem at the time. However, for all its benefits, the pain-staking documentation in EPR may take time and this may increase time pressures and consequently burnout on GPs.[14]

Demographics Of Teleconsultations

When the total number of teleconsultations (*n*=2,625) were categorized according to the age of the person for whom advice (clinical, treatment, vaccine, or administrative) was being sought, the largest group was that of adults (*n*=1,348; 51.5%), followed by the elderly (*n*=1,014; 38.7%) and finally the pediatric group (*n*=257; 9.8%) (Figure 1). However, it is important to note that the adult group comprises of the widest age range. According to the National Statistics Office (NSO) in 2018, the elderly made up around 18.8% of the total population. Thus, this means that the elderly are actually proportionally more represented in this audit as they comprised 38.7% of all teleconsultation calls. Indeed, the fact that almost 4 out of every 10 teleconsultations were carried out by the elderly population, whilst comprising ~20% of the whole

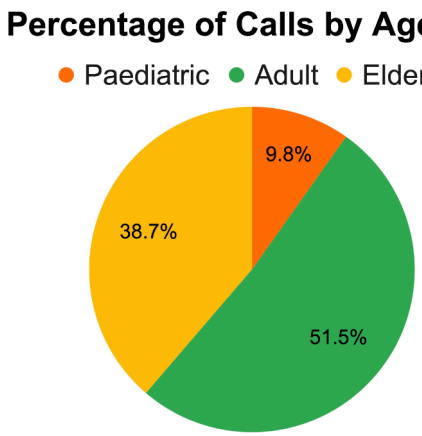

Figure 1 *Total number of calls grouped by the age of the person for whom the clinical, treatment, vaccine or administrative advice was being*

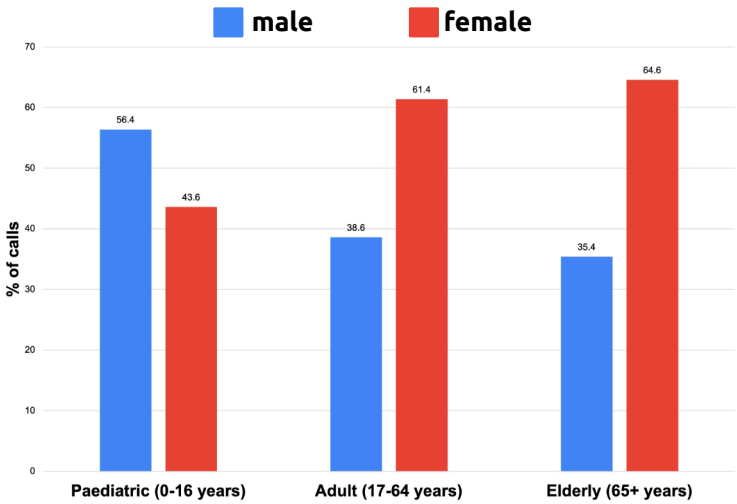

Figure 2 *Teleconsultations in each age group (paediatric, adult, elderly) according to gender (%).*

population, likely reflects the significantly greater burden of health problems in this age group. This represents an encouraging statistic, considering that the 65+ age group is not traditionally considered as 'telemedicine-friendly' and would generally prefer a face-to-face consultation. Another issue at play could be the COVID-19 pandemic, with the 65+ age group being the most vulnerable and hence most wary of avoiding crowds at health centers. Our findings are in agreement with those of others showing that telemedicine service allows primary care to achieve access targets, wherein frail and poorly mobile patients are able to better access medical service and information.[15] As a caveat, one has to keep in mind that some of these 65+ teleconsultations may have not been carried out by the elderly individuals themselves, but by, for example, their carers or younger relatives on their behalf.

When the total calls were categorized by gender in each age group, female callers predominated in both the adult and elderly populations (61.4% and 64.6%, respectively) compared to male callers (43.6% and 35.4%, respectively). That the greater share of all teleconsultations (around 2 out of every 3) originated from, or were requested for, individuals over 16 that were female is not unexpected, given that females tend to seek medical advice more often and more easily than their male counterparts, and that a greater proportion of elderly people (65+) are women.[16] In line with our findings, in a study by Reed *et al.*,[10] it was noted that female patients and patients aged between 18-44 years of age, were more likely to choose a telemedicine visit than male patients or patients of other ages, including elderly.

When considering the calls logged on behalf of children (0-16 years), the male/female distribution is more equitable (56.4% male and 43.6% female) (Figure 2). Thus, the gender difference is not seen for teleconsultations related to the pediatric population - the likely reason being that, in this case, the calls were made on behalf of the children.

Looking at the total number of finished teleconsultations according to each of the nine catchment areas in Malta (B'Kara, Cospicua, Floriana, Gzira, Kirkop, Mosta, Paola, Qormi and Rabat) (Figure 3), the average percentage of calls handled by a single catchment area was 11.1% (range: 2.9-23.8%). The three catchment areas with the highest number of calls (Gzira, Paola and Mosta) together handled around two-thirds of all calls (*n*=624, 23.8%; *n*=587, 22.4%; and *n*=451, 17.2%, respectively). On the other hand, the three catchment areas with the least number of calls (Qormi, Kirkop and Cospicua) handled an average amount of calls significantly below average (5%, 4.9% and 2.9% respectively).

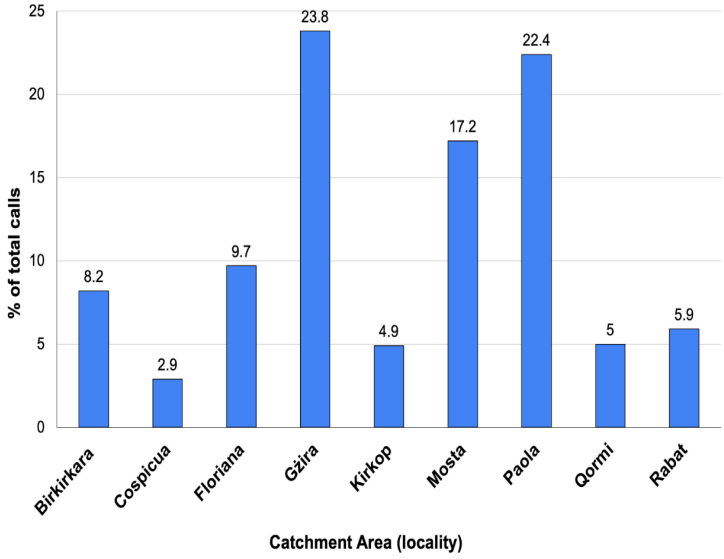

Figure 3 *Teleconsultations from each of the nine catchment areas (% of total calls)*

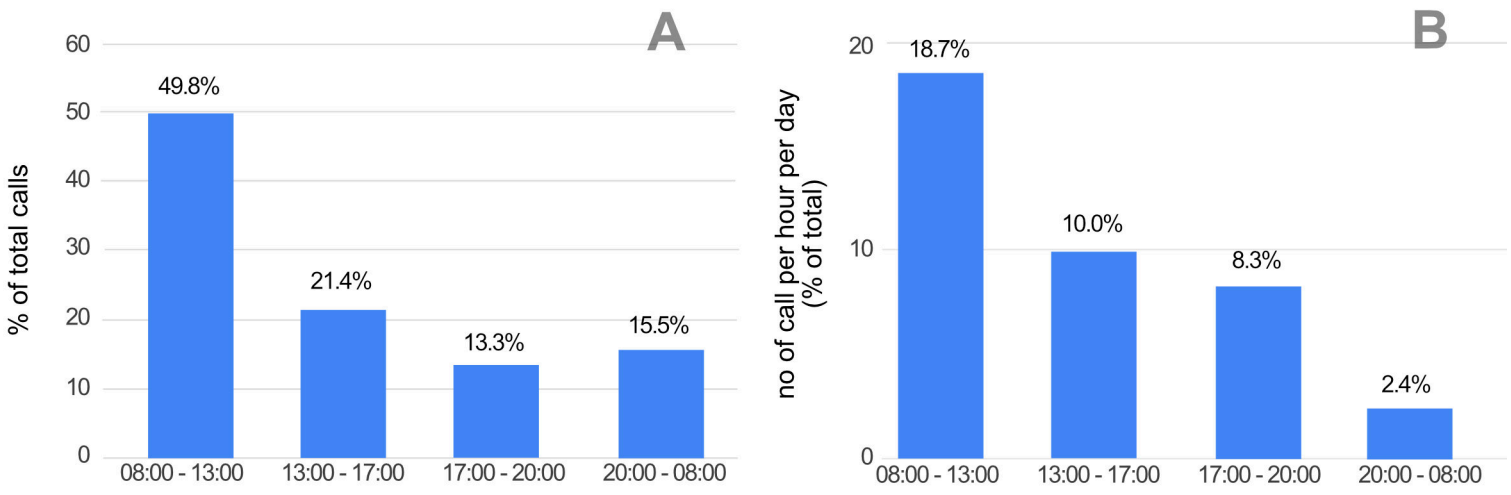

Figure 4 **A** *Total number of calls divided according to doctors' shift: morning (8:00-13:00), afternoon (13:00-17:00), evening (17:00-20:00), and night (20:00-8:00).* **B** *The number of calls received per hour per day as percentage of total calls, divided according to doctors' shift: morning (8:00-13:00), afternoon (13:00-17:00), evening (17:00-20:00), and night (20:00-8:00)*

The teleconsultations in each catchment area were then analysed according to the nationality (Maltese or Foreign) of the caller, determined from their identity card number on EPR. Taking into account all calls from the nine catchment areas, the share of teleconsultations received from, or on behalf of, Maltese individuals was by far the majority at 94.3% (*n*=2,418), with the remaining 5.7% (*n*=206) of teleconsultations from foreign individuals. In fact, the predominance of Maltese callers is seen in all catchment areas (average >93%), with the only exception being the Gzira catchment area, which registered the highest percentage of foreign callers (17% of all teleconsultations in Gzira catchment area).

Around 5% of all finished calls (*n*=144) received during the time of data collection for this audit originated from homes for the elderly. This is a comparatively low statistic; however, according to the telemedicine doctors (verbal communication with the authors), several calls originating from homes of the elderly ask for advice about several of patients at the same time and therefore the 'first' patient might be the only one documented on EPR. This stresses the importance of registration and precise documentation for each and every patient on EPR.

Day And Time Of Teleconsultations

Over the two weeks of the audit, the average total number of teleconsultations on a single day was 187, with the calls being quite evenly spread over the seven days of the week. Telemedicine has enabled a better distribution of workload and a reduction in burnout, maximizing doctor and patient wellbeing during the pandemic.[17] Mondays appeared to be slightly busier (*n*=210), while Tuesdays and Fridays were the least busy (*n*=175 each). The busiest single day was Saturday 13th November, wherein 248 calls were received.

Moreover, the time at which the teleconsultations were received on each of the 14 days of the audit was correlated with the four different doctor shifts; i.e. 08:00-12:59 (morning), 13:00-16:59 (afternoon), 17:00-19:59 (evening) and 20:00-7:59 (night) (Figure 4A). This analysis revealed that around half of all calls (*n*=1,306; 50%) were received in the first morning shift alone, thus making it the busiest shift. The second busiest was the afternoon shift (*n*=561; 21.4%), but nonetheless only approximately half as busy as the morning shift. The evening (*n*=350; 13.3%) and night shifts each received a similar share of the total telephone consultations over 24 hours (*n*=407; 15.5%). These findings are consistent with a pre-pandemic study on tele-consultation at a single primary health center in Malta.[16]

Since the four shifts are not equal in time periods (morning=5 h, afternoon=4 h, evening=3 h, night=12 h), it was also informative to look at the number of consultations in each shift *per hour* (Figure 4B). Again, the morning shift was the busiest with 18.7 calls/hour/day, followed by the afternoon shift with around half that, at 10 calls/hour/day, and a similarly busy evening shift at 8.33 calls/hour/day. The least busy was the night shift, with just 2.4 calls/hour/day.

Teleconsultations By Presenting Complaint

"Presenting complaints" from callers requesting a GP consultation were broadly classified into four categories, as explained in the methodology (Section 2.1). Around two-thirds of all calls (*n*=1,666; 63.5%) were 'clinical' calls, hence best dealt with by a qualified medical doctor (so-called "GP-led"). These represent calls from patients asking for advice directly related to clinical signs and symptoms, and therefore most of whom would have otherwise self-referred to a health center as a 'walk-in' case. The

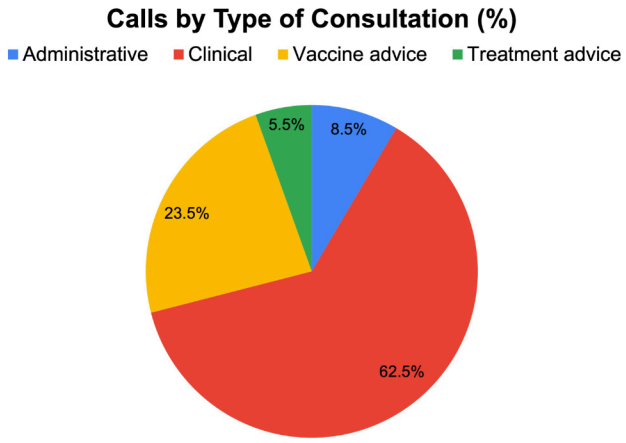

Figure 5 *Total calls by type of consultation: clinical, treatment advice, vaccine advice and administrative*

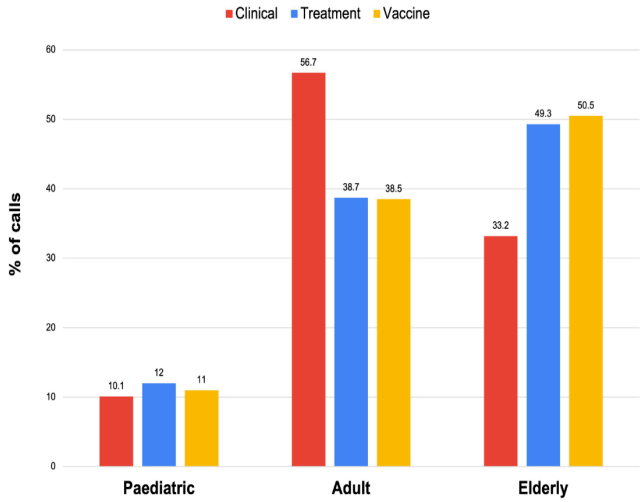

Figure 6 *Teleconsultations split by age and indicated as percentage of all calls in each of the three presenting categories: clinical problems, treatment advice, or vaccine advice*

second most common request was for 'vaccine-related advice', which comprised of 23.5% (*n*=616) of all calls. During the time this audit was carried out, the influenza vaccine was being distributed, and the COVID-19 booster dose was also being administered. This is reflected in the results represented in Figure 5. 'Administrative-related' calls formed 8.5% (*n*=223) of all calls, whilst 'Treatment-relative advice' calls formed 5.5% (*n*=142) of all calls.

It was also interesting to look at the spread of the age groups requesting clinical, treatment or vaccine advice, respectively (Figure 6). For clinical-related calls, the single largest group was the adult (17-64 yr) population (56.7%), followed by the elderly (65+) group (33.2%). However, as pointed out previously, one should also consider the fact that the elderly group represents around only one-fifth of the population as a whole. Hence, the share of clinical-related calls from this 65+ segment of the population is actually much greater. On the other hand, for both treatment- and vaccine-related advice calls, the single largest group was the elderly (65+) population (50.5% and 49.3% respectively). This is consistent with the fact that the elderly would not be as proficient in obtaining information on vaccines or drug treatment from on-line sources or leaflets. The percentage of individuals asking for a teleconsultation on behalf of the pediatric population was similar with respect to clinical (10.1%), treatment (12%) and vaccine (11%) advice.

Next, the 'Clinical' consultations were analyzed according to the presenting complaint and age for whom advice was being requested (Figure 7). For the adult and elderly populations (taken together), the

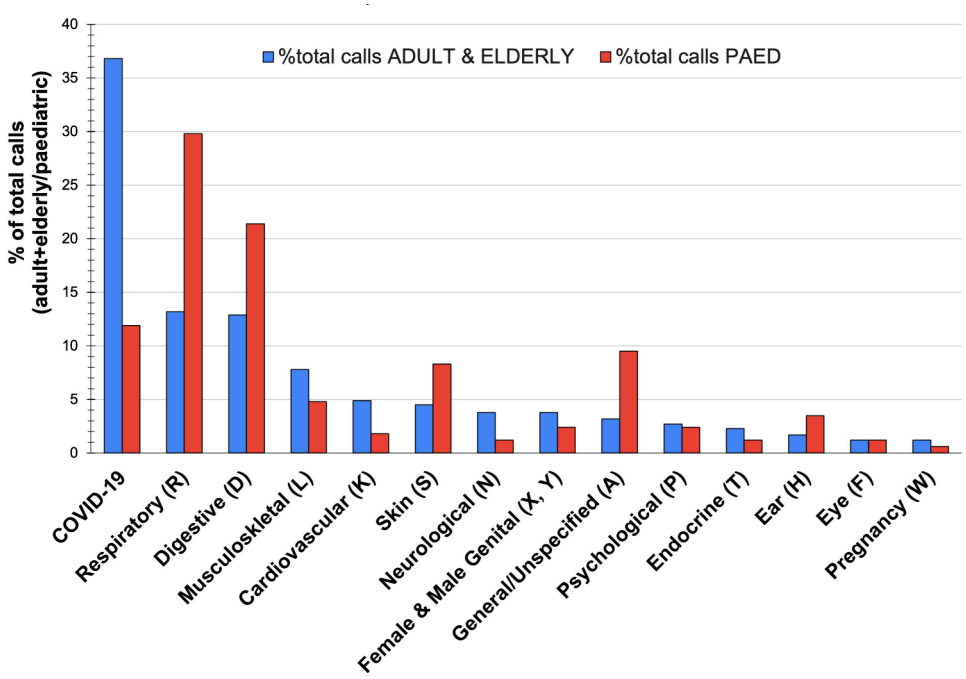

Figure 7 *Percentage of all (adult, elderly and pediatric) 'Clinical' calls, by presenting complaint. Clinical complaints were classified according to a modified ICPC-2 classification, as described in the Methods section*

largest share (36.8%) of calls was related to COVID-19 disease. This goes to indicate how significantly, during the pandemic, COVID-19 increased the overall burden on health system.[18] If telemedicine were not available, these consultations would likely have had to take place at district health centers, thereby adding further strain on the already well-attended primary healthcare system. Next followed calls related to respiratory symptoms (ICPC-2 category "R-Respiratory", 13.2%), and third calls related to gastrointestinal problems (ICPC-2 category "D-Digestive", 12.9%). Therefore, close to two-thirds of all adult/elderly calls were related to SARS-CoV-2 infection together with other respiratory and gastrointestinal illness. For the pediatric population, the same three conditions featured as the most common clinical complaints: 29.8% of pediatric calls were related to respiratory symptoms, 21.4% of were related to gastrointestinal symptoms and 11.9% were related to COVID-19 disease. Thus, approximately half of all pediatric calls comprised of respiratory and gastrointestinal-related problems alone.

As commonly seen in GP practice, complaints related to gastroenterology and respiratory disease were thus the most common among both adults (excluding COVID-19) and children. It is important to note that in the case of children, respiratory and gastrointestinal cases might also have been COVID-19 infections. During this period of time, children were not highly encouraged to swab, and thus this may have affected the results, where some respiratory- or gastrointestinal-related calls, may have actually been due to SARS-CoV-2 infection.

Assessing Outcomes Of Teleconsultations

One of the key indicators of the usefulness of a telemedicine service is the outcome following the teleconsultation with the GP (Figure 8). Almost three-fourths of all calls that were received by all catchment areas during the 14-day period of the survey were "telephone consultation-sufficient" (*n*=1,954; 74.8%), meaning no further action by the telemedicine GP was needed beyond the teleconsultation advice. Just 11.8% (*n*=309) of all calls were referred to a health center, whilst 6.9% of all calls (*n*=179) were referred for a home visit to be carried out by an on-call GP from the district health center responsible for that catchment area. Only 1 call was referred to a 'community clinic'; during the 1st - 14th November, there was little awareness about the newly appointed GP-community clinics and their importance, and this is reflected numerically in the data gathered in this audit. In 6.5% of all calls (*n*=165) the patients had to be referred to the A&E Department of the acute Mater Dei Hospital, or directly to the psychiatric Mount Carmel Hospital.

If only the 'Clinical' calls are considered (Figure 9), telemedicine consultation was again sufficient for the great majority, 62.4%. An important finding from this audit is therefore that such a considerable number of patients (*n*=1,015 over 14 days) would otherwise have most likely physically attended the district health center as a 'walk-in', to be seen by a GP. Of note, only 0.038% of all calls were referred to a community GP-appointment clinic, and this may be due to the lack of awareness of the service at the time of data collection.

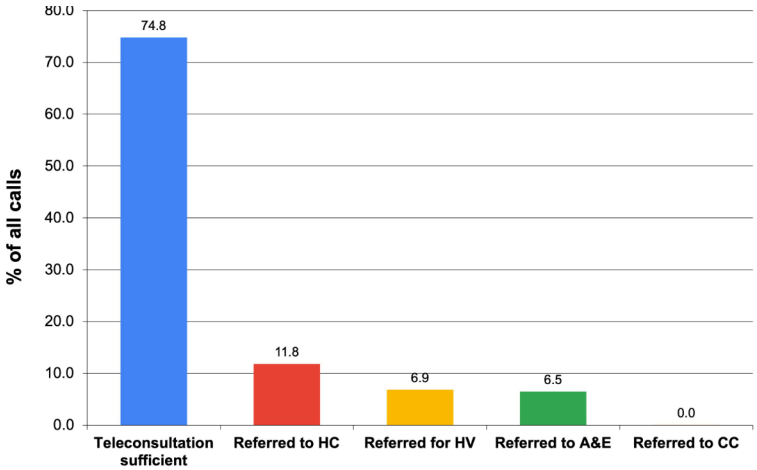

Figure 8 *Percentage of all (clinical, vaccine, treatment and administrative) calls, by outcome. (HC: Health Centre; HV: Home Visit; A&E: Accident and Emergency department at main acute hospital [Mater Dei] or psychiatric hospital [Mt. Carmel]; CC: Community Clinic)*

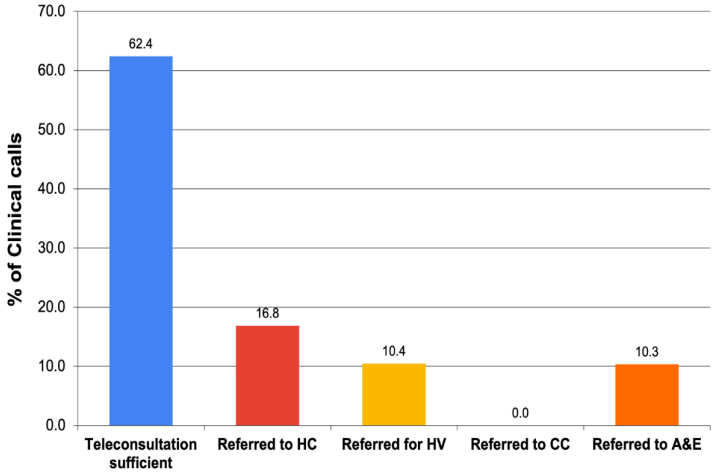

Figure 9 *Percentage of clinical teleconsultations, by outcome. (HC: Health Centre; HV: Home Visit; CC: Community Clinic; A&E: Accident and Emergency department at main acute hospital [Mater Dei] or psychiatric hospital [Mt. Carmel])*

When considering the 'Administrative', 'Treatment-related' and 'Vaccine-related' advice calls, teleconsultation with a GP was sufficient for ~95% of the calls. Although not directly determined in this audit, individuals who consulted for these types of calls might have also physically attended the district health center, if telemedicine were not available. Hence, clearly, provision of telemedicine significantly relieves pressure off from the health centers.[19]

When considering the 'Clinical - COVID-19' calls on their own (adult and pediatric), 94.2% of all COVID-19-related calls were telephone consultation sufficient. This makes it the clinical category with the highest percentage of telephone-sufficient consultations. Only 0.4% of the 'Clinical-COVID-19' calls had to be referred to a health center or a home visit, whilst it was decided for 5% of the 'Clinical - COVID-19' related calls to directly send the patients to the A&E Department.

Overall, in only 16.8% of all 'Clinical' calls did the GP decide that the patient's symptoms or clinical problems warrant further assessment at a district health center. A higher propensity for health center referral was observed for tele-consultations related to male and female genital (45.9% of 'X' and 'Y' calls), pregnancy (36.8% of 'W' calls), skin (35% of 'S' calls), neurological (34% of 'N' calls), ophthalmic (33.3% of 'F' calls), musculoskeletal (28.2% of 'L' calls) and cardiovascular (27.6% of 'K' calls) problems.

Around 10.4% of all 'Clinical' calls were referred for a home visit by another GP from the respective health center. A higher propensity for home visit referral was observed for teleconsultations related to psychological/psychiatric (37.8% of 'P' calls), musculoskeletal (24.2% of 'L' calls) and ophthalmic (23.8% of 'F' calls) problems. Furthermore, the high percentage of psychological/psychiatric calls reveals the strain the COVID-19 pandemic had on mental health.

Finally, 10.3% of all 'Clinical' calls were referred directly to the Emergency department or an ambulance was called. A higher propensity for A&E referral was observed for teleconsultations related to cardiovascular (36.8% of 'K' calls) and pregnancy-related (21.1% of 'W' calls) problems. Interestingly, in a study conducted by Ryskina et al.,[7] it was noted that patients who used telemedicine were less likely to be hospitalized than those who turned up for an in-person visit. This may be an effect of lower-risk patients being identified and appropriately triaged at telemedicine.

In summary, the majority of 'Clinical' calls necessitating referral by the GP to a health center, or for a home visit, or to emergency (around 1 in 5) were related to cardiovascular events, psychological/psychiatric problems, pregnancy, and dermatological issues. These clinical situations are either difficult to assess over the phone (e.g. skin problems) or often require further urgent clinical assessment (e.g. ECG and bloods for cardiovascular problems, assessment of the fetus in pregnancy, assessment of mental status in a psychiatric situation).

Our audit on telemedicine in primary care therefore strongly reinforces the view that telemedicine plays a crucial role in "forward triage".[20] Prior to the COVID-19 pandemic, around 69% of office encounters required an in-person visit. The majority included general well-being and immunization visits, as well as management of acute and chronic conditions. The advent of telemedicine has allowed a considerable decrease in the number of in-patient visits, and thus also in the risks of infection and cross-infection.[21]

Although not assessed in this survey, a quantitative study conducted in Norway has shown that approximately 72% of patients utilizing primary health care agreed that telemedicine may provide adequate follow-up and thus improve quality of treatment.[22] Another study in the Netherlands on the effectiveness of an on-line intervention among the elderly cohort, revealed no significant difference between those who received instructions online, and those who received instructions in-person.[1] However, patients were noted to be satisfied with tele-consultations in those situations where a physical examination was not needed, as otherwise, patients preferred a face-to face consultation.[1] This was also mentioned in Downes *et al.*,[23] who stated that teleconsultations prove to be an appropriate alternative to in-person consultation. Interestingly, prescription and investigation rates can be significantly lower for telemedicine when compared to in-person visits; particularly, there were lower rates of antibiotic prescription over the phone.[10]

Despite its considerable advantages, however, telemedicine may also have several limitations. For instance, it is not suitable in patients with hearing, speech or learning disabilities. Visual cues are essential in establishing diagnosis, and loss of body language requires a need for heightened verbal skills for accurate diagnosis. The inability to perform a physical examination may lead to diagnostic inaccuracy.[24] This is reflected in the higher rates of referral by the telemedicine GP for in-person clinical assessment at district health centers for complaints related to dermatological, neurological and ophthalmic problems, observed in the present study. Hence, increasing the amount of videoconferences in telemedicine would help in dealing satisfactorily with a greater share of clinical situations.[25]

LIMITATIONS

Important limitations of the present study include: the length of study - only 14 consecutive days in a single month were taken into account; and 30% of all teleconsultations had insufficient EPR documentation and were therefore not included in the audit. Furthermore, callers were not followed up by a questionnaire to ask about their satisfaction of the telemedicine service, or whether they still ended up having to attend to a district center to have their health problem sorted. More patients may return for an in-person visit after a telemedicine consultation, when compared to a face-to-face visit.[10]

Limitations of telemedicine include:[26] quality of care; doctor-patient relationship; more difficult to build patient trust remotely; inability to perform a thorough physical examination and an increase in the healthcare service demand due to easier access. This might increase competition over resources and thus cause inequity between more and less technological populations.[27]

CONCLUSION

Telemedicine in primary care offers multiple benefits as it reduces time-pressures, and offers a better workload distribution. Moreover, telemedicine allows better accessibility to medical doctors and thus lowers costs for patients and their families, whilst ensuring faster care and better surveillance of chronic diseases.[24] The main aim of this audit on telemedicine in Primary Health Care (PHC) was to quantitatively assess the type of consultations that were received across the island of Malta over 14 days (1st-14th November 2021) during the COVID-19 pandemic; determine the demographics of the teleconsultations that were received, and further analyze their outcomes.

Overall, this audit strongly reinforces current evidence that teleconsultations may prove to be an appropriate alternative to face-to-face consultations in certain settings. Hence, they help relieve pressure off district health centers, reserving the latter 'walk-in' service for cases requiring a more detailed clinical assessment and investigation. Telemedicine also forms an efficient way of dealing with administrative-related issues such as chasing of blood results and vaccine advice.[28,29]

RECOMMENDATIONS

Finally, based upon the audit findings, a number of recommendations can be made:

- People should be educated on the use of the telemedicine service and encouraged to make use of it more frequently.
- Telemedicine GPs should be encouraged to fully document their teleconsultations on EPR.
- Telemedicine service should remain 'GP-led', although there is scope for 'nurse-led' services such as vaccine advice or COVID-19 follow-up.
- Increase awareness among GPs of patient referral to community care services.
- Scope exists for strengthening video consultations to exploit its advantages in terms of diagnostic and therapeutic purposes.

Ultimately, additional research is needed so as to gather a more representative picture of the current situation at different time-frames of data collection, and to further validate the conclusions of this audit.

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SUMMARY BOX

The Facts

- Telemedicine is assuming an increasingly central role in the provision of primary healthcare worldwide.
- Telemedicine in Malta was first introduced in March 2020, within the context of the National Primary Healthcare service.
- The Telemedicine Centre is led by General Practitioners who provide a 24x7 teleconsultation service.

What's New?

- Telemedicine in primary care is significantly reducing the patient load from district health centers across all ages, reserving the 'walk-in' service for those cases requiring more urgent and/or detailed clinical assessment.
- Telemedicine service should remain 'GP-led', although there is scope for 'nurse-led' services such as vaccine advice or COVID-19 follow-up.
- Increased use of videoconferencing is encouraged to further potentiate clinical decision-making by the Telemedicine GPs (e.g. in dermatology cases).

REFERENCES

1. Bashshur RL, Howell JD, Krupinski EA, Harms KM, Bashshur N, Doarn CR. The Empirical Foundations of Telemedicine Interventions in Primary Care. *Telemed J E Health.* 2016;22:342-375.
2. Hayiroglu MI. Telemedicine: Current Concepts and Future Perceptions. *Anatol J Cardiol.* 2019;22:21-22.
3. Bitar H, Alismail S. The role of eHealth, telehealth, and telemedicine for chronic disease patients during COVID-19 pandemic: A rapid systematic review. *Digit Health.* 2021;7:20552076211009396.
4. Gupta VS, Popp EC, Garcia EI, et al. Telemedicine as a component of forward triage in a pandemic. *Healthc (Amst).* 2021;9:100567.
5. Iyengar K, Jain VK, Vaishya R. Pitfalls in telemedicine consultations in the era of COVID 19 and how to avoid them. *Diabetes Metab Syndr.* 2020;14:797-799.
6. Ortega G, Rodriguez JA, Maurer LR, et al. Telemedicine, COVID-19, and disparities: Policy implications. *Health Policy Technol.* 2020;9:368-371.
7. Ryskina KL, Shultz K, Zhou Y, Lautenbach G, Brown RT. Older adults' access to primary care: Gender, racial, and ethnic disparities in telemedicine. *J Am Geriatr Soc.* 2021;69:2732-2740.
8. Powell RE, Henstenburg JM, Cooper G, Hollander JE, Rising KL. Patient Perceptions of Telehealth Primary Care Video Visits. *Ann Fam Med.* 2017;15:225-229.
9. Ray KN, Chari AV, Engberg J, Bertolet M, Mehrotra A. Disparities in Time Spent Seeking Medical Care in the United States. *JAMA Intern Med.* 2015;175:1983-1986.
10. Reed ME, Huang J, Graetz I, et al. Patient Characteristics Associated With Choosing a Telemedicine Visit vs Office Visit With the Same Primary Care Clinicians. *JAMA Netw Open.* 2020;3:e205873.
11. Attard D. What's the Status of Telemedicine in Malta? *Digital Health*2020.
12. Bouayad L, Ialynytchev A, Padmanabhan B. Patient Health Record Systems Scope and Functionalities: Literature Review and Future Directions. *J Med Internet Res.* 2017;19:e388.
13. Gusso G. The International Classification of Primary Care: capturing and sorting clinical information. *Cien Saude Colet.* 2020;25:1241-1250.

14. Sinsky CA. Implementing Telemedicine in Primary Care: Learning Lessons From Electronic Health Records. *Mayo Clin Proc.* 2020;95:1835-1837.
15. De Vera K, Challa P, Liu RH, et al. Virtual Primary Care Implementation During COVID-19 in High-Income Countries: A Scoping Review. *Telemed J E Health.* 2021.
16. Grima MA, J. An evaluation of the tele-consultation and triage system at a primary health care centre in Malta. *Malta Medical School Gazette.* 2019;03:6-14.
17. Silva C, Lopes RH, Junior OGB, Fuentealba-Torres M, Arcencio RA, da Costa Uchoa SA. Telemedicine in primary healthcare for the quality of care in times of COVID-19: a scoping review protocol. *BMJ Open.* 2021;11:e046227.
18. Akande OW, Akande TM. COVID-19 pandemic: A global health burden. *Niger Postgrad Med J.* 2020;27:147-155.
19. Garattini L, Badinella Martini M, Zanetti M. More room for telemedicine after COVID-19: lessons for primary care? *Eur J Health Econ.* 2021;22:183-186.
20. Kaplan B. REVISITING HEALTH INFORMATION TECHNOLOGY ETHICAL, LEGAL, and SOCIAL ISSUES and EVALUATION: TELEHEALTH/TELEMEDICINE and COVID-*Int J Med Inform.* 2020;143:104239.
21. Wang H, Yuan X, Wang J, Sun C, Wang G. Telemedicine maybe an effective solution for management of chronic disease during the COVID-19 epidemic. *Prim Health Care Res Dev.* 2021;22:e48.
22. Zanaboni P, Fagerlund AJ. Patients' use and experiences with e-consultation and other digital health services with their general practitioner in Norway: results from an online survey. *BMJ Open.* 2020;10:e034773.
23. Downes MJ, Mervin MC, Byrnes JM, Scuffham PA. Telephone consultations for general practice: a systematic review. *Syst Rev.* 2017;6:128.
24. Gomes-de Almeida S, Marabujo T, do Carmo-Goncalves M. [Telemedicine satisfaction of primary care patients during COVID-19 pandemics]. *Semergen.* 2021;47:248-255.
25. Balut MD, Wyte-Lake T, Steers WN, et al. Expansion of telemedicine during COVID-19 at a VA specialty clinic. *Healthc (Amst).* 2022;10:100599.
26. Petrazzuoli F, Kurpas D, Vinker S, et al. COVID-19 pandemic and the great impulse to telemedicine: the basis of the WONCA Europe Statement on Telemedicine at the WHO Europe 70th Regional Meeting September *Prim Health Care Res Dev.* 2021;22:e80.
27. Dorsey ER, Topol EJ. State of Telehealth. *N Engl J Med.* 2016;375:1400.
28. Carallo C, Scavelli FB, Cipolla M, et al. Management of Type 2 Diabetes Mellitus through Telemedicine. *PLoS One.* 2015;10:e0126858.
29. McKinstry B, Watson P, Pinnock H, Heaney D, Sheikh A. Telephone consulting in primary care: a triangulated qualitative study of patients and providers. *Br J Gen Pract.* 2009;59:e209-218.