Abstract

Background: The number of antipsychotic prescriptions dispensed annually in England has increased substantially over the past decade. It is not known whether this is due to changes in prescribing practices, or an increase in the prevalence of psychosis. To our knowledge, no previous studies have investigated temporal trends in prevalence of psychotic symptoms in non-clinical populations.

Methods: We used data from the nationally representative Adult Psychiatric Morbidity Surveys 2000, 2007 and 2014 to (1) test whether the prevalence of psychotic symptoms increased between 2000 and 2014; (2) compare prevalence of psychotic symptoms to the prevalence of being prescribed antipsychotic medication; and (3) identify correlates of experiencing psychotic symptoms.

Results: There was a small increase in the prevalence of psychotic symptoms in 2014 compared to 2000 (Prevalence in 2000 5.6%, 95% confidence intervals (CI) 5.1% to 6.2%; prevalence in 2014 6.8%, 95% CI 6.1% - 7.6%). This corresponded to an adjusted odds ratio of 1.2 (95% CI 1.02 - 1.40, p=0.026) for experiencing psychotic symptoms in 2014 compared to 2007. By comparison, antipsychotic medication use doubled over this period (Prevalence in 2000 0.6%, 95% CI 0.4% - 0.7%; prevalence in 2014 1.2% 95% CI 0.9% - 1.5%; aOR 2.22 (1.52-3.25) p<0.001). Correlates of reporting psychotic symptoms included ethnic minority identity, younger age, lower social class, alcohol and cannabis use, and any psychiatric diagnosis.

Conclusions: While the rates of antipsychotic prescription doubled between 2000 and 2014, the odds of having psychotic symptoms rose only slightly. The reasons for this warrant further investigation.

Introduction

Psychotic symptoms include perceptual abnormalities and delusional beliefs such as firmly-held persecutory ideation (Bourgin et al., 2019). When pronounced and sustained, these symptoms, along with other problems of thinking and emotion, may indicate psychotic illnesses like schizophrenia (Kirkbride et al., 2012). People who experience psychotic symptoms are known to be at greater risk of developing these illnesses than the rest of the population (Andreou et al., 2019). Nevertheless, many individuals experience psychotic symptoms without meeting the criteria for a diagnosable psychotic illness (Bourgin et al., 2019, Wiles et al., 2006); indeed a majority of people identified from screening tools as having psychotic symptoms are unlikely to be given a diagnosis of psychotic illness (Bourgin et al., 2019).

Psychotic symptoms have been found to be associated with younger age, migrant status, lower socioeconomic status, trauma, and drug and alcohol use (Bourgin et al., 2019, Scott et al., 2005, Sun et al., 2017, Gibson et al., 2016), though not with a family history of schizophrenia (Zammit et al., 2008). They are frequently comorbid with other psychiatric problems, including depression, anxiety, and non-suicidal self-injury (Bourgin et al., 2019, Koyanagi et al., 2015, Saha et al., 2012). It appears therefore that the correlates of psychotic symptoms overlap largely but not entirely with those of psychotic illnesses (Bourgin et al., 2019); a finding which warrants confirmation across samples. If the correlates of psychotic symptoms in general populations are different to those of psychotic illnesses, this suggests that they may represent a different phenomenon rather than lying on a continuum with illness.

The 2014 Adult Psychiatric Morbidity Survey (APMS) aimed to establish prevalence of psychiatric illnesses in the population of England and found that rates of ‘probable psychosis’ had roughly doubled between 2007 and 2014. The APMS however used antipsychotic prescription as one of several indicators of probable psychosis, which may have artificially increased the prevalence (McManus et al., 2016). Understanding whether the prevalence of psychotic disorders and symptoms is increasing is crucial to the appropriate planning of services and the employment of preventive strategies. There have been attempts to study changes in the frequency of psychotic illness, albeit with inconsistent findings. A systematic review of the incidence and prevalence of psychotic disorders in England found no convincing evidence that psychotic illnesses had increased between 1950 and

2009 (Kirkbride et al., 2012). In contrast, an investigation based on UK electronic health records did find an increase in the incidence of diagnosed psychotic illnesses between 1996-1999 and 2010-2012, which varied in different ethnic groups (Oduola et al., 2019).

We aimed to test the hypothesis that the prevalence of psychotic symptoms in England increased between 2000 and 2014 and to to compare any change in symptom prevalence to the prevalence of being prescribed antipsychotic medication between 2000 and 2014. We also aimed to identify correlates for experiencing psychotic symptoms to see whether these overlapped with known correlates of psychotic illness, thereby strengthening the assumption that they might be a reasonable proxy for psychotic disorder in the sample. We know of no other studies of changes in the prevalence of psychotic symptoms in general, non-clinical populations.

Methods

Sample:

The Adult Psychiatric Morbidity Surveys (APMS) are nationally-representative surveys that have been conducted at seven yearly intervals to quantify the prevalence of psychiatric symptoms and disorders in the population of England, and are designed to be representative of people living in private households (McManus et al., 2019). They have used a consistent stratified, multi-stage probability sample design. APMS methodology has been described in detail elsewhere (McManus et al., 2016). In brief, the Postcode Address File, which covers over 97% of private households, was used as the sampling frame. Postcode sectors were stratified according to sociodemographic variables and selected using systematic random sampling. Households were then randomly selected within each chosen postcode sector, and one resident was randomly selected for interview from each chosen household. The interviews took approximately 1.5 hours and combined face-to-face questions with computer-inputted questions for sensitive topics. Weighting adjusted for selection probabilities and patterns of non-response in order to render results representative of the household population.

The 2007 and 2014 APMS samples consist of around 7,500 people in England aged 16 and over (McManus et al., 2016). The 2000 survey used similar methods but also covered Scotland and Wales and had an upper age limit of 74. To ensure comparability, only respondents aged 16 to 74 and living in England were included in the current study.

Exposures:

We used year of measurement (2000, 2007, or 2014) as the exposure variable for the primary analysis. We also tested multiple variables, outlined below, to explore correlates for psychotic symptoms.

Outcomes:

Psychotic Symptoms

The Psychosis Screening Questionnaire (PSQ) has high sensitivity and specificity for detecting psychotic symptoms across populations with differing likelihoods of psychosis (Bebbington and

Nayani, 1995). It contains five sections, each with three or four questions and a set of rules for interpretation (Bebbington and Nayani, 1995). It can be used as a continuous or a binary measure. Consistent with standard practice we took endorsement of one or more clusters to indicate the presence of psychotic symptoms (Johns et al., 2004), thereby forming a binary outcome variable. We also carried out a sensitivity analysis, using the stricter criterion of endorsing two or more clusters to measure this outcome.

Antipsychotic Medication Use

In 2000 participants, were asked to list medications they were currently taking. Interviewers coded all medications that were reported. In 2007, participants were shown a prompt-list of psychotropic medications and asked which if any they were taking. Interviewers then inspected medication packaging to check that it was correctly coded. In 2014 the same method was used, although the list was expanded and amended to reflect an up-to-date psychotropic medication inventory (McManus et al., 2016).

Potential Correlates for Psychotic Symptoms

We analysed: age (in 10 year brackets); sex; ethnicity (White British / Black or African or Caribbean or Black British / Indian or Pakistani or Bangladeshi or Asian or Asian British / Other); socioeconomic status; reported diagnosis of psychiatric illness; reported lifetime history of a major traumatic experience; reported cannabis use in the past year; and the Alcohol Use Disorders Identification Test (AUDIT) score (Saunders et al., 1993) as potential correlates associated with reporting psychotic symptoms. Socioeconomic status was classified in one of the following groups: 1=Employers in large establishments, higher managerial and professional occupations; 2= Lower professional, higher technical, lower managerial and administrative, and higher supervisory occupations; 3= Intermediate occupations; 4= Employers in small occupations and own account workers; 5=Lower supervisory and lower technical occupations, or; 6 / 7=Semi-routine occupations and routine occupations (Office for National Statistics, 2010). Lifetime experience of trauma was established through the following question: *The term traumatic event or experience means something like a major natural disaster, a serious automobile accident, being raped, seeing someone killed or seriously injured, having a loved one die by murder or suicide, or any other experience that either put you or someone close to you at*

risk of serious harm or death. Has a traumatic event or experience ever happened to you at any time in your life (Brewin et al., 2002, McManus et al., 2016)?

These putative correlates were chosen because of known associations with psychotic illnesses c

Analyses were conducted using pooled data from the 2000, 2007 and 2014 surveys. Reported diagnoses from a professional had only been recorded in the 2014 sample, and therefore was only analysed in this dataset. Similarly, lifetime experience of major trauma was not measured in the 2000 sample, meaning that this analysis was restricted to 2007 and 2014 data. Socioeconomic status was measured differently across years, and so was analysed only in 2014 data.

Statistical Analyses:

Data were analysed using Stata version 16 (StataCorp). We combined the three datasets for analysis. The proportion of participants in different years reporting at least one cluster of psychotic symptoms was compared. We used the *svy* function in Stata to preserve the APMS survey weighting in these analyses. All tables show weighted analyses and unweighted (true) base numbers. For the 2007 and 2014 datasets, we were also able to account for complex survey design (stratification and clustering). For 2000, we were able to account for stratification by region.

We then used logistic regression models to compare the odds of each outcome (positive PSQ result, and reported antipsychotic medication use) according to year of exposure. We restricted this analysis to participants who lived in England, were aged under 75, and had provided data on their ethnicity for comparability across the datasets. We carried out these analyses unadjusted, then adjusted for age, gender and ethnicity, to account for changes in the sample demographics over time. We included ethnicity because black men were found to have a higher prevalence of psychotic disorder (3.2%) compared to men from other ethnic groups: 0.3% in White men and 1.3% in Asian men (McManus et al., 2016, Qassem et al., 2015).

In order to establish potential correlates of psychotic symptoms in the sample, we used logistic regression to model the unadjusted odds ratios of reporting psychotic symptoms according to the

putatively associated demographic and health variables. We performed these analyses unadjusted, and adjusted for age, ethnicity and gender.

Results

The demographic characteristics of the sample are shown in Table 1.

The population profile has been broadly consistent over time, except for a decrease in the proportion who were from a White ethnic group (from 92.9% to 86.4%), and an increase in the proportions who were married/cohabiting (from 58.0% to 62.9%) and living in rented accommodation (from 25.3% to 37.3%).

Psychotic symptoms (Tables 2 and 3)

The prevalence of psychotic symptoms (as determined by the PSQ) increased between surveys. Logistic regression provided statistical evidence of a small increase in reports of psychotic symptoms between 2000 and 2014, both before and after adjustment for age, gender and ethnicity (Adjusted Odds Ratio (aOR) 1.20, 95% Confidence Interval (CI) 1.02 to 1.40, p= 0.026). There was no evidence of a change between 2000 and 2007, showing that the increase occurred between 2007 and 2014.

Sensitivity analysis

When the outcome was endorsement of two PSQ items rather than just one, there was still evidence of an increase between 2000 and 2014, both before and after adjustment (OR 1.44 (1.04 – 1.98, p=0.026, aOR 1.39, 95% CI 1.01 - 1.92, p=0.046).

Rates of Antipsychotic Prescription (Tables 2, 3 and 4)

Both crude and weighted estimates of antipsychotic medication use increased only slightly between 2000 and 2007, but approximately doubled between 2000 and 2014, both before and after adjusting for age, gender and ethnicity (aOR 2.22 95% CI 1.52 - 3.25, p<0.001). Again, this increase must therefore have occurred between 2007 and 2014. The proportion of people both with and without psychotic symptoms prescribed antipsychotic medication increased between 2007 and 2014. 3.1% of people reporting psychotic symptoms also reported antipsychotic medication use in 2000, compared to 5.2% in 2014. The proportion was lower in the group not reporting symptoms (0.4% increasing to 0.9%).

Putative Correlates for Experiencing Psychotic Symptoms (Table 5)

There was strong evidence that lifetime experience of major trauma, reported diagnosis of any mental illness, increasing AUDIT score, and past year cannabis use were associated with screening positive on the PSQ. Having been given a diagnosis of schizophrenia or psychosis was, as might be expected, strongly associated with a positive PSQ result (OR 14.98, 95% CI 7.26 - 30.89, $p<0.001$). People describing themselves as Asian or British Asian had a somewhat increased odds of psychotic symptoms compared to people describing themselves as White British (OR 1.49, 95% CI 1.07 – 2.07, $p=0.019$). There was strong evidence that people describing themselves as Black, African, Caribbean, or Black British had greater odds of reporting psychotic symptoms compared to people reporting White British ethnicity (OR 2.22, 95% CI 1.61 – 3.05, $p<0.001$). Being in routine/semi-routine and lower supervisory employment was strongly associated with greater odds of a positive PSQ result compared to being in social class 1. There was strong evidence that all age groups above age 24 had lower odds of screening positive on the PSQ compared to 16-24 year olds; in the 65-74 year old group, the odds ratio was just 0.26 (95% CI 0.19 – 0.35, $p<0.001$). There was no evidence of an association with gender.

Discussion

Main Findings

We found evidence for a relatively small increase in the prevalence of psychotic symptoms between 2000 and 2014 in England. In contrast, the frequency of antipsychotic medication prescription approximately doubled over the same period. These increases appear to have occurred between 2007 and 2014.

There are multiple possible explanations for this pattern of results. The first is that the prevalence of psychotic disorders may genuinely have increased by a large margin. The lack of a proportionate rise in psychotic symptoms could be due to a large number of people whose symptoms are in remission, perhaps due to effective treatment, or who have only negative symptoms that could not be detected by the PSQ. This would be consistent with the findings from the 2019 study of incidence rates of first episode psychosis (Oduola et al., 2019). However development of Early Intervention (EIS) services could have partially explained the apparent increase rates in this study through greater case identification (Oduola et al., 2019).

This explanation would also suggest that a large number of people had developed psychotic disorders after 2007 but were asymptomatic (in terms of positive symptoms) by 2014, which seems reasonably unlikely, given that roughly half of people with a first-episode of psychosis do not show symptomatic recovery after two years (Wunderink et al., 2009).

An alternative, more likely explanation is that the apparent increase in probable psychosis in the APMS is a measurement artefact, since receipt of antipsychotic medication was one criterion used to determine probable psychosis. This would be more consistent with the findings from the 2012 systematic review of studies reporting psychotic illness incidence (Kirkbride et al., 2012). For example, our finding that antipsychotic medication use has increased at almost double the rate of psychotic symptoms might indicate a greater readiness to recognise and treat psychotic symptoms, due to improved awareness of mental illnesses among healthcare professionals and the wider public. It may also indicate decreased stigma. A combination of 2001 healthcare policy influencing development of EIS services (Fowler et al., 2009) and greater appreciation of the importance of

minimising the duration of untreated psychosis may have played a part (Malla and McGorry, 2019). Increased use of antipsychotic medications may also be attributable to second generation antipsychotics becoming more widely available since their development in the 1990s (Shen, 1999), and a consequent perception of a reduced side effect burden (Cáceres et al., 2008). The duration of prescribing may have increased too. Newer antipsychotics have been found to have better tolerability, which may mean an increased willingness to continue treatment (Swartz et al., 2008). Nevertheless, the finding that the prevalence of antipsychotic medication use did not increase markedly between 2000 and 2007 goes against increased duration of use being the reason.

The increased prescribing of antipsychotic medications may also be due to indications other than psychosis. For example, antipsychotic medications may be indicated for mood stabilisation in bipolar affective disorder; and as augmentation therapies in depression, obsessive-compulsive disorder, and anxiety disorders; and as antiemetics (Glick et al., 2001, Jackson and Tavernier, 2003). This is consistent with our finding that the proportion of people without psychotic symptoms using antipsychotic medications increased between 2007 and 2014.

While not of the magnitude of the rise in antipsychotic treatment, the modest rise in the prevalence of psychotic symptoms in the population of England also warrants explanation. Cannabis was the most commonly used recreational drug in the APMS with an estimated prevalence of use of 9.4% in men and 5.1% in women (McManus et al., 2016). The frequency of cannabis use has been broadly stable over time, but the content of tetrahydrocannabinol (THC) in cannabinoids has increased (Murray et al., 2016). THC is particularly implicated in causing psychotic symptoms, and this might therefore be one explanation for the slight increase in prevalence of psychotic symptoms. The economic recession that began in the UK in 2008 was paralleled by an increase in the incidence of suicide (Barr et al., 2012), an indicator of the accompanying stress. Economic adversity might also therefore be a plausible contributor to the increase in prevalence of psychosis (Kirkbride et al., 2017). Prevalence rates could also have increased due to improved survival rates of people with psychosis. There has been increasing recognition of and emphasis on reducing the mortality gap for people with serious mental illness compared to those without, which could account for this (Zomer et al., 2017). Reduced

recovery rates could be a further explanation, though this seems less likely given the increase in treatment.

Screening positive on the PSQ in the 2014 APMS was associated with several factors including ethnic minority status, younger age, drug and alcohol use, trauma, lower social class, and psychiatric diagnoses. This is consistent with previous literature (Bourgin et al., 2019, Sun et al., 2017, Scott et al., 2005, Gibson et al., 2016).

Although the data are cross-sectional, the increased reporting of psychotic symptoms in the 16-24 age group suggests that such symptoms in adolescence or young adulthood may remit later on. This is consistent with findings from longitudinal data (Sullivan et al., 2017). There was no association of psychotic symptoms with gender, which was unexpected, given psychotic illness is generally considered to be more prevalent in men (Castillejos et al., 2018). These findings lend some weight to the argument that psychotic symptoms might represent a different phenomenon to psychotic symptoms seen in illnesses such as schizophrenia in a substantial proportion of survey participants (Zammit et al., 2008) , though it is clear that there is marked overlap in the correlates too (Sun et al., 2017, Gibson et al., 2016, Scott et al., 2005).

Strengths and Limitations

To our knowledge, this is the first study to measure temporal trends in the general population prevalence of psychotic symptoms. Its strengths include the use of nationally representative population-based surveys and the capacity to compare different methods of measuring psychosis. It also has limitations. As with most surveys, non-response was a potential cause of bias. The response rate was just under 70% in 2000; and was 57% in both 2007 and 2014. This is consistent with other large surveys (McManus et al., 2016). The APMS series excludes the relatively small number of people living in institutions including care homes and prisons, as well as homeless people and those in temporary accommodation or hospital. It may thus somewhat underestimate the rates of psychotic illnesses, given they are higher in those populations. Cuts in the number of mental health beds and prison beds since 2000 would have tended to increase the proportion of people identified as having psychotic symptoms in the community (The King's Fund). Response bias is also possible, for example

if people with psychotic symptoms were more distressed and therefore less likely to respond to the request to be interviewed. This should however have affected all years similarly.

The measurement of antipsychotic medication use was by self-report. Nevertheless, the finding that rates of antipsychotic prescription have increased and therefore might explain the apparent increase in probable psychosis accords with recorded rates of dispensing of antipsychotic medication (Web appendix 1). Although the use of a screening tool to determine the presence of psychotic symptoms is less reliable than a structured clinical interview, it is the only feasible way to do this in a large non-clinical population.

The fact that antipsychotic medication use was measured differently between years could theoretically have meant that more antipsychotic prescriptions were detected in 2007 and 2014 than in 2000. However, our trends in self-reported medication use mirror those from prescribing data.

Conclusions

Our study suggests that the prevalence of psychotic symptoms has increased slightly in England since 2007. Continued monitoring of temporal trends in psychotic symptoms and psychotic illnesses is warranted. It is clear, however, that the frequency of psychotic symptoms has not increased proportionately to rates of antipsychotic medication prescription. This may signify that more people are being appropriately offered treatment for psychotic and other psychiatric illnesses; or alternatively that there has been a shift towards greater medicalisation of people with psychotic symptoms that may or may not be beneficial. Given the significant side effect burden of antipsychotic medications and the marked increase in their use, it crucial that prescriptions are reviewed regularly and that the impact of increased prescribing is carefully considered (Lally and MacCabe, 2015).

Table 1: Profile of Sample [1] by year

Demographic N (%)	**2000** N=7247	**2007** N=6438	**2014** N= 6484
Sex			
Male	3239 (46.5)	2828 (49.4)	2640 (49.6)
Age			
16-24	666 (12.6)	568 (15.5)	560 (15.7)
25-34	1443 (18.9)	1035 (18.1)	1035 (18.7)
35-44	1540 (20.9)	1413 (21.2)	1180 (17.9)
45-54	1331 (19.9)	1130 (17.7)	1294 (19.3)
55-64	1195 (15.7)	1279 (16.3)	1226 (15.4)
65-74	1072 (12.0)	1028 (11.3)	1189 (13.0)
Ethnicity			
White	6741 (92.9)	5884 (88.9)	5785 (86.4)
Black	179 (2.2)	183 (3.3)	182 (3.2)
Indian, Pakistani or Bangladeshi, Asian or Asian British	136 (2.4)	196 (4.2)	345 (7.6)
Other	142 (1.9)	157 (3.2)	147 (2.8)
Missing	49 (0.6)	33 (0.5)	25 (0.4)
Marital Status [t]			
Married / Cohabiting	3700 (58.0)	3817 (64.4)	3751 (62.9)
Single / Widowed / Divorced / Separated	3547 (42.0)	2636 (35.6)	2733 (37.1)
Housing Tenure			
Owner-occupier	5183 (73.9)	4520 (69.5)	4111 (62.0)
Rent or other	2001 (25.3)	1887 (29.7)	2328 (37.3)
Missing	63 (0.9)	46 (0.8)	45 (0.8)
Cannabis Use in Past Year			
Used in past year	581 (8.5)	411 (8.1)	377 (7.4)
Missing	32 (0.4)	25 (0.5)	438 (6.4)

Alcohol Use Disorder Identification Test (AUDIT) Score			
(Mean and standard deviation)	5.2 (4.6)	4.8 (4.7)	4.4 (4.7)
Missing (%)	36 (0.4)	11 (0.2)	209 (3.0)

ι Sample = APMS participants aged 16 to 74 and living in England

ţ Marital status = de facto marital status in 2007 and 2014, and legal marital status in 2000

Table 2: Prevalence of Psychotic Symptoms and Current Antipsychotic Prescription, 2000, 2007 and 2014 for Analytic Sample

Year	Total Sample (N)	Number of cases (n)	Missing Outcome Data (n)	Prevalence (%) (95% Confidence Interval (CI))
Psychotic Symptoms				
2000	7198	431	0	5.58 (5.05 – 6.18)
2007	6406	387	14	5.89 (5.27 – 6.56)
2014	6022	437	0	6.76 (6.05 – 7.53)
Antipsychotic Medication Use				
2000	7198	50	0	0.54 (0.40 – 0.73)
2007	6406	47	14	0.62 (0.44 – 0.87)
2014	6456	89	3	1.17 (0.90 - 1.52)

Table 3: Odds Ratios for Psychotic Symptoms and Current Antipsychotic Prescription in 2007 and 2014 compared to 2000

Year	Unadjusted Odds Ratio (OR) (95% CI)	p-value	Adjusted* OR (95% CI)	p-value
Psychotic Symptoms		***N= 1,255 out of 20,063***		
2000 (Reference)	1		1	
2007	1.06 (0.91 to 1.24)	0.469	1.03 (0.88 to 1.21)	0.726
2014	1.22 (1.05 to 1.43)	0.012	1.20 (1.02 to 1.40)	0.026
Antipsychotic Medication Use		***N=186 out of 20,060***		
2000 (Reference)	1		1	
2007	1.15 (0.73 to 1.80)	0.550	1.18 (0.75 to 1.85)	0.447
2014	2.17 (1.47 to 3.20)	<0.001	2.22 (1.52 to 3.25)	<0.001

*Adjusted for age, gender and ethnicity to account for changes in sample demographics over time

Table 4: Proportion of People with Psychotic Symptoms Taking Antipsychotic Medication by Year

Year	**Proportion of People with Psychotic Symptoms reporting Antipsychotic Medication Use** Proportion (%)	**Proportion of People without Psychotic Symptoms reporting Antipsychotic Medication Use** Proportion (%)
2000	18/418 (3.1)	33/6778 (0.4)
2007	21/365 (4.4)	28/6010 (0.4)
2014	31/407 (5.2)	59/5983 (0.9)

Table 5: Correlates of screening positive for psychotic symptoms

Covariate	Category	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Sex N=20,169	Female (Reference)	1		1	
	Male	0.90 (0.78 – 1.03)	0.114	0.88 (0.77 – 1.01)	0.070
Age N=20,169	16-24 (Reference)	1			
	25-34	0.67 (0.54 – 0.83)	<0.001*	0.67 (0.54 – 0.84)	<0.001*
	35-44	0.73 (0.59 - 0.90)	0.004*	0.74 (0.60 – 0.92)	0.006
	45-54	0.58 (0.46 - 0.73)	<0.001*	0.60 (0.48 – 0.76)	<0.001*
	55-64	0.45 (0.35 - 0.58)	<0.001*	0.47 (0.36 – 0.59)	<0.001*
	65-74	0.26 (0.19 - 0.35)	<0.001*	0.28 (0.21 – 0.37)	<0.001*
Ethnicity N=20,063	White British (Reference)	1			
	Black / African / Caribbean / Black British	2.22 (1.61 – 3.05)	<0.001*	2.02 (1.46 – 2.78)	<0.001*
	Asian / Asian British	1.49 (1.07 – 2.07)	0.019*	1.26 (0.90 – 1.75)	0.174
	Mixed / Other	1.22 (0.82 – 1.81)	0.320	1.07 (0.72 – 1.59)	0.748
Social Class by Occupation[a] N=6,089	1 (Reference)	1			
	2	1.48 (0.71 – 3.07)	0.294	1.50 (0.73 – 3.10)	0.272
	3	2.39 (1.13 – 5.06)	0.023*	2.21 (1.05 – 4.62)	0.036*
	4	1.62 (0.74 – 3.51)	0.244	1.71 (0.78 – 3.73)	0.178
	5	3.03 (1.45 – 6.33)	0.003*	2.86 (1.37 – 5.95)	0.005*
	6 / 7	3.85 (1.71 – 8.67)	0.001*	3.97 (1.77 – 0.90)	0.001*

Lifetime experience of major trauma N=12,290		2.54 (2.14 – 3.02)	<0.001*	2.62 (2.20 – 3.12)	<0.001*
Any of 15 mental illness diagnoses from a professional N=6,469		3.84 (3.02 – 4.88)	<0.001*	4.92 (3.82 – 6.33)	<0.001*
Reporting ever having been diagnosed with psychosis or schizophrenia by a professional N=6,479		14.98 (7.26 – 30.89)	<0.001*	17.32 (8.37 – 35.82)	<0.001*
Increase in Odds per point increase in AUDIT [b] score N=18,025		1.06 (1.05-1.08)	<0.001 *	1.06 (1.05 – 1.08)	<0.001*
Cannabis use in past year N=19,674		2.71 (2.24 – 3.28)	<0.001 *	2.32 (1.89 – 2.84)	<0.001*

[a]AUDIT= Alcohol Use Disorders Identification Test

[b]Social Class: 1=Employers in large establishments, higher managerial and professional occupations

2= Lower professional, higher technical, lower managerial and administrative, and higher supervisory occupations

3= Intermediate occupations

4= Employers in small occupations and own account workers

5=Lower supervisory and lower technical occupations

6 / 7=Semi-routine occupations and routine occupations (Office for National Statistics, 2010)

Adjusted = adjusted for sex, age, and ethnicity.

References

ANDREOU, C., BAILEY, B. & BORGWARDT, S. 2019. Assessment and treatment of individuals at high risk for psychosis. *BJPsych Advances,* 25**,** 177-184.

BARR, B., TAYLOR-ROBINSON, D., SCOTT-SAMUEL, A., MCKEE, M. & STUCKLER, D. 2012. Suicides associated with the 2008-10 economic recession in England: time trend analysis. *BMJ : British Medical Journal,* 345**,** e5142.

BEBBINGTON, P. & NAYANI, T. 1995. The psychosis screening questionnaire. *International Journal of Methods in Psychiatric Research*.

BOURGIN, J., TEBEKA, S., MALLET, J., MAZER, N., DUBERTRET, C. & LE STRAT, Y. 2019. Prevalence and correlates of psychotic-like experiences in the general population. *Schizophrenia research*.

BREWIN, C. R., ROSE, S., ANDREWS, B., GREEN, J., TATA, P., MCEVEDY, C., TURNER, S. & FOA, E. B. 2002. Brief screening instrument for post-traumatic stress disorder. *British Journal of Psychiatry,* 181**,** 158-162.

CÁCERES, M. C., PEÑAS-LLEDÓ, E. M., DE LA RUBIA, A. & LLERENA, A. 2008. Increased use of second generation antipsychotic drugs in primary care: potential relevance for hospitalizations in schizophrenia patients. *European Journal of Clinical Pharmacology,* 64**,** 73-76.

CASTILLEJOS, M., MARTÍN-PÉREZ, C. & MORENO-KÜSTNER, B. 2018. A systematic review and meta-analysis of the incidence of psychotic disorders: the distribution of rates and the influence of gender, urbanicity, immigration and socio-economic level. *Psychological medicine,* 48**,** 2101-2115.

FOWLER, D., HODGEKINS, J., HOWELLS, L., MILLWARD, M., IVINS, A., TAYLOR, G., HACKMANN, C., HILL, K., BISHOP, N. & MACMILLAN, I. 2009. Can targeted early intervention improve functional recovery in psychosis? A historical control evaluation of the effectiveness of different models of early intervention service provision in Norfolk 1998–2007. *Early Intervention in Psychiatry,* 3**,** 282-288.

GIBSON, L. E., ALLOY, L. B. & ELLMAN, L. M. 2016. Trauma and the psychosis spectrum: a review of symptom specificity and explanatory mechanisms. *Clinical Psychology Review,* 49**,** 92-105.

GLICK, I. D., MURRAY, S. R., VASUDEVAN, P., MARDER, S. R. & HU, R. J. 2001. Treatment with atypical antipsychotics: new indications and new populations. *Journal of Psychiatric Research,* 35**,** 187-191.

JACKSON, W. C. & TAVERNIER, L. 2003. Olanzapine for intractable nausea in palliative care patients. *Journal of palliative medicine,* 6**,** 251-255.

JOHNS, L. C., CANNON, M., SINGLETON, N., MURRAY, R. M., FARRELL, M., BRUGHA, T., BEBBINGTON, P., JENKINS, R. & MELTZER, H. 2004. Prevalence and correlates of self-reported psychotic symptoms in the British population. *The British Journal of Psychiatry,* 185**,** 298-305.

KIRKBRIDE, ERRAZURIZ A , CROUDACE TJ , MORGAN C , JACKSON D , MCCRONE P , MURRAY RM & PB1, J. 2012. Systematic Review of the Incidence and Prevalence of Schizophrenia and Other Psychoses in England. University of Cambridge, .

KIRKBRIDE, J. B., HAMEED, Y., IOANNIDIS, K., ANKIREDDYPALLI, G., CRANE, C. M., NASIR, M., KABACS, N., METASTASIO, A., JENKINS, O., ESPANDIAN, A., SPYRIDI, S., RALEVIC, D., SIDDABATTUNI, S., WALDEN, B., ADEOYE, A., PEREZ, J. & JONES, P. B. 2017. Ethnic Minority Status, Age-at-Immigration and Psychosis Risk in Rural Environments: Evidence From the SEPEA Study. *Schizophrenia Bulletin,* 43**,** 1251-1261.

KOYANAGI, A., STICKLEY, A. & HARO, J. M. 2015. Psychotic-Like Experiences and Nonsuidical Self-Injury in England: Results from a National Survey. *PLOS ONE,* 10**,** e0145533.

LALLY, J. & MACCABE, J. H. 2015. Antipsychotic medication in schizophrenia: a review. *British medical bulletin,* 114**,** 169-179.

MALLA, A. & MCGORRY, P. 2019. Early Intervention in Psychosis in Young People: A Population and Public Health Perspective. *American journal of public health,* 109**,** S181-S184.

MCMANUS, BEBBINGTON P, JENKINS R & BRUGHA T 2016. (Eds) Mental health and wellbeing in England: Adult Psychiatric Morbidity Survey 2014. Leeds: NHS Digital.

MCMANUS, S., BEBBINGTON, P. E., JENKINS, R., MORGAN, Z., BROWN, L., COLLINSON, D. & BRUGHA, T. 2019. Data resource profile: Adult Psychiatric Morbidity Survey (APMS). *International Journal of Epidemiology*.

MURRAY, R. M., QUIGLEY, H., QUATTRONE, D., ENGLUND, A. & DI FORTI, M. 2016. Traditional marijuana, high-potency cannabis and synthetic cannabinoids: increasing risk for psychosis. *World Psychiatry,* 15**,** 195-204.

ODUOLA, S., DAS-MUNSHI, J., BOURQUE, F., GAYER-ANDERSON, C., TSANG, J., MURRAY, R. M., CRAIG, T. K. & MORGAN, C. 2019. Change in incidence rates for psychosis in different ethnic groups in south London: findings from the Clinical Record Interactive Search-First Episode Psychosis (CRIS-FEP) study. *Psychological medicine***,** 1-10.

OFFICE FOR NATIONAL STATISTICS 2010. Standard Occupational Classification 2010.

User Manual. *The National Statistics Socio-economic Classification: (Rebased on the SOC2010)*

QASSEM, T., BEBBINGTON, P., SPIERS, N., MCMANUS, S., JENKINS, R. & DEIN, S. 2015. Prevalence of psychosis in black ethnic minorities in Britain: analysis based on three national surveys. *Social psychiatry and psychiatric epidemiology,* 50**,** 1057-1064.

SAHA, S., SCOTT, J., VARGHESE, D. & MCGRATH, J. 2012. Anxiety and depressive disorders are associated with delusional-like experiences: a replication study based on a National Survey of Mental Health and Wellbeing. *BMJ Open,* 2**,** e001001.

SAUNDERS, J. B., AASLAND, O. G., BABOR, T. F., DE LA FUENTE, J. R. & GRANT, M. 1993. Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction,* 88**,** 791-804.

SCOTT, J., CHANT, D., ANDREWS, G. & MCGRATH, J. 2005. Psychotic-like experiences in the general community: the correlates of CIDI psychosis screen items in an Australian sample. *Psychological Medicine,* 36**,** 231-238.

SHEN, W. W. 1999. A history of antipsychotic drug development. *Comprehensive psychiatry,* 40**,** 407-414.

STATACORP 2019. Stata Statistical Software: Release 16. College Station, TX: StataCorp LLC.

SULLIVAN, S. A., THOMPSON, A., KOUNALI, D., LEWIS, G. & ZAMMIT, S. 2017. The longitudinal association between external locus of control, social cognition and adolescent psychopathology. *Social Psychiatry and Psychiatric Epidemiology,* 52**,** 643-655.

SUN, M., ZHANG, W., GUO, R., HU, A., LI, Y., MWANSISYA, T. E., ZHOU, L., LIU, C., CHEN, X. & TAO, H. 2017. Psychotic-like experiences and correlation with childhood trauma and other socio-demographic factors: a cross-sectional survey in adolescence and early adulthood in China. *Psychiatry research,* 255**,** 272-277.

SWARTZ, M. S., STROUP, T. S., MCEVOY, J. P., DAVIS, S. M., ROSENHECK, R. A., KEEFE, R. S. E., HSIAO, J. K. & LIEBERMAN, J. A. 2008. What CATIE found: results from the schizophrenia trial. *Psychiatric services (Washington, D.C.),* 59**,** 500-506.

THE KING'S FUND. *NHS hospital bed numbers: past, present, future* [Online]. Available: https://www.kingsfund.org.uk/publications/nhs-hospital-bed-numbers [Accessed 21st October 2019].

WILES, N. J., ZAMMIT, S., BEBBINGTON, P., SINGLETON, N., MELTZER, H. & LEWIS, G. 2006. Self-reported psychotic symptoms in the general population: Results from the longitudinal study of the British National Psychiatric Morbidity Survey. *British Journal of Psychiatry,* 188**,** 519-526.

WUNDERINK, L., SYTEMA, S., NIENHUIS, F. J. & WIERSMA, D. 2009. Clinical recovery in first-episode psychosis. *Schizophrenia Bulletin,* 35**,** 362-369.

ZAMMIT, S., HORWOOD, J., THOMPSON, A., THOMAS, K., MENEZES, P., GUNNELL, D., HOLLIS, C., WOLKE, D., LEWIS, G. & HARRISON, G. 2008. Investigating if psychosis-like symptoms (PLIKS) are associated with family history of schizophrenia or paternal age in the ALSPAC birth cohort. *Schizophrenia Research,* 104**,** 279-286.

ZOMER, E., OSBORN, D., NAZARETH, I., BLACKBURN, R., BURTON, A., HARDOON, S., HOLT, R. I. G., KING, M., MARSTON, L. & MORRIS, S. J. B. O. 2017. Effectiveness and cost-effectiveness of a cardiovascular risk prediction algorithm for people with severe mental illness (PRIMROSE). 7.