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Best practice guidelines

Dealing with COVID-19 in small European island states: Cyprus, Iceland and Malta

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ABSTRACT

Background: COVID-19 became a global pandemic within weeks, as every country including small states and islands experienced a surge in cases. Small islands are known to face a number of challenges but in the quest to curb the viral spread, with the absence of land boarders and small population size, these factors should have played to their advantage to minimize the spread. The aim of this article was to compare and contrast the COVID-19 situation, restrictions, preparedness, management and the healthcare systems between the small population island states of Cyprus, Iceland and Malta.

Method: Data were obtained from Ministry of Health websites and COVID dashboards of the three respective Island states in Europe. Comparisons were made between the reported cases, deaths, swabbing rates, restrictions and mitigation measures and healthcare system structures.

Results: Malta contained the COVID-19 spread better than Cyprus and Iceland during the first wave. However, a significantly higher viral spread was observed in Malta during the second wave. Similar healthcare preparedness and services, restrictions and relaxation measures were implemented across the three islands with some exceptions such as the maximum number of people permitted in one gathering, free movement restrictions and airport regulations.

Conclusion: The small population size and island status proved to be an asset during the first wave of COVID-19 but different governance approaches led to a different COVID-19 outcome during the transition phases and the onset of the second wave.

1. Introduction

COVID-19 is a pandemic that has affected every country across the world. The three small independent islands of the Republic of Cyprus, Iceland and Malta in Europe are no exceptions. Both the Republic of Cyprus and Malta are found within the Mediterranean Sea, having a total population of 875,900 and 514,564 respectively. Iceland is situated between the North Atlantic and Arctic Oceans with a total population of 364,134. Like the rest of the countries in Europe, these three Island states experienced a COVID-19 viral spread among their population at the beginning of 2020. The aim of this study was to compare and contrast the COVID-19 situation (March to September 2020), restrictions, preparedness, management and the healthcare systems between the small population island states of Cyprus, Iceland and Malta.

2. Method

Data were obtained from Ministry of Health websites and COVID dashboards of the three respective Island states in Europe and local published studies. Comparisons were made between the reported cases, deaths, swabbing rates, restrictions and mitigation measures, and healthcare system structures.

3. Results

3.1. COVID-19 Situation in Cyprus, Iceland and Malta

Iceland was the initial country to report the first positive case out of the three islands on the 28th of February 2020 followed by Malta on the 7th of March and Cyprus on the 9th of March 2020 [1–3]. The first COVID-19 related death was reported in Cyprus 11 days (21st of March) after the COVID-19 onset while both Iceland (23rd March) and Malta (8th April) reported their first death a month after the onset of COVID-19 [1–3]. To date (25th September 2020), the total COVID-19 deaths within these small Islands were 2.59 deaths per 100,000 for Cyprus (n = 22), 2.75 deaths per 100,00 for Iceland (n = 10) and 5.83 deaths per 100,000 for Malta (n = 30) [2–4]. Malta was noted by the European Centre for Disease Prevention and Control (ECDC) to have the third-highest death rate per 100,000 within the EU region [5].

The total reported COVID-19 positive cases to date (25th September 2020) across the Islands were: 1663 Cypriots (196 per 100,000), 2561 Icelandic (703 per 100,000) and 2929 Maltese (569 per 100,000) [2–4]. Fig. 1 illustrates the daily distribution of cases across the six months of the COVID-19 pandemic. During the first COVID-19 wave, a clear difference in the viral spread could be observed between Malta and the other two Islands. Iceland had the highest daily peak of cases (n = 48).
reported on the 24th of March, Cyprus (n = 58) on the 2nd of April, and Malta (n = 52) on the 7th of April.

3.2. Healthcare systems and services

Following the onset of SARS-CoV-2 in China in December 2019 [6], all the three small Islands commenced preparations for inevitable eventual COVID-19 outbreaks in their countries. Both Iceland and Malta purchased a substantial amount of medical supplies in advance to ensure an adequate supply for pandemic peak [1]. Conversely, a shortage of medical supplies, especially surgical masks, was evident in Cyprus in early April, leading to a high infection rate among Cypriot healthcare professions.

Infrastructural changes were made to Iceland’s and Malta’s state hospitals, with an increase in intensive care unit (ICU) beds and ventilators to accommodate potential COVID-19 surges in critical cases [1,7]. In addition, in the two largest hospitals in Iceland, special COVID-19 wards were created with staff that was relocated from different services within each hospital.

In Cyprus, the public Ammochostos General Hospital (AGH) was appointed to be the COVID-19 reference point in February 2020 by the Ministry of Health. Additionally, the Eden Resort Rehabilitation has been the centre for care for a total of 279 non-emergency COVID-19 positive patients to date, of whom 224 have been discharged. The Intensive Care Unit (ICU) of the AGH was equipped with ventilators and staff began treating patients with complications and increased severity (pneumonia with severe respiratory distress). In Cyprus an ICU in Nicosia General Hospital (NGH) was built for the same purposes in case of a high number of COVID-19 cases [8]. In very severe cases where hospitalization in the ICU was needed, the patient was transported intubated accompanied from the reference hospital by an anesthesiologist to the ICU of the NGH. The Accident and Emergency Department at AGH continued to operate normally by implementing a work rotation program in groups (nurses - doctors) to avoid possible transmission between staff.

In Malta, a number of non-clinical areas within the hospital building (such as the Medical School library, lecture rooms and staff canteen) underwent infrastructural changes and were converted into temporary wards [7]. Malta’s hospital public areas (such as hospital’s foyer and outpatient’s corridors) were also equipped with oxygen points in preparation for a potential need to increase the hospital beds [7].

Across all the three Islands, outpatient clinics and elective surgery were suspended (March to May 2020) in order to ensure that an adequate number of available beds were present for potential COVID-19 cases while simultaneously increasing the number of healthcare professionals to form part of the COVID-19 the management team [1,9]. Concurrently, Public Health authorities established a contact tracing unit and case management teams in order to trace the contacts of the positive cases.

Furthermore, in Cyprus at the AGH, and later on at other hospitals, the focus in dealing with the COVID-19 pandemic was based on plans and set algorithms (brief clinical practice guidelines) provided by the European Centre for Disease Prevention and Control (ECDC). There was a predetermined program in place to provide suitable guidance and training to 220 medical staff, nursing staff, cleaners, office staff, ward assistance staff, messengers, ambulance drivers and other personnel, for the implementation of these protocols. The Medical and Public Health Services (MPHS) also ensured that there were amble stocks of consumables and equipment in numbers capable of maintaining a suitable response for a few days in surge situations at the reference hospital.

Similarly, in Malta, a ‘COVID-19 Emergency Operation Centre’ was set up along with an ad hoc ‘Incident Management System’. Their role was to create different COVID-19 scenarios and building contingency plans for each scenario. Real-time and reliable dashboards were created to analyse the COVID-19 lifecycle, to anticipate the disease spread and where it might spread next, in order to ensure adequate resources were available and reinforce the healthcare system. Additionally, an ‘operational infection prevention and control programme’ was set up to minimize the risk of COVID-19 transmission to patients, hospital staff and visitors. Furthermore, all hospital staff were enrolled into a compulsory training and fitting test of Personal Protective Equipment (PPE). The Central Procurement and Supplies Department (CPSU) was responsible for the sourcing and distribution of all protective wear and equipment across the country for all Government departments.

3.3. COVID-19 first wave restrictions and legislations

A number of similar restrictions and mandatory legislations were instituted by the governments of the three small Island countries as seen in Table 1 with a Public Health Emergency declared by each country [1,3,9,10]. Concurrently, a number of economic stimulus packages and benefits were implemented by all governments to aid struggling
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Cyprus and Iceland after an approximately two months of their COVID-19 onset (Fig. 1). Indeed, a decrease in the daily reported new positive cases was observed in Iceland as of the 16th of April and from the 30th of April 2020 for Cyprus. Malta’s first wave peak was belated when compared to both of the other Islands. Comparatively, Malta had a general lower fluctuating number of daily positive cases up till 21st of April after which there was as decline in cases. Another small peak was observed in Malta following the first relaxation measures instituted on the 4th of May although the daily cases declined again after the 22nd of May 2020.

Daily media briefs were organized by the Public Health authorities of the three small Islands to update the population on the COVID-19 situation using different telecommunication and social media platforms [1,15]. Both in Cyprus (through the MPH of the Ministry of Health in collaboration with the Press and Information Office (PIO)) and in Malta (COVID-19 Data Management team and Ministry of Health), provided infographics and key public health messages broadcasted online, on the radio and television to increase public health awareness.

Table 1

Comparisons between the restrictions and mandatory legislations instituted by the three small Islands during the first COVID-19 wave [1,3,9,10].

| Restrictions and mandates | Cyprus | Iceland | Malta |
|---------------------------|--------|---------|-------|
| Quarantine for 14 days for arriving passengers | Yes | Yes | Yes |
| Closure of Airport | Yes | No but reduced schedule | Yes |
| Closure of Ports Permitted number of people in one Gathering | Yes | No but reduced freight Capped to 100 (16/03/2020) then reduced to 20 (23/03/2020) | Yes Capped to 3 (02/04/2020) |
| Social distancing Face to face education at schools | Yes | Yes | Yes |
| Non-essential retail Bars and restaurants Vulnerable Groups Act | Closed | Closed | Closed |
| Masks | Recommended | Not recommended | Recommended |

3.4. Swabbing for SARS-CoV2

A number of swabbing hubs were set up across the Islands for easy accessibility for the populations. Both Iceland and Malta followed a similar swabbing test procedure, where symptomatic and concerned individuals called a designated helpline to organize a swabbing test. Only appointment-based swabs were carried out. In Iceland, only those with symptoms were offered the swab test for free, while all others, including tests done at the border, cost between €55 to €68 (9000–11,000 ISK). In addition, the Icelandic company DeCode also swabbed random samples of individuals, for free, to determine spread in the community. On the other hand, in Malta all swabs were done for free unless the individual opted to perform the swab test at a private hospital. In Cyprus, a number of workers and professionals were mandated to perform a swabbing test at a pre-specified location for free. All other individuals opting to have the swab test could visit a swabbing hub and pay for the service (initially €110 and reduced to €60 in July).

All countries provided the swab test results within a 24-hour period while the individual remained under quarantine until the result was published. Those found to be negative were instructed to self-isolate for 7 days in Cyprus while those in Iceland (if they had stayed only in Iceland for the past 14 days) and in Malta could return to their normal lives. Penalties were instituted by governments within all three small Islands for those breaching the mandatory quarantine. In Cyprus those breaching these restrictions were taken to court with a possible jail sentence up to six months, payment of all legal expenses and fines up to €768 per individual. In Iceland, those breaching or refusing the mandatory quarantine were fined between €310 to €1549 (50,000–250,000 ISK). Similarly, in Malta those in breach of mandatory quarantine were fined €10,000 while those ordered to stay in quarantine due to having had a contact with a positive cases were fined €3000 [1].

A high daily swabbing rate was conducted across all the small Islands with an average of 1787 swabs in Cyprus, 1178 swabs in Iceland and 1661 swabs in Malta. To date (25th September 2020) Cyprus conducted 42,934 per 100,000 swabs, Iceland conducted 73,829 per 100,000 swabs while Malta conducted 47,211 per 100,000 swabs [2–4].

Of note, as of 15th of June 2020, those arriving to Iceland were mandated to either take a COVID-19 swab test at the border or quarantine for 14 days. Later on, as of 19th of August, anyone arriving to Iceland had to undergo two border COVID-19 swab tests five days apart unless they opted for a 14-day quarantine [3]. In Malta, a random COVID-19 swab test approach was introduced. On the 17th of August 2020, Malta introduced an “Amber country list” where travelers arriving from these high risk countries needed to present a negative COVID-19 test conducted in the past 72 h [15]. On re-opening the airports in June 2020, Cyprus offered COVID-19 tests for free to tourists arriving on the Island. However, this was re-visited later on to mandate all arrivals to present a negative test done within the past 72 h. Returning Cypriots citizens entering the country cannot do the test while abroad (as is the requirement for tourists) but were offered to have it done at the airport, at the price of 65€ for each test. Fig. 2 demonstrates a comparative overview of the cumulative swabbing test performed across Cyprus, Iceland and Malta over the six month COVID-19 period [2–4].

3.5. Lifting and re-introducing the COVID-19 restrictions

In the beginning of May 2020, Cyprus, Iceland and Malta started to gradually lift the restrictions that were instituted at the beginning of the pandemic. The lifting of restrictions followed a transitional phase, as illustrated in Table 2, however, it could be observed that some restrictions were re-introduced mid-Summer in Iceland and Malta [1,3,9,15,16].

During the first phase of restrictions lifting (4th May 2020), Cyprus instructed pharmacies and supermarkets to provide special opening hours (till 10 am) for the vulnerable groups, people of 60 years of age and over as well as people with disability to shop exclusively and with...
It is important to note that mitigation guidelines were instituted by all of the three small Islands to aid different the sectors in the transition period to a “new normality” while minimizing the spread of the virus within the community.

3.6. A new resurgence

Similar to the other countries in Europe, restrictions began to be eased along with lifting of travel bans in May–July 2020, with the anticipation of a “new normal” while slowly restarting the national economies [17]. Such actions were expected to involve a high risk of viral resurgence with a balancing act between stimulating the economy and minimizing morbidity/mortality from COVID-19 [18,19].

The Republic of Cyprus was observed to have had the best curbing ability of the viral infection (up till the time of writing) out of the three small Islands as restrictions were eased, including the re-opening of the airports. A number of fluctuating small peaks were observed in Cyprus during the month of August 2020, as seen in Fig. 3. However, a higher spike could be observed just 10 days after school opened on the 13th of September. Meanwhile, Iceland’s second wave was reported at the end of July with speculations that a football game was the triggering factor [20]. This surge in cases (Fig. 3) led to Greenland (11th August) and Norway (16th August), followed by the UK (September) to list Iceland as a red listed country. Concurrently new restrictions were introduced to try to curb this new wave (Table 2). The re-introduced restrictions appeared to curb the spread [21]. Indeed, on the 7th of September some measures were relaxed (Table 2). However, a significant spike in positive cases could be observed ten days following the relaxation of these measures, as seen in Fig. 3. A different scenario could be observed for the island of Malta, where the viral spread was well controlled up till mid-July until organized mass events conducted between 17 and 23rd July 2020, with over 800 attendees gathered together, resulted in a significantly spike of new positive cases (Fig. 3) and high community spread [15]. This led to a number of European countries and the US to list Malta as a red listed country [15]. The re-introduction of restrictions as seen in Fig. 3 and Table 2 led to a slight reduction in daily cases however the spread within the community was still high with a significant spill off to elderly nursing homes [4,15]. Consequently, another high spike in positive cases and 14 deaths in just a week, was observed among the elderly population [4]. In fact, a 1.23% case fatality rate was observed between 1st of September and 23rd September in Malta [4].

4. Conclusion

Small states and islands are known to face a number of challenges. However when controlling infectious diseases their small population and geographical size plays to their strengths. Islands have another advantage with the absence of land borders, making containment of infectious disease easier. During the first COVID-19 wave (March – June 2020), the small island of Malta appeared to have had the upper hand in controlling the COVID-19 spread compared to Cyprus and Iceland despite similar containment measures (with some exceptions) instituted across the three islands. Differences could be observed with regards to the closure and re-opening of airports regulations. Iceland never officially closed the airport but when other countries started to re-open their airports, it implemented a thorough border system to ensure COVID-19 is not imported to the community. The re-opening of airports in Cyprus did not lead to any spikes in positive cases and this was later enforced by a mandatory COVID-19 negative test for all arrivals to the country, a measure not implemented in Malta. However, the triggering factor for the onset of the second wave in Malta does not appear to have been the re-opening of the airport or port but rather the unrestrictive capping of people gathered in one place [15] unlike in Cyprus and Iceland. Despite the re-introduction of restrictions, Malta to date (25th September) is still struggling with high community spread and has been noted to be the seventh highest infective country out of the countries in Europe [5]. At a population level (per 100,000) Iceland appears to be currently experiencing a significant infectivity rate [3,5]. Out of these three Islands and compared to other countries in Europe, only Cyprus appears to be effectively curbing viral spread [5].

In conclusion, the small population size and island status proved to be an asset during the first wave of COVID-19 but different governance approaches led to a different COVID-19 outcome during the transition phase and the second wave. It is therefore paramount that as Europe prepares for the seasonal influenza season, that every country institutes population specific mitigation measures to curb COVID-19 spread. The introduction of stricter restrictive measures (if the need arises), with social distancing and personal hygiene, mandatory wearing of masks,
### Table 2
Comparison of the lifting and re-introduction of restriction measures between Cyprus, Iceland and Malta (May – September 2020).

| Restrictions                          | Cyprus                                      | Iceland                                     | Malta                                                      |
|---------------------------------------|---------------------------------------------|---------------------------------------------|------------------------------------------------------------|
| Maximum number of people gathered     | May 21st: 10 people in homes allowed        | May 4th: 50                                 | May 5th: 4                                                 |
| together in one place                 | June 24th: 50 indoors, 100 outdoors        | May 25th: 200                               | May 22nd: 6                                                |
|                                       | July 7th: 75 indoors, 150 outdoors         | June 15th: 500                              | June 5th: 75                                               |
|                                       | September 1st: unrestricted                 | July 31st: 100                              | June 15th: unrestricted                                    |
|                                       |                                             | August 14th: 100                            | August 7th: unrestricted                                   |
|                                       |                                             | August 28th: 100                            | 100 people indoors and 300 people outdoors                |
| Social distancing                     | 2 m: May to date                            | May to August: 2 m                          | 2 m: May to date                                           |
|                                       |                                             | September 7th: 1 m                          |                                                            |
| Wearing of masks                      | Mandatory in public spaces and where social | Mandatory while on public transport when     | Mandatory in public spaces and where social                |
|                                       | distancing cannot be observed               | traveling for more than 30 min, and in      | distancing cannot be observed                               |
|                                       | Fine of €300 if not wearing a mask in closed | settings where social distancing cannot be   |                                                            |
| public spaces                         |                                             | observed.                                   |                                                            |
| Non-essential retails                 | May 4th: Reopening of limited retails       | May 4th: Reopening of hairdressers, beauty  | May 5th: Reopening of non-essential retails                |
|                                       |                                             | salons                                      |                                                            |
| Bars & restaurants                    | May 21st: Reopening of outdoor catering     | May 25th: Reopened but need to close by 23:00| May 22nd: Reopening of restaurants, cafeterias and snack   |
| services                              | services                                    |                                             | bars with encouragement for outdoor service                |
|                                       | June 9th: Reopening of all catering services| September 18th to 27th all bars in the      | August 17th: Closure of bars and nightclubs               |
|                                       |                                             | capital area were ordered to be closed      |                                                            |
|                                       |                                             | September 28th: Reopened but have to close  |                                                            |
| Sports                                | June 13th: Reopening of Swimming pools,     | May 4th: No more than 4 individuals         | May 22nd: Outdoor pools opened under                      |
|                                       | Gyms and other sports complexes/activities  | together doing sports, no touching, 2 m    | restrictions of 50% capacity                               |
|                                       |                                             | rule, cleaning of equipment after use      | June 5th: Opening of closed spaced sports services and    |
|                                       |                                             |                                             | Gyms                                                      |
| Religious places & services            | May 23rd: Permission for worship services   | Follow rules for social distancing and how   | June 15th: Reopening of churches for mass under           |
| Cultural sites                        |                                             | many people were allowed to gather together | mitigation guidelines                                     |
| Airport/s                             | June 1st: re-opened                        | Never closed, but arrivals needed to        | June 5th: re-opened                                        |
|                                       | June 9th: Re-opened for a list of countries | quarantine for 14 days up till June 15th    | July 1st: Airport re-opened to 24 safe listed             |
|                                       |                                             |                                             | countries.                                                |
| Port/s                                | June 9th: fully operational                | June 15th: COVID-19 test at border or       | July 15th: Airport opened fully                           |
| Weddings/funerals                     | May 4th: Permission for a maximum of 10     | quarantine for 14 days                      | August 17th: Introduction of an Amber country list (high  |
|                                       | people                                      |                                             | risk countries) that require COVID-19 mitigation measures  |
|                                       | August 21st: maximum of 50 people           |                                             | July 1st: fully operational                                |
|                                       |                                             |                                             |                                                            |

* https://cyprusflightpass.gov.cy/en/country-categories
Fig. 3. Comparison of the COVID-19 situation after lifting (and re-introduction) of restrictions in Cyprus, Iceland and Malta. R – Re-introduction of restrictions and decrease in number of people in one gathering to 100 – Iceland
Re – Relaxation of measures including increase in number of people in one gathering to 200 – Iceland
S – Start of new academic year – Cyprus and Iceland respectively. Cyprus also re-introduced new measures, compulsory mask wearing in public places.

Declaration of competing interest

All authors report no conflicts of interest relevant to this article.

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