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Research Article

PREVALENCE AND RISK FACTORS OF RESPIRATORY DISEASES AMONG NON-SMOKING WOMEN AGED ABOVE 18 YEARS IN NORTH KARNATAKA: A COMMUNITY-BASED OBSERVATIONAL STUDY

Dr. Yannawar Anand[1], Dr. Srikanth Ravoori[2], Dr. Smita Nomulwar[3]*

[1]Professor & HOD, Department of Respiratory Medicine, Santiniketan Medical college, Bolpur, West Bengal, India.
[2]Associate Professor, Department of Respiratory Medicine, Santiniketan Medical college, Bolpur, West Bengal, India.
[3]Associate Professor, Department of Anatomy, Dr. Dr. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune.

Corresponding Author*: Dr. Smita Nomulwar, Associate Professor, Department of Anatomy, Dr. Dr. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune.

Email ID: srikanthravoori@gmail.com

Orcid ID: https://orcid.org/0000-0002-3848-4122

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ABSTRACT

Background: Respiratory diseases remain a major public health problem globally and are responsible for significant morbidity and mortality. Although tobacco smoking is a well-known risk factor, a considerable proportion of respiratory illnesses occur among non-smoking women, particularly in developing countries like India. Exposure to indoor air pollution from biomass fuel, passive smoking, occupational dust, and poor ventilation are important contributors to respiratory morbidity among women.

Objectives: To assess the prevalence of respiratory diseases and identify associated risk factors among non-smoking women aged above 18 years in north Karnataka.

Methods: A community-based observational study was conducted among non-smoking women aged 18 years and above residing in Karnataka. Participants were selected using an appropriate sampling technique. Data were collected through a structured questionnaire that included socio-demographic details, environmental exposures, household characteristics, and respiratory symptoms. Clinical history and relevant risk factors such as type of cooking fuel, exposure to passive smoking, occupational hazards, and housing ventilation were assessed.

Results: The study identified a measurable prevalence of respiratory diseases among non-smoking women. Significant associations were observed with exposure to biomass fuel, inadequate kitchen ventilation, passive smoking, and occupational dust exposure. Women from lower socioeconomic background and those with prolonged exposure to indoor air pollutants showed a higher likelihood of developing respiratory symptoms and diseases.

Conclusion: Respiratory diseases are prevalent among non-smoking women and are strongly associated with environmental and household risk factors.

KEYWORDS: Respiratory Diseases, Non-smoking Women, Prevalence, Risk Factors, Indoor Air Pollution.

Introduction

Respiratory diseases represent a major public health concern worldwide and contribute significantly to morbidity, disability, and premature mortality. According to global estimates, chronic respiratory diseases such as chronic obstructive pulmonary disease (COPD), asthma, and chronic bronchitis account for a substantial proportion of non-communicable diseases and place a heavy burden on healthcare systems, particularly in low- and middle-income countries like India. Traditionally, tobacco smoking has been considered the most important risk factor for respiratory diseases. However, growing evidence suggests that a significant proportion of respiratory illnesses occur among non-smokers, especially women. Studies indicate that approximately 30% of patients with COPD have never smoked, and nearly 80% of these non-smokers are women, highlighting the importance of environmental and household exposures in the development of respiratory diseases[1].

In developing countries, indoor air pollution is recognized as one of the leading risk factors for respiratory morbidity among women. Many households still rely on biomass fuels such as wood, crop residues, animal dung, and charcoal for cooking and heating. The combustion of these fuels in poorly ventilated kitchens produces high concentrations of particulate matter and toxic gases, which are inhaled by women who spend long hours performing domestic activities. In India, about 80% of rural households rely on biomass fuels for cooking, exposing millions of women to harmful smoke on a daily basis . Prolonged exposure to biomass smoke has been strongly associated with respiratory symptoms, airflow obstruction, chronic bronchitis, and decreased lung function among non-smoking women. Research has shown that women exposed to biomass fuel smoke may experience respiratory impairments similar to those seen in tobacco smokers due to long-term inhalation of particulate matter and toxic pollutants[2].

Apart from indoor air pollution, several other environmental and socio-demographic factors contribute to respiratory diseases among non-smoking women. Passive exposure to tobacco smoke, outdoor air pollution, occupational exposure to dust and chemicals, poor housing conditions, low socioeconomic status, and inadequate ventilation are recognized as significant determinants of respiratory morbidity. Increasing levels of ambient particulate matter (PM2.5) in India have also been linked with higher prevalence of respiratory conditions such as asthma and chronic bronchitis among women[3].

Despite the growing evidence of respiratory health risks among non-smoking women, these conditions often remain under diagnosed and underreported. Many women ignore early symptoms such as chronic cough, breathlessness, and wheezing, or lack access to diagnostic facilities such as spirometry, resulting in delayed diagnosis and advanced disease at presentation.

In addition, limited community-based epidemiological studies have examined the prevalence and determinants of respiratory diseases among non smoking women in north Karnataka. Therefore, this study aims to assess the prevalence and risk factors of respiratory diseases among non-smoking women aged above 18 years in north Karnataka through a community-based observational approach, which may help identify vulnerable populations and guide targeted public health interventions for prevention and early detection.

Methodology

This study was designed as a community-based observational cross-sectional study to assess the prevalence and risk factors of respiratory diseases among non-smoking women aged ≥18 years in north Karnataka. The study was conducted in selected urban and rural communities of north Karnataka over a period of six months. The required sample size was determined using a standard prevalence formula based on previously reported prevalence rates of respiratory diseases among non-smokers, with an appropriate confidence level and margin of error. Participants were selected using a stratified systematic random sampling technique to ensure adequate representation of the community in urban area of Belagavi city divided into four sites and near by four rural areas of the city were selected.

Data were collected through household surveys using a pre-tested structured questionnaire that included information on socio-demographic characteristics such as age, education, occupation, and socioeconomic status. The questionnaire also captured environmental and lifestyle risk factors including type of cooking fuel used (biomass, LPG, or others), kitchen ventilation, exposure to indoor air pollution, passive smoking, occupational exposure to dust or chemicals, and housing conditions. Information regarding respiratory symptoms such as chronic cough, wheezing, breathlessness, chest tightness, and physician-diagnosed respiratory diseases was also obtained. In addition, relevant clinical history and duration of exposure to potential risk factors were recorded. Where feasible, basic clinical assessment and measurement of respiratory symptoms were performed, and suspected cases were referred for further evaluation.

The collected data were checked for completeness and entered into statistical software (SPSS version 25) for analysis. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize demographic characteristics and estimate the prevalence of respiratory diseases among the study participants. Inferential statistical tests, including the chi-square test and logistic regression analysis, were applied to determine the association between respiratory diseases and potential risk factors such as indoor air pollution, passive smoking, occupational exposure, and socioeconomic status. A p-value of less than 0.05 was considered statistically significant. Ethical approval for the study was obtained from the institutional ethics committee, and informed consent was

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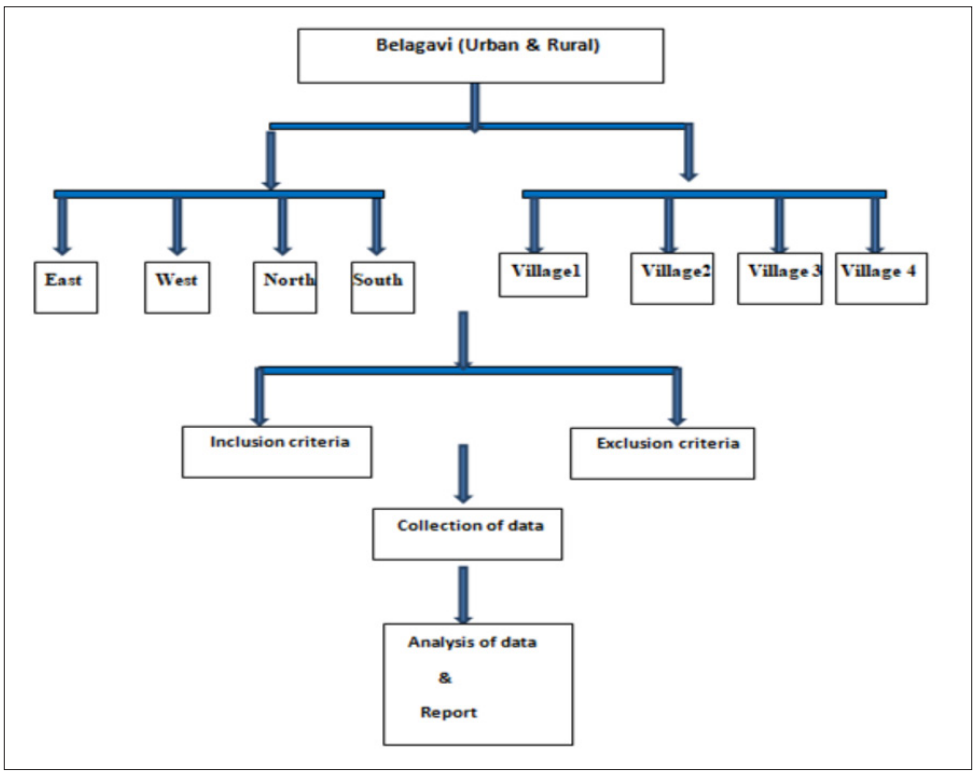
obtained from all participants prior to data collection. Confidentiality and anonymity of participants were strictly maintained throughout the study.

Study Flow Chart



Results

A total of 500 non-smoking women aged ≥18 years participated in the study. The mean age of participants was 39.8 ± 12.5 years, with the majority (42%) aged between 31 and 45 years. Most participants resided in rural areas (60%) and were primarily homemakers (72%). The prevalence of respiratory diseases among the study population was found to be 28% (140/500). Chronic cough was the most commonly reported symptom (18%), followed by breathlessness (14%) and wheezing (10%).

Table 1: Socio-demographic Characteristics of Participants (n=500)

Characteristics	Frequency (n)	Percentage (%)
Age group (years)		
18–30	120	24
31–45	210	42
46–60	110	22
>60	60	12
Residence		
Urban	200	40
Rural	300	60
Occupation		
Homemaker	360	72
Labor/Field work	90	18
Other	50	10
Socioeconomic Status		
Low	250	50
Middle	180	36
High	70	14

Table 2: Prevalence of Respiratory Symptoms (n=500)

Respiratory Symptom	Frequency (n)	Percentage (%)
Chronic cough	**90**	**18**
Breathlessness	**70**	**14**
Wheezing	**50**	**10**
Chest tightness	**40**	**8**
Physician-diagnosed respiratory disease	**140**	**28**

Table 3: Association of Risk Factors with Respiratory Diseases (n=500)

Risk Factor	Respiratory Disease Present (n=140)	Respiratory Disease Absent (n=360)	p-value
Type of cooking fuel			
Biomass fuel	95	180	<0.001
LPG/Other	45	180	
Kitchen ventilation			
Poor ventilation	85	120	<0.001
Adequate ventilation	55	240	
Passive smoking exposure			
Yes	50	60	0.002
No	90	300	
Occupational dust exposure			
Yes	40	50	0.01
No	100	310	

Table 4: Comparative Analysis of Risk Factors by Rural and Urban Residence

Risk Factor	Category	Rural Total (n=300)	Rural Disease (n=84)*	Rural Prevalence (%)	Urban Total (n=200)	Urban Disease (n=56)*	Urban Prevalence (%)	p-value
Type of cooking fuel	Biomass fuel	165	57	34.5%	110	38	34.5%	<0.001
	LPG/Other	135	27	20.0%	90	18	20.0%	
Kitchen ventilation	Poor ventilation	123	51	41.5%	82	34	41.5%	<0.001
	Adequate ventilation	177	33	18.6%	118	22	18.6%	
Passive smoking exposure	Yes	66	30	45.5%	44	20	45.5%	0.002
	No	234	54	23.1%	156	36	23.1%	
Occupational dust exposure	Yes	54	24	44.4%	36	16	44.4%	0.01
	No	246	60	24.4%	164	40	24.4%	

Discussion

The present community-based study assessed the prevalence and risk factors of respiratory diseases among 500 non-smoking women aged ≥18 years in north Karnataka. The study found an overall prevalence of 28% for respiratory diseases, with chronic cough (18%), breathlessness (14%), and wheezing (10%) being the most commonly reported symptoms. These findings highlight that a substantial proportion of non-smoking women in north Karnataka are affected by respiratory morbidity, which is similar to the study done by Rajiv TV et al.[4], Garg Ankur et al.[5],and Kaur-Sidhu M et al[6].

The key risk factors identified in the present study included biomass fuel use, poor kitchen ventilation, passive smoking, and occupational dust exposure. Biomass fuel users had significantly higher rates of respiratory diseases (95/140 affected), which is consistent with Sreedevi et al.[7] that long-term exposure to biomass smoke leads to airway inflammation, chronic bronchitis, and impaired lung function in non-smoking women.

Poor kitchen ventilation further exacerbates exposure to particulate matter and toxic gases, making women in such

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households more susceptible. Passive smoking, though less prevalent, was also significantly associated with respiratory symptoms, confirming evidence from Walia G K et al.[8] study in India where exposure to environmental tobacco smoke contributed to COPD(Chronic Obstructive Pulmonary Disease) and asthma among non-smoking women.

Socioeconomic status emerged as another important determinant. Women from lower socioeconomic groups had higher prevalence of respiratory diseases, likely due to reliance on cheaper biomass fuels, overcrowded housing, and limited awareness of ventilation practices. This aligns with findings from a community-based study in rural Tamil Nadu by Johnson P et al.[9] where lower socioeconomic status was associated with a higher burden of respiratory morbidity among non-smoking women. Occupational exposure to dust and chemicals, although less frequent among women in this study, was still significantly associated with respiratory symptoms, emphasizing the need to address workplace-related environmental risks even in non-industrial settings.

The present study underscores the importance of non-tobacco risk factors in respiratory disease development among women. While smoking remains a critical cause of respiratory morbidity, environmental exposures: especially indoor air pollution due to biomass fuel, play a substantial role in non-smoking populations. These findings highlight the need for public health interventions such as promoting clean cooking fuels, improving kitchen ventilation, reducing passive smoking exposure, and raising awareness about respiratory health, particularly in rural and lower socioeconomic communities.

Conclusion

The study confirms that a significant proportion of non-smoking women in north Karnataka suffer from respiratory diseases, primarily due to environmental and household exposures. Interventions targeting biomass fuel reduction, better ventilation, occupational safety, and passive smoking prevention are essential to reduce the burden of respiratory morbidity among this population.

Limitations

This study was cross-sectional in nature, which limits the ability to infer causal relationships between risk factors and respiratory diseases and this study did not collect data on the duration or intensity of biomass fuel exposure because of limited scope, focusing only on presence/absence of exposure rather than detailed quantification. Data were self-reported for symptoms and exposure history, which may introduce recall bias which is one of the most important limitations to address. It arises when participants do not accurately remember past events, experiences, or behaviors. This can systematically distort results and affect the validity of conclusions. We acknowledge that the absence of spirometry or lung function testing may have resulted in an underestimation of the true disease prevalence, as some asymptomatic or undiagnosed cases could not be objectively identified.

Conflict of interest

Nono

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