<u>Original Research Article</u>

Drug Utilization Study in Respiratory Disorders in In-Patients of Medical Ward in A Tertiary Teaching Care Hospital

Bharati Desai*[1], Dinesh Parmar[2], Jitendra Vaghela[3], Bhavisha Vegada[4]

[1]Senior Resident, Department of Pharmacology, GMERS Medical College Dharpur, Patan, Gujarat, India

[2]Professor, Department of Pharmacology, Shree MP Shah Medical College Jamnagar, Gujarat, India

[3]Assistant Professor, Department of Pharmacology, GMERS Medical College Dharpur, Patan, Gujarat, India

[4]Assistant Professor, Department of Pharmacology, GMERS Medical College Dharpur, Patan, Gujarat, India

Abstract:

Background: The study of prescribing pattern is a part of the medical audit and seeks to monitor, evaluate and if necessary, suggest modification in prescribing practices to make medical care rational and cost effective. Appropriate drug utilization it terms of efficacy, safety, convenience and economic aspects at all levels in the chain of drug use. Respiratory disease causes an immense worldwide health burden. In India, Asthma was one of the leading causes of morbidity and mortality in rural India. COPD is the fourth leading cause of death worldwide and the numbers are growing (CDC).

Objectives: The aim of study is obtain data on the current prescribing pattern and drug utilization trend in Patients of Respiratory Disorders in a tertiary care teaching hospital with ultimate goal to promote appropriate use of drugs.

Methods: The longitudinal, prospective, Observational study conducted for duration of 12 months on 620 Respiratory patients after approval from Institutional Ethics Committee.

Results: Most common age group affected was 41-60 year. Majority of patients were male. Average number of drugs per encounter is 10.04, among this minimum 5 drugs prescribed and maximum 19 drugs prescribed. 72.88% drugs were prescribed by generic name. 67.79% drugs were prescribed from NLEMI 2015. 59.32% were prescribed from WHO model list of essential medicine. Majority of the drugs were given via oral route. Theophylline [29.37%] was the commonest drug prescribed. Majority of drugs were Drug acting on respiratory system followed by Anti-microbial Drug. Among the Antimicrobial Drugs, Amoxicillin was the commonest drug prescribed. Commonly used FDCs was amoxicillin + clavulanic acid 45.76%. Majority of patients had Chronic Obstructive Pulmonary Disease and Majority of patients was Tobacco Chewing.

Conclusion: Despite some limitations such as single centre as well as relatively small sample size, the data generated from the present study can be used to plan multi-centric studies in the future. Drugs prescribed by generic name and drugs from WHO and National List of Essential Medicines should be promoted as it increase the rationality of prescription.

Keywords: Drug utilization study, Respiratory Disorders, Essential drug, Generic name.

Introduction

Drug utilization research is the marketing, distribution, prescription and use of drugs in a society, with special emphasis on resulting medical, social and economic consequences.[1] Important tool is a clinical use of drugs in populations and its impact on health-care system. A Number of pharmaceutical products are available on the world market and an increase both in the consumption of the drugs and in expenditure on them. In spite of this, many people throughout the world cannot obtain the drugs they need.[2] Essential drug is a satisfy the healthcare needs of the majority of the population, available at all times, in adequate amounts, in appropriate dosage forms and at a price that individual and community can afford.

Respiratory disease causes an immense worldwide health burden.[3] - Totaling more than 1 billion persons suffering from chronic respiratory conditions. It is estimated that 235 million people suffer from asthma, more than 200 million people have chronic obstructive pulmonary disease (COPD). In India, an estimated that 57,000 deaths were attributed to Asthma in 2004(6) (WHO 2004) - was one of the leading cause of morbidity and mortality in rural India. COPD is the fourth leading cause of death worldwide and the numbers are growing. (According to the Centers for Disease Control and Prevention (CDC). Antibiotics are the most frequently prescribed drugs among hospitalized patients especially in intensive care and used empirically for the treatment, and also given prophylactically in Guru Gobindsingh Government Hospital, Jamnagar(GGGH)1

To evaluate the drug utilization pattern in Respiratory patient in Medical Ward and Promote the rational use of drugs in population.[4] Also Observe demographic pattern, To study morbidity pattern - Prevent mortality, To provide some suggestions.

Materials and Methods

A longitudinal, prospective, Observational study was conducted in Respiratory patient in Medical Ward in a tertiary care hospital, over a period of 12 month with 620 Patients after obtaining approval by Institutional Ethics Committee of Guru Gobindsingh Government Hospital,jamnagar (GGGH). An appropriate study protocol and proforma were developed and discussed with teaching staff members of the pharmacology department and head of Medicine department. Written informed consent from the patient was obtained prior to conduct of the study. Case record of inpatient in the Medicine ward was used as a source of data.

Inclusion criteria such as a Indoor patients with confirmed diagnosis of Respiratory Disorders, Patients above 12 years, Either Sex, Patients referred from other department who are Admitted in the Medical Ward, suffering from Respiratory illness, Patients willing to participate in the study. Exclusion criteria such as aDiagnosis other than Respiratory Disorder, Paediatric patients (age <12 years), Patient suffering from Tuberculosis and Cancer of Respiratory Tract, Patients not willing to participate in the study.

Collection and Data analysis

Collecting of the data like Demographic details, Clinical diagnosis, Analysis of Drugs. Data was analyzed by using Microsoft excel 2010®, Microsoft Corporation Pvt. Ltd, USA.

Results

Out of total 620 patients majority 461 (74.35%) were male patients while 159 (25.65%) were female patients. In age wise

distribution, 227 (36.61%) were 41-60 year of age followed by 210 (33.87%) of 61-80 year of age, 131 (21.13%)of 21-40 year of age,43 (6.94%) of 13-20 year, 9 (1.45%)of 81-100 year of age.

WHO drug prescribing indicator:- Total drugs 6,230 prescribed in total 620 patients.

So, average number of drugs per encounter is 10.04±2.65. Minimum 5 drugs prescribed and maximum 19 drugs

prescribed. Among this, total 8 drugs prescribed in 97(15.65%) patients followed by 12 drugs in 93(15.00%) patients, 11 drugs in 92(14.84%) patients, 10 drugs in 78 (12.58%) patients, 7 drugs in 61 (9.84%) patients, 9 drugs in 48(7.74%) patients, 6 and 13 drugs in 43(6.94%) patients, 14drugs in 34(5.48%) patients, 5 drugs in 11 (1.77%) patients, 15 drugs in 9(1.45%) patients, 19 drugs in 6(0.97%) patients, 18 drugs in 5(0.80%) patients.

Table 1: Average number of Drugs acting on the Respiratory system per encounter

Total no. of Drugs acting on the Respiratory system Prescribed	Total no. of encounters	Average no. of Drugs acting on the Respiratory system per encounter (± SD)
1,903	620	3.07±2.39

Out of 59 drugs, generic name was prescribed 72.88% while 27.12% drugs prescribed by the brand name. Out of 59 drugs, 40 [67.79%] was prescribed by National List of Essential Medicines of India (NLEMI) 2011, and from WHO model list of essential medicine was 35 [59.32%].

Table 2: Percentage of Route of administration

Route of administration	No. of Drugs	Percentage (%)
Oral	2974	47.74%
Parenteral	2500	40.13%
Inhalation	756	12.13%
Total	6230	100%

Duration of stay in Hospital :- 40.80% patients stay for 5 to 8days in hospital followed by 32.42% patient hospitalized for 1 to 4days, 17.10% patient stay for 9 to 12days and 9.68% patient stay for 13 to 17days. Mean ± SD of length of hospital stay for all the patients was 6.98 ± 3.51 days.

Table 3: Analysis of Drugs prescribed in Respiratory patients and associated illness

Drugs prescribed	No. of Drugs	Percentage (%)
Drugs acting on RS	1,903	30.54%
Anti-microbial drugs	1,413	22.68%
Drugs acting on GIT	996	15.99%
Intra-venous fluids	410	6.58%
Nutritional supplements	342	5.49%
Drugs acting on CVS	398	6.39%
Antihistaminic Drugs	104	1.67%
Others	664	10.66%
Total	6,230	100%

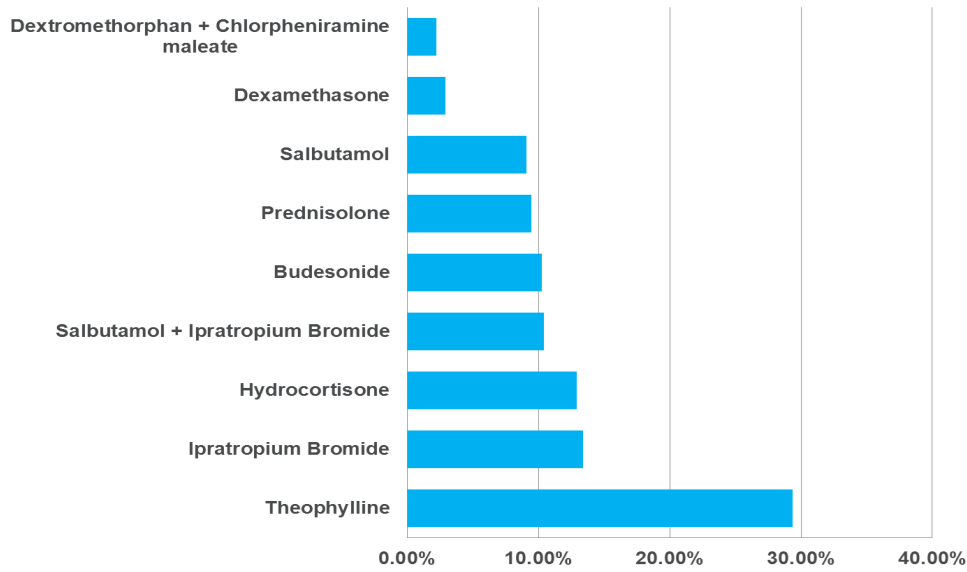**Commonly used drugs in study subjects:**

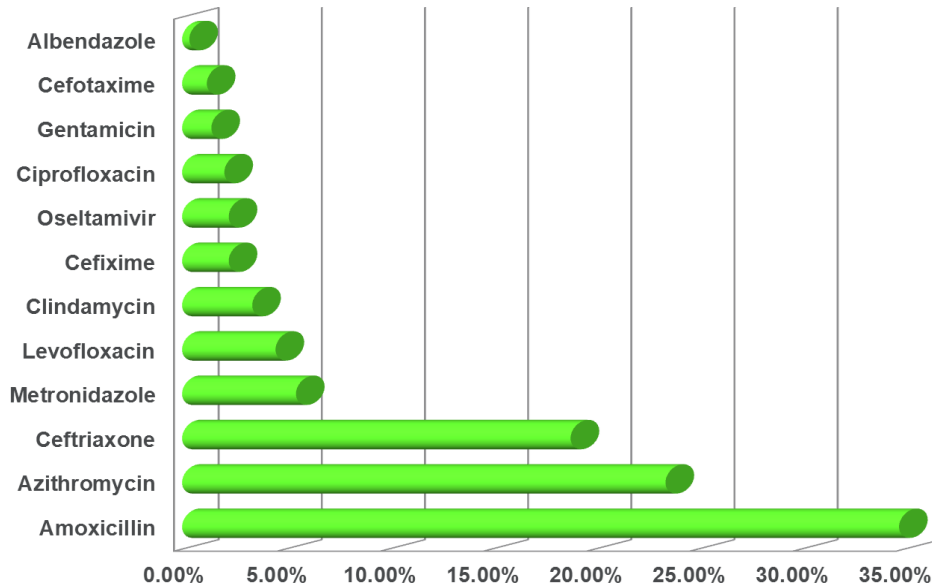**Figure 1: Drugs acting on Respiratory System**

Figure 2: Anti-microbial drugs for respiratory infection

Table 4: Fixed dose combinations (FDCs) prescribed

Fixed dose combination (FDC)	No. of Drugs (%))
Amoxicillin + Clavulanic acid	491 (45.76%)
Multivitamins	342 (31.87%)
Dextromethorphan+Chlorpheniramine maleate	42 (3.92%)
Salbutamol+Ipratropium Bromide	198 (18.45%)
Total	1,073 (100%)

Table 5: WHO core drug prescribing indicators used to assess study prescriptions (n=620)

WHO Indicators	Standard Value	Study Value
Average number of drugs per prescription	1.6-1.8	10.04
Percentage of drugs prescribed by generic name (%)	100	72.88
Percentage of drugs prescribed from Essential Drug List (%)	100	67.79
Percentage of encounters with an antibiotic prescribed (%)	20-26.8	22.68
Percentage of encounters with an injection prescribed (%)	13.4-24.1	40.13

Morbidity pattern in Respiratory patients: 246(39.68%) patients Were having Chronic Obstructive Pulmonary Disease (COPD) followed by 170 (27.42%) having Lower Respiratory Tract Infection, 43(6.94%) having Pleural Effusion, 40(6.45%) having Bronchial Asthma, 34(5.48%) having Upper Respiratory Tract Infection, 28(4.52%) having Bronchiectasis, 19(3.06%) having Pneumonia, 15(2.42%) having Hydropneumothorax, 10 (1.61%) having Pulmonary Edema and Emphysema followed by 5(0.81%) patients Were having Bronchitis.

Analysis of Causative factor: 62% were Tobacco Chewing, 42% were Smoker, 31% were found to be alcoholic.

Discussion

In general practice, the therapeutic approach for Respiratory Disease is primarily empirical and the main aim of the physicians is to treat as specifically as possible. The present study indicates the general trends of use of drugs in Respiratory Disease in medicine department. These studies should become a method of increasing job satisfaction and means of education for health professionals, rather than being perceived as threat or another bureaucratic burden.[7] Antibiotic resistance is an emerging problem and has become a major threat to the medical field. Excessive and in appropriate use of antibiotic has been a major contributor to this ever growing problem.[8]

Most commonly affected age group between 41-60 year of age 36.61% (n=620) followed by 33.87% were of 61-80 year of age in our study, which was similar to study conducted by Divya Kancherla et al.[8] In which 40.02% between 41-60 year of age followed by 37.3% were of 61-80 year of age. Also similar to study conducted by Shimpi R. D. et al.[9] This study reported a similar Age distribution of patients as seen in other studies. In our study 461 (74.35%) were male and 159 (25.65%) were female. Similar finding also found in Study conducted by Shimpi R. D. et al.[9] in which 62% were male and 38% were female, also In Divya Kancherla et al.[8] In which male predominance than Female, In Mona M. Ahmed et al.[12] in which 64% were male and 36% were female, In Lakshmi R et al.[11] in which 66% were male and 34% were female. The reason of male predominance might be due to increasing smoking and alcohol in the developing countries like in India.

In our study total drugs 6,230 prescribed in total 620 patients. So, average number of drugs per encounter was 10.04±2.65. The main purpose is to measure the polypharmacy. Average number of drugs per prescription is an important index of scope for review and educational intervention in prescribing practices. Extreme and empirical treatment is an important cause of irrational antimicrobial use. It is preferable to keep the mean number of drug per prescription as low as possible.

In our study, average number of drugs per encounter was higher, because in study patients of Respiratory disorders with associated illness and also prescribed multivitamins and other drugs. Polypharmacy is highly prevalent in Respiratory patients, exposing them not only to adverse effects but also to the drug interactions, increased cost of therapy and non-compliance.

Prescribing medicines by official names avoids the confusion and makes the medicine therapy rational and cheaper. Despite this, most doctors prescribe the medicines by their brand names. The reasons for this could be (i) tradition, (ii) aggressive medicine promotion, (iii) availability of multi-ingredient fixed dose drug combinations, (iv) faulty medicine policy and lack of "political will" etc. In our Study, Out of 59 drugs, generic name was prescribed 72.88% while 27.12% drugs prescribed by the brand name. Prescribing by generic name helps the hospital pharmacy to have better inventory control. In Our study Out of 59 drugs, 40 [67.79%] was prescribed by National List of Essential Medicines of India (NLEMI) 2011, and from WHO model list of essential medicine was 35 [59.32%]. The purpose of drugs prescribed from EML is to measure degree to which practices confirm to a national drug policy, as indicated by prescribing from national essential drug list or formulary for the type of facility surveyed. From total 620 prescriptions, 47.74% drugs given by oral route, 40.13% drugs given by parenteral route (IM/IV), 12.13% drugs given by inhalation route. In Shimpi R. D. et al.[9] 54% drugs given by oral route, 34% drugs given by inhalation route The inhalation route causes a high local concentration in the lungs with a low systemic delivery, significantly improves the therapeutic effectiveness and minimizes systemic side effects.

Parenteral route of drug administration increases the length of the hospital stay which in turn exposes the children to nosocomial and multidrug resistant infection. The parenteral route may be necessary in pediatric patients but is more expensive in terms of nursing resources. Disposable syringes are used to administer drugs, thus reducing the risk of infection but adding to the cost of treatment. More number of parenteral drugs prescription in our study may be due to study conducted in indoor patients. 40.80% patients stay for 5 to 8 days in hospital followed by 32.42% patient hospitalized for 1 to 4 days. Mean ± SD of length of hospital stay for all the patients was 6.98 ± 3.51 days. In Harish Govind Naik1 et al.[10] Mean ± SD of length of hospital stay for all the patients was 5.99 days. In Mona M. Ahmed et al.[12]study patients stay for 5 days (60%), followed by 7 days (30%) and 10 days (10%). Long duration of hospitalization, increases the chances of hospital acquired infection in patients.

In our study from total 6,230 drugs, majority of drug prescribed 1,903(30.54%) were Drugs acting on RS followed by 1,413(22.68%) were Anti-microbial Drugs followed by 996(15.99%) were Drugs acting on GIT. Among the Antimicrobial Drugs, Amoxicillin was the commonest drug (34.75%) followed by Azithromycin (23.43%), Ceftriaxone (18.83%), Metronidazole (5.52%), Levofloxacin (4.53%), Clindamycin (3.40%). In study Divya Kancherla et al.[8] Cephalosporins was the commonest drug prescribed 34.66% drug followed by Macrolides (Azithromycin) 24.2% followed by β-lactams 17.83% followed by Fluoroquinolones 14.01%. In study, done by Harish Govind Naik1 et al.[10]Ceftriaxone was the commonest drug prescribed followed by Macrolides (Azithromycin) were preferred antibiotics.

In study, done by Lakshmi R et al.[11]Cephalosporins are the most frequently prescribed antibiotic (88%) followed by quinolones (Levofloxacine) (48%), macrolides (39%). In our Study,

Among the Respiratory Drugs, Theophylline was the commonest drug (29.37%) followed by Ipratropium Bromide (13.40%), Hydrocortisone (12.93%), Salbutamol + Ipratropium Bromide (10.40%), Budesonide (10.25%), Prednisolone (9.46%), Salbutamol (9.09%), Dexamethasone (2.89%) and Dextromethorphan+Chlorpheniraminemaleate (2.21%).

In study, done by Shimpi R. D. et al.[9] Methylxanthines (48%), Corticosteroids (30%), & β2 agonists (22%) were used. Methyl xanthines were the drug of choice for asthmatic patients, probably due to their lower cost. The reason for most commonly prescribed AMA like beta-lactam and Macrolide are might be due to respiratory diseases in our study. It also depends on local availability of drugs in hospital area. Commonly used FDCs in patients were amoxicillin+clavulanic acid (45.76%), multivitamins (31.87%), Dextromethorphan + Chlorphenira-minemaleate (3.92%) and Salbutamol + Ipratropium Bromide (18.45%).

Irrational and haphazard use of combinations like multivitamins should be minimized to decreases un-necessary cost and side-effect chances. Out of 620 cases 246 (39.68%) patients were having chronic obstructive pulmonary disease (COPD) followed by 170(27.42%) having lower respiratory tract infection, 43(6.94%) having pleural effusion, 40(6.45%) patients were having bronchial asthma, 34(5.48%) having upper respiratory tract infection, 28(4.52%) having bronchiectasis, 19(3.06%) having pneumonia, 15(2.42%) having hydropneumothorax, 10 (1.61%) having pulmonary edema and emphysema followed by 5(0.81%) patients were having bronchitis. Chronic Obstructive Pulmonary Disease 61% was the most common reason for hospitalization in Lakshmi R et al.[11] study. Also, Chronic Obstructive Pulmonary Disease 68% was the most common reason for hospitalization in

Mona M. Ahmed et al.[12] study. In Jean Bourbeau M D et al.[13] Study 41% were class of Chronic Obstructive Pulmonary Disease, Which is similar to our study.

The burden of respiratory diseases in India is relatively great and expected to increase further which could be due to multiple factors like high level of pollution, use of indoor fuels, inadequate ventilation, overcrowding and infections. In our study 31% were found to be alcoholic, 42% were Smoker, 62% were Tobacco Chewing. (Table -13) In Shimpi R. D. et al.[9] 28% were found to be alcoholic, 32% were Smoker.

Conclusion

Our study concluded that in medical ward of tertiary care hospital- Majority of study participants were male and having addiction of tobacco chewing. Among the patients, COPD was the commonest cause. Majority of drugs were prescribed by generic name and as per the NLEM. Polypharmacy was observed and most commonly prescribed drug class was antibiotics. Amoxycillin-Clavulanic acid was the most commonly prescribed drug.

Our study is on a smaller scale, So, Further studies on a larger scale to identify the contributing factors of the prescription practice problems are needed. Drugs prescribed by generic name and drugs from WHO and National List of Essential Medicines should be promoted as it increase the rationality of prescription.

Acknowledgments

References

1. Lee D, Bergman U Studies of utilization In: Strom BL, editor. Pharmacoepidemiology. New York. Churchill Livingstone. 1989 259-274.

2. Rehana HS, Nagarani MA, Rehan M. A study of the drug prescribing pattern and use of antimicrobial agents at a tertiary care teaching hospital in eastern Nepal. Indian J Pharmacol. 1998; 30:175-80.

3. World Health Organization. The global burden of disease: 2004 update. Geneva, WHO, 2008. Available at www. who. int/ evidence/bod.

4. Shewade DG, Pradhan SC. Auditing of prescriptions in a government teaching hospital and four retail medical stores in Pondicherry. Indian J Pharamcol 1998; 30:408-10.

5. WHO. How to investigate drug use in health facilities: selected drug use indicators. Geneva, World Health Organization. 1993. WHO / DAP 1993; 1:1-87.

6. Smith KR. National Burden of disease in India from indoor air pollution. 2000. Proc Natl Acad Sci USA. Nov 21, 97(24). 13286-93.

7. Nandimath Mk, Ahuja S. Drug Prescribing Pattern In Upper Respiratory Tract Infection In Children Aged 1–14 Years. International Journal of Pharma& Bio Sciences. 2012; 3 (1):299-308.

8. Divya Kancherla1, Satya Sai M V. A study on prescribing pattern of antibiotics in respiratory tract infections in a tertiary care center. International Journal of Recent Scientific Research. June, 2015; 6(6): 4558-4563.

9. R. D. Shimpi, P. S. Salunkhe. Drug utilization evaluation and prescription monitoring in asthmatic patients. International Journal of Pharma& Bio Sciences. JAN-MARCH, 2012; 2(1):117-122.

10. Harish Govind Naik, Chitra C Khanwelkar. Drug utilization study on antibiotics use in lower respiratory tract infection. National Journal of medical research. Oct–Dec 2013; 3(4).

11. Lakshmi R, Lavanya Chandran R. A study on antibiotic prescribing pattern in obstructive lung disease inpatients. Asian j pharm clin res. 2016; 9(1): 260-262.

12. Mona M. Ahmed, Ashraf A. ELMaraghy. Study of prescription patterns of antibiotics in treating lower respiratory tract infections at Sohag Chest Hospital. Egyptian Journal of Chest Diseases and Tuberculosis. 2016; 65: 143–155.

13. Bourbeau, RJ Sebaldt, A Day, et al. Practice patterns in the management of chronic obstructive pulmonary disease in primary practice: The CAGE study. Can Respir J. 2008;15(1):13-19.

14. Huchon G, Gialdroni-Grassi G, Leophonte P, Manresa F, Schaberg T, Woodhead M. Initial antibiotic therapy for lower respiratory tract infection in the community: a European survey. European Respiratory Journal. 1996; 9(8): 15905.

15. Shaji J, Lodha S. Management of asthma: A review. Indian Journal of Hospital Pharmacy. 2008; 45: 88-100.

16. Mishra N, Ro KVR, Padhi Sk. Asthma education for better compliance in disease management. Indian Journal of Allergy Asthma Immunology. 2005; 19: 25-28.

17. "Respiratory Disease & Oral Health".unitedconcordia.com. Jump up American Academy of Periodontology, kpmjkk 2008 http://www.irishscientist.ie/2004/conte nts.asp?contentxml=04p 104.xml&contentxsl=is04pages.xs .

18. Vestbo, Jørgen. Definition and Overview (PDF). Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease. Global Initiative for Chronic Obstructive Lung Disease. 2013; 1–7.

19. Sharma, Sat. Restrictive Lung Disease. Retrieved, 2008-04-19.

20. Robert Beaglehole AI, Thomson Prentice. The World Health Report 2004 - Changing History. World Health Organization. 2004:120–4.

21. 9th report of the WHO expert committee: The use of essential drugs. WHO TRS. 895, 2000.
22. World Health Organization. The global burden of disease: 2004 update. Geneva, WHO, 2008. Available at www. who. int/ evidence/bod.
23. http://foundation.thoracic.org/news/globalburdenphp; ATS Foundation. The Global Burden of Lung Disease.
24. Aggarwal AN, Chaudhry K, Chhabra SK, D'Souza GA, Gupta D, Jindal SK, et al. Prevalence and risk factors for bronchial asthma in Indian adults: a multi-centre study. Indian J Chest Dis Allied Sci. 2006; 48:13-22.
25. Viswanathan R. Definition, incidence, aetiology and natural history of asthma. Indian J Chest Dis. 1964; 6: 108-24.
26. Chhabra SK, Gupta CK, Chhabra P, Rajpal S. Prevalence of bronchial asthma in schoolchildren in Delhi. J Asthma. 1998; 35:291-6.
27. Jindal SK, Aggarwal AN, Gupta D, Agarwal R, Kumar R, Kaur T, et al. Indian study on epidemiology of asthma, respiratory symptoms and chronic bronchitis in adults (INSEARCH). Int J Tuberc Lung Dis 2012; 16:1270-7.