# Assessment of respiratory health profile in cooks of roadside Dhaba's (diner) around the national highway of Nashik district

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## Abstract

**Introduction:** The health hazards in the unorganized sector, especially in Dhaba's kitchen workers, could be more attributing to both indoor pollution like fuel, methods of cooking with improper ventilation. Outdoor air pollution due to the highway also makes the working condition even more difficult for these workers. So present study was planned to assess the respiratory health profile of Dhaba's cooks & other workers.

**Aim:** To assess respiratory function in the cooks & non cooks workers of the Dhaba's and comparing their lung function test.

**Materials and Methods:** the present cross-sectional study included 105 Dhaba workers from 18 Dhabas on national highway 3 with 38 being kitchen workers & 67 being a non-kitchen worker. Interview technique for respiratory health profile questionnaire followed by pulmonary function test by spirometry was used for data collection.

**Results:** Difference in pulmonary function test was found statistically insignificant in both the groups. Stratified analysis in smokers & non-smokers groups, it was statistically higher in smoker control group compared to smoker study group ($p<0.05$). Tandoor oven workers had lower lung function values compared to others but that was also not statistically significant.

**Conclusion:** None of the parameters from pulmonary function test came significant which could be due to the duration of the exposure that would be not significant to pose any health problems. But it will not rule out the fact that the indoor air pollution irrespective of tandoor cooking or normal gas/stove cooking, all have ascertain inclination for causing respiratory alteration.

**Keywords:** Dhaba's, cooks, Kitchen, Air pollution, Occupational health.

## Introduction

Occupational health problems are the major health hazards for the working middle class of the developing country. It laid economic, social as well as mental strain on the middle class family. According to joint ILO/WHO Committee, occupational health aims to promote & maintain the highest degree of the well-being of all the workers in all occupations & protection of the workers in their employment from the risks resulting from their occupation causing adverse effects towards the health.[1] Laws are laid down for organised establishment workers for their health but what about the unorganised establishment such as these roadside Dhaba's. Employees working in such kind of establishment are at high risk for developing health problems which are rarely addressed.

Indoor pollution has been serious health hazards for developing respiratory illnesses like COPD, Bronchitis, etc. The precipitating factors for such indoor pollution could range from cooking methods/practices, passive smoking to lack of proper ventilation in the house.[2] "Cooking fumes" is the term commonly used to describe the visible emissions generated during cooking. These fumes could be due to excessive boiling of cooking oil or during the frying, charbroiling & even combustion products, organic gases pollutants & water vapour have carcinogenic effect.[3] Research conducted on chulhas creating indoor air pollution had shown a significant lowering of respiratory function in women living in rural area.[4] Similarly, tandoor oven (coal combustion) used for cooking & baking had shown a significant relationship with pinguecula.[5]

The link between indoor air pollution and health showed many studies have found a strong relationship but most of them tend to be observational. All of them control for some confounding variables such as age, gender, and location. However, they rarely question whether this relationship is causal.[6] Similarly, the existing literature finds an association between solid fuel use and respiratory health, their causal relationship has not been established clearly. Better respiratory health in cook with cleaner fuels may be due to better access to information about improving health or other unobservable health behaviour[7]. In a study of households in Bangladesh and India, address the endogeneity of smoke exposure by instrumenting cooking time with hierarchical rules used to assign cooking responsibilities within households. They find a positive effect of smoke exposure on respiratory symptoms.

Since Cooks in such work setting like Dhabha are constantly coming in contact to above risk factors & working near to the highway add a subsequent risk of developing respiratory diseases which could lead to economic loss as well. So present study was planned to assess the respiratory health profile of Dhaba's cooks & compare it with controls.

## Aims and Objective

1. To assess respiratory function in the cooks of the Dhaba's.
2. To assess respiratory function in the non-cook workers of the Dhaba's.
3. To compare the difference in their lung function test.

## Materials and Methods

**Sample Size:** 105 (case -38 & control- 67)

**Study Type:** Descriptive study i.e. Comparative Cross-sectional Study

**Study Design**: Questionnaire based along with pulmonary function test.[8] A questionnaire based on the respiratory health profile questionnaire.

**Study Population**

1. Study Group: - Cooks (a person who prepares and cooks food, especially as a job) working in roadside Dhaba's.
2. Control Group: - Other Chorus Dhaba's workers excluding the cooks which include waiter, sweeper, utensil washer, vegetable cutter.

**Study Duration:** May 2016 - June 2016.

**Study Setting:** Study was conducted in 18 Dhaba's on National Highway (Definition: It's a name given to roadside restaurants in India which are basically situated on a highway & which generally runs for 24 hours) located on NH-3 highway near medical institute. All the Dhaba's were enlisted near the medical institute & randomly 18 Dhabas were selected (Simple random sampling)

**Inclusion Criteria:**

1. Participants: Cooks & other chorus workers above 21 years of age working in the Dhaba for more than a year.
2. Dhaba's: Situated within 500 meters from the National Highway.

**Exclusion Criteria:**

1. Cooks from the street food vendors will be excluded.

## Results

There were no significant differences in basics parameters such as age, height, weight & BMI (smokers) between the two groups (Table 1). There was a significant difference in the duration of working in the dhabha's between the two groups (Table 1). In the study group, chest pain (26.31%) was the chief respiratory complaint followed by sneezing & coughing (15.75%). In control group, Chest pain (19.4%) was the chief complaint followed by dyspnoea, cough & sneezing respectively. Haemoptysis complaint was absent in both the groups. (Table 2)

There was no statically difference between study group & control group for these lung function parameters including force expiratory volume in one seconds percentage (FEV1%), force Vidal capacity percentage (FVC%), force expiratory volume in one second and force vital capacity as ratio of percentage (FEV1/FVC%), force expiratory flow 25-75% (FEF 25-75%) and peak expiratory flow rate as percentage (PEFR%). (Table 3)

There was no statistically significant in non-smokers study & control group but there was statistical difference in FVC & FEV1 between both active smokers group of cooks & non-cook workers of the Dhabas (Table 4 & 5)

In kitchen worker stratified analysis, exclusively participants working in tandoor showed lower FVC%& PEFR% compared to exclusively cooking & both duties in the kitchen worker while FEV1/FVC% & FEF 25-75% was lower in the exclusively cooking group. None of this was statistically significant. (Table 6)

**Table 1: Basics characteristics of study group & control group**

| Variables | Study group | Control (Mean±SD) | P-value |
|---|---|---|---|
| | (Mean±SD) | N=67 | |
| | N=38 | | |
| Age(yrs) | 27.86±8.75 | 28.43±12.27 | 0.80 |
| Height (cm) | 159.1±5.67 | 160±6.95 | .019 |
| Weight (Kg) | 61.76±9.96 | 59.62±12.51 | 0.36 |
| BMI ($kg/m^2$) | 24.44±4.09 | 22.92±3.9 | 0.06 |
| Duration of Years | 9.17±6.27 | 5.80±6.35 | **0.01** |
| Working | | | |

**Table 2: Respiratory symptoms among study group & control group**

| Respiratory symptoms | Frequency in the study group | Frequency of Control | |
|---|---|---|---|
| | (N=38) | | (N=67) |
| Cough | 6 (15.78%) | 9 (13.43%) | |
| Dyspnoea | 5 (13.15%) | 11 | (16.41%) |
| Haemoptysis | 0 (0%) | | 0 (0%) |
| Sneezing | 6 (15.75%) | 5 | (7.46%) |
| Chest Pain | 10 (26.31%) | 13 | (19.40%) |

**Table 3: Distribution of pulmonary function test results in study & control groups**

| Variables | Study group | Control (mean±SD) | P-value |
|---|---|---|---|
| | (mean±SD) | N=67 | |
| | N=38 | | |
| Percentage FEV1 | 103.02±18.13 | 96.34±17.92 | 0.07 |
| Percentage FVC | 102.97±18.39 | 95.25±20.94 | 0.06 |
| FEV1/FVC% | 100.26±8.01 | 98.47±14.09 | 0.47 |

| | | | |
|---|---|---|---|
| FEF 25-75% | 76.84±23.08 | 74.02±21.88 | 0.53 |
| PEFR% | 70.84±18.79 | 67.65±22.09 | 0.45 |

**Table 4: Distribution of FEV1% & FVC% among study participants & control participants who are non-smokers**

| Variables | Study -non-Smokers | Control –non- | P-value |
|---|---|---|---|
| | (mean±SD) | smokers (mean±SD) | |
| | N=25 | N=44 | |
| Percentage FEV1 | 100.96±18.66 | 98.02±19.59 | 0.54 |
| Percentage FVC | 99.32±19.46 | 96.06±22.75 | 0.55 |

**Table 5: Distribution of FEV1% & FVC% among study participants & control participants who are smokers**

| Variables | Study -Smokers | Control - | P-value |
|---|---|---|---|
| | (mean±SD) | Smokers (mean±SD) | |
| | N=13 | N=23 | |
| Percentage FEV1 | 107±17.06 | 93.13±14.04 | .013 |
| Percentage FVC | 110±14.29 | 93.65±17.31 | .007 |

**Table 6: Pulmonary function test in different kitchen work.**

| Variables | Tandoor workers | Both Tandoor | Regular Cooking |
|---|---|---|---|
| | only (Mean±SD) | and regular | Only |
| | N=11 | cooking | (Mean±SD) |
| | | (Mean ± SD) | N=11 |
| | | N=18 | |
| Percentage | 102.36±18.98 | 100.5±14.86 | 106.9±21.77 |
| FEV1 | | | |
| Percentage | 101.54±18.26 | 104.11±16.52 | 103.36±21.39 |
| FVC | | | |
| FEV1/FVC% | 99.45±5.75 | 103.77±8.92 | 97±7.61 |
| FEF 25-75% | 75.45±20.68 | 82.33±26.86 | 72.36±17.47 |
| PEFR% | 65.9±12.37 | 71.55±14.7 | 76±27.25 |

## Discussion

Indoor air quality and heat exposure in kitchen workers is an important occupational health and safety concern in several workplaces including dhaba workers. Various Studies investigated the heat, particulate matter (PM), total volatile organic compounds (TVOCs) and polycyclic aromatic hydrocarbons (PAHs) emissions in indoor air of commercial kitchen has an effect on respiratory health centres. Even, over cooking, excessive charring, frying, improper ventilation in kitchen results in accumulation of noxious gaseous elements which in longer course of time will alter lung function. As 15% of adult asthma is attributed to the workplace environment, occupational respiratory diseases, especially asthma and allergic rhinitis (Symptoms).

Studies done on the female population using biomass fuel showed some form of derangement compared to the women who cooked with other fuels.[9] The selected study group includes cook of dhaba workers working more than 1 year which includes both smokers & non-smokers population. The groups contain exclusively workers involved in cooking practices. The groups were further subdivided into tandoor workers only, cooking activities only & both. The selected control groups include worker of non-cooking background which could do anything except working in the kitchen. Both this group have the same environmental work setting that is highway which minimizes the bias. In our study, both the study & the control group were comparable on all the parameters of age, height, weight, BMI except years of working in the Dhabas duration of working as a cook in the Dhabas was significantly longer compared to the control.

In a cross sectional study conducted in the khanar village, Nepal in housewives on the consequences of indoor air pollution on the respiratory symptoms on 297 sample showed 27.3% women complain about dyspnoea, 19.7% for productive cough, 8.9% dry cough & 3% other symptoms.[6] When we compared both the case & Control groups without stratified analysis in both groups for pulmonary function test, it was found that all the (FEV1%, FVC%, FEV1/FVC%, FEF 25-75%, PEFR%) where non-significant.

In non-smoking women, 2 study group one using LPG & other using biomass fuel, only PEFR was significantly reduced while rest of the parameter was non-significant. Even step-wise multivariate linear regression analysis carried out on the same population showed no co-relation between cooking fuel & lung function test.[2] In other study done on the same population of biomass fuel user, all the parameters FEV1%, FVC%, FEV1/FVC% & FEF 25-75%

are significant & PEFR% are nonsignificant.[10] When the stratified analysis was carried-out in non-smokers, study & control group no parameters in the lung function test was significant. But between smoker study group & smoker control group was carried out there was significant better FVC% & FEV1% in the study group compared to the control group. On evaluating the history of the smoking population, the no. of packs & duration of smoking was higher in the control group compared to study group which could be the possible reason for the significant difference in the FVC% & FEV1%.

Tandoor oven requires charcoal for the cooking process. Charcoal being a biomass fuel which is still used by the women as a cooking fuel has shown to decline lung function test. Studies conducted in kitchen workers where electric induction cooking was found better than normal fuel cooking.[11] Study on 393 kitchen workers, where 115 used electric stoves & 278 used a gas stove for cooking showed FEV1 & FVC values where 5.4% & 3.8% respectively higher in cooks using a gas stove. It was found that wheeze, phlegm, cough & sore throat problems common to kitchen worker using gas stove.[12] Studies with biomass fuel in west Bengal found that duration of the exposure is an important factor in lung function alteration & appearance of the symptoms.[8] In our study, exclusive tandoor workers in the Dhabas kitchen are more prone to deteriorating respiratory health compared to cooks working on both tandoor & cooking & exclusively cooking. A study conducted in pune highway restaurant worker showed Musculoskeletal symptoms such as low back pain, fatigue, body ache and pain in limbs present in 18 (14.2%) of the workers. Gastrointestinal complaints such as heartburn, abdomen pain, stomatitis, etc. were reported by 12 (9.4%) subjects.[13]

## Conclusion

As discussed earlier, most research concerning with the indoor air pollution showed that there is obviously some changes happening in the respiratory system but it is evident that most research that has been carried out is anobservational study with anumber of confounding factors influencing its outcome. Usage of biomass fuel substantially increases the risk of developing COPD. In my study particularly, none of the parameters from pulmonary function test came significantly which could be due to theduration of the exposure that would be not significant to pose any health problems. But it is not adenial from the fact the indoor air pollution irrespective of tandoor cooking or normal gas/stove cooking, all have acertain inclination for causing respiratory alteration seen from the results. Working in highway pose another great challenge for these workers. Outdoor air pollution along with the internal kitchen condition without any proper ventilation & improper method of cooking, all these tends to end up & results in decline the lung function in due course of time. Dhaba's is a set-up which doesn't have ahigher regulatory activity to monitor their welfare of the workers. They neither have health insurance nor is their wages too high enough to sustain a healthy lifestyle practice. So, more research in this neglected occupation is needed for appropriate health safety measures.

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**Conflict of Interest:** Nil.

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