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Household Passive Smoking and Acute Respiratory Infection among Under-Five Children Attending Kanti Children's Hospital

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ABSTRACT

Background: Worldwide, children are more heavily exposed to passive smoking than any other age group where majority of these occur in child's house.Children's passive smoking and risk of developing respiratory diseases has been well established in severalstudies. However, such studies are limited in Nepal. Therefore, the objective of this study was to determine association between household passive smoking and acute respiratory infection among under-five children attending Kanti Children's Hospital.

Methods: A descriptive, cross-sectional study using quantitative method was carried out in Kanti Children's Hospital. Data was collected by face-to-face interview from 198 parents.Bivariate and multivariate analyses were performed to seeassociation between household passive smoking and acute respiratory infection.

Results: Among 198 children, 79(39.9%)were passive smokers. Among the total passive smokers, 31(39.2%) were exposed to paternal smoking, 18(22.8%) to parental smoking, 18(22.8%) to other member's smoking and 12(15.2%) to maternal smoking. Among 36 daily passive smokers, 18(50.0%) were exposed to high amount and 18(50.0%) to low amount of passive smoking. Household passive smoking had a slight risk of developing acute respiratory infection where adjusted odds ratio was 1.35;however it was not statistically significant.

Conclusions: Children exposed to passive smoking had a slight risk ofdeveloping acute respiratory infection than non-passive smokers however, it was not statistically significant.

Keywords: acute respiratory infection; household passive smoking;Kanti Children's Hospital; under-five children.

INTRODUCTION

Smoking of household members and acute respiratory infection (ARI) showed association in several studies with various designs from different culture and geographic regions.[1-5]However, studies on association between passive smoking and ARI are limited and insufficiently explored in Nepal. It is estimated that 36% children are regularly exposed to passive smoking in Nepal.[6] Research on health effects of exposure of children to passive smoking is crucial as among smoking parents, 80% smoke in front of their children in Nepal.[7]Therefore,the objectives of this study were to determine association between household passive smoking and ARI, amount of exposure to passive smoking and ARI and type of exposure to passive smoking and ARI.

METHODS

Descriptive, cross-sectional study using quantitative method was conducted in Kanti Children's Hospital, Kathmanduduring October 2012. The study population was all under-five children attending Kanti Children's Hospital during the period of study. Parents of under-five children were included as study participants. Those

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parents, who agreed to participate in the study, were included in study until the required sample size of 198 was achieved. In this study, 190 participants were mother and 8 participants were father. Semi-structured questionnaire was used to collect data. Ethical approval was taken from Institutional Review Committee of Kanti Children's Hospital to pursue the study. Verbal consent was taken from every participant before collecting data.

Type of exposure and amount of exposure to passive smoking were key independent variables. Exposure to passive smoking was defined as high amount if number of cigarettes or other smoked tobacco products smoked by daily smokers of child's house were more than nine per day and low amount if this number was one to nine per day.Type of exposure to passive smoking was defined as paternal if father was smoker, maternalif mother was smoker, parental if both father and mother were smokersand other if people other than child's parents were smokers.

Sample size was calculated through Stat Calculator of Epi Info 7. Following values were taken into consideration while calculating sample size.Two sided confidence level=95%, Power= 80%, Odds ratio (OR) = 2.74[8], Ratio of children unexposed to exposed to passive smoking=1.77[6], Percent of ARI in children not exposed to passive smoking = 30.[9]

Percent of ARI in children exposed to passive smoking=50[9], Non-responserate=10.%

Control for confounding factor=15%, Therefore, the calculated sample size was 198. All data were entered, processed, and analyzed using SPSS full version 19.Descriptive statistics was done in terms of frequency, percentage, mean and standard deviation. Unadjusted ORand their 95% confidence interval (CI) were calculated in bivariate analysis.Logistic regression model was used for multivariate analysis to see the independent effect of passive smoking on ARI controlling effect of other covariates like age, sex, exclusive breastfeeding, separate kitchen in house, number of under-five children sharing same sleeping room and presence of sibling of under-five of study child. Significance was set at α=0.05 for all tests.

RESULTS

The mean age of under-five children was 28.82 months with standard deviation of 11.58 months.Regarding sex-wise distribution, 103(52%) were male and 95(48%) were female. One-fourth of children (25.8%) had ARI at any time in last two weeks preceding the study.

Out of 198 studied children79(39.9%)were passive smokers. Similarly, among passive smokers,31 (39.2%) children were exposed to paternal smoking (Table 1).

Among the independent variables of interest, presence of smoker at house, smoking in presence of child, amount of exposure to passive smoking and type of exposure to passive smoking (parental and paternal) were significantly associated with ARI in bivariate analysis(Table 2).

Table 1. General characteristics of household passive smoking among under-five children.

Household passive smoking	ARI		Frequency	Percentage
	Yes	No		
Smoker in house				
Yes	30	49	79	39.9
No	21	98	119	60.1
Smoked in presence of child (n=79)				
Yes	26	30	56	70.9
No	4	19	23	29.1
Daily smokers in child's house (n=79)				
Yes	13	23	36	45.6
No	17	26	43	54.4
Amount of exposure to passive smoking (n=36)				
High amount	10	8	18	50.0
Low amount	3	15	18	50.0
Type of exposure to passive smoking (n=79)				
Paternal	11	20	31	39.2
Parental	6	12	18	22.8
Other members	8	10	18	22.8
Maternal	5	7	12	15.2

Table 2. Household passive smoking and ARI.

Household passive smoking	ARI		Crude OR (95% CI)
	Yes	No	
Smoker in house			
Yes	30	49	2.85 (1.48-5.49)
No	21	98	
Smoked in presence of child			
Yes	26	30	4.11 (1.24-13.65)
No	4	19	
Amount of exposure to passive smoking			
High amount	10	8	6.25 (1.32-29.43)
Low amount	3	15	
Type of exposure to passive smoking			
None			
Parental	6	12	0.24(0.08-0.69)
Paternal	11	20	0.39(0.16-0.93)
Maternal	5	7	0.30(0.08-1.03)
Other	8	10	0.42(0.14-1.27)

Table 3. Multivariate analysis of significant variables in logistic regression model.

Variables	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Smoker in house		
No		
Yes	2.85(1.48-5.49)	1.35(0.01 -10.02)
Smoke in presence of child		
No		
Yes	4.11(1.24-13.65)	4.05(1.00-20.4)
Amount of exposure to passive smoking		
Low amount		
High amount	6.25(1.32-29.43)	2.25(0.98-10.5)
Type of exposure to passive smoking		
None		
Parental	0.24(0.08-0.69)	1.29 (0.85-8.72)
Paternal	0.39(0.16-0.93)	2.52 (0.98-6.35)

(Adjusted for age of child, sex of child, number of under-five children sharing same sleeping room, presence of siblings of under-five of study child, separate kitchen in house and excusive breast-feeding)

Other variables like age,sex, number of under-five children sharing same sleeping room, presence of siblings of under-five of study child, separate kitchen in house and exclusive breastfeeding, were also associated with ARI in bivariate analysis. Since these variables played as a confounder in this study, they were adjusted to see the independent effect of passive smoking on ARI in multivariate analysis. In final model however, significant association between household passive smoking and ARI was not seen, even though the risk of developing ARI was higheramong passive smokers (Table 3).

DISCUSSION

In spite of sufficient literatures showing association between children's passive smoking and ARI, this study did not find significant association between household passive smoking and ARI, however the risk of having ARI among passive smokers was slightly high(adjusted OR=1.35, 95% CI: 0.01-10.02). It may be due to the type of study chosen and insufficient number of samples.

Since selection of study subjects were done from hospital, they were not complete representative of study population. In addition, only those children who at a time of study came to hospital were likely to be selected as study participants. Furthermore, recruited participants who denied answering the specific questions were excluded ethically from the study.

Assessment of ARI was done based on self-report of parentsusing standardized questionnaireof assessing ARI.Recall bias of ARI was minimized by asking the participants about their illness in past two weeks of time and exposure status was measured at a current point of time. As the study was based on self-report, the study findings should be cautiously interpreted. Moreover, amount and type of passive smoking was taken verbally. Therefore, this study could be viewed as a proxy estimate of risk of developing ARI among passive smokers.

A study done by Armstrong and Campbell, found dose-response association between passive smoking and ARI in early childhood.[10]However, this study, did not find association between amount of exposure and ARI. This was likely due to small sample size in this study. However, the risk of developing ARI was higher. Most of the daily household members in this study reported to have smoked only three to five cigarettes per day. This level of smoking may not have been of sufficient magnitude to develop ARI.

Regarding type of exposure to passive smoking, maternal smoking was reported to be the least in this study. Reason behind this could be deliberate hiding of facts by some mothers about their smoking habit. Various literatures have shown the evidence of association between maternal smoking and respiratory infections in children.[2,4,11]However, this study did not find any association, which could also be due to the small number of maternal smokers and literate smoker mothers not exposing their children during smoking.Further, some mothers whose children suffered with respiratory illness might have stopped smoking.

A study done by Armstrong and Campbell have shown association between paternal smoking and ARI.[10] Several studies done by Campbell and others have shown association between parental smoking and ARI.[1,10,12] Similarly, a study by Gutierrez-Ramirez and colleagues have shown association between smoking by other members except parents of respective house and respiratory infection.[13] In contrary, this study has not revealed any association between paternal, parental smoking and ARI. Variation in this study could be due to small sample size and deliberate or non-deliberate under-reporting of tobacco smoke exposure by some parents.

CONCLUSIONS

Independent variables of interest namely household passive smoking, amount of exposure to passive smoking and type of exposure to passive smokinghad slight risk of developing ARI.However, they were not statistically significant.

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