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## Risk Factors for Chronic Bronchitis among Women in Shahrekord, IRAN

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### ABSTRACT

**Introduction:** Chronic bronchitis is expected to be less prevalent among Iranian women, since smoking is uncommon among them, however, recent reports disagreed this claim. Traditional baking and cooking with biomass fuel (wood fuel being the most commonly used) is still common in our villages and small towns. These seem to be contributive factors for high prevalence rate of chronic bronchitis among women.

**Materials and Methods:** We conducted a case-control study to identify the possible risk of indoor smoke and biomass combustion. We compared 100 chronic bronchitis cases with 100 age-matched controls. The odds ratio (OR) was used as the basic statistic to evaluate risk.

**Results:** Chronic bronchitis was associated with cigarette smoking (OR=6.10;  $p=0.009$ ), water-pipe smoking (OR=4.41;  $p=0.014$ ), household baking (OR=4.90;  $p=0.002$ ), using wood for baking (OR=3.04;  $p=0.000$ ), using wood for space heating (OR=2.36;  $p=0.009$ ), using wood for cooking (OR=7.17;  $p=0.000$ ), and using kerosene fuel for cooking (OR= 4.63 ;  $p=0.000$ ).

**Conclusion:** Results have revealed that among women in Chahar- Mahal- Bakhtiari, wood and other biomass fuels used for cooking, baking and heating are associated with chronic bronchitis. Changing to safer alternative fuels for cooking and heating would ameliorate the impacts of chronic bronchitis. (*Tanaffos* 2002; 1(3); 19-23).

**Key words:** Chronic bronchitis, Women, Biomass fuel.

### INTRODUCTION

Chronic airway diseases and chronic bronchitis have become major concerns throughout the world (1). Prior investigators have reported cigarette smoking, exposure to occupational dusts, social class, and male gender as independent risk factors for

chronic bronchitis (2). Higher prevalence rate of chronic bronchitis among men is considered being mainly due to occupational exposure and cigarette smoking. However, these two risk factors are uncommon among women; thus, other potential risk factors for the development of chronic bronchitis should be explained (3). Few studies have evaluated the association between occupation and chronic respiratory disease in women (4). Therefore, more

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studies in this area are needed especially in developing countries.

It has been estimated that half the world's population still rely primarily on wood, coal and other biomass fuels as the only source of energy. Most of these people live in rural areas of developing countries (5). Unfortunately, such fuels are substantially used in simple stoves under insufficient ventilation; thus, severe indoor air pollution occurs (3). The members of the family most commonly exposed to this hazard are women because of their role as a cook. In Iran, although studies have shown similar rates of chronic bronchitis between men and women, smoking is uncommon among women (6).

Epidemiologic studies that determine the etiologic factors of chronic bronchitis are considered to be as health preferences in the field of non-contagious diseases, because assessing the pathogenesis of chronic bronchitis among women and estimating their relative risk could be used to address public and social health decisions. We have therefore investigated the possible risk factors including cigarette smoking, baking, and use of biomass fuel for chronic bronchitis in women.

## MATERIALS AND METHODS

The study is an epidemiologic case-control investigation of risk factors for the development of chronic bronchitis among women in Chahar-Mahal-Bakhtiari province in Iran. We selected cases and control subjects from Hajar hospital in Shahrekord.

One hundred women with clinical diagnosis of chronic bronchitis, referred consecutively from the medical wards or pulmonary outpatient clinics, were included. They were  $\geq 40$  years old.

The control group consisted of 100 age-matched women selected from healthy relatives visiting the same hospital. Chronic bronchitis was defined as the regular cough and expectoration for at least three

months in the year and for not less than two successive years (7).

We used a well-known questionnaire for such epidemiologic studies (8), and added a set of questions regarding household baking. We first asked demographic questions, then information on risk factors was completed.

Factors thought to bear some relationship to the risk of chronic bronchitis were compared by SPSS software. These factors included age, urban or rural residence, level of education, cigarette smoking, water-pipe smoking, and household baking. The case-control distribution of each factors was compared by  $X^2$  tests. The Mantel-Haenzel statistic was used to test for significance of the association, and to develop test-based confidence intervals (95% CIs) for the odds ratio (OR).

## RESULTS

Totally, 100 patient cases and 100 control subjects were enrolled in the study. The mean ( $\pm$  SD) age of patient cases and control subjects were  $66.02 \pm 9.47$  years (range, 42-86 years), and  $64.27 \pm 10.6$  years (range, 44-96 years), respectively. Distribution of demographic variables by cases and control subjects are shown in table 1.

**Table 1.** Distribution of demographic variables by case and control subject status.

Variable	Case (n= 100)	Control (n= 100)
Living in urban area	50	53
Regular past smoker	16)	2
Current smoker	11	2
Water-pipe smoking	12	3
Household baking	96	83
Primary education *	100	96

\* Have not finished the primary school.

Table 2 presents the distribution by cases and control subjects of the variables that were statistically

associated with chronic bronchitis; meanwhile, non-significant variables were also reported.

Table 2. Distribution of risk factors associated with chronic bronchitis

Risk factor	Case(% (n=100)	Control(% (n=100)	P-value	Odds ratio (95% CI)
Cigarette smoking	11(11)	2(2)	0.009	6.10 (1.31-28.10)
Water –pipe smoking	12(12)	3(3)	0.014	4.41 (1.20-16.14)
Household baking	96(96)	83(83)	0.002	4.90 (1.60-15.20)
Using wood for baking	49(49)	24(24)	0.000	3.04 (1.66-5.56)
Using wood for space heating	31(31)	16(16)	0.009	2.36 (1.20-4.67)
Using wood for cooking	23(23)	4(4)	0.000	7.17 (2.38-21.61)
Using kerosene fuel for cooking	43(43)	14(14)	0.000	4.63 (2.32-9.24)
Using kerosene fuel for space heating	74(74)	64(64)	NS	1.60 (0.87-2.90)
Using coal for space heating	2(2)	0(0)	NS	2.02 (1.76-2.35)
Using coal for cooking	4(4)	0(0)	NS	2.04 (1.80-2.36)

Our results have revealed that the following risk factors are statistically associated with chronic bronchitis; cigarette smoking, water-pipe smoking, household baking, and using wood/ kerosene fuel for space heating/ cooking.

## DISCUSSION

The association between chronic bronchitis and cigarette smoking has been postulated for many years. The OR of this association has varied from 2.1 to 6.1 (6), so our study, with respect to the few number of smokers, with OR= 6.10, confirms these previous findings. Meanwhile, strong associations were found between chronic bronchitis and traditional cooking (indoor exposure) among women

aged  $\geq 40$  years. Indeed, the present study reports a higher OR for baking when compared to cigarette smoking. Needless to say, men and children are also highly susceptible to indoor exposure of biomass fuel. Unfortunately, using wood or kerosene fuel for cooking and space heating is an important public health problem in different parts of Iran.

There was a potential for confounding in the study, since it was based on interview and patient's recall, however, questions like baking (Yes or No) may not be subject to poor recall, thus, our results seem to be reliable.

Like other case-control studies possible interference by other risk factors including age, socioeconomic status, place of residence, and exposure to other outdoor dust may also exist, but this was minimized by the fact that the control subjects were age-matched and selected, like patients cases, from Shahrekord or other nearby villages. Since cigarette smoking was uncommon among women in our study, it does not seem to play role as a confounding factor; furthermore, increased risk of chronic bronchitis was reported in some nonsmokers.

Studies of chronic bronchitis associated with smoke exposure due to burning of wood, as fuel for cooking and space heating, have been conducted before (9). In developed countries, the prevalence rate of chronic bronchitis is higher in men than in women (1), however, in developing countries the higher prevalence rate in women could be explained by biomass fuel exposure (10).

The amount of indoor pollution due to wood combustion has been measured in some countries and the concentration of air pollutants (total suspended particles, benzopiren particles, formaldehyde, SO<sub>2</sub>, NO<sub>2</sub>) are greatly elevated, exceeding by far the standard levels (11). It has been estimated that women exposed to indoor wood burning emissions may smoke the equivalent of 20 packs of cigarettes per day (11). Our study shows that exposure to

indoor wood burning emissions a major risk factor for development of chronic bronchitis among women in Chahar-Mahal-Bakhtiari province. Moreover, water-pipe smoking, was found to be another serious risk factor for chronic bronchitis. Few reports in the literature, have evaluated this association (12). Thus, water-pipe smoking cessation as well as cigarette smoking cessation should comprehensively be followed. Indoor exposure to biomass fuel, a major risk factor for chronic bronchitis, could be ameliorated by alteration in household cooking/heating systems. To meet this demand, use of smokeless stoves, substituting fuels, and designing better-ventilated dwellings are strongly recommended.

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