

Effect of tobacco control policies on perinatal and child health: a systematic review and meta-analysis



Timor Faber, Arun Kumar, Johan P Mackenbach, Christopher Millett, Sanjay Basu, Aziz Sheikh, Jasper V Been



Summary

Background Tobacco smoking and smoke exposure during pregnancy and childhood cause considerable childhood morbidity and mortality. We did a systematic review and meta-analysis to investigate whether implementation of WHO's recommended tobacco control policies (MPOWER) was of benefit to perinatal and child health.

Methods We searched 19 electronic databases, hand-searched references and citations, and consulted experts to identify studies assessing the association between implementation of MPOWER policies and child health. We did not apply any language restrictions, and searched the full time period available for each database, up to June 22, 2017. Our primary outcomes of interest were perinatal mortality, preterm birth, hospital attendance for asthma exacerbations, and hospital attendance for respiratory tract infections. Where possible and appropriate, we combined data from different studies in random-effects meta-analyses. This study is registered with PROSPERO, number CRD42015023448.

Findings We identified 41 eligible studies (24 from North America, 16 from Europe, and one from China) that assessed combinations of the following MPOWER policies: smoke-free legislation (n=35), tobacco taxation (n=11), and smoking cessation services (n=3). Risk of bias was low in 23 studies, moderate in 16, and high in two. Implementation of smoke-free legislation was associated with reductions in rates of preterm birth (−3.77% [95% CI −6.37 to −1.16]; ten studies, 27 530 183 individuals), rates of hospital attendance for asthma exacerbations (−9.83% [−16.62 to −3.04]; five studies, 684 826 events), and rates of hospital attendance for all respiratory tract infections (−3.45% [−4.64 to −2.25]; two studies, 1 681 020 events) and for lower respiratory tract infections (−18.48% [−32.79 to −4.17]; three studies, 887 414 events). Associations appeared to be stronger when comprehensive smoke-free laws were implemented than when partial smoke-free laws were implemented. Among two studies assessing the association between smoke-free legislation and perinatal mortality, one showed significant reductions in stillbirth and neonatal mortality but did not report the overall effect on perinatal mortality, while the other showed no change in perinatal mortality. Meta-analysis of studies on other MPOWER policies was not possible; all four studies on increasing tobacco taxation and one of two on offering disadvantaged pregnant women help to quit smoking that reported on our primary outcomes had positive findings. Assessment of publication bias was only possible for studies assessing the association between smoke-free legislation and preterm birth, showing some degree of bias.

Interpretation Smoke-free legislation is associated with substantial benefits to child health. The majority of studies on other MPOWER policies also indicated a positive effect. These findings provide strong support for implementation of such policies comprehensively across the world.

Funding Chief Scientist Office Scotland, Farr Institute, Netherlands Lung Foundation, Erasmus MC.

Copyright © The Author(s). Published by Elsevier Ltd. This is an Open Access article under the CC BY 4.0 license.

Introduction

Almost half of children worldwide are regularly exposed to second-hand smoke, and 28% of the 600 000 deaths each year related to second-hand smoke occur in children.^{1,2} Maternal smoking and second-hand smoke exposure during pregnancy are detrimental to fetal growth and development, leading to adverse birth outcomes such as preterm birth, low birthweight, being small for gestational age, and perinatal and infant mortality.^{3–8} Additionally, second-hand smoke exposure presents substantial health risks postnatally by increasing the risk of asthma and respiratory tract infections.^{1,9}

Protection of children from the adverse health implications of second-hand smoke during important

phases of development and the subsequent disease burden carried on into adulthood is crucial. The WHO Framework Convention on Tobacco Control (FCTC) aims to reduce tobacco consumption and second-hand smoke exposure through national tobacco control programmes.² In 2008, six MPOWER measures were introduced to guide FCTC implementation (panel).^{2,10} With tobacco use increasingly becoming a problem of developing countries already experiencing the largest burden of early-life morbidity and mortality, the absence of tobacco regulation is set to be a big driver of between-country inequality in child health outcomes.¹¹ However, evaluations of the effectiveness of tobacco control interventions have generally excluded children, focusing instead on smoking rates and adult health outcomes.^{12–14}

Lancet Public Health 2017; 2: 420–37

See [Comment](#) page e392

Division of Neonatology (T Faber MPH, J V Been PhD), Department of Paediatrics (T Faber, J V Been), and Department of Obstetrics and Gynaecology (J V Been), Erasmus University Medical Centre—Sophia Children's Hospital, Rotterdam, Netherlands; Department of Public Health, Erasmus University Medical Centre, Rotterdam, Netherlands (T Faber, Prof J P Mackenbach PhD); Centre of Medical Informatics, Usher Institute of Population Health Sciences and Informatics, University of Edinburgh, Edinburgh, UK (J V Been, A Kumar MSc, Prof A Sheikh MD); Public Health Policy Evaluation Unit, School of Public Health, Imperial College London, London, UK (Prof C Millett PhD); Prevention Research Center, Stanford University, Stanford, CA, USA (S Basu PhD); Division of General Internal Medicine and Primary Care, Brigham and Women's Hospital/Harvard Medical School, Boston, MA, USA (Prof A Sheikh); and Department of Medicine, Harvard Medical School, Boston, MA, USA (Prof A Sheikh)

Correspondence to: Dr Jasper V Been, Division of Neonatology, Erasmus University Medical Centre—Sophia Children's Hospital, PO Box 2060, 3000 CB Rotterdam, Netherlands j.been@erasmusmc.nl

Research in context

Evidence before this study

Tobacco smoke exposure is the world's leading cause of preventable morbidity and premature mortality. Children cannot control their tobacco smoke exposure and therefore need protection through tobacco control measures. In a previous systematic review, we investigated the associations between smoke-free legislation and perinatal and child health outcomes. We searched 14 online medical research databases, the WHO International Clinical Trials Registry Platform, hand-searched references and citations, and consulted a panel of experts in the field to identify published and unpublished literature in any language from January, 1975, to May, 2013, on the associations between smoke-free legislation and our outcomes of interest. The primary outcomes were preterm birth, low birthweight, and hospital attendance for asthma. We identified 11 studies showing that smoke-free legislation was associated with significant reductions in preterm birth and severe asthma exacerbations. Studies have since addressed various knowledge gaps identified in our previous review, including assessments of the effect of smoke-free legislation on respiratory tract infections, the most important contributor to the global burden of paediatric morbidity and mortality associated with tobacco smoke exposure. The increased number of studies now available was also anticipated to allow investigation of another knowledge gap: exploration of a potential dose–response association between the comprehensiveness of smoke-free laws and their effect on child health. Furthermore, we sought to substantially broaden the focus of our study by evaluating the early-life health effect of the entire range of WHO-recommended tobacco control policies (ie, MPOWER). Following a prespecified and

peer-reviewed protocol, we did a comprehensive literature search for experimental and quasi-experimental studies assessing associations between implementation of MPOWER policies and key perinatal and childhood outcomes associated with tobacco smoke exposure.

Added value of this study

To our knowledge, this is the first systematic review examining the association between the full spectrum of MPOWER policies and perinatal and child health. Our findings add value to the existing evidence base by identifying a link between smoke-free legislation and a substantial reduction in severe paediatric respiratory tract infections, providing consistent evidence that comprehensive smoke-free laws are associated with broad health effects, and collating evidence supporting the potential for other MPOWER measures to benefit child health. We also identified several key knowledge gaps, including a shortage of studies in low-income and middle-income countries, and of studies assessing MPOWER measures other than smoke-free legislation, tobacco tax increases, and smoking cessation services.

Implications of all the available evidence

With most of the world's population currently not covered by comprehensive tobacco control policies, there is great potential for global public health gains by protecting unborn babies and children from tobacco smoke exposure. Future efforts should focus on increasing the uptake of comprehensive MPOWER policies worldwide to protect the health of children, while developing and evaluating new and ongoing tobacco control policy initiatives around the world.

In a previous systematic review,¹⁵ we partly addressed this gap in the literature by synthesising available evidence on the effect of smoke-free legislation (ie, “P” in MPOWER, for “Protect people from tobacco smoke”) on perinatal and child health. By combining data from 11 studies, we found smoke-free legislation to be associated with substantial reductions in preterm birth and hospital admissions for asthma among children. Studies have since addressed various knowledge gaps identified in our review, including assessments of the effect of smoke-free legislation on respiratory tract infections and on general practitioner (GP) consultations.^{16–19} The increased number of studies now available was also anticipated to allow investigation of another knowledge gap: exploration of a potential dose–response association between the comprehensiveness of smoke-free laws and their effect on child health. In addition to addressing this association, we sought to substantially broaden the focus of our systematic review by systematically evaluating the early-life health effect of the entire range of MPOWER measures. This analysis has implications for the Sustainable Development Goal 3 (SDG 3) aims to strengthen FCTC implementation

and reduce child mortality. As such, findings from this study can guide policy making for prioritisation of the most effective tobacco control policies to protect child health, especially in parts of the world where MPOWER implementation is lagging behind, while identifying the key remaining knowledge gaps that need to be addressed.

Methods

Search strategy and selection criteria

This systematic review and meta-analysis was done according to a peer-reviewed protocol that is published²⁰ and registered with PROSPERO (CRD42015023448). We followed the PRISMA checklist when reporting our findings.²¹ Ethical approval was not required for this study.

Studies were eligible for inclusion if they investigated the association between one or more MPOWER tobacco control policies and health outcomes among fetuses, neonates, or children (ie, the majority of the study population aged <12 years).

We searched for published studies in the following databases: Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Embase, PsycINFO,

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات