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Objective: To explore the prevalence of asymptomatic SARS-CoV-2 in the maternity population.

Study Design: Newham University Hospital based in East London serving a population with the highest death rate secondary to SARS-CoV-2 in the UK, commenced universal screening of all admissions to the Maternity Unit from 22nd April to 5th May, 2020. A proforma was created to capture key patient demographics, indication for admission and presence of SARS-CoV-2 related symptoms at the point of presentation.

Results: A total of 180 women with a mean age of 29.9 (SD 7.4) years, at a median gestation of 39 (IQR 37+1 to 40+3) weeks underwent universal screening with nasopharyngeal PCR swabs during the two-week period of the study. BAME identity or parity was not associated with the likelihood of a positive result. Seven women (3.9%, 1.6 to 7.8) were tested positive for SARS-CoV-2, of whom 6 (3.3%, 1.2 to 7.1) were asymptomatic; 85.7% (42.1 to 99.6) of the SARS-CoV-2 positive women were asymptomatic.

The sensitivity of symptom-driven testing was 14.3% (0.36 to 57.87) and specificity was 91.86% (86.72 to 95.48) with a positive predictive value of 6.67% (1.08 to 31.95) and a negative predictive value of 96.34% (95.10 to 97.28).

Conclusion The prevalence of SARS-CoV-2 in the maternity population served by Newham University Hospital was 3.9%, four weeks after lockdown. Of the women who were found to be SARS-CoV-2 positive, a high proportion (87.9%) were asymptomatic. These findings support the need for universal testing to enable targeted isolation and robust infectious control measures to mitigate outbreaks of SARS-CoV-2 in maternity units.

Key Words: SARS-CoV-2; Universal screening; Medical disorders in pregnancy

Universal Screening for SARS-CoV-2 in Pregnant Women at Term Admitted to an East London Maternity Unit

Introduction

SARS-CoV-2, a novel strain of coronavirus causing COVID-19, has changed the world in an unprecedented manner. First identified in Wuhan City, China towards the end of 2019, SARS-CoV-2 was declared a global pandemic by the WHO on 11th of March 2020.¹ The rapid global dissemination of SARS-CoV-2 may indicate that the currently accepted estimate of the basic reproduction number (R_0) may well be an underestimate as asymptomatic carriers of the virus, though still contagious elude detection by public health surveillance systems.²

Complete lockdown commenced on 23rd March 2020 in the UK. Lockdown though having proven to be effective at keeping R_0 consistently below one³, cannot be sustained indefinitely without leading to increasing social and economic damage. Relaxation of lockdown measures without either a pharmacological cure or vaccine will inevitably lead to a resurgence of the virus resulting in a further wave of deaths, with the most socially disadvantaged groups suffering the most. Universal screening together with contact tracing, albeit its challenges, has been postulated to enable the resumption of normal life in the UK.⁴

As per current public health guidance in the UK, pregnant women are considered a clinically vulnerable group and are advised to continue shielding to minimise the risk of infection.⁵ Although shielding may be possible for other high-risk groups, pregnant women are still required to attend hospital appointments in person for regular antenatal care. Pregnant women have not been found to be more likely to contract SARS-CoV-2 than the general population⁶, however, physiological adaptations in pregnancy that affect the immune system can lead to more severe symptoms. Maternity services have as a result adapted to minimise virus transmission by conducting virtual clinics, screening for symptoms of SARS-CoV-2 prior to hospital visits, rationalising scans, limiting visitors and implementing universal screening of all admissions.

Newham University Hospital based in East London serving a population with the highest death rate secondary to SARS-CoV-2 in the UK⁷, commenced universal screening of all admissions to the Maternity Unit on 22nd April

2020. The primary aim of our study was to evaluate the prevalence of SARS-CoV-2 in our obstetric population and determine the presence of asymptomatic disease. A secondary aim was to identify any relationship between patient demographics and SARS-CoV-2.

Material and methods

All patients admitted to the maternity unit at Newham University Hospital from 22nd April to 5th May, 2020 were offered the SARS-CoV-2 nasopharyngeal PCR swab test. The study was registered with the local clinical effectiveness team and underwent review by the COVID-19 committee. Ethics approval was not required as this was an anonymous service evaluation.

A proforma was created to capture key patient demographics, indication for admission and presence of SARS-CoV-2 related symptoms at the point of presentation. Details of the patients were recorded in a protected database to allow follow up when the results would become available within 24 hours. Those who tested positive were managed based on the severity of the disease and given self-isolation advice if clinically well.

Numerical variables were expressed as a mean and standard deviation or median and interquartile range (IQR) based on their distribution. Categorical variables were expressed as numbers and percentages.

The Medcalc Diagnostic Test Evaluation Calculator was used to calculate sensitivities, specificities, positive predictive values, and negative predictive values for the presence of symptoms at admission as a predictor for a positive SARS-CoV-2 screening result.

Results

A total of 180 women with a mean age of 29.9 (SD 7.4) years, at a median gestation of 39 (IQR 37+1 to 40+3) weeks underwent universal screening with nasopharyngeal PCR swabs during the two-week period of the study. Two women were excluded from the study, as one of them had previously been suspected to be infected and the other declined testing. The completion rate of the proformas was 98.33% with no record about symptoms for 3 patients.

Hundred and twenty-six women (70%) were from a Black, Asian or Minority Ethnic group (BAME), mainly of South Asian origin (46.7%), and 71 (39.7%) were nulliparous. BAME identity or parity was not associated with the likelihood of a positive result.

The majority of women were admitted for obstetric indications, whereas 16 (8.9%) had SARS-CoV-2 suspected symptoms, of whom one was tested positive for SARS-CoV-2. Figure 1 shows the prevalence of SARS-CoV-2 in our cohort stratified by symptom status with 95% confidence intervals. Seven women (3.9%, 1.6 to 7.8) were tested positive for SARS-CoV-2, of whom 6 (3.3%, 1.2 to 7.1) were asymptomatic; 85.7% (42.1 to 99.6) of the SARS-CoV-2 positive women were asymptomatic.

The sensitivity of symptom-driven testing was 14.3% (0.36 to 57.87) and specificity was 91.86% (86.72 to 95.48) with a positive predictive value of 6.67% (1.08 to 31.95) and a negative predictive value of 96.34% (95.10 to 97.28).

Discussion

Providing care to pregnant women during the SARS-CoV-2 pandemic represents a clinical challenge as not only are they more susceptible to any infectious outbreak due to altered physiology, but there is also a clear need to safeguard the health of the fetus. The obstetric population unlike other clinically vulnerable groups still need to access healthcare services on a regular basis and will most likely require admission for delivery. Universal screening of all admissions allows the early identification of asymptomatic carriers. It enables the appropriate use of PPE and effective re-organisation of maternity services to facilitate isolation of positive cases.

The prevalence of SARS-CoV-2 at Newham University Hospital was 3.9%, four weeks after lockdown. A similar study at a Maternity Unit in New York showed a prevalence of 15.4%, at the beginning of lockdown.⁸ Cities that are geographically far apart at different points in their pandemic experience will consequently have different rates of positive cases. Prevalence of a contagious disease is a dynamic figure and therefore, requires ongoing surveillance and cannot be extrapolated from other populations.

Of the women who were found to be SARS-CoV-2 positive, a high proportion (87.9%) were asymptomatic. This figure was comparable with the proportion of asymptomatic SARS-CoV-2 positive women among all SARS-CoV-2 positive patients in the study by Sutton et al, despite the substantially higher prevalence of SARS-CoV-2 positive women in the latter⁹. These findings support the need for universal testing to enable targeted isolation and tracing; since symptomatic screening would have identified only one out of 7 women tested positive for SARS-CoV-2 in our study. Interestingly, a similar study by Breslin et al, also based in New York showed only one third who tested positive for the virus were asymptomatic at admission.⁹ Though there is some variation in the rates of asymptomatic prevalence, the findings suggest that SARS-CoV-2 is frequently asymptomatic and should be considered in all pregnant women in areas of high disease prevalence.

Strengths of our study include the high completion rate of the screening questionnaire reducing risk of reporting bias. Demographics of the population surveyed were similar to the demographic diversity of the local population in Newham.

Limitations of this study include the relatively limited sample size to estimate the prevalence of SARS-CoV-2, however the consistency of asymptomatic women among all SARS-CoV-2 positive women strengthen the validity of our findings. Our study was conducted in Newham, an area with the highest mortality rate associated with COVID-19 in the UK, therefore, extrapolating the results to other maternity services within the UK should be done with caution. Additionally, the true prevalence of the virus may be underestimated due to false-negative results.

Conclusion

Universal testing will enable the identification of asymptomatic patients and facilitate effective tracing and targeted isolation. These strategies will minimise the risk of further peaks in the pandemic and allow for a safer transition out of complete lockdown. Maternity services provide the ideal platform for this strategy of universal testing given the multiple encounters pregnant women have with health care services as part of their routine antenatal care.

Declaration of interests

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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Figure 1

