Journal of Travel Medicine
International Society of Travel Medicine
Established 1991
Promoting healthy travel worldwide
Journal of Travel Medicine, 2020, 1–3
doi: 10.1093/jtm/taaa102
Advance Access Publication Date: 25 June 2020
Research Letter

Research Letter

A cluster of COVID-19 in pilgrims to Israel

Androula Pavli[1], Paraskevi Smeti[1], Kalliopi Papadima[2], Anastasia Andreopoulou[2], Sofia Hadjianastasiou[1], Eleni Triantafillou[2], Annita Vakali[3], Chrysovalantou Kefaloudi[3], Danai Pervanidou[3], Charalambos Gogos[4], and Helena C. Maltezou[5,*]

[1]Department of Travel Medicine, National Public Health Organization, Athens, Greece, [2]Department of Respiratory Diseases, Directorate of Epidemiological Surveillance and Interventions for Infectious Diseases, National Public Health Organization, Athens, Greece, [3]Department of Vectorborne Diseases, Directorate of Epidemiological Surveillance and Interventions for Infectious Diseases, National Public Health Organization, Athens, Greece, [4]Department of Internal Medicine, University of Patras Medical School, Patras, Greece, and [5]Directorate of Epidemiological Surveillance and Interventions for Infectious Diseases, National Public Health Organization, Athens, Greece

*To whom correspondence should be addressed. Email: helen-maltezou@ath.forthnet.gr

Submitted 2 June 2020; Revised 12 June 2020; Accepted 15 June 2020

Key words: SARS-CoV-2, infection, pandemic, pilgrimage, transmission, travel, imported

Short Communication

The emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in China in December 2019 that causes a respiratory disease named coronavirus disease 2019 (COVID-19) was declared by the World Health Organization on 11 March 2020 a pandemic. Mass gatherings with high intensity social contacts have been a well-recognized risk factor for the transmission of infectious diseases, including SARS-CoV-2, as shown by recent reports in returning pilgrims.[1–4] Therefore, and in the interests of global safety, many mass gatherings have been suspended as a response to the pandemic.[5]

The aim of this report is to describe a cluster of SARS-CoV-2 infections in Christian pilgrims returning from Israel to Greece in late February 2020, after their pilgrimage at Jerusalem holy place, a mass gathering attended by a large number of people. In Greece, the first COVID-19 case was diagnosed in Thessaloniki (Northern Greece) on February 26 in a traveler returning from Italy. Similarly, in Israel there were only two imported cases and in Egypt one case reported at that time.

On 3 March 2020, two COVID-19 cases were notified to the National Public Health Organization among pilgrims returning from Jerusalem on 27 February 2020 with a direct flight from Tel Aviv, Israel. Both cases were symptomatic during the flight. These two cases were part of a large group of 53 pilgrims which visited Jerusalem on February 19. Their trip also included visits to Jericho, Mount Sinai in Egypt and Bethlehem from 19 to 27 February 2020, common activities, transportation in the same buses and residing in the same hotels. Upon arrival to Athens, the group was transferred to their final destinations to Peloponnese by bus and to an Ionian island by bus and later by ship.

Following the notification of the two COVID-19 cases, extensive contact tracing was carried out of all passengers and crew members of the same flight; five additional COVID-19 cases were diagnosed among close contacts (four passengers not belonging to the same group and one crew member). Guidelines were provided to all close contacts (group of pilgrims, tour guides, all passengers and crew members) for a 14-day self-quarantine following their last exposure, self-monitoring for fever and/or respiratory symptoms, and for contacting the National Public Health Organization's hotline for further advice in case of symptoms onset. In addition, the travel agent was informed in order to notify travel agencies in Israel and Egypt to take relevant public health measures.

All 53 pilgrims were tested for SARS-CoV-2 by RT-PCR 7 days after their arrival upon notification of the two COVID-19 cases. Of them, 48 (90.5%) were tested positive. Table 1 shows the characteristics of the 48 positive cases. All 48 pilgrims were Greek nationals, with a female-to-male ratio of 2.2 (33 women and 15 men). Their mean age was 58 years (range: 29–84 years) and 18 (37.5%) were 65 years of age and older. Twelve pilgrims (25%) had an underlying condition. Overall, 41 (85.4%) of the 48 positive cases developed symptoms consistent with

Table 1. Characteristics of 48 pilgrims with SARS-CoV-2 infection

No	Symptom onset	Imaging test	Underlying conditions	Complications	Hospitalization	Outcome
1	29/02/2020	Yes	Hypertension, atrial fibrillation	ARDS, MODS, ARF	ICU	Dead
2	04/03/2020	Yes	Nil	No	Ward	Recovery
3	29/02/2020	Yes	COPD	Pneumonia	Ward	Recovery
4	27/02/2020	No	Multiple sclerosis	No	-	Recovery
5	29/02/2020	No	Nil	No	-	Recovery
6	29/02/2020	No	Nil	No	-	Recovery
7	N/A	No	Nil	No	-	Recovery
8	02/03/2020	No	Nil	No	-	Recovery
9	03/03/2020	No	Nil	No	-	Recovery
10	03/03/2020	No	Nil	No	-	Recovery
11	26/02/2020	No	CVD, malignancy	Pneumonia	Ward	Recovery
12	01/03/2020	No	Nil	No	-	Recovery
13	29/02/2020	No	Atrial fibrillation	No	-	Recovery
14	06/03/2020	No	Nil	No	Ward	Recovery
15	27/02/2020	Yes	Nil	ARDS, MODS	ICU	Dead
16	02/03/2020	Yes	Bronchial asthma	N/A	Ward	Recovery
17	26/02/2020	Yes	Nil	Pneumonia	Ward	Recovery
18	01/03/2020	No	Hypertension	No	-	Recovery
19	02/03/2020	Yes	Myelodysplastic syndrome	Pneumonia	Ward	Recovery
20	03/03/2020	No	Nil	No	-	Recovery
21	03/03/2020	N/A	Nil	No	Ward	Recovery
22	01/03/2020	No	Nil	No	Ward	Recovery
23	N/A	No	Nil	No	-	
24	04/03/2020	Yes	Nil	No	Ward	Recovery
25	N/A	N/A	Nil	No	-	Recovery
26	03/03/2020	Yes	Nil	Pneumonia	Ward	Recovery
27	27/02/2020	N/A	Nil	No	Ward	Recovery
28	28/02/2020	Yes	Nil	No	-	Recovery
29	N/A	No	Nil	No	-	Recovery
30	25/02/2020	N/A	Nil	No	-	Recovery
31	25/02/2020	No	Nil	No	-	Recovery
32	25/02/2020	No	Nil	No	-	Recovery
33	28/02/2020	No	Nil	No	-	Recovery
34	N/A	No	Nil	No	-	Recovery
35	01/03/2020	No	Nil	No	Ward	Recovery
36	29/02/2020	Yes	Nil	Pneumonia	Ward	Recovery
37	N/A	No	Nil	No	-	Recovery
38	29/02/2020	No	Hypertension	No	-	Recovery
39	28/02/2020	No	Nil	No	Ward	Recovery
40	N/A	No	Nil	No	-	Recovery
41	28/02/2020	No	Rheumatoid arthritis	No	-	Recovery
42	N/A	No		No	-	Recovery
43	28/02/2020	No	Hypertension	No	Ward	Recovery
44	26/02/2020	No	Heart failure	No	-	Recovery
45	04/03/2020	No	Nil	No	-	Recovery
46	N/A	Yes	Nil	No	-	Recovery
47	29/02/2020	No	Nil	No	Ward	Recovery
48	06/03/2020	Yes	Nil	No	Ward	Recovery

ARDS: acute respiratory distress syndrome, ARF: acute renal failure, COPD: chronic obstructive pulmonary disease, CVD: cardiovascular disease, ICU: intensive care unit, M: male, MODS: multiple organ dysfunction syndrome, N/A: non applicable and SARS-CoV-2: severe acute respiratory syndrome coronavirus 2.

COVID-19 while 7 (14.6%) remained asymptomatic (Table 1). Onset of symptoms occurred up to 9 days after return. Fever, cough, sore throat, weakness, dyspnea, rhinorrhea and gastrointestinal symptoms were recorded in 30 (73.2%), 27 (65.8%), 8 (19.5%), 6 (14.6%), 5 (12.2%), 4 (9.7%) and 3 (7.3%) of the 41 symptomatic cases, respectively. Investigation with a chest imaging test was performed in 13 (27%) of all positive cases of whom 7 (53.8%) had findings compatible with pneumonia. Twenty pilgrims required hospitalization, including two cases admitted in the intensive care unit. Overall, eight of hospitalized pilgrims developed complications. Two pilgrims died because of COVID-19; all others had an uneventful recovery. Self-isolation

and health monitoring for 14 days was recommended to the five pilgrims who were tested negative; repeat tests were also negative. It is worth mentioning that a Greek tour bus driver of the pilgrim group in Israel was also infected.[6]

Containment measures including contact tracing and isolation implemented at that time seemed to be effective to prevent disease spread in the local community. Considering the low possibility of local transmission at destinations and also at the country of origin due to low prevalence in origin and destination countries, it is possible that the pilgrims were infected during religious rituals by other SARS-CoV-2 infected travelers from countries where local transmission was already established.[1] Based on the results of our study, these cases suggested a high risk of SARS-CoV-2 infection for pilgrims traveling during the pandemic. A large proportion of these pilgrims were 65 years of age and older with underlying conditions. This explains their high complication rate and case fatality rate.[7] The high attack rate among this group of pilgrims, is probably related to potential risk behaviours during pilgrimage, such as exposure to crowded conditions with pilgrims from different countries and also engagement in common activities, including religious rituals and also recreational activities for a long period of time.[1] A similar outbreak was reported among South Korean nationals who were tested positive for SARS-CoV-2 infection after they visited the West Bank from February 9 to 14 as a group of 77 members; however, no evidence was found of connection leading to transmission between the two groups.[8]

Mass gatherings, including pilgrimage, are a risk factor for rapid spread of respiratory infections which is the most common disease among pilgrims. Crowded conditions and intensity of social contacts during their engagement in religious rituals may lead to propagation and amplification of this novel respiratory virus SARS-CoV-2.[1] As the pandemic continues, there will be an increasing number of pilgrims returning back home. SARS-CoV-2 may be seeded in and transmitted out of holy places by visitors. Therefore, it is strongly recommended that the home countries should be prepared to receive such cases, and therefore to implement appropriate public health measures.[9] Public health authorities should increase awareness in pilgrims about the risks and the need for personal protection. Pilgrims should be advised adherence to hygiene recommendations, to avoid close contact with sick people and to report and seek healthcare if they become symptomatic after pilgrimage.[10] Travel health professionals must be aware of the risks posed by returned pilgrims. Preventive measures before departure and on the field should be reinforced during pre-travel consultation. Postponement may be recommended in particular for elderly pilgrims and those with chronic and underlying conditions.

Authors' Contributions

Androula Pavli: investigation, writing, review, editing. Paraskevi Smeti: investigation, writing and review. Sofia Hadjianastasiou: Investigation and review. Kalliopi Papadima: investigation, editing and review. Anastasia Andreopoulou: investigation and review. Danai Pervanidou: investigation and review. Chrysovalantou Kefaloudi: investigation and review. Anita Vakali: investigation and review. Charalambos Gogos: investigation, writing and review. Helena C. Maltezou: investigation, writing, review and editing.

Acknowledgement

We thank Athanasios Minitsios and Panagiota Isari from the Department of Travel Medicine of the National Public Health Organization for their administrative and data management support.

Funding

No funding was received for this work.

Conflict of Interest

There is no conflict of interest to declare.

References

1. Memish ZA, Steffen R, White P *et al.* Mass gatherings medicine: public health issues arising from mass gathering religious and sporting events. *Lancet* 2019; **393**:2073–84.
2. Gu Y, Lu J, Yang Z. Pilgrimage and COVID-19: the risk among returnees from Muslim countries. *Int J Infect Dis* 2020; **95**:457–8.
3. Badshah SL, Ullah A, Badshah SH, Ahmad I. Spread of novel coronavirus by returning pilgrims from Iran to Pakistan. *J Travel Med* 2020; **27**:taaa044. doi: 10.1093/jtm/taaa044.
4. Che Mat NF, Edinur HA, Abdul Razab MKA, Safuan S. A single mass gathering resulted in massive transmission of COVID-19 infections in Malaysia with further international spread. *J Travel Med* 2020; **27**:taaa059.
5. Ahmed QA, Memish ZA. The cancellation of mass gatherings decision making in the time of COVID-19. *Travel Med Infect Dis* 2020; **14**:101631.
6. The Jerusalem Post. Available at: https://www.jpost.com/breaking-news/16th-israeli-diagnosed-with-coronavirus-619908 (7 June2020, date last accessed).
7. de Lusignan S, Dorward J, Correa A *et al.* Risk factors for SARS-CoV-2 among patients in the Oxford Royal College of general practitioners research and surveillance Centre primary care network: a cross-sectional study. *Lancet Infect Dis* 2020; S1473-3099(20)30371-6.
8. *Korean nationals who visited Israel, West Bank tested positive for coronavirus*. Available at: https://www.haaretz.com/israel-news/health-ministry-korean-nationals-who-visited-israel-tested-positive-for-coronavirus-1.8564475 (7 June 2020, date last accessed).
9. Ebrahim SH, Memish ZA. COVID-19: preparing for super spreader potential among Umrah pilgrims to Saudi Arabia. *The Lancet* 2020; **395**:e48.
10. Alqahtani AS, Heywood AE, Rashid H. Preparing Australian pilgrims for the Hajj 2018. *J Travel Med* 2018; **25**:tay068.