The impact of needle and syringe provision and opiate substitution therapy on the incidence of hepatitis C virus in injecting drug users: pooling of UK evidence


CRD summary

This review concluded that uptake of opiate substitution therapy and high coverage of needle and syringe programmes could substantially reduce the risk of hepatitis C virus transmission among injecting drug users. The lack of quality assessment of included studies and the limited number of participants for whom complete data were available mean that these conclusions may not be reliable.

Authors' objectives

To assess whether opiate substitution therapy and needle and syringe programmes, alone or in combination, reduce hepatitis C virus transmission among injecting drug users.

Searching

PubMed and Web of Science were searched for studies conducted from the year 2000; search terms were reported. UK experts were consulted to identify further potentially relevant studies.

Study selection

Studies that reported individual-level data on intervention coverage (opiate substitution therapy and/or needle and syringe programmes) and a measure of newly acquired hepatitis C virus infection among injecting drug users in the community were eligible for inclusion. Studies conducted in prisons were excluded from the review. The primary outcome of interest was newly acquired hepatitis C virus infection. Secondary outcomes were self-reporting of needle sharing in the last month and the number of injections in the last month.

Included studies were conducted in Birmingham, Bristol, Glasgow, Leeds, London and Wales. The mean age of participants ranged from 27.7 to 34.9 years; most were men (68 to 88%). Most studies included participants who had injected drugs within the last four weeks; one study included participants who had ever injected drugs. Participants had been injecting drugs for a mean of 3.9 to 12 years. One study only included participants who were younger than 30 years or who had only been injecting for less than six years. The proportion of participants that were homeless in the last year ranged from 32 to 62%. The percentage of participants who had injected crack in the previous month ranged from 3 to 80%. Coverage of opiate substitution therapy and needle and syringe programmes was assessed using questionnaires. Hepatitis C virus infection was assessed with a laboratory assay that used dried blood spot samples or oral fluid.

The authors did not state how many reviewers selected studies for inclusion.

Assessment of study quality

The authors did not state that they assessed validity.

Data extraction

Data were extracted on coverage of opiate substitution therapy and needle and syringe programmes using binary measures. In cross-sectional studies, opiate substitution therapy was defined as current (yes or no); in cohort studies, opiate substitution therapy was defined as more than six months on opiate substitution therapy in the last year (yes or no). Needle and syringe programme coverage was categorised as high if one or more sterile needles were obtained for each injection. The binary variables were combined to categorise participants as full harm reduction, partial harm reduction and minimal harm reduction, based on the combination of whether they received opiate substitution therapy and/or reported high needle and syringe programme coverage.

Data were extracted on hepatitis C virus status. In cross-sectional studies, recently acquired infection was defined as individuals who tested hepatitis C virus RNA-positive among those who tested hepatitis C virus antibody-negative; in cohort studies, recently acquired infection was defined as individuals who were hepatitis C virus antibody-negative at
baseline and were re-tested antibody-positive at 12-month follow-up.

The authors did not state how many reviewers extracted the data.

**Methods of synthesis**
Separate logistic regression models were used to estimate the study-specific associations of the effects of opiate substitution therapy and needle and syringe programmes on new hepatitis C virus infection. Heterogeneity was assessed using $I^2$. For one study there were no cases in one intervention group, so the data were augmented by adding one case and three controls to the intervention group with zero cases to fit the regression model.

Logistic regression was used to generate pooled adjusted and unadjusted odds ratios (ORs) with confidence intervals (CIs) of the risk of new hepatitis C virus infection associated with opiate substitution therapy, high needle and syringe programme coverage, and level of harm reduction (based on the combination of opiate substitution therapy, and needle and syringe programme coverage). The augmented data points were removed from this analysis. Confounding factors adjusted for in the analysis were gender, injecting duration, injecting crack, and homelessness.

Secondary outcomes were pooled using logistic regression and linear regression.

**Results of the review**
Six studies (2,986 participants) were included in the review. There were 919 individuals who were hepatitis C virus antibody-negative and had complete case data, of which 40 became hepatitis C virus positive.

At baseline, 57% of injecting drug users reported exposure to opiate substitution therapy, and 67% were classified as high needle and syringe programme coverage.

**New hepatitis C virus infection**
Based on the augmented data, opiate substitution therapy significantly reduced the incidence of hepatitis C virus transmission among injecting drug users (OR 0.45, 95% CI 0.25 to 0.82). However, there was evidence of some heterogeneity ($I^2=47.7\%$). High needle and syringe programme coverage did not significantly reduce the incidence of hepatitis C virus transmission among injecting drug users (OR 0.58, 95% CI 0.30 to 1.15); there was no evidence of heterogeneity for this result ($I^2=0.0\%$).

Based on the analysis with the augmented data points removed, opiate substitution therapy significantly reduced the incidence of hepatitis C virus transmission among drug users (OR 0.36, 95% CI 0.19 to 0.70). High needle and syringe programme coverage also significantly reduced the incidence of hepatitis C transmission among drug users (OR 0.52, 95% CI 0.28 to 0.99).

**Self-reported injecting risk behaviour**
Participants who were on full harm reduction (that were receiving opiate substitution therapy and reported high needle and syringe programme coverage) were at a significantly lower risk of new hepatitis C virus infection (OR 0.19, 95% CI 0.08 to 0.47) compared with those at minimal harm reduction. There was no statistically significant difference in the risk of new hepatitis C virus infection for those on partial harm reduction compared to minimal harm reduction.

The results for the adjusted analysis (adjusted for gender, injecting duration, injecting crack and homelessness) were similar to the main results. Female gender, homelessness and injecting crack cocaine were associated with a higher risk of new hepatitis C virus infection.

Results were also presented for the effects of opiate substitution therapy and needle and syringe programmes on injecting risk behaviours.

**Authors’ conclusions**
Uptake of opiate substitution therapy and high coverage of needle and syringe programmes (harm reduction interventions) can substantially reduce the risk of hepatitis C virus transmission among injecting drug users.
CRD commentary

The review question and inclusion criteria were clear. A limited search was undertaken with no attempts to locate unpublished data, which may increase the potential for publication bias. It was unclear whether study selection and data extraction were carried out with sufficient attempts to minimise error and bias.

The quality of the included studies was not assessed, which limited the reliability of the findings of the review. The pooled analysis included 919 participants for whom complete data were available. Heterogeneity was assessed and, in the absence of significant heterogeneity, the individual patient data were pooled.

Whilst the authors’ conclusions reflect the results presented, the lack of any quality assessment of included studies and the limited number of participants for whom complete data were available mean that these conclusions may not be reliable.

Implications of the review for practice and research

Practice: The authors did not state any implications for practice.

Research: The authors stated that their findings needed to be corroborated; more studies or public health surveillance programmes that measured hepatitis C virus incident infections and intervention exposure were required. In addition, the population impact of different levels of intervention coverage should be monitored to assess what combination of interventions, including hepatitis C virus treatment, were most effective at reducing hepatitis C virus transmission amongst injecting drug users.

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