

## RESEARCH ARTICLE



# Respiratory symptoms and other associated factors among the hotel chefs in Gondar town, Ethiopia

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## Abstract

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**Objective:** The objective of the study is to examine the respiratory symptoms and other associated factors among the hotel chefs. **Methods:** A cross-sectional survey with the hotel chefs was conducted using a face-to-face interview. Seventy-five hotel chefs participated in the study. A structured questionnaire was used and identified the self-reported symptoms of respiratory problems and factors associated. Data were analyzed using descriptive statistics and a regression model. **Results:** The multivariate analysis show that level of education and the frequency of cooking were significantly associated with the respiratory symptoms among the hotel chefs with the p-value 0.05 and 0.011 respectively. In univariate analysis variables such as age, marital status, job position, years of service, cooking hours, and cooking frequency are found to be non-significant in association with respiratory symptoms among respondents. **Discussion and conclusion:** The variables such as Education and Cooking frequency reported higher prevalence and are significant and had the higher risks of getting respiratory symptoms though, the majority of the variables such as gender, age, marital status, job position, and cooking hours are non-significant in both univariate and multivariate analysis. The cooking oil fumes exposure and the cooking frequency activity among hotel chefs to be minimized/controlled to avoid their exposure to such respiratory symptoms.

**Keywords:** Cooking oil fumes; Ethiopia; Hotel Chefs; Respiratory symptoms; Star hotels

## 1 Introduction

Cooking is science and art of preparing food by the application of heat for eating purposes and this activity is undertaken in the food production department or kitchen with the help of kitchen staff. The staff involved in cooking processes are called chefs<sup>(1,2)</sup>. The time duration the chefs spend for cooking purposes varies from few hours to very long hours that depend upon the size of the hotel, menu, its customers, food-selling outlets that exist in the hotels<sup>(3,4)</sup>.

While cooking, oil release its smoke, fumes, or vapors and inhaling these result to the cause of lung cancer<sup>(5)</sup>. Cooking methods such as stir-frying and deep-frying with

the help of linseed and rapeseed oil also leads to the cause of lung cancer<sup>(3)</sup>. Chefs working for long hours and several years and having exposed to cooking oil fumes and handling 4 or more cooking stoves had symptoms such as cough, wheeze, Phlegm, stuffy nose, and dyspnea<sup>(6)</sup>. Cooking fumes occupational exposure is associated with an enlarged dominance of respiratory indications and critical alterable diminution in lung efficient ability<sup>(7)</sup>.

The studies conducted by A.Sonia Buist et.al and Olayemi Fehintola Awopeju et.al mentions the factors of the respiratory indicators as cough, phlegm, wheezing or whistling, Shortness of breath<sup>(7,8)</sup>. Many studies reported worldwide regarding the occurrence of lung cancer due to cooking and the release of its fumes when the oil is heated. However, studies solely estimating the prevalence of the respiratory symptoms and its predictors among cooking employees at hotels are scant<sup>(4,6-9)</sup>.

Affording to the World Tourism and Travel Council, tourism affords about 9.8% of comprehensive gross domestic product (GDP) and 10 percent of the world's income and 9.4 % of employment universal, earnings description for a little over 5.7% of world export and 4.3% of total investment. In Ethiopia, tourism, and travel donate much to the nation's GDP, employment, investment, etc<sup>(10)</sup>.

UNWTO report of 2014, states the number of international tourist's arrival reached 1.14 billion. For one in every 11 persons, it created job worldwide (277 million). This progress is only set to remain over a decade onward, with the projection of an added 74.5 million new jobs and an influence of over US \$ 11 trillion to the global economy by 2015 and the estimate for international tourist entrances is to grasp 1.8 billion<sup>(11)</sup>.

Ethiopia continues to demonstrate a steady rise in the number of visitors in the years under review, from 427286 in 2009 to 596,341 in 2012, despite the adverse impact of the global economic downturn on tourism performance worldwide. The tourism industry has emerged as one of the leading sectors that have the potential of driving the Ethiopian economy. It is now the third main source of foreign exchange earnings in Ethiopia (International Visitor's Survey, MOCT, 2013)<sup>(12)</sup>.

Similar occupational studies on respiratory symptoms were undertaken in Ethiopia with different categories of workers in various industries such as textile factories, cement factories, farms, flower farms, pharmaceutical factories, steel factory and the like<sup>(13-19)</sup>. Further, there was a similar study among flourmill workers<sup>(20)</sup>. In the hospitality industry there was a study focusing on health aspects of food handlers<sup>(21)</sup> associated with hygiene practices but there are no surveys conducted in relation to the respiratory symptoms of hotel chefs in the Tourism and hospitality sector that is the backbone of any country's economy including Ethiopia. Hence, it is mandatory to have this survey to know the health respiratory symptoms of hotel chefs because they are the ones feeding (cooking and having more exposure to fumes) the tourists during their stay in the hotels.

## 2 Materials and Methods

### 2.1 Study design and period

A cross-sectional survey was piloted from June to September 2020 in Gondar city, Northwest Ethiopia. This study registered at [www.researchregistry.com](http://www.researchregistry.com) with Research Registry UIN: research registry 6154.

### 2.2 Study Population

All the food preparation staffs/chefs working in the 3-star hotels in the Gondar town.

### 2.3 Inclusion Criteria

All chefs who are free from vision and hearing difficulties are included in the study.

### 2.4 Exclusion Criteria

Chefs with communication problems, vision, and hearing complications were excluded from the study.

### 2.5 Sample size and sampling procedure

According to the website information of the Ministry of Culture and Tourism, Ethiopia, there are six 3 star hotels in Gondar town among which there are 371 rooms, 394 beds, 223 male employees, and 299 female employees. Among the star-rated hotels in Gondar town, six 3-star hotel chefs were selected for the study purpose due to the relevancy for the selected research topics investigation purposes. For the study the researcher had agreed 95% confidence level, 25% expected frequency and 5% Confidence limits. The ultimate sample size was 75 respondents from a total of 81 kitchen employees, who are the real kitchen staff/chefs actively participated in the survey working in the six 3-star hotels in Gondar town. A face-to-face interview system was engaged in the data collection using a designed questionnaire from these selected respondents.

## 2.6 Dependent Variable

Respiratory symptoms and associated factors in those chefs working in the star hotels

## 2.7 Independent variable

Gender, education, age, marital status, job position, years of service, cooking hours, and cooking frequency

## 2.8 Data collection tool and procedure

The data collector announced himself and explained the tenacity of this study to the participants. Cognizant permission was obtained from each contributor. The questionnaire was primed in regional language (Amharic) and the investigator checked for inclusiveness and clearness of the data each day and again before scrutiny. Respiratory symptoms are considered to be present when a participant self-reported the existence of shortness of breath, cough, phlegm, wheezing, and chest tightness.

## 2.9 Data processing and analysis

Information collected from the hotel chefs was coded and arrived into IBM Statistical Package for Social Sciences (SPSS) version 21 for examination by the investigator after checking for accuracy. Descriptive statistics (percentages, cross tabs, and frequency,) were used for all participant features and connected variables for cooking and respiratory symptoms. With reported factors of respiratory symptoms (categories: yes versus no) as the dependent variable, the bivariate and multivariate binary logistic regression model was used to recognize related independent variables. Independent variables with a p-value of less than  $< 0.20$  in the bivariate logistic regression were tailored into the multivariable logistic regression scrutiny for monitoring the probable main effect of confounders and interface terms were used to examine the possible relations between cooking hours, cooking frequency, years of service and age. Results were measured statistically substantial when 95% confidence intervals not containing unity (equal to p-value  $< 0.05$ ) for both main effects and interaction effects.

## 3 Results

Table 1 denotes the various demographic variables and the associated respiratory symptoms for each variable wherein among the 75 respondents, 24 (72.7%) are female respondents and 9 (27.3%) are male with reported respiratory symptoms. Among them 21 (63.6%) had Diploma and above educational qualification and 12 (36.4%) just had only school level education. In the age 10(30.3%) belong to 20-25 years category, 9 (27.3%) in 26-30 years, 8 (24.2%) in 31-35 years, and the rest 6 (18.2%) in 36 and above age category with respiratory symptoms. In the marital status of the respondents with respiratory symptoms, 16 (48.5%) are married and 17 (51.5%) are single. In the Job position, 11 (33.3%) are in the head chef and supervisor category, and others 22 (66.7%) are the Commis chefs and Apprentice/Trainee job positions and they have 2-6 years and 7-12 years' work experiences respectively. From them, 19 (61.3%) spend  $>30$  Hrs/week in cooking and 12 (38.7%) spend 0-30 Hrs/week in cooking. 27 (87.1%) of the respondents with respiratory symptoms cook  $>Twice/day$  whereas 4 (12.9%) cook  $\leq Twice/day$ . Among the variables, only education is significant with  $p = .042^*$  and the rest of the variables are insignificant to  $p < 0.05$ .

**Table 1.** Socio-demographic, cooking, job-related and distribution of respiratory symptoms among hotel chefs working in 3-star hotels in Gondar town, Ethiopia (N=75)

Variables	N (%)	Respiratory symptoms		P
		No	Yes	
Gender				
Male	25 (33.3%)	16 (38.1%)	9 (27.3%)	.407
Female	50 (66.7%)	26 (61.9%)	24 (72.7%)	
Education				
School Level	27 (36.0%)	15 (35.7%)	12 (36.4%)	.042*
Diploma and above	48 (54.0%)	27 (64.3%)	21 (63.6%)	
Age( In years)				
20-25	17 (22.7%)	7 (16.7%)	10 (30.3%)	.347
26-30	25 (33.3%)	16 (38.1%)	9 (27.3%)	
31-35	22 (29.3%)	14 (33.3%)	8 (24.2%)	
36 and above	11 (14.7%)	5 (11.9%)	6 (18.2%)	

*Continued on next page*

*Table 1 continued*

Marital Status	37 (49.3%)	21 (50.0%)	16 (48.5%)	.423
Married	38 (50.7%)	21 (50.0%)	17 (51.5%)	
Job Position				
Head Chef & Supervisors	24 (32.0%)	13 (31.0%)	11 (33.3%)	.644
Commis chefs & Apprentice	51 (68.0%)	29 (69.0%)	22 (66.7%)	
Years of Service				
2-6 years	50 (66.7%)	28 (66.7%)	22 (66.7%)	.868
7-12 years	25 (33.3%)	14 (33.3%)	11 (33.3%)	
Cooking Hours				
0-30 Hrs/week	27 (36.0%)	15 (34.1%)	12 (38.7%)	.112
>30 Hrs/week	48 (64.0%)	29 (65.9%)	19 (61.3%)	
Cooking Frequency				
≤Twice/day	17 (22.7%)	13 (29.5%)	4 (12.9%)	.09
>Twice/day	58 (77.3%)	31 (70.5%)	27 (87.1%)	

\*Denotes significant at p < 0.05

The result of the univariate analysis with various variables and its association with respiratory symptoms among the respondents is projected in [Table 2](#). In the univariate model, the male gender appears to be at 1.5 times higher risk of reporting respiratory symptoms when compared with their counterpart, though the association is not significant. In Education, the respondents with Diploma and above qualification are 2.9 times at higher risk of reporting respiratory symptoms and significant when compared with the respondents with school-level qualifications. Similarly, variables such as Age, Marital status, Job position, Years of service, cooking hours, and cooking frequency were found to be non-significant in association with respiratory symptoms among respondents. However, few among the variables are at higher risks though they are non-significant such as in Age Category 31-35 and 36 and above category are at 1.42 and 1.72 times, in marital status Single category is at 1.45 times risk. Further, in job position Commis chefs and apprentice are at 1.26 times risk, and in cooking frequency, respondents cooking >twice/day are at 2.8 times of higher risk of suffering respiratory symptoms though the association is non-significant.

**Table 2.** Univariate analysis of factors associated with respiratory symptoms among hotel chefs working in 3-star hotels in Gondar town, Ethiopia (N=75)

Variable	N (%)	COR (95% CI)	P
Gender			
Male	25 (33.3%)	1.51 (.57, 3.9)	.40
Female	50 (66.7%)	1 ref	
Education			
School Level	27 (36.0%)	1 ref	.04
Diploma and above	48 (54.0%)	2.86 (1.02, 8.0)	
Age( In years)			
20-25	17 (22.7%)	1 ref	
26-30	25 (33.3%)	.55 (.15, 2.0)	.37
31-35	22 (29.3%)	1.42 (.39, 5.1)	.58
36 and above	11 (14.7%)	1.71 (.37, 7.9)	.49
Marital Status			
Married	37 (49.3%)	1 ref	.42
Single	38 (50.7%)	1.45 (.57, 3.6)	
Job Position			
Head Chef & Supervisors	24 (32.0%)	1 ref	3.4
Commis chefs & Apprentice	51 (68.0%)	1.26 (.46, 2.1)	
Years of Service			
2-6 years	50 (66.7%)	1 ref	.92
7-12 years	25 (33.3%)	.92 (.34, 2.4)	
Cooking Hours			
0-30 Hrs/week	27 (36.0%)	1 ref	.81
>30 Hrs/week	48 (64.0%)	.81 (.31, 2.1)	

*Continued on next page*

Table 2 continued

Cooking Frequency			
≤Twice/day	17 (22.7%)	1 ref	.09
>Twice/day	58 (77.3%)	2.8 (.82, 9.7)	

\*Denotes significant at p < 0.20

The outcomes of the multivariate analysis depicted in Table 3 display that the two categories: Education and Cooking frequency are significant in association with the respiratory symptoms among the hotel chefs with the p-value .05 and .011 respectively.

Table 3. Multivariate analysis of factors associated with respiratory symptoms among hotel chefs working in 3-star hotels in Gondar town, Ethiopia (N=75)

Variable	N (%)	AOR (95% CI)	P
Education			
School Level	27 (36.0%)	2.82 (1.0, 8.1)	.05
Diploma and above	48 (54.0%)		
Cooking Frequency			
≤Twice/day	17 (22.7%)	2.7 (1.79, 9.8)	.011
>Twice/day	58 (77.3%)		

\*Denotes significant at p < 0.20

#### 4 Discussion

The findings of this study showed that the overall prevalence of respiratory symptom was higher (44%) among the restaurant chefs. Educational level and frequency of cooking were significantly associated with the self-reported respiratory symptoms. The absence of assessment of kitchen environment and concentration of air pollutants may not allow this study to explain the dose-response relationship. However, this paper is unique in the study area reporting workplace exposure to smoke and related respiratory symptoms among restaurant chefs. These findings are in line with the previous studies conducted in Norway<sup>(22)</sup> and Nigeria which reported on the association of exposure to kitchen smoke and respiratory symptoms. Surprisingly, the prevalence reported in this study is higher than the prevalence of respiratory symptoms among children and women secondary to domestic cooking in the country. This might be due to increased frequency of cooking in commercial set up, frying frequency, lack of exhaust system in the restaurant, and smoking habits in the study population.

Our study showed that the level of education and frequency of cooking influenced the respiratory symptoms. Similarly the studies conducted in Thailand<sup>(6)</sup> and China reported association between the respiratory symptoms and frying activities, frequency of cooking, type of oil used, cooking method and fuel used for cooking. Another unusual finding was that having a longer service and position of job is not associated with the risk of respiratory symptoms. The possible explanation could be is that having a separate kitchen, ventilation hoods, and differences in the hotel standard and domestic cooking habits among the population studied.

#### Strength of the study

The strength of this study was the inclusion of both genders and the young and older adult population that can provide significant results.

#### Limitation of the study

The study is limited to the chefs working in the 3-star hotels only it failed to include other star hotel chefs from one star to 5 star hotels.

#### 5 Conclusion

The results of this survey demonstrated that two of the variables: education and cooking frequency were significant and have the higher risks of getting respiratory symptoms though, the majority of the variables such as gender, age, marital status, job position, and cooking hours are non-significant in both univariate and multivariate analysis. The cooking oil fumes exposure and the cooking frequency activity among hotel chefs to be minimized/controlled to avoid their exposure to such respiratory symptoms.

## Research registration unique identifying number (UIN)

Researchregistry6154

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## References

- Short F. Kitchen Secrets: The Meaning of Cooking in Everyday Life. 2006. Available from: [https://scholar.google.com/scholar?hl=en&as\\_sdt=0%2C5&q=Short+F.+Kitchen+secrets%3A+The+meaning+of+cooking+in+everyday+life.+Berg%3B+2006.+&btnG=](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Short+F.+Kitchen+secrets%3A+The+meaning+of+cooking+in+everyday+life.+Berg%3B+2006.+&btnG=).
- Gisslen W. Professional cooking, college version. John Wiley & Sons. 2010. Available from: [https://books.google.com.et/books?hl=en&lr=&id=N5eI9CYbEP0C&oi=fnd&pg=PR22&dq=Gisslen+W.+Professional+cooking,+college+version.+John+Wiley+%26+Sons%3B+2010.+&ots=dcvy\\_nRRvO&sig=mF8jAFnJk6l6Kk8aKZPRuWJt-s&redir\\_esc=y#v=onepage&q=Gisslen%20W.%20Professional%20cooking%2C%20college%20version.%20John%20Wiley%20%26%20Sons%3B%202010.&f=false](https://books.google.com.et/books?hl=en&lr=&id=N5eI9CYbEP0C&oi=fnd&pg=PR22&dq=Gisslen+W.+Professional+cooking,+college+version.+John+Wiley+%26+Sons%3B+2010.+&ots=dcvy_nRRvO&sig=mF8jAFnJk6l6Kk8aKZPRuWJt-s&redir_esc=y#v=onepage&q=Gisslen%20W.%20Professional%20cooking%2C%20college%20version.%20John%20Wiley%20%26%20Sons%3B%202010.&f=false).
- Metayer C, Wang Z, Kleinerman RA, Wang L, Brenner AV, Cui H, et al. Cooking oil fumes and risk of lung cancer in women in rural Gansu, China. *Lung Cancer*. 2002;35:111–117. Available from: [https://dx.doi.org/10.1016/s0169-5002\(01\)00412-3](https://dx.doi.org/10.1016/s0169-5002(01)00412-3).
- Lee T, Gany F. Cooking Oil Fumes and Lung Cancer: A Review of the Literature in the Context of the U.S. Population. *Journal of Immigrant and Minority Health*. 2013;15(3):646–652. Available from: <https://dx.doi.org/10.1007/s10903-012-9651-1>.
- Juntarawijit C, Juntarawijit Y. Cooking smoke and respiratory symptoms of restaurant workers in Thailand. *BMC Pulmonary Medicine*. 2017;17:1–1. Available from: <https://dx.doi.org/10.1186/s12890-017-0385-7>.
- Neghab M, Delikhoon M, Baghani AN, Hassanzadeh J. Exposure to Cooking Fumes and Acute Reversible Decrement in Lung Functional Capacity. *The International Journal of Occupational and Environmental Medicine*. 2017;8:207–216. Available from: <https://dx.doi.org/10.15171/ijom.2017.1100>.
- Awopeju OF, Nemery B, Afolabi OT, Poels K, Vanoirbeek J, Obaseki DO, et al. Biomass smoke exposure as an occupational risk: cross-sectional study of respiratory health of women working as street cooks in Nigeria. *Occupational and Environmental Medicine*. 2017;74(10):737–744. Available from: <https://dx.doi.org/10.1136/oemed-2016-104107>.
- FK H, TF N. Practices and Challenges of Corporate Social Responsibility (CSR) in the Hospitality Industry: The Case of First Level Hotels and Lodges in Gondar City, Ethiopia. *Journal of Tourism & Hospitality*. 2015;04(184). Available from: <https://dx.doi.org/10.4172/2167-0269.1000184>.
- S N. The Role of Tourism on Local Economic Development of Gondar City, Amhara Regional State, Ethiopia. *Journal of Global Economics*. 2016;4(3). Available from: <https://dx.doi.org/10.4172/2375-4389.1000207>.
- Liben S, Ensermu M. Forecasting Tourist Arrivals and Supply and Demand Gap Analysis for Hotel Sector in Addis Ababa, Ethiopia. *Ethiopian Journal of Business and Economics (The)*. 2016;5(2):269–300. Available from: <https://dx.doi.org/10.4314/ejbe.v5i2.5>.
- Tadesse S, Bezabih K, Destaw B, Assefa Y. Awareness of occupational hazards and associated factors among welders in Lideta Sub-City, Addis Ababa, Ethiopia. *Journal of Occupational Medicine and Toxicology*. 2016;11(1):1–6. Available from: <https://dx.doi.org/10.1186/s12995-016-0105-x>.
- Alemu K, Kumie A, Davey G. Byssinosis and other respiratory symptoms among factory workers in Akaki textile factory, Ethiopia. *Ethiopian Journal of Health Development*. 2010;24(2). Available from: <https://dx.doi.org/10.4314/ejhd.v24i2.62962>.
- Gizaw Z, Yifred B, Tadesse T. Chronic respiratory symptoms and associated factors among cement factory workers in Dejen town, Amhara regional state; vol. 11. Ethiopia. 2015. Available from: <https://doi.org/10.1186/s40248-016-0043-6>.
- Asfaw S, Enquselassie E, Tefera Y, Gizaw M, Wakuma S, Woldemariam M. Determinants of Chronic Respiratory Symptoms among Pharmaceutical Factory Workers. *Journal of Tropical Medicine*. 2018;2018:1–10. Available from: <https://dx.doi.org/10.1155/2018/3815689>.
- Girma F, Kebede Z. Dust Exposure Associations with Lung Function among Ethiopian Steel Workers. *Annals of Global Health*. 2019;85(1). Available from: <https://dx.doi.org/10.5334/aogh.2422>.
- Hanssen VM, Nigatu AW, Zeleke ZK, Moen BE, Bråtveit M. High Prevalence of Respiratory and Dermal Symptoms Among Ethiopian Flower Farm Workers. *Archives of Environmental & Occupational Health*. 2015;70:204–213. Available from: <https://dx.doi.org/10.1080/19338244.2013.853645>.
- Lagiso ZA, Mekonnen WT, Abaya SW, Takele AK, Workneh HM. Chronic respiratory symptoms, lung function and associated factors among flour mill factory workers in Hawassa city, southern Ethiopia: “comparative cross-sectional study”. *BMC Public Health*. 2020;20:1–9. Available from: <https://dx.doi.org/10.1186/s12889-020-08950-9>.
- Tilahun W, Endebu T, Abera T. Health Status of Food Handlers and Associated Factors at Hotels and Restaurants in Adama Town, Ethiopia. 2020;50(2):102–113. Available from: <https://core.ac.uk/download/pdf/322601097.pdf>.
- Svensden K, Sjaastad AK, Sivertsen I. Respiratory symptoms in kitchen workers. *American Journal of Industrial Medicine*. 2003;43:436–439. Available from: <https://dx.doi.org/10.1002/ajim.10197>.
- Adewole OO, Desalu OO. Respiratory symptoms and lung function patterns in workers exposed to wood smoke and cooking oil fumes (mai suya) in Nigeria. *Annals of Medical and Health Sciences Research*. 2013;3(1):38–42. Available from: [10.4103/2141-9248.109475](https://doi.org/10.4103/2141-9248.109475).
- Dagne H, Andualem Z, Dagnaw B, Taddese AA. Acute respiratory infection and its associated factors among children under-five years attending pediatrics ward at University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia: institution-based cross-sectional study. *BMC pediatrics*. 2020;20(1):1–7. Available from: <https://doi.org/10.1186/s12887-020-1997-2>.
- Zheng P, Li W, Chapman S, Zhang Z, Gao J, Fu H. Workplace exposure to secondhand smoke and its association with respiratory symptoms—a cross-sectional study among workers in Shanghai. *Tobacco Control*. 2011;20(1):58–63. Available from: <https://dx.doi.org/10.1136/tc.2010.036921>.