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Early View

Research letter

The impact of asthma on mental health & wellbeing during COVID-19 lockdown

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It has been assumed that people with asthma would be at a high risk of developing severe illness from coronavirus disease 2019 (COVID-19), despite a lack of evidence [1]. Social isolation measures have aimed to mitigate this risk to vulnerable groups, however such interventions can have negative mental health impacts [2].

Asthma is associated with increased risk of anxiety and depression and data from general population studies report increased anxiety and depression during the pandemic [3, 4]. However, available population studies have not included pre-pandemic detailed clinical history nor prior psychological assessment, meaning that conclusions about the effect of COVID-19 on people with asthma have been impossible. Our objective was to determine if people with asthma across a range of age groups experienced worse mental health, wellbeing, physical symptoms and social restrictions than people without asthma during COVID-19 lockdown.

This study utilised data from the Avon Longitudinal Study of Parents and Children (ALSPAC), a world leading, longitudinal population-based birth cohort [5]. Lockdown was announced in the UK on the 23rd March 2020. We used data from 3737 mothers and their partners (ALSPAC-G0) and 2942 of their offspring (ALSPAC-G1) who completed an online questionnaire about the impact of the COVID-19 pandemic between 9th April and 14th May 2020 [6]. The COVID-19 survey examined symptoms in the preceding two weeks and mental health in lockdown. Measures included the Mental wellbeing the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) [7], Short Mood and Feelings Questionnaire (SMFQ) [8], Generalised Anxiety Disorder Assessment (GAD-7) [9]. Higher scores indicated better mental wellbeing, higher depression and higher anxiety respectively. In ALSPAC-G1 the same measurements were available pre-pandemic. In ALSPAC-G0, the Edinburgh Postnatal Depression Scale score for depression [10] and State-Trait Anxiety Inventory score for anxiety were available for analysis [11]; mental wellbeing was not previously assessed. The proportion of participants with data from the COVID questionnaire and baseline data was 63.2-78.8% in G1 and 78.1-84.8% in ALSPAC-G0.

We explored differences in participants with and without asthma for confirmed or suspected COVID-19, 'shortness of breath or difficulty in breathing', 'contact with confirmed or suspected COVID-19', 'difficulty sleeping and severe fatigue', healthcare utilisation, change in social activities, and worries during lockdown. We reported p-values from Pearson Chi-square test and Z-test when comparing categorical and continuous characteristics respectively. We used Poisson and logistic regression models to estimate the effect of asthma on wellbeing, anxiety and depression, and other factors relating to COVID-19 and lockdown. Analysis was conducted separately for ALSPAC-G0 and ALSPAC-G1, adjusting for sex, age, smoking/vaping status, being overweight and pre-existing mental health. Exponentiated Poisson regression estimates were reported as symptom count ratios (SCRs). We used 2-sample Z-test to compare the effect of asthma in ALSPAC-G1 vs ALSPAC-G0.

410 (13.9%) participants in ALSPAC-G1 (mean age 28) and 400 (10.7%) in ALSPAC-G0 (mean age 59 years) reported a diagnosis of asthma in the COVID-19 survey. Younger (ALSPAC-G1) participants with asthma reported worse pre-existing wellbeing and depression scores, although pre-existing anxiety scores were not significantly different to those without asthma. In the lockdown COVID-19 survey, G1 participants with asthma reported worse wellbeing, depression and anxiety than those without asthma. There was some evidence that older (ALSPAC-G0) participants with asthma had worse pre-existing depression scores (with weak evidence for worse anxiety) than those without asthma. ALSPAC-G0 participants also reported worse depression and anxiety in the COVID-19 survey than those without asthma, however, there was no difference in wellbeing. (**Table 1**).

Wellbeing, depression and anxiety levels in asthma were all worse in younger ALSPAC-G1 participants vs. older ALSPAC-G0 participants during COVID-19 lockdown (p value <0.001). After adjusting for pre-existing mental health, gender, age, smoking and being overweight: asthma was associated with a 13% increase in depression score in lockdown in ALSPAC-G1 (adjusted SCR 1.13 95%CI (1.04,1.22), p=0.005) and 15% increase in ALSPAC-G0 (1.15 (1.00,1.31), p=0.05). Anxiety scores in asthma increased by 14% in ALSPAC-G1 (1.14 (1.04,1.26), p=0.005) and by 16% in ALSPAC-G0 (1.16 (1.02,1.32), p=0.02). Wellbeing score in asthma decreased by 3% (0.97 (0.95,1.00), p=0.02) in ALSPAC-G1. Asthma was associated with a similar increase of anxiety and depression scores during COVID-19 in both generations (Z test p values >0.80).

In lockdown participants with asthma reported more shortness of breath, difficulty sleeping, eating and sleep changes, worry about getting COVID-19 and longer self-isolation than those without asthma. Additionally, younger (ALSPAC-G1) participants with asthma reported more difficult sleeping and worry about losing their job. While older (ALSPAC-G0) participants with asthma reported more confirmed or suspected COVID-19 and more self-isolation (all p-values<0.05).

Our study provides evidence that levels of anxiety, depression and wellbeing deteriorated during the pandemic. It shows that asthma was associated with a greater decline in mental health during lockdown, particularly among young adults.

The deterioration in wellbeing was clinically meaningful among all younger ALSPAC-G1 participants, however those with asthma had a mean score that crossed the threshold for risk of depression [12]. In contrast increases in anxiety scores were not greater than the minimal clinically important difference (MCID) [13] in ALSPAC-G1 participants. However, the concern is that repeated and prolonged lockdowns might cause this to become clinically significant deterioration in anxiety. MCID for older ALSPAC-G0 participants were not available due to the difference in questionnaires, however the COVID-19 assessment identified newly observed increases of anxiety and depression in the asthma in this group.

We identified factors which provide insight into the origins of the increased anxiety asthma. Some of these such as increased breathlessness, might have been pre-existing, however others were COVID-19-specific such as increased worry about getting COVID-19. Whilst we have no direct record of asthma control in our data, a British Lung Foundation survey has estimated that 24.6% of people with asthma triggered by pollution reported an improvement in their symptoms since lockdown [14]. Furthermore, control of asthma in paediatric patients has improved since the outbreak [15]. Knowing this, it is likely that it is the psychological rather than physical effects of the pandemic and/or the lockdown that have had a greater impact on the mental health of participants with asthma compared with those without.

The strength of our study lies in the detailed longitudinal data from the large ALSPAC population pre- and post-pandemic, including an insight into pandemic specific concerns. There are limitations, for example, asthma diagnoses were self-reported, though this would not affect the psychological stigma of the diagnosis which is central to our hypothesis. Different questionnaires were used in the ALSPAC-G0 pre-pandemic assessments, but still provided a longitudinal assessment of anxiety and depression in this group.

Further investigation is required to clarify the relationship between asthma and COVID-19 infection. It is also important to further understand the origins of mental health issues in people with asthma. This study should remind healthcare professionals to screen people with asthma for symptoms of anxiety and depression. It will also help to inform government policies which whilst intended to protect the population, are not without negative consequences.

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Table 1. Current and pre-existing mental health: asthma vs. no asthma

ALSPAC-G1 Offspring					
	No Asthma at 28 years		Asthma at 28 years		
	N=2532 (86.1%)		N=410 (13.9%)		
	Total	Mean (SD)	Total	Mean (SD)	Pvalue†
Pre-existing Mental Health					
WEMWBS-14 Wellbeing score at 24 years	1959	48.99 (8.71)	313	47.54 (9.37)	0.007
SMFQ-13 Depression score at 26 years	1979	6.63 (6.23)	313	8.09 (6.64)	<0.001
GAD-7 Anxiety score at 22 years	1615	4.50 (4.41)	245	4.87 (4.43)	0.22
Mental Health during lockdown (COVID 19 survey)					
WEMWBS-14 Wellbeing score at 28 years	2399	44.38 (8.37)	392	42.18 (8.83)	<0.001
SMFQ-13 Depression score at 28 years	2148	6.67 (5.28)	362	8.30 (6.15)	<0.001
GAD-7 Anxiety score at 28 years	2113	6.87 (5.02)	362	8.27 (5.43)	<0.001
ALSPAC-G0 Parents					
	No Asthma at 59 years		Asthma at 59 years		
	N=3337 (89.3%)		N=400 (10.7%)		
	Total	Mean (SD)	Total	Mean (SD)	Pvalue†
Pre-existing Mental Health					
EPDS-10 Depression score at 52 years	2591	6.28 (5.27)	307	6.88 (5.33)	0.06
STAI-20 Anxiety score at 39 years	2831	34.99 (10.18)	332	35.70 (10.56)	0.23
Mental Health during lockdown (COVID-19 survey)					
WEMWBS-14 Wellbeing score at 59 years	3087	48.11 (8.42)	364	48.09 (8.78)	0.96
SMFQ-13 Depression score at 59 years	3076	2.89 (3.58)	364	3.61 (4.40)	<0.001
GAD-7 Anxiety score at 59 years	3138	3.36 (4.00)	371	4.20 (4.87)	<0.001

† Z-test from logistic regression