

Omicron Outbreak at a Private Gathering in the Faroe Islands, Infecting 21 of 33 Triple-Vaccinated Healthcare Workers

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There are concerns that the severe acute respiratory syndrome coronavirus 2 Omicron variant evades immune responses due to an unusually high number of mutations on the spike protein. Here, we report a superspreading event of Omicron infections among 21 of 33 triple-vaccinated healthcare workers who attended a private gathering.

Keywords. Omicron; breakthrough infection; COVID-19; superspreading; vaccination.

South African researchers first reported the B.1.1.529 variant of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) on 24 November 2021 [1]. Two days later, the World Health Organization named the variant Omicron and classified it as a variant of concern [2].

The Omicron variant carries from 26 to 32 mutations on the spike protein, the main antigenic target of antibodies generated by infection or vaccination [3]. Early reports suggest that Omicron displays higher transmissibility and immune escape potential than earlier variants, while a neutralization study has shown lower neutralization activity for those previously infected and vaccinated against the Omicron variant [4].

Although many countries worldwide enacted travel restrictions to restrict the transmission of the Omicron variant, the variant managed to spread quickly within Europe and beyond during the first weeks of December 2021. The fast spread led to the expectation that the Omicron variant will become the dominating variant within a short time, and surveillance of the severity and transmissibility of the Omicron variant is critical in the following weeks and months [5].

The Faroe Islands (population 53 600), a self-governing group of islands between Iceland and Norway, have been relatively successful in containing the coronavirus disease 2019 (COVID-19) pandemic [6, 7]. On 30 December 2020, the first Faroese received the BNT162b2 vaccine (Comirnaty; BioNTech, Mainz, Germany), the only vaccine used in the Faroe Islands. Since that time, a large proportion of the population has been vaccinated. As of 24 January 2022, 76.0% of the population has been vaccinated 2 times, and 36.1% has been vaccinated 3 times [8]. From March 2020 to September 2021, the Faroe Islands had registered only 1001 cases of COVID-19 (1868 per 100 000) and 2 deaths (3.73 per 100 000). However, after loosening restrictions and the introduction of the more contagious Delta variant, a large outbreak has plagued the islands, with more than 13 000 cases and 17 deaths registered from 1 September 2021 to 24 January 2022 [8].

Here, we report a superspreading event where 21 of 33 healthcare workers were infected with the Omicron variant after attending a social gathering in early December 2021, even though all infected participants had been vaccinated 3 times and had a recent negative test.

METHODS

The Chief Medical Officer's office performs contact tracing in the Faroe Islands by interviewing all SARS-CoV-2-positive individuals and identifying their close contacts and their vaccination status [6]. Usually, only SARS-CoV-2-naïve contacts are asked to quarantine. However, since the emergence of Omicron, all contacts with suspected Omicron-positive individuals are asked to quarantine for 7 days. They are also asked to get a polymerase chain reaction (PCR) test immediately and on days 4 and 6, regardless of vaccination status. All positive individuals are required to isolate.

The Faroe Islands have performed among the highest numbers of COVID-19 tests per capita globally. Throat swabs are offered for free at governmental testing centers, with subsequent PCR analysis at 1 of 2 centralized laboratories; test results are delivered within 12–24 hours. All cases connected to foreign travel or where the Omicron variant is suspected are genome sequenced using targeted sequencing in which the N-terminal domain and receptor-binding domain of the spike protein are sequenced.

All infected individuals from the gathering agreed to participate in this study. They were interviewed by staff at the Chief Medical Officer's office twice. The first time was shortly after the positive test when the date of symptom debut, vaccination status, and personal characteristics were recorded. The second interview was performed 12–14 days after the exposure;

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individuals completed a questionnaire about symptoms and severity, comorbidities, and medications.

The Faroese Health Research Ethics Committee ruled that this project belonged to the category of registry research and committee approval was not necessary.

RESULTS

During early December 2021, 33 people attended a private gathering. The setting was in a private house with a large indoor area with good ventilation. The participants were seated in a common room but interacted regularly during the gathering, and none wore masks. Several participants noticed symptoms during the following days and a PCR test was performed, which was positive. PCR testing was also performed for the other participants subsequently, resulting in 21 of 33 participants testing positive, corresponding to an attack rate of 63.6%. The unusually high attack rate led the chief medical officer to request genome sequencing of the virus; the first Omicron variant in the Faroes was identified on December 8. To date, 13 samples from the gathering and an additional 4 from the extended transmission chain have been verified as the Omicron variant. The remaining cases are assumed to be the Omicron variant. It has not been possible to definitively identify the index case; presumably, the variant had been imported from abroad. Extensive contact tracing was performed, and seemingly the transmission chain was stopped at approximately 70 cases.

All infected participants were fully vaccinated with the mRNA vaccine BNT162b2 (Comirnaty; BioNTech, Mainz, Germany) and had received a third booster dose. None had a history of previous SARS-CoV-2 infection. One of the infected had received their booster within days of the gathering, while the rest had their booster at least 3 weeks earlier. The characteristics of the infected participants are listed in [Table 1](#). All infected participants had a negative test approximately 36 hours before the gathering. Most had a PCR test, while 5 had a lateral flow test. All infected cases in our study experienced symptoms. The most common symptoms were myalgia and arthralgia, fatigue, and fever, while the least common symptoms were loss of taste and smell. No one was admitted to the hospital. We do not have individual-level information on the uninfected participants. However, we know that all were fully vaccinated and had a negative test approximately 36 hours before the gathering.

Assuming that the exposure to SARS-CoV-2 happened during the gathering, the time to symptom onset was short, ranging from 2 to 6 days, with a mean incubation period of 3.24 days (95% confidence interval [CI]: 2.87–3.60). The mean time from exposure to positive test was 3.82 days (95% CI: 3.46–4.19), ranging from 3 to 5 days. Time to resolution of symptoms varied. At the end of follow-up, 5 individuals still reported symptoms, while the rest reported symptoms lasting 1 to 9 days. The individual data regarding incubation period, time to positive test, and duration of symptoms are shown in [Figure 1](#).

Table 1. Characteristics and Symptoms of Omicron-Infected Individuals (n = 21) from a Gathering in the Faroe Islands

| Characteristics and Symptoms | | | | |
|-----------------------------------------|------------------------------------|-------------------|-----------------------|---------------------|
| Age, median | 45 years | | | |
| Date of first vaccination ^a | 4 January 2021 to 15 January 2021 | | | |
| Date of second vaccination ^a | 5 February 2021 to 4 March 2021 | | | |
| Date of third vaccination ^a | 28 October 2021 to 2 December 2021 | | | |
| Any comorbidity, n (%) | 4 (19) | | | |
| Any medication, n (%) | 3 (14) | | | |
| | Symptoms (%) | Mild Symptoms (%) | Moderate Symptoms (%) | Severe Symptoms (%) |
| Asymptomatic | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Fever | 13 (62) | 9 (69) | 3 (23) | 1 (8) |
| Headache | 11 (52) | 4 (36) | 5 (45) | 2 (18) |
| Dry cough | 13 (62) | 9 (69) | 3 (23) | 1 (8) |
| Wet cough | 8 (38) | 6 (75) | 2 (25) | 0 (0) |
| Dyspnea | 8 (38) | 7 (88) | 1 (13) | 0 (0) |
| Loss of smell | 4 (19) | 1 (25) | 3 (75) | 0 (0) |
| Loss of taste | 5 (24) | 2 (40) | 3 (60) | 0 (0) |
| Fatigue | 15 (71) | 4 (27) | 7 (47) | 4 (27) |
| Rhinorrhea | 12 (57) | 5 (42) | 3 (25) | 4 (33) |
| Sinusitis symptoms | 6 (29) | 3 (50) | 1 (17) | 2 (33) |
| Throat pain | 10 (48) | 7 (70) | 2 (20) | 1 (10) |
| Myalgia | 13 (62) | 7 (54) | 4 (31) | 2 (15) |
| Arthralgia | 11 (52) | 7 (64) | 3 (27) | 1 (9) |
| Chest pain | 4 (19) | 2 (50) | 2 (50) | 0 (0) |

^aAll infected individuals had received 3 vaccinations.

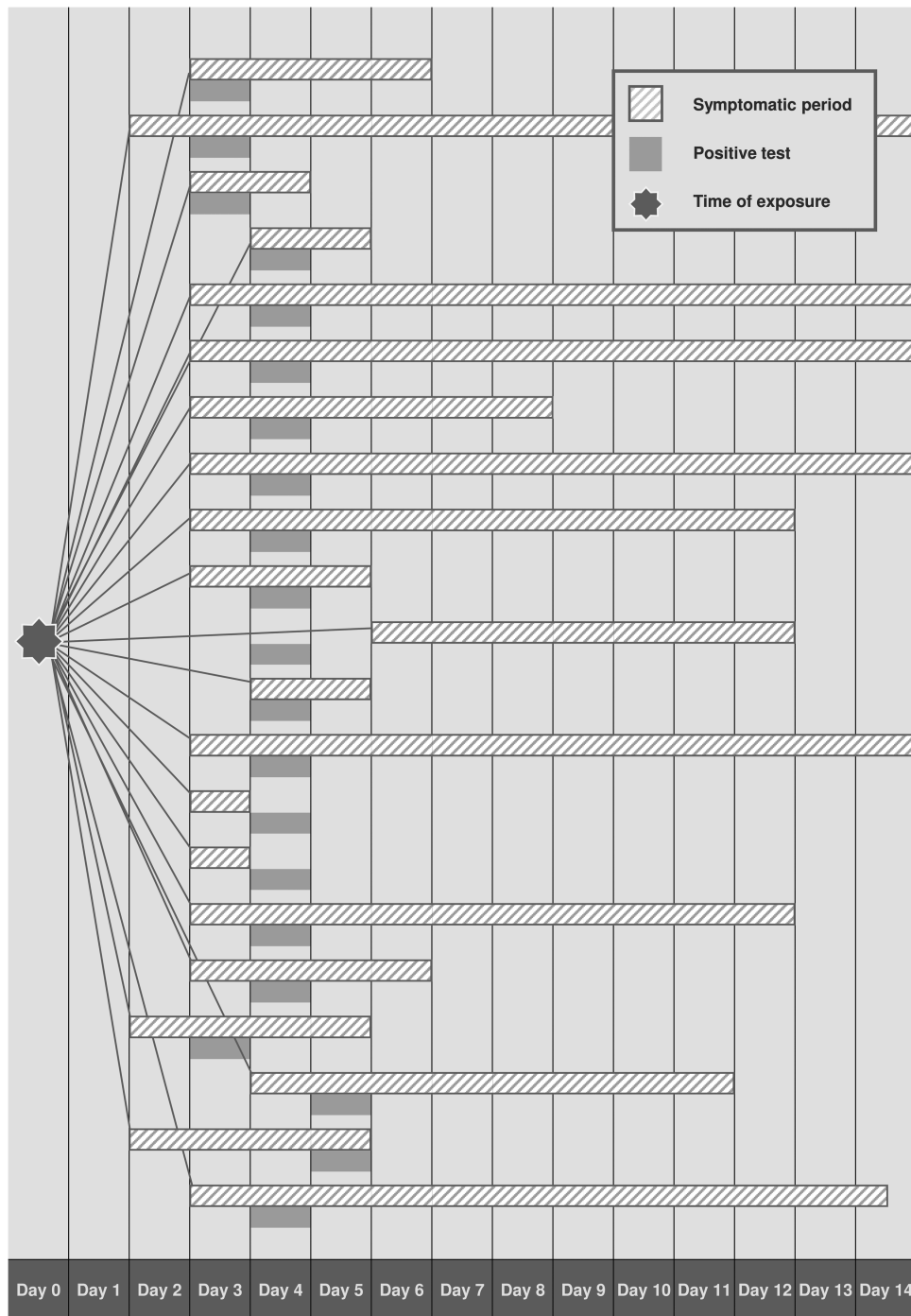


Figure 1. Individual data regarding incubation time, time to positive test, and duration of symptoms.

DISCUSSION

Our findings indicate that the Omicron variant displays potent immune-escape properties even when recently boosted individuals get infected and that the variant can cause superspreading events. A shorter incubation period for Omicron than for previous variants was found in this study that could explain, in part, the increased infection rates in individuals with some immunity. Urgent research into the Omicron variant is needed, as

with the current growth rates, it is anticipated to dominate the spread within a short time [9].

Our findings also highlight the importance of social distancing and the avoidance of larger gatherings during the pandemic to prevent possible superspreading events as factors such as indoor settings, poor ventilation, loud talking, laughing, and singing will increase the potential spread of the virus [10].

There are still limited clinical data available on the Omicron variant. It is notable that all of the infected cases experienced symptoms and that loss of taste and smell seemed to be less common in these cases compared with previous variants. Brandal et al. reported a similar outbreak in Norway, with a high attack rate of 74% and symptoms similar to those reported here [11]. Furthermore, Espenhain et al. published an early report on the first Omicron cases in Denmark, highlighting the rapid spread of the variant, its ability to induce superspreading events, and a high proportion of infection in those who were fully vaccinated. Since there is a lag time from infection to hospitalization and death and this variant has only recently been discovered, sufficient data are not available to make conclusions on the severity of this variant [12].

There are some limitations to our observations. Of note, the fact that many were infected at this gathering does not negate the possibility that the COVID-19 vaccines can prevent infections. It is not unlikely that a higher attack rate would have been observed if the infected participants had not been triple-vaccinated. Also, the setting of a social gathering with close contact between participants does not necessarily generalize to other settings, since the amount of virus in the air will be higher in such social settings, increasing the risk of infection even among triple-vaccinated individuals. We are also aware that the small size of the study is a limitation, especially in determining the hospitalization or death rates. However, it is likely that vaccination protects against severe disease with the Omicron variant, even if protection against infection has waned to some degree, still underlining the importance of vaccination. Finally, the findings might not generalize to SARS-CoV-2 –naive individuals, and further research of Omicron among SARS-CoV-2–naive individuals is needed.

Notes

Author contributions. G. H. and M. F. K. wrote the manuscript. O. K. H. and L. F. M. were responsible for contact tracing and interviewing the participants. D. H. C. was responsible for the sequencing of the viral genomes. G. H., O. K. H., L. F. M., D. C., M. S. P., and M. F. K. contributed to interpretation of the data and read, edited, and approved the final manuscript.

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Potential conflicts of interest. G. H. reports being a member of the Faroese Research Ethics Committee. M. S. P. reports grants from the Velux Foundation, the Faroese Research Council, the Faroese Parkinson's Association, and the Faroese Health Insurance Fund outside the submitted work and serves as a member of the Board of the Faroese National Data Protection Authority. M. F. K. reports grants from Sjúkrakassagrannur Føroya, Krabbameinsfelag Føroya, Dansk Kræftforskningsfond, and Brødrene Hartmans fond outside the submitted work and travel support from Kræftens Bekæmpelse. All remaining authors: No reported conflicts of interest. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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