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COVID-19 deaths in a secondary mental health service

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ABSTRACT

We present data on outcomes associated with COVID-19 in a time-limited sample of 1181 patients who were receiving treatment within secondary care services from a mental health and learning disabilities service provider. Unfortunately, 101 (9%) died after contracting COVID-19, though the real death rate is probably lower due to mild, unreported cases. Those who died were more likely to be male, of older age (75.7 vs. 42.7 yrs) and have a diagnosis of dementia (57% vs. 3.4%). We examined Health of the Nation Outcome Scale (HoNOS) scores as possible predictors for COVID-19 outcomes. Although the deceased group had higher HoNOS scores (17.7 vs. 13.2), the differences disappeared when examining only cases of dementia in 65+ age-group, suggesting that diagnosis is key. There has been little information published about people with severe mental health problems within secondary care. Although our sample is small, it does highlight some important inequalities that would benefit from further research.

1. Introduction

The global COVID-19 pandemic has presented an enormous public health challenge. There is a need to get a better understanding of risk of severe outcomes from COVID-19 associated infection, including COVID-19 associated death. This paper focuses on people with significant mental health issues prior to COVID-19.

Some evidence from the US suggests that people with mental health conditions are at increased risk of contracting COVID-19, and subsequently dying from it \cite{1}. Moreover, in a cohort study of adults testing positive for COVID-19 in a large New York medical system \cite{2}, adults with a schizophrenia spectrum disorder diagnosis were associated with an increased risk for mortality, but those with mood and anxiety disorders were not. Similarly, in the UK, a population cohort study of 1205 general practices of over 4000 COVID-19 associated deaths, found that those with ‘severe mental illness’, dementia or learning disability were at greater risk of dying from COVID-19 \cite{3}. Severe Mental Illness’ was defined as Bipolar Affective Disorder, Psychosis, Schizophrenia or Schizoaffective Disorder, or severe depression. Furthermore, Livingston et al. \cite{4} report a 15% case fatality rate in older psychiatric UK inpatients and those with dementia.

Less is known about the impact of COVID-19 on people who use secondary care mental health services in the UK. Local health care data, including Health of the Nation Outcome Scale (HoNOS) data, provides an opportunity to explore and describe the distribution of COVID-19 cases among this group \cite{5}. Use of routinely collected information such as diagnosis and HoNOS data may assist in characterizing key risk factors and whether these are similar or different to those already identified in other populations.

The study aim was to describe the distribution of cases of COVID-19 recorded within a UK mental-health trust and, specifically, whether COVID-19 was reported more frequently for certain diagnostic groups. We examined COVID-19-related deaths with a view to understanding key risk factors, and whether these were similar to those seen in the more general population (i.e., age, gender, ethnicity). Finally we examined whether HoNOS was helpful in predicting COVID-19 related deaths.

2. Method

The data for this study was collected by Hertfordshire Partnership University NHS Trust, which provides health and social care for over 400,000 people with mental ill health, physical ill health and learning disabilities across Hertfordshire, Buckinghamshire, Norfolk and North Essex. The majority of services contributing data were in Hertfordshire, which is a semi-rural home county with a population of approximately
There were 1181 cases of COVID-19 reported, with the majority (97%) confirmed by swab testing. Of these, 101 died and 1080 survived, suggesting an apparent fatality rate of approximately 9%. Table 1 provides a breakdown of key sample characteristics. Gender distributions are highly similar for deceased and survived groups, showing a preponderance (6:4) for COVID-19 in males. In line with national statistics, the ‘survived’ group had a significantly lower mean age (42.7 vs. 75.7 years, t(1178) = 18.37, p < 0.0001). The distribution of case location was significantly different for the deceased and survived groups (Chi-square [2] = 61.07, p < 0.0001) and the higher proportion of inpatients in the deceased group may reflect some outbreaks of COVID-19 on old-age inpatient wards.

It is unclear why the proportion of unreported ethnicities was so high in the deceased group, but these could not be adequately resolved despite EPR searches. We excluded unknown cases from the analysis. The association between ethnicity and outcome in this cohort was not significant (Chi-square [1] = 1.43, p > 0.2). We also looked at primary diagnosis to see whether certain mental health and neurodevelopmental diagnoses were more strongly represented in the different outcome groups. Table 2 provides a breakdown of cases across broad diagnostic groups.

Dementia cases account for 57% COVID-19 deaths but only 3.4% cases in the survived group. The overall number of dementia cases seemed surprisingly low but on further inspection, this results from the way in which dementia services are configured. People may be in contact with a dementia diagnosis service initially but are then discharged to primary care so would no longer be within secondary care services. Most patients currently open to secondary care mental health services with dementia would be on inpatient dementia wards. These are likely

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**Table 1**

| Key characteristics of our sample group. |
|-----------------------------------------|
| All Patients | Died from Covid-19 | Survived Covid-19 |
| COVID-19 Status | | |
| Confirmed | 1145 (97%) | 88 (87%) | 1057 (98%) |
| Suspected | 36 (3%) | 13 (13%) | 23 (2%) |
| Gender | | |
| Male | 712 (60%) | 60 (60%) | 652 (60%) |
| Female | 469 (40%) | 41 (40%) | 428 (40%) |
| Age Mean | 75.7 | 42.7 |
| SD | 14.2 | 17.7 |
| Location | | |
| Inpatient | 54 (5%) | 20 (20%) | 34 (3%) |
| Community | 972 (82%) | 74 (73%) | 898 (83%) |
| Both | 155 (13%) | 7 (7%) | 148 (14%) |
| Ethnicity | | |
| White | 989 (84%) | 80 (79.2%) | 909 (84.2%) |
| BAME | 151 (13%) | 8 (7.9%) | 143 (13.2%) |
| Unknown/unstated | 41 (3%) | 13 (12.9%) | 28 (2.6%) |
| n | 1181 | 101 | 1080 |

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**Table 2**

| Breakdown of cases by deaths and mental health diagnoses. |
|----------------------------------------------------------|
| All patients | Died from COVID-19 | Survived COVID-19 |
| Learning Disability | 88 (8%) | 12 (14%) | 76 (86%) |
| Bipolar Disorder | 97 (8%) | 1 (1%) | 96 (99%) |
| Perinatal Disorder | 38 (3%) | 0 (0%) | 38 (100%) |
| Depression/Anxiety | 242 | 7 (3%) | 235 (97%) |
| Schizophrenia/Psychosis | 300 (20%) | 10 (3%) | 290 (97%) |
| Personality Disorder | 123 (10%) | 2 (2%) | 121 (98%) |
| Obsessive Compulsive Disorder | 44 (4%) | 0 (0%) | 44 (100%) |
| Post-Traumatic Stress Disorder/Depression | | | |
| Substance Use Disorder | 18 (2%) | 1 (6%) | 17 (94%) |
| Eating Disorder | 12 (1%) | 0 (0%) | 12 (100%) |
| Unspecified | 79 (7%) | 8 (10%) | 71 (90%) |
| Other | 32 (3%) | 2 (6%) | 30 (94%) |
| TOTAL | 1181 | 101 (8.8%) | 1080 (91.4%) |
to be more severe cases, with associated cognitive decline and frailty.

Of 1181 patients with COVID-19, a recent HoNOS rating (recorded between Jan 2019 and Feb 2020) was available for 668 survivors and 58 deceased patients. Average item scores are displayed in Table 3. Significant item score differences (between deceased and survivors) emerged on total HoNOS score, and the following individual items: 1, 3, 4, 5, 6, and 10.

The group who died from COVID-19 comprised mainly older people, many with a dementia diagnosis (Tables 1 and 2). We focussed firstly on those patients aged 65+ (Table 4) and secondly on those who were 65+ and had a dementia diagnosis. When comparing deceased vs. survived in 65+ group, significant differences were still apparent on total HoNOS score, but the number of item scores showing significant differences was reduced to 4 (items 1, 4, 6, 10). However, when focussing on age 65+ with a dementia diagnosis (n deceased = 42, n survived = 23), there were no differences in HoNOS at all. So, for people with dementia, HoNOS does not identify increased risk. The numbers here are quite small and, as highlighted earlier, the type of dementia patients in our sample have limited representativeness of dementia more widely.

Finally we looked for patterns in recent HoNOS score changes in the deceased group. For example, were patients whose HoNOS score had increased considerably over the preceding year more at risk of COVID-19 death? We examined 45 patients for whom 2 consecutive HoNOS ratings from approximately one year apart were available. The mean change in total HoNOS score across this group was 2.35 (+/- 7.06) points. However, as the high standard deviation indicates, there were some patients with large reductions in total HoNOS score too (change in HoNOS score ranged from -4 to +21 points to -16 points in this group). Even looking at deceased dementia patients only (n = 33), the picture was still unclear: the mean change in HoNOS score was 3.45 points but ranged from an increase of 21 points to a decrease of 13 points. Change in HoNOS score clearly varies considerably within this patient group, and indeed within the deceased group more generally, so we did not investigate it further.

4. Discussion

COVID-19 is said to be a disease of health inequalities [8] or one that starkly highlights pre-existing inequalities prior to the pandemic. People with severe mental illness have worse life expectancy than the general population [9]. In the UK, secondary care mental-health services are used by some of those with the most severe mental illness and disadvantages. They can experience discrimination, stigma and challenges in accessing physical health care. Understanding how COVID-19 affects this population is critically important to plan appropriate responses to meet health care needs and address inequalities, both now and in the future.

The death rate in our sample was just under 9%. We suspect this to be an overestimate, given that milder cases of COVID may have gone undetected, and unreported, during this period. Dementia had by far the worst outcome: the majority of those who acquired COVID-19 experienced a fatal outcome (61%). However, the next most affected group, those with a learning disability, saw the majority of affected individuals survive (86%). By contrast, at the population level Clift and colleagues [3] found that, of the groups we studied, Down’s syndrome had the greatest risk of death. The poorer outcomes seen in our dementia sample likely reflect the more severe nature of the condition in those being treated within secondary care services, largely dementia inpatient wards.

The UK vaccination strategy for COVID-19 has been chiefly driven by age. The Department of Health and Social Care’s Joint Committee on Vaccination and Immunisation (JCVI) state that ‘current evidence strongly indicates that the single greatest risk of mortality from COVID-19 is increasing age and that the risk increases exponentially with age’ [10]. Age was a powerful risk factor in our sample too, with the mean age of those dying being over 30 years higher than those who survived.

Severe mental illness (SMI) is an ‘underlying health condition’ considered to carry a greater risk of morbidity and mortality by the JCVI [10]. Clift and colleagues [3] report a Hazard Ratio of 1.29 for women and 1.26 for men with severe mental illness. Rates of death of different diagnoses within this group are not widely reported, though Wang and colleagues [1] report a death rate of 8.5% in their US population of people with a recent diagnosis of depression. We found notable differences between diagnostic groups: 3% of those with schizophrenia/psychosis who contracted COVID-19 died, whilst 1% of people with bipolar disorder and 1% of people with depression/obsessive disorder. Others have also reported an increased risk for schizophrenia [1,4]. Among other diagnoses (not defined as SMI by [3]), a number of groups experienced no COVID-19-associated deaths, including OCD, Eating Disorders, Perinatal Disorders and PTSD/Stress. However the total numbers of cases were relatively small in these groups.

Our previous paper [5] looking at COVID-19 associated death in older people found those who died had a significantly higher HONOS score prior to death compared with a large, age-matched, sample of secondary care mental health patients without COVID-19. The current study examined HONOS scores only in those infected with COVID-19. We examined HONOS scores in the year prior to the pandemic, so that they captured the status of the person prior to infection with COVID-19. For the study population, total HONOS score was significantly higher in the year prior to infection for those who subsequently died. A higher

Table 3

Mean HoNOS item scores for those who died from COVID-19 vs. those who contracted but survived it. HoNOS items can be rated from 0 to 4. All p-values were computed using unpaired t-tests and a Bonferroni correction was applied to account for multiple testing.

| HoNOS Item | COVID Dec'd (n = 58) | COVID Survived (n = 668) | t (df 724) and p values |
|------------|---------------------|-------------------------|------------------------|
| 1          | 1.96                | 0.90                    | 6.66, < 0.0001         |
| 2          | 0.29                | 0.57                    | 1.98, > 0.05, NS       |
| 3          | 0.12                | 0.54                    | 3.03, < 0.005          |
| 4          | 2.69                | 0.62                    | 14.4, < 0.0001         |
| 5          | 2.16                | 1.41                    | 3.95, < 0.0001         |
| 6          | 1.45                | 0.95                    | 2.94, < 0.005          |
| 7          | 1.36                | 1.62                    | 1.61, > 0.1, NS        |
| 8          | 1.98                | 2.13                    | 0.91, > 0.35, NS       |
| 9          | 1.12                | 1.30                    | 1.05, > 0.25, NS       |
| 10         | 2.25                | 1.27                    | 7.80, < 0.0001         |
| 11         | 0.5                 | 0.55                    | 0.38, > 0.7, NS        |
| 12         | 1.52                | 1.30                    | 1.25, > 0.2, NS        |
| Total      | 17.71 (+/-7.24)     | 13.17 (+/-7.09)         | 4.67, < 0.0001         |

Table 4

Mean HoNOS item scores for those aged 65 and over who died from COVID-19 vs. those aged 65 and over who contracted but survived COVID-19. HoNOS items can be rated from 0 to 4. All p-values were computed using unpaired t-tests and a Bonferroni correction was applied to account for multiple testing.

| HoNOS Item | COVID Dec'd (n = 52) | COVID Survived (n = 109) | t (df 159) and p values |
|------------|---------------------|-------------------------|------------------------|
| 1          | 2.02                | 0.96                    | 4.71, < 0.0001         |
| 2          | 0.27                | 0.20                    | 0.62, > 0.5 NS         |
| 3          | 0.13                | 0.19                    | 0.55, > 0.5 NS         |
| 4          | 2.87                | 1.26                    | 7.23, < 0.0001         |
| 5          | 2.15                | 2.04                    | 0.56, > 0.55 NS        |
| 6          | 1.54                | 0.87                    | 3.52, < 0.001          |
| 7          | 1.31                | 1.29                    | 0.07, > 0.95 NS        |
| 8          | 2.04                | 1.82                    | 1.04, > 0.25 NS        |
| 9          | 1.21                | 1.03                    | 0.87, > 0.35 NS        |
| 10         | 2.56                | 1.48                    | 4.96, < 0.0001         |
| 11         | 0.50                | 0.43                    | 0.42, > 0.65 NS        |
| 12         | 1.54                | 1.28                    | 1.20, > 0.2 NS         |
| Total      | 18.13 (+/-7.46)     | 12.84 (+/-7.61)         | 4.14, < 0.0001         |
HONOS score might therefore be considered a risk factor for death in those who subsequently infected with COVID-19. However, the true picture is more complex. Looking closely at item scores, it is notable that those with the greatest difference include ‘cognitive problems’, ‘problems with activities of daily living’, ‘overactive aggressive, disruptive or agitated behaviour’ and problems with ‘delusions and hallucinations’, all of which would likely be inflated by the presence of dementia. Indeed, when looking only at people aged 65+ with a dementia diagnosis, differences in HONOS scores disappeared. These findings suggest that higher pre-infection HONOS scores may be associated with subsequent death from COVID-19, but that these items are largely explained by age and diagnosis (of dementia). We are therefore cautious about whether HoNOS, on its own, can be used as a reliable predictor of risk.

We also note that concerns have been raised about the reliability and validity of HoNOS [11–13]: for example, item agreement can be poor when assessed by raters with different backgrounds and experience; and total HoNOS score is questionable as a measure of illness severity.

This study, although very modest in scale and scope, suggests areas for further work. People with severe mental illness may not have the same underlying risk of death from COVID-19, and there is a need to understand more about whether different diagnostic groups face different risks. Our sample was too small to permit a meaningful analysis of ethnicity, but a larger study pooling data across several organisations would be able to address this, as well as elucidating risk differences between diagnostic groups. Further studies on dementia cases across both primary and secondary care would also help to address some of the limitations of our sample.

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Data availability

The data that support this study may be available in anonymised format on request from the corresponding author. The data are not publicly available due to restrictions around confidentiality of information which may compromise the privacy of research participants.

Declaration of interest

None.