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Nature, cause & management strategies of respiratory complication in northern regions (Rajshahi) of Bangladesh: A cross-sectional health survey

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Abstract
A cross-sectional health survey was conducted in Rajshahi of Bangladesh regarding respiratory disease. The objective of the study was to identify the nature, cause and management strategies of respiratory complication. The data was collected from 170 patients among them 76.47% are male and 23.53% are female. Among those of surveyed patients 46% are smoking regularly and most of them (71%) are smoking 1-3 times/day. The patients are affected from surrounding environment and 58.82% patients are affected by passive smoking, 56.47% affected by fume emitted from cooking and 77.06% inhaling dust particles. About 51.76% patients have family history of allergy, 24.71% has food allergy, and 58.24% has discomfort to fog and smoke. The patients are suffering mainly from chronic bronchitis 51.76% and asthma 41.18%. The patients are facing various complications like cough 92.94%, phlegm 38.24%, chest tightness 50%, wheezing 29.41%, itchy 28.24%, runny nose 18.24%, red and watery eye 15.29% and mucous membrane irritation 8.24%. The patients conducted chest X ray 58.24%, lung function test only 0.59% and 11.18% conducted both of them while 30% patient does not conduct any diagnostic test. Patient perception data about their environment shows fully satisfaction 22.94%, partially satisfaction 54.71% and dissatisfaction 21.18%.

Keywords: respiratory disease; smoking; allergy; patient perception

Introduction

Lung is the most vulnerable organ to infection and damage because of its exposure to environments especially environmental pollutants and contaminants. At present, globally more than 2 billion people are exposed to the toxic smoke which originated from combustion of biomass fuel, vehicles, and industrial exposure of toxic gases to the environment. Data from current research shows that about one billion people are inhaling the air which is polluted and 1 billion are taking tobacco smoke both actively and passively. Respiratory disease affects peoples of ages, races, and genders but the peoples living with poverty and poor hygienic condition are affected most [1].

Respiratory disease is one of the major causes of mortality and morbidity in the world. In 2015 respiratory disease was the fifth leading cause of death causing 6.7% death worldwide [2]. The most common respiratory disease are acute respiratory tract infection (ARI), chronic obstructive pulmonary disease (COPD), asthma, lung cancer, pneumonia and tuberculosis (TB). Acute respiratory infection is the infection of respiratory tract and surrounding area like sinus, middle ear and pleural cavity and it is one of the major causes of disability in developing countries. Infections in lower respiratory tract causes death around 2.5 million annually which mainly occurs in middle and lowincome countries [3]. Surprisingly it takes more lives than acquired immune deficiency syndrome (AIDS), TB and malaria combindly. Children's less than 5 years old are most vulnerable to this [4]. Another promising respiratory disease named chronic obstructive pulmonary disease which causes inflammation in respiratory tract resulting obstructed airflow is the cause of suffering of about 65 million peoples and death of 3 million of people [5]. Asthma is the most common chronic disease during childhood, which affects 14% of child and total number of affected people is 334 million [6]. Lung cancer is one of the most common types of cancer kills 1.6 million people every year [7]. It has two forms: small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC) [8]. A infectious respiratory disease named pneumonia caused by *Streptococcus pneumoniae* is one of the very common disease in child below 5 years old kills 393,000 children in 2015 [1]. Another bacterial disease named tuberculosis caused by *Mycobacterium tuberculosis* was one of the top ten cause of death in 2015 whose prevalence was about 1.4 million [9]. A recent report published by WHO suggests that treatment adherence and drug resistant is the major factors leading to death [10-11]. Influenza, a viral infection is the cause of illness about 3-5 million people [12]. Along with these major respiratory disorder several other respiratory disease like sleep apnea, cystic fibrosis, and pleural effusion are the cause of suffering of more than 100 million people [13].

Respiratory diseases is one of the most common cause of disability and loss of productivity of old age and more than 10% of people are the victims of it [14]. It is known that respiratory disease is not curable for most of the times and its severity increases over time and causing an impact of daily life activities, mental stability and quality of life [15-16]. Ultimately it leads to a challenging condition to face and cope with it due to the necessity of support from family and

society [17].

Materials and Methods

Setting and Design

The study location was Rajshahi. Usually Rajshahi is a clean and green city and air quality is better than most of the cities of Bangladesh. But the location is choose because there is EPZ (Export Processing Zone) in Rajshahi and some industry especially textile industry are there. Hence the city is choosing for the study zone. The data was collected mainly from Rajshahi Medical College Hospital but some data are also collected from various hospitals, clinics in Rajshahi over six month's period from May to October, 2018. Geographically Rajshahi is situated in the northern region of Bangladesh and is surrounded by river Padma (Figure 1) having population of 2,595,197. The total land area for Rajshahi is 2,407.01 km^2 [18].

Fig 1: Map of Rajshahi district.

Data instrument development and quality assurance

The questionnaire was developed by few set of adapted questionnaire from in-depth review of related literature [2, 5, 8, 15-16]. At first an initial version of a standard questionnaire was developed then reviewed by expert advisory group (includes statistician and medical doctor) and address their comments. Finally the questionnaire were piloted by the reasonable number of respondent and all the necessary correction about wording and ease of use, in addition to assessing the feasibility of the questionnaire were made to ensure face validity and finally excluded the piloted data from final analysis.

Data Collection

A self-designed pretested and structured questionnaire was prepared to carry out this cross-sectional survey. The data was collected by directly interviewing the 170 patients. Each of the patients provides written consent to the survey form. The English questionnaire was translated to Bengali by data collectors to make the questions more familiar to the patients. The Bengali answer is transferred to English by data collectors and the fill out the form. To ensure the data accuracy for translation process, double or parallel translation method was utilized to confirm that the meaning of the original survey was maintained in the translated version. The incomplete forms were excluded during checking and data analysis.

Ethical Considerations

The study was conducted following the general principles (section 12) of WMA declaration of Helsinki. The personal information of patient and their response is kept secret and is used only for educational purpose. The respondent's gives their opinion without any external influence and the data collector's collects information without any biasness. Written consent was taken from the participants.

Statistical Analysis

Due to generalize the results from quantitate research, data cleaning is an important in itial steps to go for initial data analyzing procedure [19]. For our current study, data were checked and cleaned for missing cases, incomplete information a]nd also for extreme value using informal technique [20-21]. Descriptive statistics were used to describe the study variables and frequencies and corresponding percentages have been reported. All data analysis was performed using Microsoft Excel 2013 software.

Results

Patient Characteristics

Most of the patients were 21 to 40 years old with average of 41.46 ± 17 (mean ± SD) years old. About 29% respondents were 21-30 years old, while 23% patients were 31-40 years old. Although some of the patients age observed from 41-70 years old. Among the participants 76.47% were male while rest of them were female.

Table 1: Patients characteristics.

Variable	Range	Frequency	Percentage
Age	10-20y	9	5.29%
	21-30y	49	28.82
	31-40y	39	22.94%
	41-50y	22	12.94%
	51-60y	27	15.88%
	61-70y	14	8.24%
	≥71y	10	5.88%
Gender	Male	130	76.47%
	Female	40	23.53%
Occupation	Agriculture	68	40.0%
	Businessman	12	7.06%
	Labour	22	12.94%
	Housewife	34	20.0%
	Student	21	12.35%
	Other	13	7.65%
Smoking habit	Yes	78	45.88%
	No	92	54.12%
Duration of smoking	1-3 times/day	55	70.51%
	4-6 times/day	19	24.36%
	>6 times/day	4	5.13%

The data collected from patients, belongs to versatile occupation like agrarian, labour, housewife, student and other occupations. Agrarian found the leading occupation belonging to our survey and it comprising of 40%, followed by housewife 20%, labour 13%, student 12% and businessman 7%. Among the surveyed patients 46% are smoking regularly and the duration is 1-3 times/day is 71%, 4-6 times /day 24% and >6 times /day is 5%.

Environmental Cue

In this study it is found that 58.82% patients are suffer from passive smoking, more than half (56.47%) of the patients affected by fume that emitted from cooking and 8.82% affected by fume that exhaust from vehicle. In this study 77.06% respiratory patient are inhaling dust, 27.06% are taking pollen pigment through inhalation, 14.12% taking fibre and 5.29% taking wood dust. The patients are also exposed to toxic chemicals that are used for farming and food processing and about 16.47% are exposed to insecticide, followed by 5.88% are exposed to carbide, 18.24% are exposed to different fertilizers and 6.47% are exposed to formaldehyde. Only a few of the patients (6.47%) are exposed to flour which is originated to rice processing farms.

Table 2: Patient's exposure to environmental parameters related to respiratory problems.

Surrounding Condition	Response	Frequency	Percentage
Suffer from Passive Smoking	Yes	100	58.82%
	No	70	41.18%
Affected by Fume emitted from cooking	Yes	96	56.47%
	No	74	43.53%
Affected by Fume of Vehicle	Yes	15	8.82%
	No	155	91.18%
Inhale Dust	Yes	131	77.06%
	No	39	22.94%
Inhale Pollen Pigment	Yes	46	27.06%
	No	124	72.94%
Inhale Fibre	Yes	24	14.12%
	No	146	85.88%
Inhale Wood Dust	Yes	9	5.29%
	No	161	94.71%
Exposed to Insecticide	Yes	28	16.47%
	No	142	83.53%
Exposed to Carbide	Yes	10	5.88%
	No	160	94.12%
Exposed to Fertilizer	Yes	31	18.24%
	No	139	81.76%
Exposed to Flour	Yes	11	6.47%
	No	159	93.53%
Exposed to Formaldehyde	Yes	11	6.47%
	No	159	93.53%
Exposed to Perfume	Yes	26	15.29%
	No	144	84.71%

Patient Profiles

More than half of the patient (51.76%) has family history of allergy and about one fourth of (24.71%) patient has allergy to different types of food and 58.24% patient are feeling discomfort with fog and smoke (Table 3).

Table 3: Patient profile

Sensitivity	Response	Frequency	Percentage
Family History of Allergy	Yes	88	51.76%
	No	82	48.24%
Allergic Reaction with Food	Yes	42	24.71%
	No	128	75.29%
Discomfort with Fog/Smock	Yes	99	58.24%
	No	71	41.76%

Figure 2 represent the different diseases faced by patients and observe that chronic bronchitis is the leading respiratory disease faced by the patients and its occurrence is 51.76%. Asthma is the second leading respiratory disease whose prevalence is 41.18%.

The other respiratory disease chronic obstructive pulmonary disease (COPD) consists of 20% and sinusitis comprising of 15.88%. A few patients are suffering from pneumonia (2.35%) and influenza (1.18%)

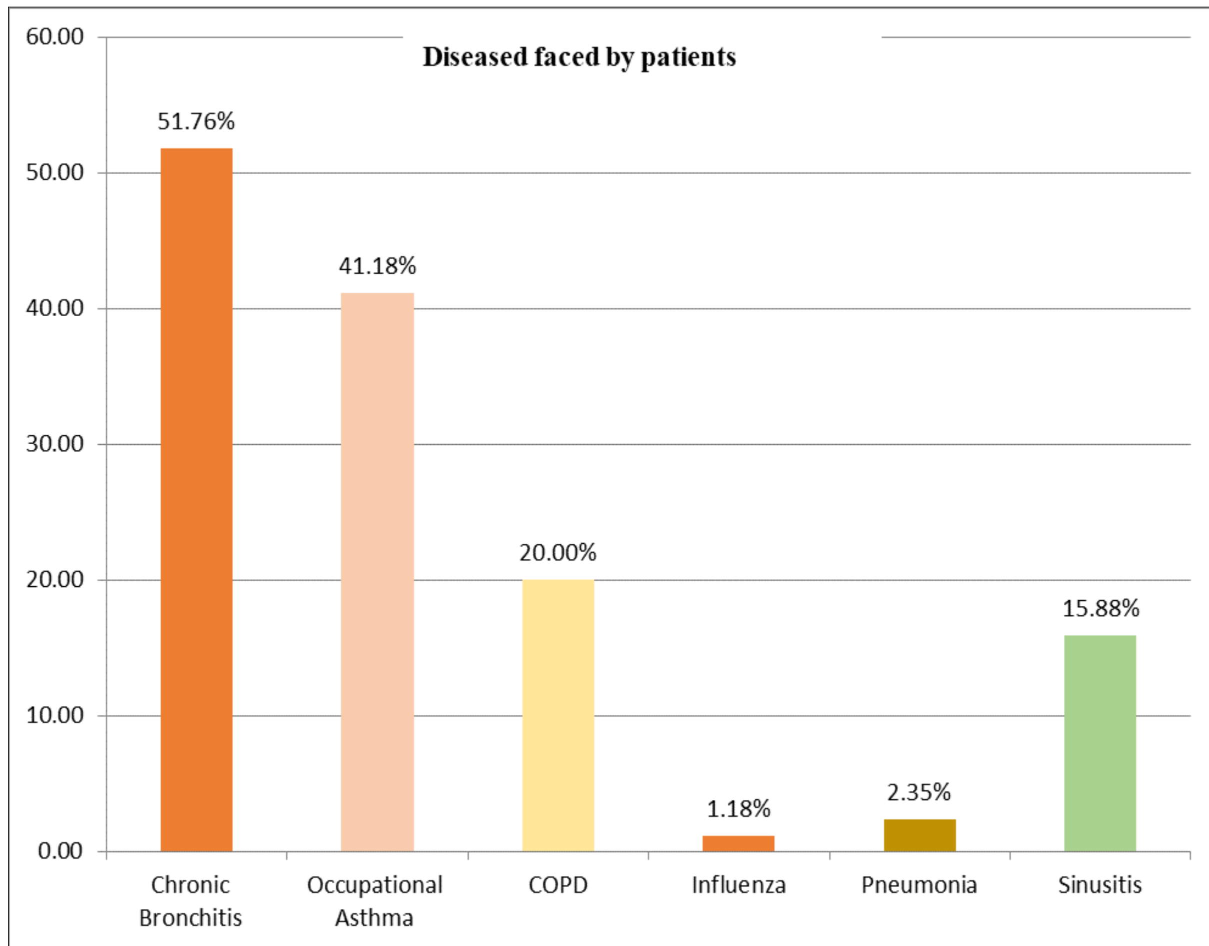

Fig 2: Disease faced by patient.

The patients are facing various types of respiratory problems like cough 92.94%, phlegm 38.24%, chest tightness 50%, wheezing 29.41%, itchy 28.24%, runny nose 18.24%, red and watery eye 15.29% and mucous membrane irritation 8.24% (Figure 3).

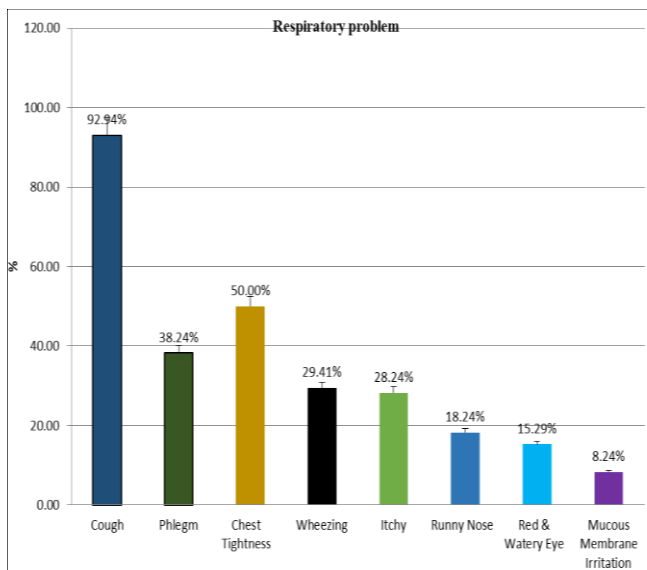

Fig 3: Respiratory problems faced by patient.

Several other organs apart from respiratory system are affected during respiratory disease. The study finds that the patients are suffering from fever 51.18%, headache 43.53%, weakness 54.12%, shivering 5.29%, muscle pain 16.47%, loss of appetite 36.47% and weight loss 18.82% (Figure 4).

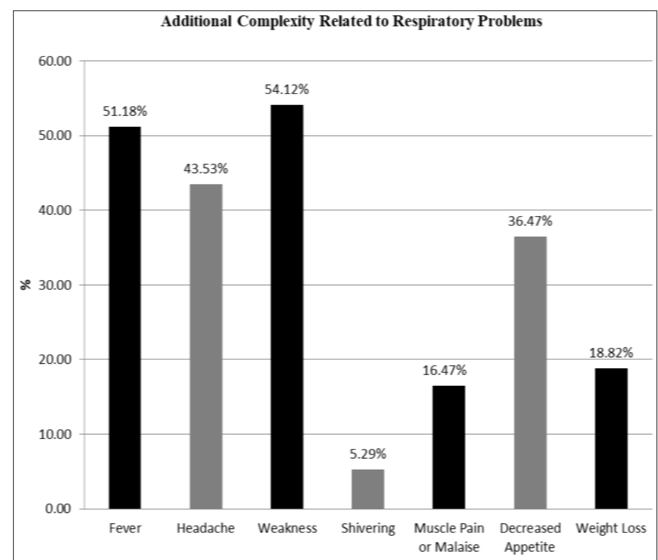

Fig 4: Additional complexity related to respiratory problems.

Regarding the treatment, the patients are treated mainly by antibiotics 34.12%, bronchodilator 97.06% corticosteroid 21.76% and nasal decongestant 10%. Several other drugs also reported such as anticholinergic agent 6.47%, cough expectorant 4.12% and leukotriene receptor antagonist 5.88% (Figure 5).

The patients face negligible amount of side effects (6%) of administered drug (Figure 6).

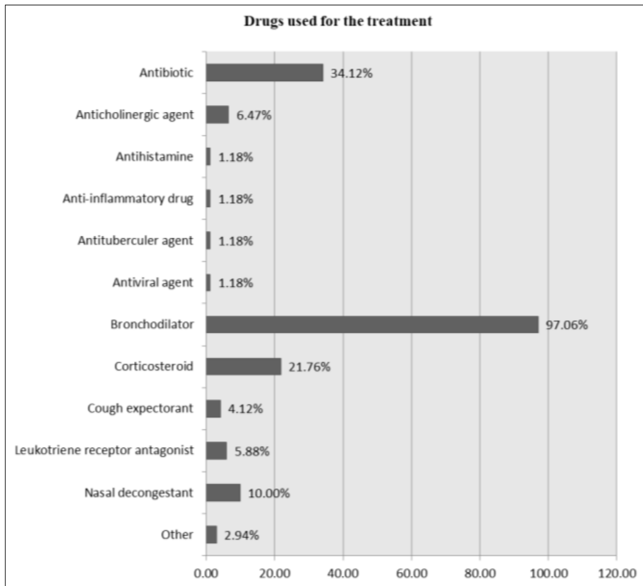

Fig 5: Drug used for the treatment

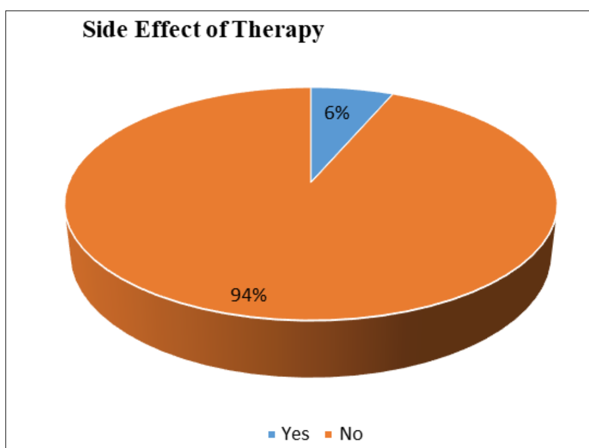

Fig 6: Side of therapy.

From patient's perception, about safety lifestyle around twenty five percent (24.12%) patients are advised to avoid dust, 2.94% to avoid foods and only4.12% suggested to exercise regularly (Figure 7).

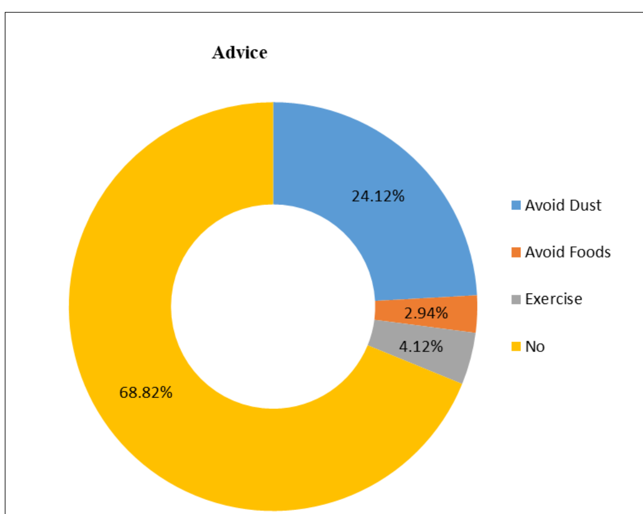

Fig 7: Advice provided to patient.

The respiratory diseases are identified by different kind of diagnostic test. Where chest X ray is conducted by 58.24% and 0.59% do lung function test, 11.18% conducted both of them and 30% patient does not Has any diagnostic test report (Figure 8).

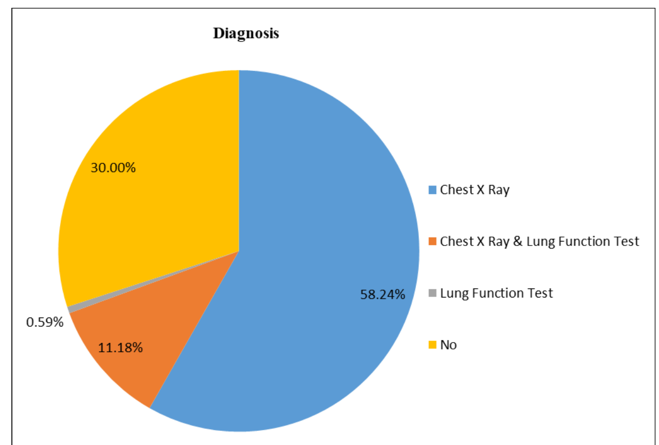

Fig 8: Diagnosis used to identify disease.

The patients have been asked about their perception on current environment and found about 22.94% patients reported that they are fully satisfied on their surrounding environment, while more than half (54.71%) are partially satisfied and only 21.18% patients are dissatisfied about their environment (Figure 9).

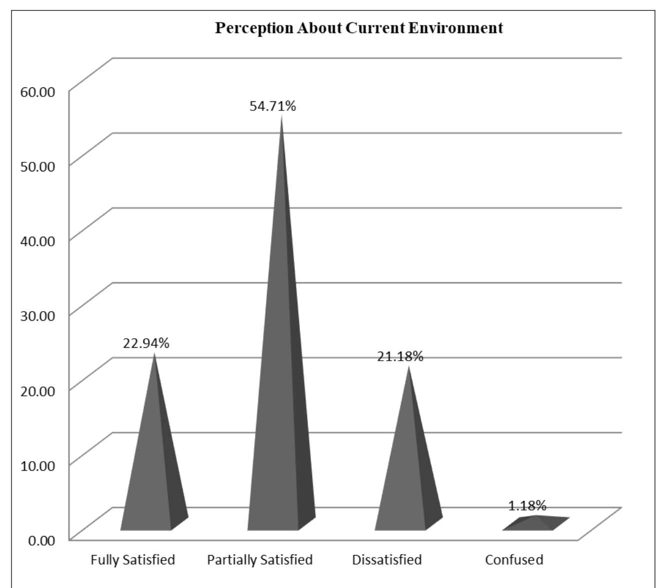

Fig 9: Patient perception about current environment.

Discussion

Respiratory diseases are the disease which affecting lungs, pleural cavity, bronchial tubes, trachea, upper respiratory tract, and of the nerves and muscles used in breathing [22]. Respiratory diseases may be not only mild condition like common cold but also to life threatening such as bacterial pneumonia [23]. In this cross sectional health survey a wide range of peoples are involving including various occupations like agrarian, housewife, labour, students and businessman bearing ages from 10-70 years and both male and female participants are included. There is clear association between cigarette smoking and respiratory disease and in this survey 46% respiratory patient has habit of smoking. The duration of smoking indicates the intensity of damage caused by toxic chemicals.

Second hand smoking (SHS) or passive smoking increases the risk of death in both adults and children. Every year 600,000 deaths are caused by passive smoking [24-25]. Cigarette smoke is a toxic compilation of more than 4000 chemicals generated from combustion of tobacco plant leaves, is known to cause disorders of respiratory system and also associates with an increase in respiratory infections [26-27]. Various disease like lung cancer increases to 20-30% in non-smoker who are exposed to second hand smoke and risk of heart disease enhances to 30% by passive smoke [28]. In this study it is found that more than half of the patents are suffer from passive smoking, 56.47% affected by fume that emitted from cooking and 8.82% affected by fume that exhaust from vehicle. A study in China in 2016 found similar prevalence of passive smoking (48.7%) [29]. In another study in Jilin Province, China the prevalence of passive smoking among non-smoker women was 60.6% [30]. The patients are taking various types of dust and pigments that go through trachea and sediments in the alveolus and causes irritation, inflammation and other respiratory complexity. The patients are also exposing to various types of toxic chemicals such as insecticide, carbide, formaldehyde that are harmful to living cell and causes multiple diseases like throat cancer, emphysemia etc.

Respiratory disease is also transfers through genetic trait and in this study more than half of the patient has family history of respiratory disease. The leading respiratory disease suffered by patient is bronchitis 51.76%, asthma 41.18%, COPD 20% and sinusitis 15.88%. In a study conducted by Sultana T *et al*., in 2017 in Pakistan finds that the prevalence of asthma is 28.08% and COPD 11.31% [31]. The patients are facing various types of respiratory problems along with disease like cough, phlegm, chest tightness, wheezing, itchy, runny nose, red and watery eye, and irritation. Additional complexity along with respiratory disease are also found like fever 51.18%, headache 43.53%, weakness 54.12%, shivering 5.29%, muscle pain 16.47%, loss of appetite 36.47% and weight loss 18.82%. In her study in 2017, Sultana T *et al*., reports different associated disease with respiratory disease containing hospital patients. She shows that respiratory patients are suffering blood pressure 66%, fever 34%, diabetes 25%, fatigue 18%, and chest pain 16% [31]. Drugs mainly bronchodilator, followed by antibiotics and corticosteroid are used for the treatment purpose. The diagnostic test report is used in most of the case to identify the respiratory disease. Patient's opinion about their surrounding environment have been asked and found that most of the patients are partially satisfied about surrounding their environment.

Conclusion

From the current study it is found that a large proportion of people are in the threat of respiratory problem as more than half of the people are in the contact of smock, dust, fume and other particles that can trigger respiratory complexity. Both indoor (asbestos, building & paint products, CO, carpets, and residential wood burning) and outdoor air pollutants (NO_2, O_3, SO_2, fungal spore and pollen particles) has the potential to damage respiratory system. So, immediate steps should be taken against air pollution to ensure safety of public health.

Study limitation

The study has several limitations. firstly the sample size is not very high. Next the detail study of patients diagnostic reports are not included in the study. And lastly the daily exercise level of the patients are not evaluated.

Conflict of interest

None

Reference

1. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet,2016:388:1459–544. doi: 10.1016/S0140-6736(16)31012-1.
2. Dwyer-Lindgren L, Bertozzi-Villa A, Stubbs RW, Morozoff C, Shirude S, Naghavi M *et al*. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Journal of the American Medical Association,2018:318(12):1013-1023. doi: 10.1001/jama.2018.0900.
3. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V *et al*. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet,2012:380(9859):2095-128. doi: 10.1016/S0140-6736(12)61728-0.
4. Pneumonia: The forgotten killer of children. Geneva, The United Nations Children's Fund (UNICEF)/World Health Organization (WHO), 2006. Available from: http://www.who.int/ maternal_child_adolescent/documents/9280640489/en/
5. Burney PG, Patel J, Newson R, Minelli C, Naghavi M. Global and regional trends in COPD mortality, 1990–2010. European Respiratory Journal, 2015; 45:1239-1247; doi: 10.1183/09031936.00142414.
6. Global Asthma Report. Auckland, Global Asthma Network, 2014. Available from: http://www. globalasthmareport.org/resources/Global_Asthma_Report_2014.pdf
7. Torre LA, Bray F, Siegel RL, Ferlay J, Lortet-Tieulent J, Jemal A. CA: A Cancer Journal For Clinicians,2015:65:87-108. https://doi.org/10. 3322/caac.21262.
8. Ahmed WH, El-Hadaad HA, Anter AH, Ahmad MAS, Abd-El Hay Ghazy HF. Outcomes and Prognostic Factors of Small Cell Lung Cancer: A Retrospective Study. Advances in Lung Cancer,2018:7(3):21-31. https://doi.org/10.4236/n alc. 2018.73003
9. WHO Global Tuberculosis Report. Geneva, Switzerland: WHO Press; 2016. https:// apps. who.int/medicinedocs/documents/s23098en/s23098en.pdf
10. Global Tuberculosis Control Report of. Geneva, Switzerland: WHO Press, 2012. https://www.who.int/tb/publications/global_report/gtbr12_main.pdf
11. Tola HH, Tol A, Shojaeizadeh D, Garmaroudi G. Tuberculosis Treatment Non-Adherence and Lost to Follow Up among TB Patients with or without HIV in Developing Countries: A Systematic Review. Iranian Journal of Public Health,2015:44(1):1-11.
12. Standards of Practice for Case Management. Little Rock, Case Management Society of America, 2010.

Available from: http://www.cmsa.org/ portals/0/pdf/memberonly/StandardsOfPractice.pdf
13. World Health Organization. Global surveillance, prevention and control of chronic respiratory diseases. A comprehensive approach. Geneva, WHO, 2007. Available from: http://www.who.int/ gard/publications/GARD_Manual/en/
14. GBD. DALYs and HALE Collaborators. Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990-2015: a systematic analysis for the Global Burden of Disease Study, 2015. Lancet 388. http://www. thelancet. com/ journals/lancet/article/ PIIS0140-6736(16)31460-X/abstract
15. Blakemore A, Dickens C, Guthrie E, Bower P, Kontopantelis E, Afzal C *et al*. Depression and anxiety predict health-related quality of life in chronic obstructive pulmonary disease: systematic review and meta-analysis. International Journal of Chronic Obstructive Pulmonary Disease,2014:9(1):501-512.doi:10.2147/COPD. S58136.
16. Heslop-Marshall K, De Soyza A. Are We Missing Anxiety in People with Chronic Obstructive Pulmonary Disease (COPD)? Annals of Depression and Anxiety,2014:1(5):1023.
17. Jordan RE, Majothi S, Heneghan NR, Blissett DB, Riley RD, Sitch AJ *et al*. Health Technology Assessment,2015:19(36):1-516. doi:10.3310/hta1 9360.
18. Bangladesh Bureau of Statistics, Rajshahi 2011. http://www.bbs.gov.bd/WebTestApplication/userfiles/Image/District%20Statistics/Rajshahi.pd
19. Osborne JW. Best Practices in Data Cleaning. Sage, 2013. http://pzs.dstu. dp.ua/ DataMining/ preprocessing/bibl/cleaning.pdf
20. Dunn OJ, Clark VA. Applied Statistics: Analysis of Variance and Regression. Toronto: John Wiley & Sons, 1974.
21. Islam A, Islam N, Bharati P, Aik S, Hossain G. Socio-economic and demographic factors influencing nutritional status among early childbearing young mothers in Bangladesh. BMC women's health,2016:16:58. https:// bmcwomenshealth.biomedcentral.com/articles/10.1186/ s12905-016-0338-y.
22. Divita L. List of diseases of the respiratory system. Retrieved, 2013 from http://www.livestrong.com/ article/79558-list-diseases-respiratory-system/.
23. Khan A, Salik S. Increasing air pollution causing respiratory diseases in Pakistan. Retrieved July 25, 2012, from http://www. dailytimes.com.pk /default. asp? page=story,2009:2(3):14-1.
24. Oberg M, Jaakkola MS, Woodward A, Peruga A, Prüss-Ustün A. Worldwide burden of disease from exposure to second-hand smoke: a retrospective analysis of data from 192 countries. Lancet, 2011, 377. doi: 10.1016/S0140-6736(10)61388-8.
25. Zalata A, Yahia S, El-Bakary A, Elsheikha HM. Increased DNA damage in children caused by passive smoking as assessed by comet assay and oxidative stress. Mutation Research,2007:629:140-7.
26. Patel RR, Ryu JH, Vassallo R. Cigarette smoking and diffuse lung disease. Drugs,2008:68(11):1511-27. doi: 10.2165/00003495-200868110-00004.
27. Margaritopoulos GA, Vasarmidi E, Jacob J, Wells AU, Antoniou KM. Smoking and interstitial lung diseases. European Respiratory Review,2015:24:428-435. doi: 10.1183/16000617.0050-2015.
28. Steyn K, de Wet T, Saloojee Y, Nel H, Yach D. The influence of maternal cigarette smoking, snuff use and passive smoking on pregnancy outcomes: The birth to ten study. Paediatric And Perinatal Epidemiology,2006:20:90-9.
29. Zeng J, Yang S, Wu L, Wang J, Wang Y, Liu M, *et al*. Prevalence of passive smoking in the community population aged 15 years and older in China: a systematic review and meta-analysis. BMJ Open,2016:6(4):e009847. http://dx.doi.org/10.1136/bmjopen-2015-009847.
30. Li Z, Yao Y, Yu Y, Shi J, Liu Y, Tao Y et. al. Prevalence and Associated Factors of Passive Smoking among Women in Jilin Province, China: A Cross-Sectional Study. International Journal of Environmental Research and Public Health,2015; 12(11):13970-13980. doi: 10.3390/ijerph121113 970.
31. Sultana T, Afzal A, Sultana S, Al-Ghanim K, Shahid T, Jabeen Z. Brazilian Archives of Biology and Technology,2017:60:e17160358. doi: 10.1590/1678-4324-2017160358.