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Short Communication

Lessons learnt from an outbreak of COVID-19 in a workplace providing an essential service, Thames Valley, England 2020: Implications for investigation and control

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ABSTRACT

Objectives: Human behavioural factors are an important consideration in the response to COVID-19 outbreaks. Prior to the emergence of highly infectious variants of SARS-CoV-2 and implementation of vaccination programmes, we conducted a study to explore the role of behavioural factors influencing transmission at an essential services workplace during an outbreak of COVID-19.
Study design: Observational cohort study.
Methods: In response to a COVID-19 outbreak in November 2020 at an office-based call centre workplace providing an essential service in Thames Valley, we designed and conducted an anonymous staff questionnaire to explore potential behavioural factors of staff behaviour that influence transmission.
Results: A total of 45 staff (27%) tested positive for SARS-CoV-2 over a six-week period between 26 October and 14 December 2020. The online questionnaire was cascaded to 168 staff members; the response rate was 41%. Self-reported use of hand sanitiser, face masks and cleaning of equipment in line with workplace guidance was 86%, 66% and 63% respectively. On the same behaviours, respondents reported that 33%, 31% and 14% of their colleagues followed the recommendations. Almost two thirds of respondents (63%) reported that they were unable to maintain social distancing at the workplace, primarily due to operational constraints.
Conclusions: Prevention and control of COVID-19 outbreaks at workplaces providing an essential service is challenging. Operational requirements, often compounded by reduced staff availability, impede implementation of more robust control measures. Ongoing assessment of human behavioural factors in the control of COVID-19 outbreaks at workplaces in the post-vaccine era is essential.

1. Introduction

Guidance on COVID-secure measures to minimise workplace transmission is available to employers in England [1,2]. Recommendations to employers include supporting working from home arrangements whenever possible, face coverings and personal protective equipment (PPE) for certain roles where social distancing is not possible, changes in workplace layout to support social distancing and enhanced cleaning and disinfection of frequently used environmental surfaces.

COVID-secure measures are particularly relevant to workplaces that provide essential services crucial to population health [3]. Essential service organisations, such as emergency services, have a duty to the population they serve, while ensuring the health and safety of their staff. Due to the nature of services they provide and operational requirements that necessitate close collaboration among staff, working from home is often not feasible. In view of these, standard control measures in response to an outbreak such as encouraging remote working or closure of service are not acceptable interventions. Hence, it is not surprising that several COVID-19 outbreaks affecting office-based essential services have been reported [4].

In England, outbreaks in the workplace were often reported to Public Health England (PHE) for further guidance on management. PHE's

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Health Protection Teams and Local Authority Public Health teams provided enhanced support with outbreak investigation and implementation of control measures to mitigate further spread [5]. Understanding root causes for outbreaks is important to inform strategies for minimising opportunities for introduction and transmission events in the workplace. Here, we present a cohort study of a COVID-19 outbreak in an office-based call centre workplace providing an essential national service and discuss the challenges of outbreak investigation and management.

2. Methods

In early November 2020, a workplace providing an essential service in Thames Valley, England reported to PHE that 14 of 168 employees (8.3%) had tested positive for SARS-CoV-2 on Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) in the preceding ten-days. For context the background community incidence at the same time was 0.27%.

The workplace had several COVID-secure measures in place, including maximum occupancy numbers for rooms; temporary Perspex screens; hand sanitiser in each workspace (with the recommendation to use at least three times per shift); written reminders on desks for employees to clean equipment at the start and end of every shift and after long periods away from the desk; resetting the air conditioning system to maximise fresh air and minimise recirculation; physical distancing of 2m where possible; and an organisational policy which encouraged and supported early reporting of symptoms and self-isolation.

An Incident Management Team (IMT) was convened, two days after the first 14 cases were identified, to consider the epidemiology of the outbreak, to review and identify potential causative factors and to advise appropriate control measures. This included screening all staff for SARS-CoV-2 with RT-PCR testing in mid-November.

In early December 2020, we designed a questionnaire and conducted a cohort study to explore personal and colleague behavioural factors influencing transmission in the workplace. Using the staff internal communication portal, all staff were invited to complete the voluntary anonymous online questionnaire. The questionnaire was open for 10 days with a reminder sent using the same system. Results of the questionnaire were exported to STATA and descriptive epidemiological analysis was performed.

3. Results

A total of 45 staff (27%) tested positive for SARS-CoV-2 across a six-week period between 26 Oct 2020 and 14 December 2020 (Fig. 1). In the all staff screening exercise with RT-PCR in mid-November, five asymptomatic cases were identified. The asymptomatic case identified at the end of November was also identified on RT-PCR testing.

Additional infection control measures implemented during the course of the outbreak included a one-way system inside the office, installation of permanent Perspex screens between work spaces, requirement to use face coverings when not at a personal desk, minimising face to face interactions as far as possible, using telephones for supervision and support for junior staff. Staff were reminded of the importance of complying with isolation requirements for symptomatic and asymptomatic SARS-CoV-2.

A total of 69 (41%) staff members responded to the questionnaire. On personal behaviours at the workplace, 86% of respondents reported that they used hand sanitiser at least three times a day. Regarding cleaning work equipment and use of face masks, 63% and 66% reported following recommendations. On the behaviours of their colleagues at the workplace, respondents reported that 33%, 14% and 31% of their colleagues used hand sanitiser at least three times a day, cleaned work equipment and used face masks, respectively.

Almost two-thirds of respondents (63%) reported they and their colleagues had difficulties in maintaining social distancing. Reported reasons for being unable to maintain social distancing included a combination of operational workplace requirements (31%), self-reported necessity to be closer than 2 m due to job role (16%) or because it was perceived to be the norm (16%).

4. Discussion

Despite implementation of COVID-secure measures prior to the outbreak, we found epidemiological evidence consistent with transmission of SARS-CoV-2 in a workplace providing an essential service in early November 2020. Investigation of this outbreak has provided important insights on workplace behaviours, and their impact on investigation and control of COVID-19 in such settings.

As noted in the epidemic curve, laboratory confirmed cases were reported throughout the 6-week period with most of transmission likely occurring in early November. The actual number of cases could potentially be higher given that testing during the early period of the outbreak was restricted to symptomatic individuals. Given the low community levels of SARS-CoV-2 at the time the outbreak in this workplace was reported, the IMT considered that it was highly likely most identified cases acquired the infection at the workplace. Nevertheless, in the absence of whole genome sequencing, this could not be conclusively established. As standard infection control measures were already in place, the IMT advised more enhanced measures and a review of behavioural factors that could explain the level of transmission among staff.

The study suggested that there were substantial challenges in ensuring high levels of compliance with recommended infection control measures to minimise transmission at this workplace. Essential service organisations have a duty to provide services to the population while

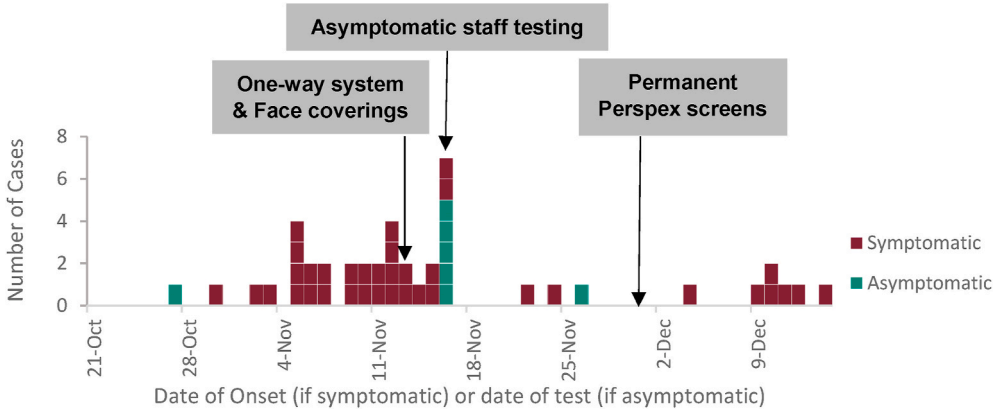

Fig. 1. Distribution of RT-PCR confirmed cases and timeline of mitigation measures of SARS-CoV-2 in a workplace in England, October–December 2020.

ensuring health and safety of their own staff. Control measures such as closing the workplace or asking staff to work from home were not an option in this setting. Unexpected staff absences, due to isolation requirements disrupted established ways of working and necessitated staff covering more roles than usual thus increasing the level of staff mixing. The inability to robustly observe social distancing recommendations due to operational requirements is a major barrier to preventing ongoing workplace transmission in such settings [6].

Regular reminders on measures such as hand washing and maintaining social distancing may be easy to implement but compliance is not always guaranteed. It may be preferable to build in more systematic measures to minimise lapses in behaviour by redesigning the workplace as necessary. There is emerging evidence on the optimisation of indoor ventilation as a measure to minimise transmission of respiratory pathogens [7]. Although the COVID-19 vaccination programmes are expected to have substantial population impact on mortality and morbidity, the role of vaccines in limiting transmission is still unclear [8, 9]. Nevertheless, measures to optimise vaccination uptake amongst essential service employees would be beneficial for both individual health and organisational operational effectiveness. It should be noted that vaccination is unlikely to completely eliminate outbreaks, therefore specific measures to minimise opportunities for COVID-19 transmission are likely to be an important control measure requiring consideration in respiratory outbreaks in workplaces.

Limitations of this study must be noted. First, given the lower than expected response rate to the questionnaire due to service-related pressures, a degree of selection bias is likely. We attempted to minimise the impact of social desirability bias by not seeking any identifiable information from respondents and using non-judgemental language throughout. Despite these measures, we found differences in responses between self-reported and perceived colleague behaviour suggesting a degree of social desirability bias. Future investigators may wish to consider other qualitative research methods such as semi-structured interviews or ethnographic techniques. Finally, this outbreak occurred prior to the emergence of more infectious variants such as Alpha and Delta and the implementation of vaccination programmes. It is likely that transmission patterns and outcomes in the post-vaccine era may be different.

We considered but decided not to explore social mixing of staff outside of the workplace due to confidentiality concerns. It is possible that some of the transmission may be linked to exposures outside of the workplace. Whole genome sequencing may have helped to better estimate the levels of transmission and understand transmission dynamics in the workplace by identifying sporadic and workplace associated cases but could not be pursued due to operational reasons.

5. Conclusions

Despite implementation of COVID-secure measures, prevention and control of a COVID-19 outbreak at a workplace providing essential service was challenging. Difficulties in maintaining social distancing and reported suboptimal behaviours among staff were compounded by operational requirements and reduced staff availability. Encouraging high rates of vaccination amongst essential service staff and robust implementation of infection control measures, including rapid identification and isolation of infectious cases, remain key interventions to limit spread. Ongoing assessment of human behavioural factors in the control of COVID-19 outbreaks at workplaces in the post-vaccine era is essential.

Contributors

The study idea was conceived as part of the outbreak investigation by HT, SC, MSC, KP, CH and DR. The questionnaire was designed by HT, SC, MSC and KP and piloted by CH and DR. Data was analysed by SC, RD, HT, MSC and KP. HT and SC wrote the first draft of the manuscript. All authors contributed to the discussion and subsequent revisions.

Approval and funding

No ethical approval was required for this outbreak investigation. PHE, now UKHSA, has legal permission, provided by Regulation 3 of The Health Service (Control of Patient Information) Regulations 2002, to process confidential patient information for national surveillance of communicable diseases. This study was undertaken as part of an outbreak investigation and had no funding.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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