TECHNICAL COMMENTARY

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SCHIZOPHRENIA LIBRARY

Smoking

Introduction

Tobacco smoking is very common among people with schizophrenia, who often show particularly heavy use. This poses considerable health risks, potential interference with the metabolism of antipsychotic medications, as well as financial burden for the individuals.

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 are 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[1]. Reviews reporting less than 50% of items 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 or 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 or if there is a dose dependent response. We have also taken into account sample size and whether results are consistent, precise and direct with low associated risks (see end of table for an explanation of these terms).[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 two systematic reviews that met inclusion criteria[3, 4].

- Moderate to low quality evidence finds some long-term benefit of specialised smoking abstinence programs for people with schizophrenia over standard group therapy. There was no sustained benefit of individual therapy over standard care for smoking abstinence, but there was a significant reduction in number of cigarettes smoked over one year with individual therapy.
- Moderate to low quality evidence finds contingency reinforcement in combination with transdermal nicotine is more effective for reducing smoking than contingency reinforcement alone or self-quit.
- An American Lung Association group program was more effective than a specialised smoking cessation group therapy at 6-month follow up.

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Banham L, Gilbody S

Smoking cessation in severe mental illness: what works?

Addiction 2010; 105: 1176-1189

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Comparison 1	**Specialised smoking program plus NRT vs. standard smoking group therapy plus NRT.**
Summary of evidence	**Moderate to low quality evidence (1 small RCT, imprecise, direct) finds some long-term benefit of specialised smoking abstinence programs over standard smoking group therapy.**
Smoking abstinence	
There was no difference between groups at the end of the trial, but at follow up the standard program showed higher rates of abstinence; End of treatment: 1 RCT, N = 45, RR = 1.01, 95%CI 0.45 to 2.28 8.5 months follow-up: 1 RCT, N = 45, RR = 0.61, 95%CI 0.14 to 2.67, *p* > 0.05	
Consistency in results‡	Not applicable
Precision in results§	Imprecise
Directness of results‖	Direct
Comparison 2	**Individual therapy plus NRT vs. usual care.**
Summary of evidence	**Moderate to low quality evidence (medium-sized sample, imprecise, direct) suggests no sustained benefits of individual therapy over usual care for smoking abstinence but a significant reduction in number of cigarettes smoked over 1 year.**
Smoking abstinence and reduction	
A medium effect size suggests significantly better abstinence in those receiving individual therapy plus NRT, compared to usual care. This was not maintained at follow up; End of treatment: 1 RCT, N = 298, RR = 2.74, 95%CI 1.10 to 6.81, *p* < 0.05 3 months follow-up: 1 RCT, N = 298, RR = 2.74, 95%CI 0.74 to 10.12, *p* > 0.05 9 months follow-up: 1 RCT, N = 298, RR = 5.14, 95%CI 0.61 to 43.44, *p* > 0.05 *A medium effect suggests a significant increase in smoking reduction (≥50% reduction from*	

baseline cigarettes/day) in people receiving individual therapy plus NRT; 4 months follow-up: 1 RCT, N = 298, RR = 2.62, 95%CI 1.76 to 3.93 7 months follow-up: 1 RCT, N = 298, RR = 1.61, 95%CI 1.07 to 2.44 13 months follow-up: 1 RCT, N = 298, RR = 1.75, 95%CI 1.15 to 2.66 This RCT also reported less depression and anxiety in those receiving individual therapy, $p < 0.01$	
Consistency in results	Not applicable
Precision in results	Imprecise
Directness of results	Direct

Tsoi DT, Porwal M, Webster AC

Interventions for smoking cessation and reduction in individuals with schizophrenia

Cochrane Database of Systematic Reviews 2013; 2: Art. No.: CD007253

View review abstract online

Comparison 1	**Contingent reinforcement (CR) using money plus transdermal NRT vs. CR alone vs. no active intervention (self-quit).**
Summary of evidence	**Moderate to low quality evidence (small sample, unable to assess consistency or precision, direct) suggests CR in combination with NRT is more effective than either CR alone or self-quit at reducing smoking.**
Smoking abstinence	
1 RCT, N = 80, showed 32.5% of participants expressed an interest in quitting smoking. Abstinence rates were significantly higher in the CR with NRT (50%) compared to the CR group (27.8%) or the self-quit group (10%) at the end of the 36 week trial. The CR with NRT group had significantly lower nicotine dependence at 20 and 36 weeks compared to both comparison groups. The CR with NRT group had significantly lower expired carbon monoxide level at the end of the trial compared to self-quit, but not CR alone. Two studies reported that contingent reinforcement (CR) with money may increase smoking abstinence rates and reduce the level of	

smoking in patients with schizophrenia. However, it is uncertain whether these benefits can be maintained in the longer term.	
Consistency in results	Not applicable (1 RCT).
Precision in results	No measure of precision is reported.
Directness of results	Direct
Comparison 2	**American Lung Association (ALA) group program vs. specialised smoking cessation group therapy designed for schizophrenia (both with transdermal NRT).**
Summary of evidence	**Moderate to low quality evidence (small sample, unable to assess consistency or precision, direct) finds higher abstinence rates with an ALA group program compared to a specialised smoking cessation group therapy at a 6 month follow up. There were higher abstinence rates with second generation than first generation antipsychotics.**
Smoking abstinence	
1 study (N = 45) reported a trend-level reduction in smoking in the ALA program compared to the specialised therapy group; 23.5% vs. 32.1, $p = 0.06$. At 6 month follow up, the ALA therapy group had significantly lower rates of smoking than the specialised therapy group; 17.6% vs. 10.7% ($p < 0.03$). This effect was stronger in participants receiving atypical antipsychotics compared to first-generation medications. No difference between groups in expired carbon monoxide (CO) level, psychiatric symptoms, medication side effects.	
Consistency in results	Not applicable
Precision in results	No measure of precision is reported.
Directness of results	Direct
Comparison 3	**Smoking cessation individual therapy plus transdermal NRT vs. routine care.**
Summary of evidence	**Moderate to low quality evidence (small to medium-sized samples, unable to assess consistency, imprecise, direct) suggests benefit of individual therapy plus NRT for reducing smoking.**

Smoking abstinence	
1 RCT (N = 169) showed a significant reduction in total smoking in the therapy group compared to routine care at 3 months, this was no sustained at 6 or 12 months. OR = 3.96, 99%CI 1.53 to 10.23, $p < 0.01$ There were no significant differences in number of participants abstinent from smoking at 3 months, 6 months or 12 months. 1 RCT (N = 78) compared motivational interviewing, psychoeducation, and routine care, and found no difference in expired CO at one week and one month after intervention.	
Consistency in results	No measure of consistency is reported.
Precision in results	Imprecise where applicable
Directness of results	Direct
Comparison 4	**Treatment of addiction to nicotine in schizophrenia (TANS) plus NRT vs. medication management (MM) plus NRT.**
Summary of evidence	**Moderate to low quality evidence (small to medium-sized sample, unable to assess consistency or precision, direct) finds no differences in rates of smoking cessation between TANS and MM.**
Smoking abstinence	
No significant differences between groups; 3 months: 1 RCT, N = 100, TANS =15.6%, MM = 26.2%, $p = 0.22$ 6 months: TANS = 14%, MM = 16%, $p = 0.78$ 12 months: TANS = 12%, MM = 12%, $p = 0.90$	
Consistency in results	No measure of consistency is reported.
Precision in results	No measure of precision is reported.
Directness of results	Direct

Explanation of acronyms

ALA = American Lung Association, BPRS = Brief Psychiatric Rating Scale, CI = Confidence Interval, CO = carbon monoxide, CPD = cigarettes per day, CR = contingency reinforcement, *d* = Cohen's *d* and *g* = Hedges' *g* = standardised mean differences (see below for interpretation of effect size), HAM-D = Hamilton rating scale for Depression, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), MD = mean difference, N = number of participants, NRT = Nicotine Replacement Therapy, OR = odds ratio, *p* = statistical probability of obtaining that result ($p < 0.05$ generally regarded as significant), PANSS = Positive and Negative Syndrome Scale, RCT = randomised controlled trial, RR = relative risk, vs. = versus

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[5].

† 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).

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. Less than 0.4 represents a small effect, around 0.5 a medium effect, and over 0.8 represents a large effect[5].

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, a 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. A 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[6]. 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.

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Correlation coefficients (eg, r) indicate the strength of association or relationship between variables. They can provide an indirect 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 independent 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 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 considerable heterogeneity and over this is considerable 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, these criteria should be relaxed[7].

‖ 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 and is therefore 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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