Expert paper 4: 'Association between smoking and mental disorders' by Jo Leonardi-Bee

Association between smoking and mental disorders

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Aim

People with mental disorders are more likely to be smokers. Many cross sectional studies have been performed which have shown a clear association between smoking and mental disorders. However, it is not clear in which direction the association occurs. It could be that smoking increases the risk of developing mental disorders, or mental disorders increases smoking uptake. We therefore performed a systematic review of longitudinal studies to determine the temporal relationship between smoking and mental disorders.

Methods

We performed a comprehensive search strategy of three electronic databases (Medline, EMBASE, and PsycInfo) from conception to February 2011. We included all comparative longitudinal studies which assessed either the impact of smoking on the risk of mental disorders, or mental disorders on smoking uptake. Mental disorders included were based on behavioural and emotional disorders, behavioural syndromes, schizophrenia, schizotypal, delusions disorders, mood and affective disorders, and neurotic and stress-related disorders. We excluded organic mental disorders (including dementia, mental and behavioural disorders due to psychoactive substance use, mental retardation and disorders of psychological development). We identified further studies from scanning the reference lists of the included studies, and translations were sought where necessary. We used recognised methods for screening of titles and abstracts, study selection using full-texts, and data extraction. We performed meta-analyses where possible using random effect models. Results are presented as pooled Relative Risks (RR) with 95% confidence intervals (CI).

Results

From a total of 10,522 papers identified from the searches, we checked the eligibility of 286 full text papers, and finally included 87 papers in the systematic review. The studies were categorised based on diagnosis into the following groups: any mental disorder, emotional and behavioural problems, depressions, anxiety, eating disorders, bipolar disorder, schizophrenia, and psychoses.

Smoking and risk of any mental disorders

Three studies were identified that assessed the impact of smoking on the risk of mental disorders, primarily relating to mood and anxiety disorders. Two studies found significant increased risk of developing mental disorders in the next 12 months among the adult general population and in US marines deployed to combat zones. But no effect was seen in the third study in adults with learning difficulties.

Smoking and developmental and behavioural disorders

Twenty one studies were identified, of which all assessed smoking uptake; however, only one study also assessed the onset of behavioural disorder. Seven studies focussed on ADHD, 13 studies on conduct disorder, and five on hyperactivity. Smaller numbers of studies looked at other developmental/behavioural disorders, including oppositional defiant disorder, hyperactivity-impulsivity, and inattention. A meta-analysis of three studies found behavioural disorders significantly increased smoking uptake (RR 1.23, 95% CI 1.07 to 1.42); however, no relationship was seen in the one study that looked at the association between smoking and the onset of a behavioural disorder.

In a meta-analysis of 5 studies, ADHD was found to be significantly associated with an increase in smoking uptake (RR 1.75, 95% CI 1.31 to 2.34). Results also indicated that inattention was associated with a 23% increase in smoking uptake (3 studies), but no effect was seen for hyperactivity-impulsivity (1 study), inattention with hyperactivity (1 study), or hyperactivity alone (3 studies). Furthermore, a pooled analysis of three studies found no significant effect of oppositional defiant disorder on smoking uptake. In a meta-analysis of five studies, conduct disorder was found to be significantly associated with an increase in smoking uptake (RR 1.30, 95% CI 1.17 to 1.44).

Smoking and bipolar disorder

Two studies were identified which assessed the relationship between smoking and bipolar disorder. In one study of adults, no significant association was seen between smoking and development of bipolar disorder, or bipolar disorder and smoking onset in adulthood. In the remaining study, bipolar disorder significantly increased uptake of heavy smoking in adolescence.

Smoking and schizophrenia

A wealth of cross-sectional literature exists regarding the relationship between smoking and schizophrenia; however, only four studies were identified from our searches which assessed the temporal relationship. Conflicting results were seen for two studies in young male army recruits, where one study in Israel found smoking significantly increased the risk of schizophrenia; however, a non-significant decreased risk was seen in the other study conducted in Sweden. One study reported that the time between smoking initiation and onset of mental disorders was shorter for schizophrenia than other disorders. Furthermore, in the remaining study, smoking was found to significantly increase the risk of developing schizophrenia spectrum disorder and affective spectrum disorder, in women.

Smoking and anxiety disorders

Eleven studies assessed the impact of anxiety disorders on uptake of smoking, with all but one study reporting increased risk of smoking uptake. Furthermore, eight studies assessed the impact of smoking on the risk of anxiety disorder. Five of these studies reported significant increased risk of an anxiety disorder, two reported a significant increased risk of post-traumatic stress disorder, but one study reported smoking was associated with a non-significant decreased risk of an anxiety disorder.

Smoking and eating disorders

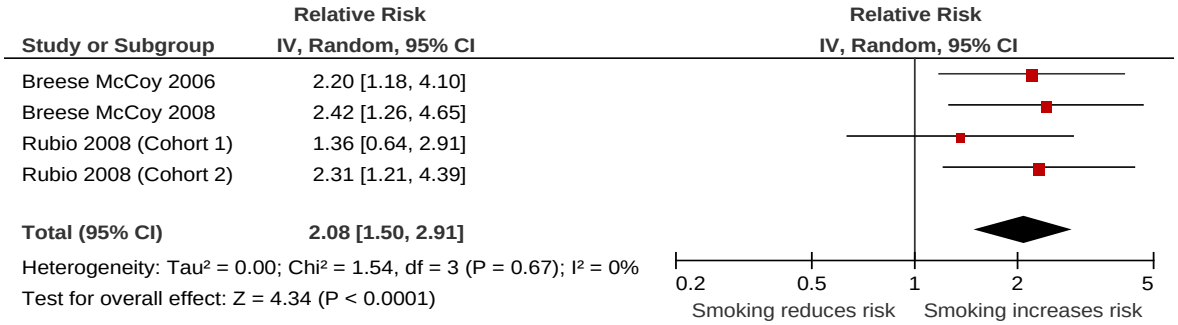
Three studies were identified which assessed the association between smoking and eating disorders. All three studies were conducted on adolescents aged 11-15 years, who were followed-up for one

year. Body dissatisfaction and/or eating pathology were significantly associated with smoking uptake. However, binge eating or purging was not associated with smoking uptake in males or females. Furthermore, in one study smoking was not significantly associated with binge eating or purging in females.

Smoking and depression

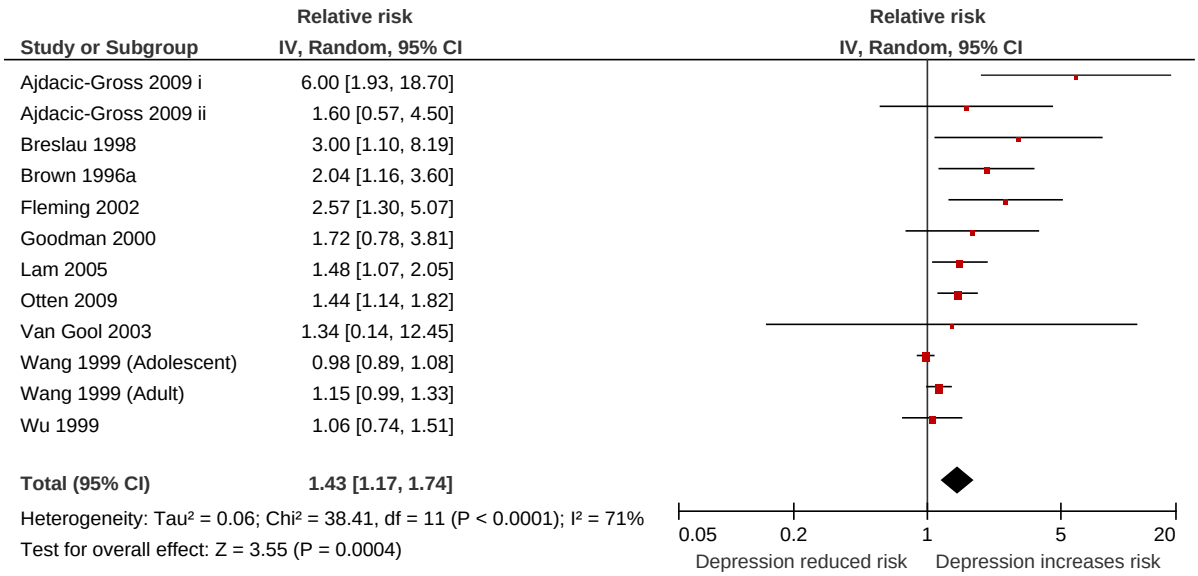
Thirty one studies assessed the impact of smoking on the onset of depression. In a meta-analysis, smoking was found to be associated with a 52% significant increase in the risk of depression (RR 1.52, 95% CI 1.36 to 1.71). Similar magnitudes of effect were seen in males and females, and between adults and adolescents. In a meta-analysis of three studies [1-3], smoking was found to be significantly associated with onset of postpartum depression (RR 2.08, 95% CI 1.50 to 2.91; Figure 1).

Figure 1 Smoking and onset of postpartum depression



A meta-analysis of 10 studies [4-13] found depression was associated with a significant increase of smoking uptake (RR 1.43, 95% CI 1.17 to 1.74; Figure 2), with similar magnitude of effect being seen between adults and adolescents.

Figure 2 Depression and smoking uptake



Smoking and dementia

A separate literature review was conducted to identify systematic reviews which assessed the association between smoking and the risk of dementia. Two systematic reviews were identified, which were published in 2007 [14] and 2008 [15], and contained approximately 20 studies. Findings from these reviews identified that smoking significantly increased the risk of dementia by 27%, Alzheimer's disease by approximately 60-70%, and vascular dementia by 78%.

Summary

Many cross sectional studies have identified a significant association between smoking and mental disorders; however, the temporal direction of the effect is not known. We found consistent evidence of a bi-directional association between smoking and anxiety disorders, and between smoking and depression. There was also consistent evidence that smoking increases the risk of postnatal depression and dementia. Furthermore, there was consistent evidence that smoking uptake is associated with ADHD, conduct disorder, bipolar disorder, and eating disorders.

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