TECHNICAL COMMENTARY

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Ethnicity

Introduction

Some ethnic groups may show greater or less risk for schizophrenia than others. Incidence refers to how many new cases there are per population in a specified time-period, while prevalence refers to how many existing cases there are at a particular point in time. Differences in the incidence and prevalence across various ethnic groups can provide clues to possible causes of schizophrenia.

Method

We have included only systematic reviews with detailed literature search, methodology, and inclusion/exclusion criteria that were published in full text, in English, from the year 2000. Reviews were identified by searching the databases MEDLINE, EMBASE, and PsycINFO. Reviews with pooled data are prioritized for inclusion. Reviews reporting fewer than 50% of items on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA[1]) checklist have been excluded from the library. The evidence was graded guided by the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach[2]. The resulting table represents an objective summary of the available evidence, although the conclusions are solely the opinion of staff of NeuRA (Neuroscience Research Australia).

Results

We found nine systematic reviews that met our inclusion criteria[3-11].

- Moderate to high quality evidence suggests the incidence of psychotic disorders in ethnic minority groups in the UK and the Netherlands is greater than in the majority population in those areas. The incidence of psychotic disorders in ethnic minority groups is highest in areas with low own-group ethnic density than in areas with high own-group ethnic density. It is also highest in Black ethnic groups.
- Moderate quality evidence suggests a large effect of increased risk of schizophrenia in black Caribbean and black African migrants, and in their descendants, compared with the white British population, and a medium-sized increased risk for Asian migrants, apart from Chinese migrants.
- Moderate quality evidence suggests a medium-sized effect that Black people in the United States are more likely to be diagnosed with schizophrenia than White people in the United States. The effect size was largest in studies with more males, more White patients, more young patients, studies in hospital or military settings, and studies conducted in the Midwest, Southeast, National, or multistate USA. There were no differences in risk according to diagnostic method (structured vs. unstructured), DSM version (DSM-III or DSM-IV), or study year.
- Moderate quality evidence suggests a small increase in the prevalence and incidence of subclinical psychotic symptoms in people from ethnic minority groups.
- Moderate quality evidence found small effects showing increased rates of psychotic symptoms and experiences in people with high perceived ethnic discrimination.

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Baker SJ, Jackson M, Jongsma H, Saville CWN

The ethnic density effect in psychosis: A systematic review and multilevel meta-analysis

British Journal of Psychiatry 2021; 219: 632-43

View review abstract online

Comparison	**The rate of psychotic disorders in ethnic minority groups in areas with high or low levels of ethnic density.**
Summary of evidence	**Moderate to high quality evidence (unclear sample size, consistent, precise, direct) found a small effect of increased psychosis risk in areas of low own-group ethnic density. This was particularly apparent in Black ethnic groups.**
Psychotic disorders	
A small effect showed less own-group density was associated with an increase in psychosis risk; 10 studies, N not reported, OR = 1.20, 95%CI 1.09 to 1.32, $p < 0.001$ The strongest associations were observed in Black populations, particularly Black Antillean migrants in The Netherlands, Black British, and Black African groups in the UK and Denmark. There were no moderating effects of country, time, or area size.	
Consistency in results‡	Consistent (authors report low inconsistency)
Precision in results§	Precise
Directness of results‖	Direct

Bardol O, Grot S, Oh H, Poulet E, Zeroug-Vial H, Brunelin J, Leaune E

Perceived ethnic discrimination as a risk factor for psychotic symptoms: a systematic review and meta-analysis

Psychological Medicine 2020; 50(7): 1077-89

View review abstract online

Comparison	**Perceived ethnic discrimination and risk for schizophrenia and other psychoses.**

Summary of evidence	**Moderate quality evidence (large sample, inconsistent, imprecise, direct) found small effects showing increased rates of psychotic symptoms and experiences in people with perceived ethnic discrimination.**
Psychotic symptoms	
Small effects showed increased rates of psychotic symptoms and experiences with perceived ethnic discrimination; Psychotic symptoms: 9 studies, N = 30,451, OR = 1.82, 95%CI 1.41 to 2.36, $p < 0.05$ Psychotic experiences: 7 studies, N not reported, OR = 1.94, 95%CI 1.42 to 2.67, $p < 0.05$ The effect size was larger for delusional symptoms than for hallucinatory symptoms. There were no moderating effects of ethnic group or origin.	
Consistency in results	Authors report results were inconsistent
Precision in results	Imprecise
Directness of results	Direct

Bosqui TJ, Hoy K, Shannon C

A systematic review and meta-analysis of the ethnic density effect in psychotic disorders

Social psychiatry and psychiatric epidemiology 2014; 41(4): 519-529

View review abstract online

Comparison	**The incidence of psychotic disorders in ethnic minority groups in areas with high or low levels of ethnic density compared to the majority population.**
Summary of evidence	**Moderate to high quality evidence (large samples, consistent, unable to assess precision, direct) suggests the incidence of psychotic disorders in ethnic minority groups in the UK and the Netherlands is higher than in the majority population in those areas (large effect). This effect is largest in areas with low ethnic density compared to areas with high ethnic density.**
Psychotic disorders	

High density ethnic minority areas; 3 studies from the UK reported significant, large increased incidence in psychotic disorders in ethnic minority groups from high density ethnic minority areas compared to the majority population (N = 4,671, IRR 2.38 to 3.81, $p < 0.05$). Two studies (one from the UK and one from the Netherlands) reported non-significant, small increased incidence in psychotic disorders in ethnic minority groups compared to the majority population (N = 740, IRR 1.25 to 1.48, $p > 0.05$). *Low density ethnic minority areas;* 5 studies (4 from the UK, one from the Netherlands) reported significant, large to very large increased incidence in psychotic disorders in ethnic minority groups from low density ethnic minority areas compared to the majority population (N = 5,411, IRR 2.36 to 6.60, $p < 0.05$). Authors report $I^2 = 0\%$ for both comparisons.

Consistency in results	Consistent
Precision in results	Unable to assess; no CIs are reported.
Directness of results	Direct

Halvorsrud K, Nazroo J, Otis M, Brown Hajdukova E, Bhui K

Ethnic inequalities in the incidence of diagnosis of severe mental illness in England: a systematic review and new meta-analyses for non-affective and affective psychoses

Social Psychiatry and Psychiatric Epidemiology 2019; 54: 1311-23

View review abstract online

Comparison	**Incidence of schizophrenia in ethnic groups in England vs. the majority population.**
Summary of evidence	**Moderate to low quality evidence (unclear sample sizes, mostly inconsistent, imprecise, direct) found large effects of higher rates of schizophrenia in Black African and Black Caribbean ethnic groups in England. There were medium-sized effects of higher rates of schizophrenia in South Asian, mixed ethnicity, and other white ethnic groups in England. There were no increases in the Chinese population.**
Schizophrenia	

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Significant, large effects of higher rates of schizophrenia in the following ethnic groups; Black African: 9 studies, N unclear, RR = 5.72, 95%CI 3.87 to 8.46, $p < 0.05$, $I^2 = 74\%$ No moderating effects were found. Black Caribbean: 21 studies, N unclear, RR = 5.20, 95%CI 4.33 to 6.24, $p < 0.05$, $I^2 = 69\%$ No moderating effects were found. *Significant, medium-sized effects of higher rates of schizophrenia in the following ethnic groups;* South Asian: 14 studies, N unclear, RR = 2.27, 95%CI 1.63 to 3.16, $p < 0.05$, $I^2 = 85\%$ The rates were higher in women and older (30 + years) adults. White Other: 9 studies, N unclear, RR = 2.24, 95%CI 1.59 to 3.14, $p < 0.05$, $I^2 = 92\%$ No moderating effects were found. Mixed ethnicity: 4 studies, N unclear, RR = 2.24, 95%CI 1.32 to 3.80 $p < 0.05$, $I^2 = 19\%$ The rates were higher in more recent studies. *There were no significant differences in;* Chinese: 2 studies, N unclear, RR = 2.61, 95%CI 0.88 to 7.72, $p < 0.05$, $I^2 = 34\%$	
Consistency in results	Mostly inconsistent
Precision in results	Imprecise
Directness of results	Direct

Kirkbride JB, Errazuriz A, Croudace TJ, Morgan C, Jackson D, Boydell J, Murray RM, Jones PB

Incidence of Schizophrenia and Other Psychoses in England, 1950–2009: A Systematic Review and Meta-Analyses

PLoS One 2012; 7(3); e1660

View review abstract online

Comparison	**Incidence of schizophrenia in ethnic migrant groups in the UK.**
Summary of evidence	**Moderate quality evidence (unclear sample size consistent, imprecise, direct) suggests a large effect of increased rates of schizophrenia in black Caribbean and black African migrants, and in their descendants, compared with the white British population, and a medium-sized increased risk for Asian**

	migrants.
Schizophrenia	
A large size effect of increased risk of schizophrenia in black Caribbean and black African migrants, and their descendants, compared with the white British population; Black Caribbean: 5 studies (N unclear), RR = 5.60, 95%CI 3.40 to 9.20, I^2 = 77%, *p* not reported Black African: RR = 4.70, 95%CI 3.30 to 6.80, I^2 = 47%, *p* not reported *A medium size effect of increased risk of schizophrenia in Asian migrants;* 3 studies (N unclear), RR = 2.4, 95%CI 1.30 to 4.50, I^2 = 0.42, *p* not reported Authors reported similar findings for affective psychoses in black Caribbean and black African migrants, but not Asian migrants. Results were not explained by age and sex differences between ethnic minority groups and the general population.	
Consistency in results	Consistent
Precision in results	Imprecise
Directness of results	Direct

Leaune E, Dealberto MJ, Luck D, Grot S, Zeroug-Vial H, Poulet E, Brunelin J

Ethnic minority position and migrant status as risk factors for psychotic symptoms in the general population: a meta-analysis

Psychological Medicine 2019; 49: 545-58

View review abstract online

Comparison	**Psychotic symptoms in ethnic minority groups.**
Summary of evidence	**Moderate to high quality evidence (large sample, inconsistent, precise, direct) suggests a small increase in psychotic symptoms in ethnic minority groups.**
Psychotic symptoms and psychotic experiences	
Significant, small increase in psychotic symptoms in ethnic minority groups; 13 studies, N = 103,691, OR = 1.43, 95%CI 1.21 to 1.68, *p* = 0.001, I^2 = 84% Adjusted for age, sex, and socioeconomic status. The effect was significant in adults, but not in children or adolescents, nor in children or	

grandchildren of migrants. The effect was significant for both symptoms and experiences, and for hallucinations and delusions. The effect was significant in studies that assessed symptoms with the Composite International Diagnostic Interview, but not the Psychosis Screening Questionnaire. The effect was significant in studies conducted in the UK, USA, The Netherlands, and high-income countries, but not in low-middle-income countries. It was largest in people from Northwest Africa or the Middle East living in Europe, in Hispanic groups living in the USA, and in Black populations anywhere.	
Consistency in results	Inconsistent
Precision in results	Precise
Directness of results	Direct

Linscott RJ, van Os J

An updated and conservative systematic review and meta-analysis of epidemiological evidence on psychotic experiences in children and adults: on the pathway from proneness to persistence to dimensional expression across mental disorders

Psychological Medicine 2013; 43: 1133-1149

View review abstract online

Comparison	**Prevalence and incidence of subclinical psychotic symptoms in ethnic minority groups from general population samples.**
Summary of evidence	**Moderate quality evidence (unclear sample size, consistent, imprecise, direct) suggests a small increase in prevalence and incidence of subclinical psychotic symptoms in ethnic minority groups.**
Subclinical psychotic symptoms	
Significant, small increased prevalence and incidence of subclinical psychotic symptoms in ethnic minority groups; All ethnic minority groups: Prevalence: (9 studies, N not reported) OR 1.35, 95%CI 1.09 to 1.67, $p < 0.05$, I^2 48%, $p > 0.05$ Incidence: (1 study, N not reported) OR 1.25, 95%CI 0.89 to 1.82, $p > 0.05$ Ethnic minority groups, less Asian groups:	

Prevalence: (9 studies, N not reported) OR 1.55, 95%CI 1.26 to 1.90, $p < 0.05$, I^2 45%, $p > 0.05$	
Consistency in results	Consistent
Precision in results	Imprecise
Directness of results	Direct

Olbert CM, Nagendra A, Buck B

Meta-analysis of black vs. white racial disparity in schizophrenia diagnosis in the United States: Do structured assessments attenuate racial disparities?

Journal of Abnormal Psychology 2018; 127: 104-15

View review abstract online

Comparison	**Racial disparity (Black vs. White) in the diagnosis of schizophrenia in the US.**
Summary of evidence	**Moderate quality evidence (large sample, inconsistent, imprecise, direct) suggests a medium-sized effect that Black people in the United States are more likely to be diagnosed with schizophrenia than White people in the United States. The effect size was largest in studies with more males, more White patients, more young patients, studies in hospital or military settings, and studies conducted in the Midwest, Southeast, National, or multistate USA. There were no differences in risk according to diagnostic method (structured vs. unstructured), DSM version (DSM-III or DSM-IV), or study year.**

Schizophrenia

A medium-sized, significant effect of greater rates of diagnosis of schizophrenia in Black individuals;

52 studies, N = 2,099,506, OR = 2.42, 95%CI 1.59 to 3.66, $p = 0.00003$, $I^2 = 98\%$, $p < 0.001$

The effect size was largest in studies with more males, more White patients, more young patients, studies in hospital or military settings, and studies conducted in the Midwest, Southeast, National, or multistate USA.

There were no significant moderating effects of diagnostic method (structured vs. unstructured), DSM version, or study year.

Authors report there was little evidence of publication bias.

Consistency in results	Inconsistent
Precision in results	Imprecise
Directness of results	Direct

Shaw RJ, Atkin K, Becares L, Albor CB, Stafford M, Kiernan KE, Nazroo JY, Wilkinson RG, Pickett KE

Impact of ethnic density on adult mental disorders: narrative review

The British Journal of Psychiatry 2012; 201: 11-19

View review abstract online

Comparison	**Relationship between rates of schizophrenia and psychotic disorders and levels of ethnic density.**
Summary of evidence	**Moderate to low quality evidence (unclear sample size, unable to assess precision or consistency, direct) indicates high levels of ethnic density may be a protective factor for schizophrenia, however this relationship is unclear when assessing specific ethnic minority groups.**

Schizophrenia and psychosis

4 studies reported that higher ethnic density among ethnic minority groups as potentially protective against psychosis (regardless of ethnicity), and 1 study reported this to be particularly relevant for schizophrenia, rather than non-affective psychoses in general.

1 Dutch study reported that higher ethnic density was protective against psychoses among those of Moroccan ethnicity but not those of Surinamese or Turkish origin.

1 study reported that higher ethnic density was protective for people of Indian and Bangladeshi origin, as well as for Black people in general.

1 UK study reported no associations of ethnic density with psychosis risk for any of the specific ethnic minority groups: 'Black Caribbean', 'Black African', 'Asian', 'Mixed ethnicity', 'White' or 'other ethnic groups'.

1 study reported that higher ethnic density was associated with increased risk of psychotic symptoms among Pakistani people who were mostly living in the most deprived category of neighbourhood, so the results may have been confounded by low socio-economic status.

Consistency in results	Unable to assess; no measure of consistency is reported.

Precision in results	Unable to assess; no measure of precision is reported.
Directness of results	Direct

Explanation of acronyms

CI = confidence interval, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), IRR = incidence rate ratio, N = number of participants, OR = odds ratio, *p* = statistical probability of obtaining that result ($p < 0.05$ generally regarded as significant), RR = relative risk, X^2 = chi-square test of heterogeneity

Ethnicity

Explanation of technical terms

* Bias has the potential to affect reviews of both RCT and observational studies. Forms of bias include; reporting bias – selective reporting of results; publication bias - trials that are not formally published tend to show less effect than published trials, further if there are statistically significant differences between groups in a trial, these trial results tend to get published before those of trials without significant differences; language bias – only including English language reports; funding bias - source of funding for the primary research with selective reporting of results within primary studies; outcome variable selection bias; database bias - including reports from some databases and not others; citation bias - preferential citation of authors. Trials can also be subject to bias when evaluators are not blind to treatment condition and selection bias of participants if trial samples are small.

† Different effect measures are reported by different reviews.

Median rate ratio refers to the ratio between prevalence or incidence rates of two groups, based on the median rather than the mean. The median is often used as a better measure of central tendency than the mean when data are skewed. Harmonic means are also used when data are skewed and are appropriate for rate data.

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post treatment) and in a randomised trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardised mean differences are divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous) that allows results from different scales to be combined and compared. Each study's mean difference is then given a weighting depending on the size of the sample and the variability in the data. 0.2 represents a small effect, 0.5 a medium effect, and 0.8 and over represents a large treatment effect[12].

Odds ratio (OR) or relative risk (RR) refers to the probability of a reduction (< 1) or an increase (> 1) in a particular outcome in a treatment group, or a group exposed to a risk factor, relative to the comparison group. For example, a RR of 0.75 translates to a reduction in risk of an outcome of 25% relative to those not receiving the treatment or not exposed to the risk factor. Conversely, an RR of 1.25 translates to an increased risk of 25% relative to those not receiving treatment or not having been exposed to a risk factor. An RR or OR of 1.00 means there is no difference between groups. A medium effect is considered if RR > 2 or < 0.5 and a large effect if RR > 5 or < 0.2[13]. lnOR stands for logarithmic OR where a lnOR of 0 shows no difference between groups. Hazard ratios measure the effect of an explanatory variable on the hazard or risk of an event.

Correlation coefficients (e.g., r) indicate the strength of association or relationship between variables. They are an indication of prediction, but do not confirm causality due to possible and often unforseen confounding variables. An r of 0.10 represents a weak association, 0.25 a medium association and 0.40 and over represents a strong association. Unstandardised (*b*) regression coefficients indicate the average change in the dependent variable associated with a 1 unit change in the dependent variable, statistically controlling for the other independent variables. Standardised regression coefficients represent the change being in units of standard deviations to allow comparison across different scales.

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Ethnicity

Prevalence refers to how many existing cases there are at a particular point in time. Incidence refers to how many new cases there are per population in a specified time period. Incidence is usually reported as the number of new cases per 100,000 people per year. Alternatively some studies present the number of new cases that have accumulated over several years against a person-years denominator. This denominator is the sum of individual units of time that the persons in the population are at risk of becoming a case. It takes into account the size of the underlying population sample and its age structure over the duration of observation.

Reliability and validity refers to how accurate the instrument is. Sensitivity is the proportion of actual positives that are correctly identified (100% sensitivity = correct identification of all actual positives) and specificity is the proportion of negatives that are correctly identified (100% specificity = not identifying anyone as positive if they are truly not).

‡ Inconsistency refers to differing estimates of treatment effect across studies (i.e. heterogeneity or variability in results) that is not explained by subgroup analyses and therefore reduces confidence in the effect estimate. I^2 is the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance) - 0% to 40%: heterogeneity might not be important, 30% to 60%: may represent moderate heterogeneity, 50% to 90%: may represent substantial heterogeneity and 75% to 100%: considerable heterogeneity. I^2 can be calculated from Q (chi-square) for the test of heterogeneity with the following formula;

$$I^2 = \left(\frac{Q - df}{Q}\right) \times 100\%$$

§ Imprecision refers to wide confidence intervals indicating a lack of confidence in the effect estimate. Based on GRADE recommendations, a result for continuous data (standardised mean differences, not weighted mean differences) is considered imprecise if the upper or lower confidence limit crosses an effect size of 0.5 in either direction, and for binary and correlation data, an effect size of 0.25. GRADE also recommends downgrading the evidence when sample size is smaller than 300 (for binary data) and 400 (for continuous data), although for some topics, this criteria should be relaxed[14].

‖ Indirectness of comparison occurs when a comparison of intervention A versus B is not available but A was compared with C and B was compared with C that allows indirect comparisons of the magnitude of effect of A versus B. Indirectness of population, comparator and or outcome can also occur when the available evidence regarding a particular population, intervention, comparator, or outcome is not available so is inferred from available evidence. These inferred treatment effect sizes are of lower quality than those gained from head-to-head comparisons of A and B.

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