The association between sexual orientation and psychotic experiences during adolescence: A prospective cohort study

Emma Corcoran
Warneford Hospital

Amal Althobaiti
University College London

Glyn Lewis
University College London

Francesca Solmi
University College London

Tayla McCloud
University College London

Gemma Lewis (✉ gemma.lewis@ac.uk)
University College London

Research Article

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Abstract

Purpose

Psychotic experiences are relatively common during adolescence and associated with a range of negative outcomes. There is evidence that sexual minorities are at increased risk of mental health problems including depression, anxiety, self-harm and suicidality. However, no study has investigated the association between sexual orientation and psychotic experiences during adolescence. We compared trajectories of psychotic experiences in sexual minority and heterosexual adolescents from 12 to 24 years of age.

Methods

We used data from the Avon Longitudinal Study of Parents and Children (ALSPAC). Participants provided data on sexual orientation at age 16 and psychotic experiences at ages 12, 17 and 24. We used multi-level logistic regression models to test associations between sexual orientation and psychotic experiences, before and after adjusting for covariates. We investigated whether the association differed according to time-point and sex using interaction terms.

Results

We found evidence that the odds of psychotic experiences were 2.35 times (95% Confidence Interval 1.79–3.05, p < .0001) higher among sexual minority compared with heterosexual adolescents, after adjusting for covariates. There was no evidence that the association between sexual orientation and psychotic experiences differed according to time-point (p = 0.49) or sex (p = 0.29).

Conclusion

We found an increased risk of psychosis in sexual minorities compared with heterosexuals, which was present from around 12 years of age and persisted until age 24. Early interventions to prevent this mental health inequality could include universal interventions to promote inclusivity and acceptance of diverse sexual orientations.

Introduction

Psychotic experiences involve hallucinations and delusions (core symptoms of schizophrenia) without a diagnosis of psychotic disorder [1] [2]. Psychotic experiences are relatively common in the general population, particularly during childhood and adolescence[2]. Psychotic experiences are debilitating and increase the risk of subsequent psychotic disorders, depression, post-traumatic stress disorder, eating disorders and suicide [1]–[4]. These experiences have also been identified as markers of severe common
mental disorder within the general population [5]. During adolescence, psychotic experiences are associated with a range of other negative outcomes including lower educational attainment, substance use and criminal behaviour [6]. However, we have a relatively poor understanding of risk factors for psychotic experiences, which could inform interventions to prevent or reduce them. Adolescence, defined as 10 to 24 years of age [7] is particularly important for prevention as the peak age at onset for mental health problems is 14 and most mental health problems begin by age 25 [8].

Sexual minorities are often exposed to stigma, prejudice, discrimination and abuse within societies that promote being heterosexual and cisgender as normal. According to minority stress theory, these experiences create a hostile and stressful environment that causes mental health inequalities between sexual and gender minorities. There is evidence that the prevalence of depression, anxiety, self-harm and suicidality [9]–[13] is around twice as high in sexual minority compared with heterosexual adolescents [14]. However, to our knowledge, no study has investigated the association between sexual orientation and psychotic experiences during adolescence. In adults, three cross-sectional studies [15]–[17] and one case-control study [18] find that psychotic disorders and symptoms are higher among sexual minorities than heterosexuals [19]. However, these findings are unlikely to generalise to adolescents who are experiencing a distinct developmental stage characterised by biopsychosocial transitions [7].

Another limitation of existing evidence is that the cross-sectional and case-control studies asked participants to recall psychotic experiences across their lifetime, which could lead to bias. This approach also does not provide evidence on when the increased risk of psychotic experiences emerges, which could inform the timing of interventions. Longitudinal studies with repeated measures of mental health can be used to investigate when the risk of psychotic experiences emerges in sexual minority compared with heterosexual adolescents, and how it changes over time. Previous longitudinal studies suggest that depressive symptoms are higher in sexual minorities than heterosexuals from around 12 years of age [13], [20], [21] and this disparity persists throughout adolescence [13]. In this study, we investigated the association between sexual orientation and psychotic experiences at multiple time-points during adolescence, using data from a population-based birth cohort study.

Method

Sample

We used data from the Avon Longitudinal Study of Parents and Children (ALSPAC). The original sample consisted of 15,454 pregnant women in the former county of Avon in Bristol, United Kingdom, with due dates between 1 April 1991 and 31 December 1992 [22]–[24]. We used data from core singleton offspring (excluding multiple births) who answered a question about sexual orientation when they were an average age of 16 [13][25].

The authors assert that all procedures contributing to this work comply with the ethical standard of the relevant national and institutional committees on human experimentation and with the Helsinki
Declaration of 1975, as revised in 2008. Ethical approval for the study was obtained from the ALSPAC Ethics and Law Committee and the Local Research Ethics Committees. The study website (http://www.bristol.ac.uk/alspac/researchers/our-data/) contains details of all the data that is available through a fully searchable data dictionary and variable search tool. Study data were collected and managed using REDCap electronic data capture tools hosted at the University of Bristol. REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies [26]: https://projectredcap.org/resources/citations/.

Procedure

Outcome – Psychotic experiences

Psychotic experiences were measured at ages 12, 17 and 24 using the psychosis-like symptoms interview (PLIKSi). The PLIKSi is a semi-structured interview consisting of 12 questions from the psychosis section of the Schedule for Affective Disorders and Schizophrenia for School-Age children (K-SDAS) [27] and the Diagnostic Interview Schedule for Children (DISC-IV) [28]. The interview explored the past 6-month presence of hallucinations, delusions and thought interference, with each symptom rated as not present, suspected, or definitely present. If a symptom was scored as suspected or definitely present, further questions were asked about the frequency and specificity of symptoms (i.e. location of voices, types of delusions [29]). If participants were able to give specific examples of the symptoms, they were marked as definite (unless they were related to substance use, lack of sleep or fever). We classified psychotic experiences as a binary outcome [30], indicating the presence or absence of suspected/definite symptoms.

Exposure – Sexual orientation

Sexual orientation was measured at a research clinic when participants were on average 16 years old. Participants were asked to choose the description that best fit how they thought about themselves. Response options were 100% heterosexual (straight), mostly heterosexual but also attracted to the same sex, bisexual (attracted to both sexes), mostly homosexual but also attracted to the opposite sex, 100% homosexual (gay), not sexually attracted to either sex and not sure. Consistent with other studies [10], [13], [25] and due to relatively small numbers in all responses except 100% heterosexual, we combined all non-heterosexual respondents into a single sexual minority category. We classified as sexual minority participants who were mostly heterosexual, bisexual, mostly homosexual, 100% homosexual and not sure [31]. This is consistent with previous evidence that all sexual minority groups, including those who identify as mostly heterosexual or not sure, have an increased risk of mental health problems compared with those identifying as 100% heterosexual [14]. In line with previous studies [13], individuals who were not attracted to either sex were excluded.

Covariates

Consistent with prior studies [11], [13] we adjusted for sex, maternal education (split into compulsory and non-compulsory[32]) and social class (split into manual and non-manual [33]). Experiences such as
bullying are associated with sexual orientation [11, 34, 35] and psychotic experiences [36]. However, we did not adjust for variables likely to be on the causal pathway from sexual orientation to psychotic experiences as this can bias associations.

**Statistical Analysis**

All analyses were conducted in Stata version 15.[37] Participants were included in the main analyses if they had complete data on the exposure and covariates, and at least one measurement of the outcome. First, we explored the characteristics of our sample according to sexual orientation. We then compared socio-demographic characteristics of participants with complete and missing data.

We used multilevel logistic regression models to investigate the association between sexual orientation and psychotic experiences. Time-point was clustered within individual, with a random intercept at the level of the individual.

We investigated whether the association between sexual orientation and psychotic like symptoms differed across time points, by calculating an interaction between sexual orientation and time (entered as a three-level categorical variable). We investigated whether the association between sexual orientation and psychotic experiences differed by sex, by calculating an interaction between sexual orientation and sex.

All models were run before and after adjusting for covariates. We calculated the population attributable fraction using the `punaf` command in Stata [13].

We conducted a sensitivity analysis using multiple imputation with chained equations (MICE), to explore the potential role of missing data. We started with the sample that had provided complete data on the exposure. We then imputed missing data in the outcome and covariates. To predict missing data we used all variables in the main analysis, plus auxiliary variables: the Mood and Feeling Questionnaire (ages 10 years, 12 years, 13 years, 17 years, 18 years, 22 years, 22 years & 11 months and 23 years) [38], IQ (measured at age 15 using the Wechsler Abbreviated Scale of Intelligence [39]), child anxiety scores (measured at age 24 using the Clinical Interview Schedule-Revised [40]) maternal depression (measured using the Edinburgh Postnatal Depression Scale [41]) maternal alcohol use during the first three months and last two months of pregnancy and maternal smoking during pregnancy. To improve prediction of missing outcome data, we restricted the sample with imputed data to those with at least one MFQ (in addition to having complete exposure data).[38]

**Results**

**Sample**

Of the 4,842 participants with complete exposure data, 3,530 provided outcome data on at least one time point. Of these, 3,054 had complete data on all covariates and were included in our analytic sample (Fig. 1). In this sample, 399 participants (13%) identified as sexual minority. Sexual minority adolescents...
were more likely to be female and from families with higher education and social class levels (Table 1). Compared to participants with complete data, participants with missing data were more likely to be male, to have mothers with compulsory education and to report slightly more psychotic experiences (Table 2).

Table 1
Characteristics of the sample with complete data\(^1\) (n = 3,054) according to sexual orientation

<table>
<thead>
<tr>
<th>Characteristic – N (%)</th>
<th>Heterosexual (n = 3,054)</th>
<th>Sexual Minority (n = 399)</th>
<th>P value(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>1,438 (54.1%)</td>
<td>270 (67.5%)</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Manual parental social class(^3)</td>
<td>359 (13.5%)</td>
<td>62 (15.5%)</td>
<td>.062</td>
</tr>
<tr>
<td>Compulsory maternal education(^4)</td>
<td>1,307 (49.2%)</td>
<td>178 (44.5%)</td>
<td>.002</td>
</tr>
</tbody>
</table>

\(^1\)Participants with complete data on the exposure and covariates and at least one measure of psychotic experiences

\(^2\)P values obtained from Chi-square tests

\(^3\)Occupations dichotomised into manual and non-manual to form a social class measure based on the 1991 classification of the UK Office of Population Censuses and Surveys

\(^4\)No A-Level or Degree qualification
Table 2
Characteristics of participants with complete data compared to those with missing data

<table>
<thead>
<tr>
<th>Characteristic – N (%)</th>
<th>Complete case sample(^1) (n = 3,054)</th>
<th>Missing data sample(^2) (n = 11,404)</th>
<th>P-value(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual Orientation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual minority</td>
<td>400 (13.1%)</td>
<td>225 (12.7%)</td>
<td></td>
</tr>
<tr>
<td>Heterosexual</td>
<td>2,655 (86.9%)</td>
<td>1,547 (87.3%)</td>
<td>.518</td>
</tr>
<tr>
<td>Psychotic experiences at age 12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspected/definite symptoms</td>
<td>331 (11.2%)</td>
<td>402 (11.8%)</td>
<td>.157</td>
</tr>
<tr>
<td>None</td>
<td>2,633 (88.8%)</td>
<td>2,992 (88.2%)</td>
<td></td>
</tr>
<tr>
<td>Psychotic experiences at age 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspected/definite symptoms</td>
<td>182 (7.0%)</td>
<td>169 (9.4%)</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>None</td>
<td>2,442 (93.1%)</td>
<td>1,600 (90.5%)</td>
<td></td>
</tr>
<tr>
<td>Psychotic experiences at age 24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspected/definite symptoms</td>
<td>246 (11.4%)</td>
<td>203 (14.5%)</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>None</td>
<td>1,920 (88.6%)</td>
<td>1,193 (85.5%)</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1,708 (55.9%)</td>
<td>5,033 (46.2%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1,346 (44.1%)</td>
<td>5,864 (53.8%)</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Social class</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual</td>
<td>421 (13.8%)</td>
<td>1,568 (22.6%)</td>
<td></td>
</tr>
<tr>
<td>Non-manual</td>
<td>2,633 (86.2%)</td>
<td>5,359 (77.4%)</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Maternal education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compulsory</td>
<td>1,485 (48.6%)</td>
<td>6,481 (70.0%)</td>
<td></td>
</tr>
<tr>
<td>Higher</td>
<td>1,569 (51.4%)</td>
<td>2,780 (30.0%)</td>
<td>&lt; .0001</td>
</tr>
</tbody>
</table>

\(^1\) Participants with complete data on the exposure and covariates and at least one measure of psychotic experiences

\(^2\) Participants with missing data on exposure, outcome and/or covariates

\(^3\) P-values obtained using chi-square tests to test the association of missing data with all variables included in our analysis
Sexual orientation and psychotic experiences

The prevalence of psychotic experiences in the sample overall was 11.2% (n = 331) at age 12, 7.0% (n = 182) at age 17 and 11.4% (n = 246) at age 24 (Table 3). The prevalence of psychotic like symptoms was higher in sexual minorities compared with heterosexuals at each time-point (Table 3). In the univariable model, there was strong evidence that the odds of psychotic experiences were higher in sexual minority compared with heterosexual adolescents (OR = 2.28, 95% CI = 1.79–2.92, p < .0001). After adjusting for covariates, this association remained similar (OR = 2.35, 95% CI = 1.79–3.05, p < .0001) (Table 3). There was no evidence that the association between sexual orientation and psychotic experiences differed across time (p value for interaction = 0.49) or between sexes (p value for interaction = 0.29).

Table 3
Multilevel logistic regression models for associations between sexual orientation at age 16 and psychotic experiences, using sample with complete data

<table>
<thead>
<tr>
<th>Prevalence of psychotic experiences – N (%)¹</th>
<th>Psychotic experiences</th>
<th>Age 12</th>
<th>Age 17</th>
<th>Age 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heterosexual</td>
<td>263/2,577 (10.2%)</td>
<td>138/2,286 (6.0%)</td>
<td>192/1,864 (10.3%)</td>
<td></td>
</tr>
<tr>
<td>Sexual minority</td>
<td>68/387 (17.6%)</td>
<td>44/338 (13.0%)</td>
<td>54/301 (17.9%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Odds ratios (95% confidence intervals) at individual time-points²</th>
<th>Psychotic experiences</th>
<th>Age 12</th>
<th>Age 17</th>
<th>Age 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unadjusted model</td>
<td>2.04</td>
<td>2.90</td>
<td>2.23</td>
<td></td>
</tr>
<tr>
<td>(1.47–2.81)</td>
<td>(1.96–4.31)</td>
<td>(1.51–3.27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted model³</td>
<td>2.10</td>
<td>2.89</td>
<td>2.32</td>
<td></td>
</tr>
<tr>
<td>(1.49–2.98)</td>
<td>(1.89–4.45)</td>
<td>(1.53–3.49)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Overall odds ratios across time points
Unadjusted model                                                                                                           2.28 (1.79–2.92), p < .0001
Adjusted model²                                                                                                           2.35 (1.79–3.05), p < .0001

¹Participants with complete data on exposure and confounders and at least one measure of psychotic experiences

²P values not reported for individual time-points because p values from sub-group analyses can be unreliable

³Adjusted for sex, social class and maternal education
The population attributable fraction was 11.2% at age 12 (95% CI = 9.4%-11.5%), 6.1% at age 17 (95% CI = 5.3%-7.1%) and 10.5% at age 24 (95% CI = 9.2%-11.9%) (Table 4).

<table>
<thead>
<tr>
<th>Age</th>
<th>Population Attributable Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>11.2% (9.4%-11.5%)</td>
</tr>
<tr>
<td>17</td>
<td>6.1% (5.3%-7.1%)</td>
</tr>
<tr>
<td>24</td>
<td>10.5% (9.2%-11.9%)</td>
</tr>
</tbody>
</table>

*Table 4*

Population attributable fractions with 95% confidence intervals, at each time-point.

The proportion by which psychotic experiences would be reduced if all factors linking sexual orientation to psychotic experiences were addressed.[63]

**Multiple imputation**

Results from the imputed sample were similar to those from the sample with complete data (Table 5). There was no evidence that the association between sexual orientation and psychotic experiences varied across time-point or by sex.

*Table 5*

Multilevel logistic regression models for associations between sexual orientation at age 16 and psychotic experiences, using imputed data (n = 4,842).

<table>
<thead>
<tr>
<th>Psychotic experiences</th>
<th>Odds ratios across all time points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unadjusted model</td>
<td>2.30 (1.81–2.93), p &lt; .0001</td>
</tr>
<tr>
<td>Adjusted model¹</td>
<td>2.33 (1.84–2.93), p &lt; .0001</td>
</tr>
</tbody>
</table>

¹Adjusted for sex, social class and maternal education.

**Discussion**

In this large population-based birth cohort, we found evidence that sexual minority adolescents were more likely to experience psychotic experiences than heterosexuals. The association between sexual orientation and psychotic experiences was observed at age 12, and persisted over time (from age 12 to 24). There was no evidence that the magnitude of the association between sexual orientation and psychotic experiences changed with age. This suggests that the risk of psychotic experiences is already higher in sexual minorities compared with heterosexuals during early adolescence, representing a mental health disparity that persists to adulthood.

**Strengths and Limitations**
To our knowledge, this is the first study of sexual orientation and psychotic experiences during adolescence; a critical time for the onset and prevention of mental health problems. We measured psychotic experiences at multiple time-points during adolescence, which enables us to investigate changes in the association with sexual orientation. The prospective design also minimised recall bias. We used a semi-structured interview based on principles of standardized clinical examination to measure psychotic experiences. This should reduce biases that might be introduced by self-reports.

A limitation of our study was that, due to attrition, our analyses were based on a sub-sample of the initial ALSPAC cohort, which could lead to selection bias. ALSPAC also has a high proportion of white participants and we were not able to include ethnicity in our analyses. As there is an association between ethnicity and psychotic experiences [42], it would be useful for future studies to examine whether associations are influenced by ethnicity.

There were some limitations in how we measured and classified sexual orientation. We classified all participants who were not 100% heterosexual into one sexual minority group, due to small numbers in some sexual minority categories. This increased the power and precision of our analyses. The added rationale was evidence that all sexual minority groups are at increased risk of mental health problems compared with heterosexuals [43]. However, there is evidence that certain sexual minority groups are at increased risk of mental health outcomes compared with others [44]. Bisexual women, for example, have been found to have higher rates of depression than other sexual minority groups. [14], [44]–[46] Further research in larger samples would be useful, to investigate whether associations between sexual orientation and psychotic experiences differ according to sexual minority group and gender. Eighty nine percent of participants who attended the research clinic at age 16 provided data on their sexual orientation. It is possible that participants who provided data on their sexual orientation differed systematically to those who did not, leading to selection bias. Sexual orientation may have been underreported due to perceived stigma. However, if the heterosexual group contained sexual minority adolescents who had higher psychotic experiences, or if some sexual minority adolescents chose not to report their sexuality, this misclassification is likely to have attenuated our associations, rather than introduced a spurious effect [13].

Our assessment of sexual orientation occurred after one of our psychotic experience outcomes (at 12 years of age). We included psychotic experiences at age 12 because prior studies have found that differences in the mental health of sexual minorities and heterosexuals emerge early in adolescence, from as young as 11 years of age [43], [47]. Many adolescents who identified as sexual minority at 16 years of age would not have been fully aware of their emerging sexual orientation at age 12. However, the development of sexual orientation is a multifaceted process that usually unfolds over many years [48]. A recent meta-analysis found that LGBQ+ people first became aware of attraction to the same gender at an average age of 12.7, though there was of course substantial heterogeneity. LGBQ+ people first questioned their sexual orientation at an average age of 13.2 [48]. It is also possible that people who become non-heterosexual are perceived differently by others from a young age and this affects mental health. Longitudinal studies have shown that young people who identified as sexual minority at age 16
were more likely to be bullied from the age of 10 [49]. There is also evidence of a prospective association between gender non-conformity during childhood and sexual minority identification during adolescence [50], [51].

We measured sexual orientation at one point in time whereas sexual orientation is often fluid [52], particularly among young people. Our results suggest that identifying as sexual minority at age 16 is associated with mental health problems but future studies could investigate how fluidity in sexual orientation might affect mental health [53]. The use of a single question about sexual attraction and identity might have classified fewer individuals as sexual minority than would separate questions on attraction, behaviour, and identity. Finally, ALSPAC used binary measures of gender and we were unable to identify trans (transgender, non-binary or gender diverse) adolescents. Large high-quality population-based studies of the mental health of trans adolescents are needed [54].

**Mechanisms**

Sexual minorities experience unique stressors due to stigma, discrimination and prejudice within societies that predominantly treat heterosexual orientations as normative [55]. Compared with heterosexuals, sexual minority adolescents are more likely to experience bullying, [11], [34], [35] which is associated with an increased risk of psychotic experiences [36]. Family conflict and feelings of shame, guilt, isolation, loneliness and rejection are also likely to contribute to the increased risk of psychotic experiences in sexual minority adolescents compared with heterosexuals [13], [56].

**Implications**

Our findings provide strong evidence of mental health inequalities between sexual minorities and heterosexuals, from early in adolescence[20], [57]. We found evidence of an increased risk of psychotic experiences in sexual minority young people compared with heterosexuals at 12 years of age. This suggests that universal interventions to prevent psychotic experiences should occur earlier than this, in childhood. Schools are a potential setting for universal interventions that would reach most adolescents. Promoting inclusivity and acceptance of diverse sexual orientations in schools could improve the mental health of sexual minority adolescents. Inclusive anti-bullying policies and curriculums and gay-straight alliances have been found to improve the school environment and the mental health of students[58]–[60]. It is important to acknowledge that sexual minority adolescents are living in a largely heteronormative society, which may make lead to isolation, marginalisation and mental health difficulties[43]. Despite some initial attempts to introduce a more diversified curriculum,[61] the main focus remains on heterosexual relationships within most schools. Education could incorporate wider social issues and influences on the attitudes and behaviours of adolescents by challenging these heteronormative assumptions, rather than focusing on isolated issues of bullying[13], [62]. Fostering safety and inclusivity for sexual minority adolescents is a responsibility that everyone must take in order to protect these individuals from psychotic experiences and other associated mental health and social difficulties.

**Declarations**
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We are extremely grateful to all the families who took part in this study, the midwives for their help in recruiting them, and the whole ALSPAC team which includes interviewers, computer and laboratory technicians, clerical workers, research scientists, volunteers, managers, receptionists and nurses. We would also like to acknowledge the warm mentorship, intellectual rigour and critical thinking of Professor Michael King (1951-2021), whose seminal work on the mental health of sexual minorities led to this paper.

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Author details and contribution

Emma Corcoran, University College London, United Kingdom. Writing paper; statistical analysis

Amal Althobaiti, University College London, United Kingdom. Formulating research question; writing paper; statistical analysis.

Glyn Lewis, University College London, United Kingdom. Advising on concept, methods and design and critically reviewing paper.

Francesca Solmi, University College London, United Kingdom. Advising on concept, methods and design and critically reviewing paper.

Tayla McCloud, University College London, United Kingdom. Statistical analysis; critically reviewing paper; supervising work of the second author during an MSc project.

Gemma Lewis, University College London, United Kingdom. Formulating research question; statistical analysis; critically reviewing paper; supervising work of the first authors.
Competing interests

None.

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35. K. Yates *et al.*, ‘Association of Psychotic Experiences with Subsequent Risk of Suicidal Ideation, Suicide Attempts, and Suicide Deaths: A Systematic Review and Meta-analysis of Longitudinal


61. J. Richardson and P. Parnell, And Tango makes three. 2015.


Figures
Figure 1

Flow chart of ALSPAC study participants

Abbreviations: ALSPAC: Avon Longitudinal Study of Parents and Children; PLIKS: Psychotic experiences.