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Parental education

Introduction

Any association of low parental education with a higher risk for schizophrenia has been largely inconsistent. There are additional factors related to low parental education such as low socioeconomic status, urban living, stressful life events and migrant status which may have influence on any association. This topic outlines the evidence for low parental education as a risk factor for schizophrenia, however the results may reflect the other influencing factors rather than parental education itself.

Method

We have included only systematic reviews (systematic literature search, detailed methodology with inclusion/exclusion criteria) published in full text, in English, from the year 2000 that report results separately for people with a diagnosis of schizophrenia, schizoaffective disorder, schizophreniform disorder or first episode schizophrenia. Reviews were identified by searching the databases MEDLINE, EMBASE, CINAHL, Current Contents, PsycINFO and the Cochrane library. Hand searching reference lists of identified reviews was also conducted. When multiple copies of reviews were found, only the most recent version was included. Reviews with pooled data were prioritised for inclusion.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist that describes a preferred way to present a meta-analysis. Reviews with less than 50% of items checked have been excluded from the library. The PRISMA flow diagram is a suggested way of providing information about studies included and excluded with reasons for exclusion. Where no flow diagram has been presented by individual reviews, but identified studies have been described in the text, reviews have been checked for this item. Note that early reviews may have been guided by less stringent reporting checklists than the PRISMA, and that some reviews may have been limited by journal guidelines.

Evidence was graded using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach where high quality evidence such as that gained from randomised controlled trials (RCTs) may be downgraded to moderate to low if review and study quality is limited, if there is inconsistency in results, indirect comparisons, imprecise or sparse data and high probability of reporting bias. It may also be downgraded if risks associated with the intervention or other matter under review are high. Conversely, low quality evidence such as that gained from observational studies may be upgraded if effect sizes are large, there is a dose dependent response or if results are reasonably consistent, precise and direct with low associated risks (see end of table for an explanation of these terms)[1]. 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 one systematic review that met our inclusion criteria[2].

- Moderate quality evidence suggests a small to medium-sized increased odds of lower parental education in people with schizophrenia compared to people without schizophrenia.

Margarete Ainsworth Building, Barker Street, Randwick NSW 2031. Phone: 02 9399 1000. Email: info@neura.edu.au

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Laurens KR, Luo L, Matheson SL, Carr VJ, Raudino A, Harris F, Green MJ

Common or distinct pathways to psychosis? A systematic review of evidence from prospective studies for developmental risk factors and antecedents of the schizophrenia spectrum disorders and affective psychoses

BMC Psychiatry 2015; 15: 205. DOI 10.1186/s12888-015-0562-2

View review abstract online

Comparison	**Parental education in people with schizophrenia compared to people without schizophrenia.**
Summary of evidence	**Moderate quality evidence (large samples, mostly imprecise, unable to assess consistency, direct) suggests a small to medium-sized increased odds of lower parental education in people with schizophrenia.**

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1 study (N = 13,015,22) reported a significant, small increased odds of < 2 years of post-compulsory maternal education in people with schizophrenia compared with people without schizophrenia, and no differences for > 4 years of post-compulsory maternal education;

< 2 years: OR 1= .46, 95%CI 1.23 to 1.74, $p < 0.01$

> 4 years: OR = 0.93, 95%CI 0.79 to 1.10, $p > 0.05$

1 study (N = 64,997) reported a significant, small increased odds of low maternal and paternal education (under 8 years compared with over 13 years) in people with schizophrenia compared with people without schizophrenia;

Low paternal education: OR = 1.17, 95%CI 1.04 to 1.32, $p < 0.01$

Low maternal education: OR = 1.14, 95%CI 1.01 to 1.28, $p < 0.05$

Results were adjusted for year of birth.

1 study (N = 164) reported a significant, medium sized increased odds of maternal education less than high school level in people with schizophrenia compared to people without schizophrenia;

Maternal education less than high school: OR = 3.16, 95%CI 1.33 to 7.50, $p < 0.05$

1 study (N = 1,544) reported a significant, small decreased odds of schizophrenia with maternal education at bachelor degree compared to high school graduate;

Bachelor degree vs. high school: OR = 0.70, 95%CI 0.51 to 0.96, $p < 0.05$

No differences were reported for less than high school or masters/PhD compared to high school;

Less than high school vs. high school: OR = 1.08, 95%CI 0.85 to 1.38, $p > 0.05$

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Master / PhD degree vs. high school: OR = 0.86, 95%CI 0.56 to 1.32, $p > 0.05$ *1 study (N = 117) reported a large increased odds of maternal education over 8 years in people with schizophrenia compared to people without schizophrenia, although study authors report that this finding was not significant in the multivariate analysis;* Maternal education beyond 8 years: OR = 5.69, 95%CI 1.62 to 19.92, $p < 0.05$ *1 study (N = 7,780) reported no significant differences in maternal education levels in people with schizophrenia compared with people without schizophrenia;* High school graduate: OR = 1.52, 95%CI 0.88 to 2.62, $p > 0.05$ High school + trade school: OR = 1.04, 95%CI 0.65 to 1.68, $p > 0.05$ High school + some college: OR = 0.75, 95%CI 0.42 to 1.35, $p > 0.05$ College graduate: OR = 0.86, 95%CI 0.45 to 1.66, $p > 0.05$	
Consistency in results	Unable to assess, no heterogeneity measure is reported.
Precision in results	Mostly imprecise
Directness of results	Direct

Explanation of acronyms

CI = confidence interval, N = number of participants, OR = odds ratio, p = statistical probability of obtaining that result ($p < 0.05$ generally regarded as significant), vs. = versus

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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[3].

† Different effect measures are reported by different reviews.

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).

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post treatment) and in a randomized trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardized mean differences are divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous) which 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[3].

Odds ratio or relative risk ratio refers to the probability of a reduction (< 1) or an increase (> 1) in a particular outcome in the treatment group 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. 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 certain risk factor. An RR of 1.00 means there is no difference between groups. The RR effect is statistically significant if the CI completely sits on either side of 1.00 and the *p* value is < 0.05. A medium effect is considered if RR > 2 or < 0.5 and a large effect if RR > 5 or < 0.2[4]. ln OR stands for logarithmic OR where a ln OR = 0 shows no difference between groups and the

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In OR is statistically significant if the CI completely sits on either side of zero.

Correlation coefficients (eg 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.

‡ 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.

§ 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[5].

‖ 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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