HH Lin et al. PLoS Med 4(1): e20. doi:10.1371/journal.pmed.0040020 Tobacco Smoke, Indoor Air Pollution and Tuberculosis: A Systematic Review and Meta-Analysis

Evidence of a significantly increased risk of TB among smokers is presented. Risks associated with passive smoking are less clear.

Several reports have suggested that exposure to tobacco smoke increases the risk of catching Tuberculosis (TB) or, at least remaining in a disease state. This review attempts to consolidate opinion and quantify the risk.

TB status was assessed to be positive if any of the following applied: Tuberculin Sensitivity Test (TST) positivity (e.g. Mantoux Test), clinical TB disease, or TB mortality. To be included in the review, sources must have full data on smoking or passive smoking status.

Summary estimates of risk were made for a variety of possible associations. The ones which are most reliably interpreted are reproduced in the following 2 graphs. Uncertainties arise from categorisation as current or ever smoking and from the distinction between active and inactive disease. Therefore, for the purposes of this Radar report we select data relating to <u>ever</u> smoking and, <u>any</u> positive disease test.

Publication bias was assessed and seemed to show low bias in this field of research.

Results were tested for the possible confounding effects of alcohol consumption, socio-economic status, gender and age.



Note: The horizontal axis is on log scale * No summary statistic given

Figure 5. Risk of Clinical TB Disease for Ever Smoking Compared with Nonsmoking doi:10.1371/journal.pmed.0040020.g005



Note: The horizontal axis is on log scale *All studies are case control studies

Figure 7. Risk of Clinical TB Disease for Passive Smoking Exposure Compared with Nonexposure doi:10.1371/journal.pmed.0040020.g007

These results clearly show that active smoking is associated with a higher risk of TB positive status. The result would be predicted by those who believe smoking decreases resistance to infection or that smokers more often come into contact with carriers of active disease, or, both. For passive smoking, the association is less clear and based on a less reliable study design.

Comment

TB transmission is usually carried by droplets produced in coughing, speaking or sneezing and only occurs when the host is in the active phase of the disease. Three mechanisms could explain the observed increase in risk:

- Smokers are more likely to be exposed to others who smoke and, presumably, cough more often.
- Evidence suggests that smoking and passive smoking are predominant in the lower socioeconomic groups and that these groups are more likely to come into close contact with TB carriers.
- Smoking decreases resistance to infection.

Work groups with close proximity to colleagues are at higher risk of TB; passive smoking could add to that risk. The evidence presented here is not convincing on that point.

It seems unlikely that passive smoking would be blamed for a case of TB.