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Public Health

journal homepage: www.elsevier.com/puhe

Original Research

Socio-economic inequalities in secondhand smoke exposure at home in the context of mother-child pairs in Bangladesh

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ARTICLE INFO

Article history:
Received 17 January 2018
Received in revised form
23 April 2018
Accepted 30 April 2018
Available online 17 July 2018

Keywords:
Secondhand smoke
Mother-child pairs
Cotinine measure
Saliva test
Bangladesh

ABSTRACT

Objectives: This study aimed to examine socio-economic disparities in mother-child pairs' self-reported and cotinine-measured secondhand smoke (SHS) exposure at home.
Study design: This is a cross-sectional study.
Methods: This study was conducted in the Rajshahi district of Bangladesh from May to July 2017. A total of 541 mother-child pairs were interviewed for self-reported measured SHS; cotinine-measured saliva test was performed on 263 mothers and 236 children. Mother-child pairs' SHS exposure at home was the outcome of interest.
Results: Overall self-reported prevalence of SHS exposure at home was 49.0%. Self-reported SHS exposure among mothers (50.2%) and children (51.3%) were lower than the prevalence rate of cotinine-measured exposure for mothers (60.5%) and their children (58.9%). Maternal rich bands of wealth were found to be associated with lower likelihood of self-reported (adjusted odds ratio [AOR] = 0.59, 95% confidence interval [CI] = 0.35–0.99) and cotinine-measured SHS exposure among mothers (AOR = 0.17, 95% CI = 0.08–0.37). Maternal rich bands of wealth were also found to be associated with lower likelihood of cotinine-measured SHS exposure among children (AOR = 0.11, 95% CI = 0.07–0.26).
Conclusions: Socio-economic inequalities exist in exposure to SHS at home. Interventional approaches aimed at reducing SHS at home are urgently needed at public health and health-care service level, with special focus given to the socioeconomically disadvantaged groups.

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https://doi.org/10.1016/j.puhe.2018.04.018

Introduction

Secondhand smoke (SHS) has emerged as a significant public health concern around the world. There has been increased awareness of the wide range of mental,[1,2] physical,[1,3–9] and reproductive health[9] consequences of SHS among different subgroups of the population. Recently, specific concern has been shown on the association between childhood SHS exposure at home and adverse health outcomes. According to the World Health Organization, almost one-half of the world's children breathe air polluted by tobacco smoke, particularly at home.[10] Evidence shows that SHS exposure among children is associated with lower birth weight, middle ear disease, bacterial meningitis, respiratory problems, food sensitization, caries/cavities in primary dentition, atrial fibrillation, behavioral problems, lower engagement in school activities, and lower weight and height gain.[1,3–8] Similar to children, women are also bearing the maximum brunt of SHS. Adverse health outcomes among women include cardiovascular disease and respiratory problems and increased risk of breast cancer.[11,12]

With a population of 150 million, Bangladesh is one of the top 10 countries in the world having a high smoking prevalence, where 43% of adults use some form of tobacco.[13] Bangladesh implemented smoking and tobacco product use control law in 2005. Under this law, smoking is prohibited in most of the indoor public places and workplaces.[14] While workplaces and public smoking bans have been proven to be successful in reducing exposure to SHS in public areas,[15] private homes cannot be directly targeted by smoke-free legislation. They might nevertheless be indirectly affected. Evidence shows that smoking bans in public places would lead to more smoking in the home and hence to increased SHS exposure of non-smoking family members and children.[16] A recent study showed that nearly 40% of children are exposed to SHS at home in Bangladesh.[17] Similar to children, women are also vulnerable to SHS exposure in this country. In a highly patriarchal society like Bangladesh, where traditional gender paradigms exist, women, in custom and practice, remained subordinate to men in almost all aspects of their lives, and they do not have the power to negotiate smoke-free spaces.

Social differences in health are well recognized, and a stepwise or linear decrease has been observed with decreasing social status. Socio-economic inequalities exist in tobacco use and exposure among pregnant women, adolescents, young adults at home, workplace, and hospitality venues or in educational settings.[18–20] In recent years, the association between socio-economic status (SES) and children's exposure to SHS at home has been highlighted. The relationship between SES and the exposure of children to SHS has been studied in both developed and developing nations.[21–27] Most of the studies reported from developed countries, mainly the United States,[21] Canada,[22] the United Kingdom,[23] Australia,[24] and New Zealand,[25] have shown an association between childhood exposure to SHS and low SES. Social inequalities in parental or other household member's tobacco use could partly explain SES differences in children's SHS exposure at home. There is a paucity of research on the association between childhood exposure to SHS at home and SES in the developing countries.[18,26] Moreover, most of these studies from developing countries have focused on the relationship between SES and the childhood exposure to SHS, with limited reports on the relationships between the SES and the SHS exposure among women.

Additionally, methodological limitation related to the measurement of SHS at home need to be considered. Most of the earlier studies from developing countries verified SHS exposure using self-reported questionnaire; however, to confirm that SHS was actually inhaled by a child or a woman, the measurement of biomarkers is required.[28] Despite the fact that Bangladesh is in a state of rapid economic and epidemiologic transition where industrialization and urbanization are met with rising SES inequality, there is a dearth of evidence from this country on the association between SES and childhood or women's exposure to SHS. Three studies have been found.[17,29,30] These studies have predominantly been conducted by targeting only children,[17] or women,[29] or non-smoking adult population.[30] Moreover, findings of these studies were not validated using any cotinine measurements or environmental exposure assessment. In addition, no attempt has been made in these studies to assess the relationship between exposure to SHS and SES. The main purpose of this study is therefore to examine the extent of socio-economic disparities in mother-child pair's exposure to self-reported and cotinine-measured SHS exposure.

Methods

Sampling and study population

This study is a cross-sectional survey, covering both rural and urban areas in Rajshahi district of Bangladesh. We selected the households based on the following criteria: (1) households having ever married woman of child-bearing age (15–49 years old), who were non-smoker, and had at least one child younger than 5 years, and (2) households having at least one adult smoker. Mothers of children with gross congenital anomalies or chronic illnesses were excluded from the study.

Administratively, urban area in Rajshahi district is divided into wards and rural area is divided into union parishads (UPs). Assuming SHS exposure among children at home is 40%[17] and a design effect of 1.2, the minimum sample size needed to achieve a precision of ±6% was estimated to be 257 households from each area. We thus planned to survey a minimum sample of 514 households in urban areas as well as in rural areas. We further increased our sample size to 541 to increase the power of the study. A two-stage sampling approach was adopted to select the households from urban and rural areas of Rajshahi district. In the first stage, out of 30 wards of urban areas of Rajshahi district, two wards were randomly selected, and out of 70 UPs, two UPs were randomly selected from rural areas. Because our target populations were not easily identified or accessed, in the second stage by using the snowball sampling technique, we started with one or two key individuals whom we believed know about the subject we are investigating (See Fig. 1 for details of sample selection for the study).