

Is employment the key to reducing smoking prevalence? Is there a role for occupational hygiene in reducing smoking in the workplace?

Semple S.

Respiratory Group, Division of Applied Health Sciences, University of Aberdeen, Aberdeen, AB25 2ZG, Scotland.

Manuscript statistics: abstract 115 words, text 1677 words, 2 figures, 17 references

Running head: Employment and smoking

Keywords: tobacco, occupational hygiene, work

Corresponding author: Dr Sean Semple, Respiratory Group, Division of Applied Health Sciences, University of Aberdeen, Aberdeen, AB25 2ZG, Scotland. Email: sean.semple@abdn.ac.uk

Abstract

The association between smoking and poverty is well established but the relationship between smoking and employment is less clear. Those in work are less likely to smoke, with recent data from Scotland suggesting the unemployed are nearly 2.5 times more likely to smoke than those in employment. This commentary looks at emerging evidence that work may have a positive role in reducing smoking prevalence. Occupational hygienists are uniquely placed to provide health-based information and risk communication that may help workers and those seeking employment to become smoke-free. The public health benefits of such intervention are likely to be substantial and are entirely in keeping with the health protection aims of the discipline of Occupational Hygiene.

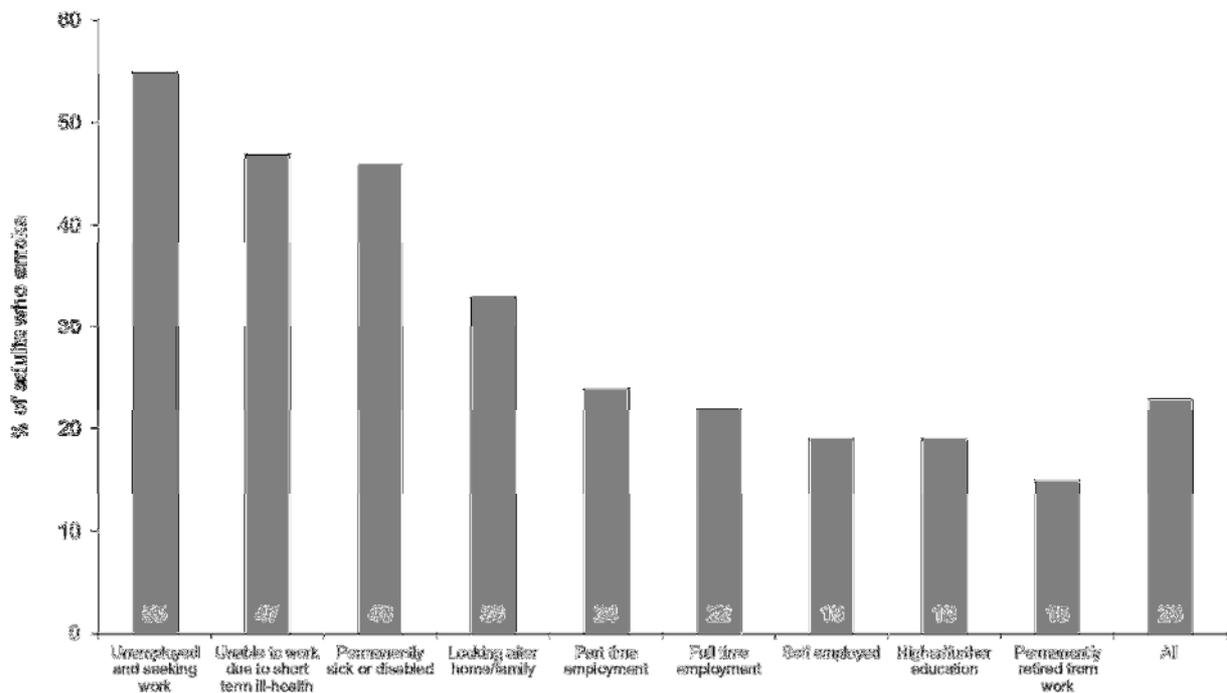
Commentary

Occupational hygiene usually focuses on illness and injury caused by work. As a discipline it is involved in identifying chemical, physical and biological hazards, quantifying the risks they pose and finding ways to best protect the health of the workforce. Rarely do those of us involved in occupational health turn things around and consider the benefits and positive impacts of work. It is worth considering that those not in work are twice as likely to be exposed to a material that kills half of those who use it, is the cause of about 6 million global deaths a year (WHO, 2011) and, in addition to societal costs of tens of billions of pounds (estimates of £13 billion pa in the UK and \$289 billion pa for the USA) (CDC,2014; ASH, 2014), exposure makes those affected less likely to gain future employment (Brook et al., 2014).

The material in question is tobacco and the exposure is from smoking in particular. It has been known for over sixty years that smoking is bad for our health (Doll et al., 2004) and causes a whole range of ill-health effects (US Surgeon General, 2006) that, in countries such as the UK, dwarf the burden from workplace accidents and workplace related illness by a factor of 5-10 times [13,000 workplace related deaths per annum compared to 100,000 smoking related deaths per annum]. There is increasing awareness that even second-hand smoke (SHS) is harmful to health (Howard, 2004) and legislation to prevent occupational exposure to SHS in workplaces has been introduced in many countries in the past decade. What is much less recognised is the very strong association between not being in work and being a smoker.

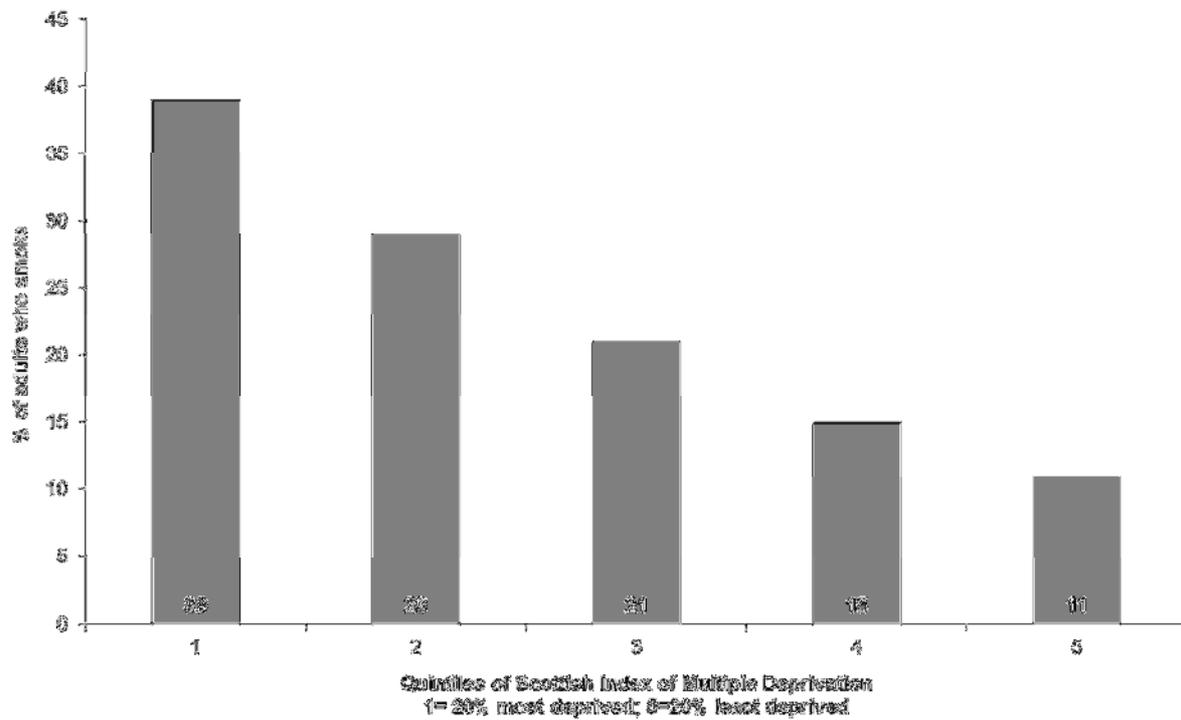
The relationship is particularly clear in Scotland where just under a quarter of adults currently smoke. Figure 1 shows the latest data and looks at the percentage of smokers by employment group. What is striking is that those who are of working age and engaged in employment or in higher education are about half as likely to smoke as those who are unemployed and seeking a job, or out of work as a result of ill-health.

Figure 1: Percentage of respondents who smoke, by economic status [Scottish Government, 2014]



So what drives this association between smoking and employment? Like many things it is likely to be a complex picture. Certainly there is little argument that tobacco use is strongly associated with poverty and social deprivation. Analysis based on the Scottish Index of Multiple Deprivation – a measure that looks at 38 indicators across income, housing, education, employment and health - shows that those living in the 20% most socially deprived areas are about four times more likely to smoke as those in the 20% most affluent areas (figure 2).

Figure 2: Percentage of respondents who smoke, by Scottish Index of Multiple Deprivation (SIMD) (Scottish Government, 2014)



This relationship is clearly very similar to employment opportunity: those living in socially and economically deprived areas are more likely to suffer unemployment and so it can be difficult to disentangle these twin impacts of high smoking prevalence and low employment opportunity. However, there may be further relationships between health and smoking that are independent of deprivation. Smokers will suffer from poor health earlier in their life time and indeed the generational impact of being exposed to your parents' second-hand smoke can have early life impacts on health (Silvestri et al., 2014), school absentee rates (Gilliland et al., 2003), poor educational attainment – perhaps rolling on to higher levels of sickness absence as we enter the world of work. A meta-analysis of 29 longitudinal or cohort studies concluded that smokers were 33% more likely to be absent from work with smokers taking an average of 2.74 additional days of sick leave compared to non-smokers (Weng et al., 2013). Having chronic health problems from smoking may impact on your employment record and make it more difficult to find a job when circumstances change.

Smoking may also be a barrier to gaining and staying in employment and recent literature from France and the USA supports this theory. Even after controlling for demographic

factors and other risk characteristics (obesity, binge drinking), current smoking among Californians was significantly associated with being unemployed and job-seeking (Prochaska et al., 2013). A longitudinal study of French workers found that heavy smoking was associated with becoming unemployed (Jusot et al., 2008) while a recent report (Schunck & Rogge, 2012) examining longitudinal data from 1998-2008 from the German Socio-Economic Panel (SOEP) also suggests that the unemployed are more likely to smoke (causation) and that smokers have a higher probability of becoming unemployed (selection). The German analysis proposes, however, that there is neither a causal effect of unemployment on smoking behaviour nor a direct effect of smoking on unemployment probability. Instead this analysis argues, smoking and unemployment may be related through a common cause, socio-economic deprivation. In contrast, a large, comprehensive study published in 2014 looked at employment and smoking among a cohort in New York state over a 29 year period and found that, after adjusting for deprivation and other potential confounders, those who were continuous or occasional smokers were four times more likely to be unemployed at age 43 than those who were never smokers or had quit smoking (Brook et al., 2014). The study concluded that intervention programs designed to deal with unemployment should consider focussing on smoking as a potential barrier to employment.

Is it also possible that work actually has a positive, preventive impact on the risk of becoming a smoker? Carol Black's review of the health of Britain's working population in 2013 stressed the key role the workplace can play in promoting health and well-being, and highlighted the health advantages of work compared to unemployment (Black, 2008). So, it is not too great a leap of imagination to think that perhaps the positive effects of your daily toil having value to society and the confidence and self-belief that brings help people to quit smoking or prevent initiation. Perhaps it goes wider than this: peer pressure is a well-recognised driver of behaviour and if the smoker finds themselves in a minority within the workplace maybe it encourages them to follow the example of their non-smoking colleagues. And then there is the availability of time to smoke. For most of the past decade in the UK workplaces have been smoke-free with smokers required to leave the building to smoke. Could it be that cessation becomes easier when your time at work includes extended periods when smoking is not an option? Lastly, in larger workplaces there is an increasing emphasis on Total Worker Health where the workplace looks at all aspects of

keeping the workforce healthy including encouraging a good diet, regular exercise, moderation of alcohol intake and stopping smoking. Schemes such as Scottish Healthy Working Lives (<http://www.healthyworkinglives.com>) can play an important role in health promotion and signposting workers towards support services. The positive effect of work on preventing or reducing smoking is also suggested by recent work in the USA that looked at the impact of the 2008 economic recession and found that those in work became less likely to smoke than before the recession while those not working became more likely to smoke (Gallus et al., 2013). More widely, it is likely that examining how universal health protection measures (such as smoke-free workplace restrictions) interact with more individualised targeted health promotion approaches will also provide useful insights on how to reduce smoking prevalence among those in work.

Or perhaps it is much more about the effect of work on how we view ourselves? Work gives us a sense of the future. It empowers us with aims and ambition. It enables us to plan, seek promotion, advance our skills and knowledge. It gives us hope. For many, unemployment is the opposite of that. It is life stalled and in stasis. It diminishes our ability to see beyond the here and now, reduces our feelings of control, and discourages any belief that our future health is in our hands. The health effects of this 'hopelessness' has been studied in Finland and the USA where it has been shown to have a strong relationship with cardiovascular morbidity and mortality (Everson et al., 1997). Do the crippling impacts of 'hopelessness' explain why 55% of those who are unemployed and seeking a job in Scotland smoke?

Scotland has recently set out a series of bold, world-leading targets to tackle the harm caused by smoking. By 2020 the Scottish Government aims to halve the number of children who breathe in second-hand smoke at home, and by 2034 an aim to have a 'smoke-free Scotland' where fewer than 5% of adults smoke. These are ambitious and admirable aims that demonstrate the need to tackle head-on the inequalities that tobacco generates. These aims will not be simple to achieve but it seems that reducing unemployment and reducing smoking behaviour may go hand-in-hand.

Occupational hygienists are involved daily in protecting the health of workers and have skills in hazard assessment, measurement and risk communication that can be particularly useful in encouraging behaviour change. It is important for hygienists to consider the opportunities

for these skills to be used in helping both those in the workplace and those who are seeking employment to realise the benefits of being smoke-free. Policymakers and other health professionals involved in tobacco control activity can also benefit from the skills and knowledge of hygienists in terms of measurement of tobacco smoke aerosols, comparison of risk information and advice on behaviour change and other exposure control methods. The public health benefits of such intervention are likely to be substantial and are entirely in keeping with the health protection aims of the discipline of Occupational Hygiene.

The wider positive role that employment can play in improving health is an area that is poorly understood but the discipline of Occupational Hygiene is well placed to work with other stakeholders in the public health community - from Health Psychologists through to Smoking Cessation Advisors - to look at what can be achieved when we work together.

Acknowledgements

I am grateful to Professor John Cherrie for his helpful comments on a draft of this commentary.

Declaration

This commentary was written during paid employment at the University of Aberdeen with no direct or indirect financial support from any other organization.

References

- Action on Smoking and Health (2014). The Economics of Tobacco. Fact Sheet 16. London.
- Black C (2008). Working for a healthier tomorrow: Dame Carol Black's Review of the health of Britain's working age population. The Stationery Office, London.
- Brook JS, Zhang C, Burke L, Brook DW. (2014) Trajectories of Cigarette Smoking From Adolescence to Adulthood as Predictors of Unemployment Status in the Early 40s. *Nicotine Tob Res.* ntu107. [Epub ahead of print].
- Centre for Disease Control and Prevention (2014). Smoking and Tobacco Use. Fast Facts. http://www.cdc.gov/tobacco/data_statistics/fact_sheets/fast_facts/index.htm#cost [Accessed 26th November 2014].
- Doll R, Peto R, Boreham J, Sutherland I. (2004) Mortality in relation to smoking: 50 years' observations on male British doctors. *BMJ.*;328(7455):1519.
- Everson SA, Kaplan GA, Goldberg DE, Salonen R, Salonen JT. (1997) Hopelessness and 4-year progression of carotid atherosclerosis. The Kuopio Ischemic Heart Disease Risk Factor Study. *Arterioscler Thromb Vasc Biol.*;17:1490-5.
- Gallus S, Ghislandi S, Muttarak R. (2013) Effects of the economic crisis on smoking prevalence and number of smokers in the USA. *Tob Control.* doi: 10.1136/tobaccocontrol-2012-050856. [Epub ahead of print]
- Gilliland FD, Berhane K, Islam T, Wenten M, Rappaport E, Avol E, Gauderman WJ, McConnell R, Peters JM. (2003) Environmental tobacco smoke and absenteeism related to respiratory illness in schoolchildren. *Am J Epidemiol.*;157:861-9.
- Howard J. (2004) Smoking is an occupational hazard. *Am J Ind Med.*;46:161-9.
- Jusot F, Khlal M, Rochereau T, Serme C. (2008) Job loss from poor health, smoking and obesity: a national prospective survey in France. *J Epidemiol Community Health.*;62:332-7.
- Prochaska JJ, Shi Y, Rogers A. (2013) Tobacco use among the job-seeking unemployed in California. *Prev Med.*;56:329-32.

Schunck R, & Rogge BJ. (2012) Unemployment and Smoking: Causation, Selection, or Common Cause? Evidence from Longitudinal Data. SOEP papers on Multidisciplinary Panel Data Research 491. German Socio-Economic Panel Study (SOEP), Berlin, Germany.

Scottish Government. (2014) Scotland's People Annual Report: Results from 2013 Scottish Household Survey. Chapter 9 Health & Caring
<http://www.scotland.gov.uk/Publications/2014/08/7973/9> [Accessed 22nd December 2014]

Silvestri M, Franchi S, Pistorio A, Petecchia L, Rusconi F. (2014) Smoke exposure, wheezing, and asthma development: A systematic review and meta-analysis in unselected birth cohorts. *Pediatr Pulmonol*. doi: 10.1002/ppul.23037. [Epub ahead of print]

U.S. Surgeon General. (2006) The health consequences of involuntary exposure to tobacco smoke: A report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services. Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

Weng SF, Ali S, Leonardi-Bee J. (2013) Smoking and absence from work: systematic review and meta-analysis of occupational studies. *Addiction*.;108:307-19.

World Health Organization. (2011) WHO Report on the Global Tobacco Epidemic, 2011. Geneva: World Health Organization.