

**PNEUMOCOCCAL VACCINATION IN PULMONARY OUT-PATIENT PRACTICE –
HOW FAR IS THE ADHERENCE AND WHAT ARE THE CHALLENGES?****Amit S. Gupta^{*1}, Rajesh V.², Jolsana Augustine³, Divya R.⁴ and Melcy Cleetus⁵**¹DM Pulmonary Medicine – Assistant Professor – Geetanjali Medical College and Hospital, Udaipur.²MD Chest and TB – Senior Consultant and HOD, Pulmonary Medicine, Rajagiri Hospital, Kochi, Kerala.^{3,4}Consultant Pulmonologist, Rajagiri Hospital, Kochi, Kerala.⁵Junior Specialist Pulmonary Medicine, Rajagiri Hospital, Kochi, Kerala.***Corresponding Author: Dr. Amit S. Gupta**

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ABSTRACT

Introduction: Invasive pneumococcal disease is cited as the commonest vaccine preventable cause of mortality and accounts for major morbidity globally. Recommendations for pneumococcal vaccination is well adhered in paediatric population as opposed to their adult counterparts, where the stress placed is much less. Global bodies like CDC propose pneumococcal vaccination as a mandatory strategy in all subjects aged above 65 years. In subjects less than 65 years, those with certain medical comorbidities are targets to pneumococcal vaccination strategy. **Aim:** The aim of the current study was to evaluate the indications for pneumococcal vaccination in adult subjects attending the pulmonary medicine outpatient clinic of a tertiary care facility and to examine the vaccine adherence rate. In those subjects who were not vaccinated as per guidelines, the reasons for non-compliance to vaccination guidelines were also studied. **Materials and methods:** The present study was carried out in the pulmonary medicine unit of Geetanjali Medical College and hospital, Udaipur which is a tertiary care hospital in the state of Rajasthan, India. Patients attending the pulmonary medicine outpatient clinic with various diseases over a 2 month period (July 1st, 2019 to August 31st 2019) were included in the study. The demographic details of patients, primary respiratory disease and other medical comorbidities were noted. The indications to pneumococcal vaccination as per the CDC recommendations were systematically studied. Among those with indications, the actual number of subjects who underwent vaccine administration was taken down and reasons for non-compliance were recorded. **Results:** A total of 215 patients attended the pulmonary medicine outpatient clinic in the study period due to varying primary respiratory diseases and comorbidities. The vast majority of them had asthma, COPD or interstitial lung disease as a primary diagnosis. Of these 190 patients had one or more indications for pneumococcal vaccination as per CDC criteria. Among those who required, the vaccine was administered only in 77 subjects. The reasons for non-adherence to vaccination in these patients were variable. Lack of recommendation by the treating doctor, concerns about cost, adverse effects of vaccine and suspicion on the efficacy were identified as the major stumbling blocks. Active counselling and vaccine recommendation was found to be missing in the case records of 11 patients, probably due to overlooking on the part of medical team. **Conclusions:** A pneumococcal vaccination adherence rate of 41% was noted in the present study. Indications for pneumococcal vaccination were overlooked in a substantial number of patients. In a health care setting where patient has to pay out of his pocket for health expenses, concerns of cost proves to be a hindrance in implementing a successful pneumococcal vaccination protocol. Vaccine phobia and concerns about side effects also prove to be stumbling blocks.

KEYWORDS: Pneumococcal vaccine, chronic lung diseases, adherence rate.**INTRODUCTION**

Invasive pneumococcal disease is the commonest vaccine preventable cause of mortality in the world. Pneumococcal pneumonia, bacteraemia and meningitis are the syndromes grouped under invasive pneumococcal disease. Subjects with certain medical comorbidities are especially vulnerable to these conditions. Patients with chronic lung disease are at increased risk for pneumococcal pneumonia, and patients with other

system diseases like chronic kidney disease, chronic liver disease and heart failure are more likely to have adverse outcomes if pneumonia occurs.^[1] Asplenia, either surgical or functional, significantly compromises immune response to pneumococci and greatly increases the risk for pneumococcal sepsis and death. A cerebrospinal fluid leak or a cochlear implant increases the chance of pneumococcal meningitis. Although initially unrecognised, asthma has been conclusively

settled as an important risk factor for pneumococcal disease.^[2] Diabetes independently increases the likelihood of invasive pneumococcal disease.^[3] These conditions impair the ability of the individual to mount a successful antibody response to pneumococcal capsular polysaccharide.

Pneumococcal vaccination is recommended as a preventive strategy for those individuals at high risk of developing invasive pneumococcal disease. Despite clear-cut recommendations by the CDC^[4] the adherence to pneumococcal vaccine among adult subjects has been traditionally low. A previous in-hospital study from the Indian subcontinent did reveal an excellent adherence rate in hospitalised patients with respiratory diseases, although the authors did highlight certain important lacunae in the vaccination strategy.^[5] The hindrances to successful vaccination are manifold, including ignorance about adult vaccination, negative media publicity, cost, suspicion on efficacy and fear of adverse effects. The present study attempts to elucidate the indications for pneumococcal vaccination among out-patients attending the respiratory clinic of a tertiary care hospital, the adherence rate to vaccination policies and the reasons for non-vaccination among those indicated.

MATERIALS AND METHODS

The present study was conducted in the out-patient respiratory clinic of a tertiary care hospital in India. This was a retrospective observational study. Subjects attending the respiratory outpatient department over a two month period (June 1st, 2019 to July 31st 2019) were included in the study. Data was collected from the outpatient records. A focused history was elicited from the study subjects and any available medical record was studied with regard to the presence of any medical comorbidity. The presence or absence of any indication for pneumococcal vaccination as per the CDC recommendation was noted down. Among those who had indication for pneumococcal vaccine, the adherence rate was noted down. In case of non-administration of vaccine, the reason for the same was probed into.

RESULTS

A total of 215 patients attended the pulmonary medicine outpatient clinic in the study period due to varying primary respiratory diseases and comorbidities. Of these, 156 were males and 59 were females. The mean age of the study population was 57.4 years. Interestingly, almost one-third of the subjects were above 65 years of age, which itself is an indication for pneumococcal vaccine even in the absence of medical comorbidities. The demographic details of the study population are given in table 1 and figure 1. The outpatient pulmonary medicine unit does not cater to subjects less than 16 years of age.

The vast majority of the study patients had asthma, COPD or interstitial lung disease as a primary diagnosis. 86 patients had COPD, 58 had asthma, 18 had interstitial

lung disease, 14 had bronchiectasis and 13 had pulmonary tuberculosis. The primary respiratory diagnosis of the study subjects is depicted in figure 2. 69 patients had diabetes mellitus and 47 had chronic kidney disease. Cardiovascular disease was present in 83 subjects.

190 patients had indications for pneumococcal vaccination as per CDC criteria. 93 patients had 2 or more diseases needing vaccination. Among those who required, the vaccine was administered only in 77 subjects, (figure 3) yielding a vaccination adherence rate of 40.52%. The reasons for non-adherence to vaccination in these patients were variable as is evident in figure 4. Lacks of recommendation by the treating doctor, concerns about cost, adverse effects of vaccine and suspicion on the efficacy were identified as the major stumbling blocks.

Table 1: Age Distribution.

AGE	Number (total 215)	Percentage
17-35 years	37	17.21 %
35-50 years	41	19.07 %
50-65 years	65	30.23 %
> 65 years	72	33.45 %

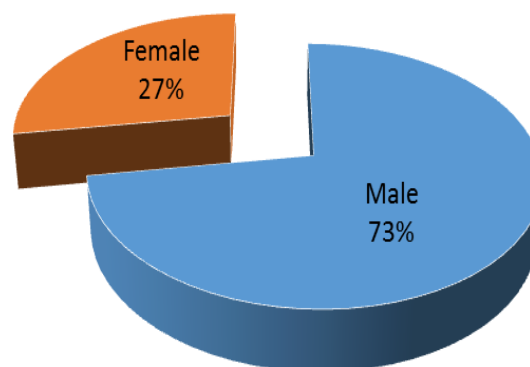


Figure 1: Gender Distribution.

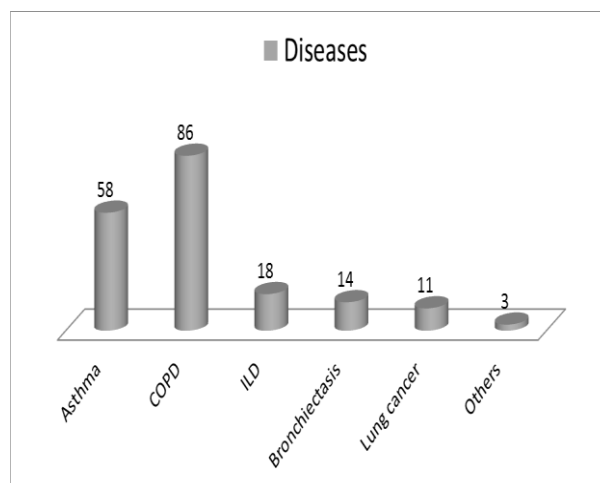


Figure 2: Diseases for Which Vaccination Indicated.

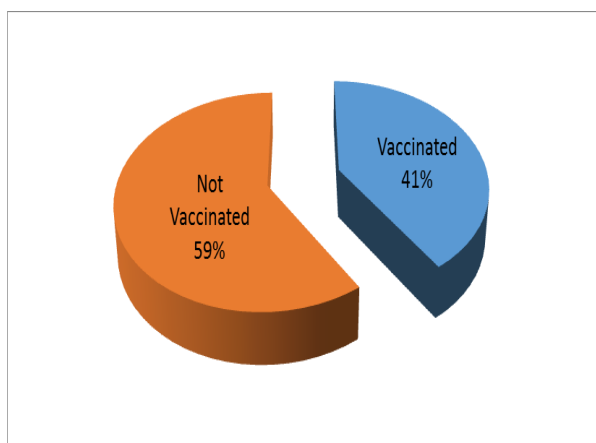


Figure 3: Vaccination Status.

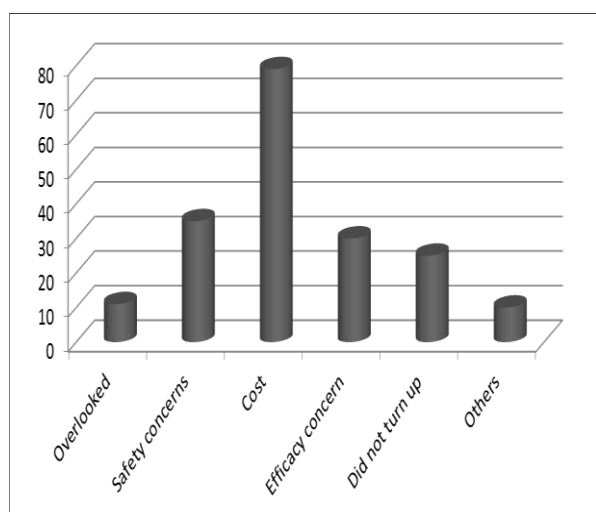


Figure 4: Causes for Non-Adherence to Vaccination.

DISCUSSION

The present study reveals a pneumococcal vaccine administration rate of 40.52% in indicated subjects attending the pulmonology outpatient clinic. Vaccination adherence rates have been in general patchy and variable depending on the study population. Adherence rates ranging from 2% to 82% have been quoted in various studies. A vaccine safety data linkstudy^[6] has shown a vaccine adherence rate of 26% only in 60-65 year old population, which sharply rises to 82% in those above 65 years. A single centre cross sectional study^[7] revealed a vaccination rate of 41% in diabetic subjects. The higher adherence rate observed in the study by Ramachandran and Venkitakrishnan *et al.*^[5] is probably an off shoot of the fact that it was an in-patient study. It may be logical to assume that the chance of overlooking indications is much less in hospitalised subjects and the acceptance rate by patients also tend to be better. In contrast, in busy out-patient settings, the time spent by consultant with an individual patient tends to be less and consequently convincing and conversion rate tends to be less. Subclinical chronic kidney disease, early congestive cardiac failure, allergic rhinitis (with associated intermittent asthma) etc need focused investigation for early detection which may be overlooked in speciality

practice. A South Indian study^[8] did reveal an asthma prevalence rate of 22.8% in patients with allergic rhinitis (13 out of 57 subjects). Although this study was focused on allergen sensitivity and pneumococcal vaccination data has not been recorded in the results, a retrospective re-analysis of the data revealed that only three of the asthma patients in the study group underwent pneumococcal vaccination.

The causes of non-adherence to vaccination guidelines are many and varied. In countries like India, pneumococcal vaccination expenses are not reimbursed by state and expenses are to be met out of patient's pocket. It becomes challenging in these situations to motivate a relatively healthy patient and convince him to take an expensive vaccine. Concerns over the safety of vaccine, vaccination myths and negative publicity stand as stumbling blocks in successfully implementing a vaccination programme. Vaccination practices in paediatric population have immense focus and implementation whereas there is a lack of focus on adult vaccinations in undergraduate as well as post graduate training programmes across the country. A Western survey^[9] states that denial on the part of the patient is one of the major reasons for non-compliance. In the in-patient setting, patients are much more sensitive to accept any prescribed vaccination, reflecting the high administration rate in the South Indian study.^[5] Previous researchers have attempted to define predictors of pneumococcal vaccine in older adults with pneumonia.^[10] The most important predictors of pneumococcal vaccination among older adults included: getting an influenza vaccine within the past, having one or more co-morbidities or chronic conditions, being 70 years of age or older, having health problems that limited physical activities and reporting having spiritual values or religious faith. Recommendation by a health care provider has been suggested as the most important predictor of PPV immunization among older adults in one study.^[11]

Rural to urban differences have been mentioned as predictors for acceptance of pneumococcal vaccination and a rural study revealed that knowing someone with pneumonia is a strong predictor of successful acceptance.^[12] Further, every centre is unique with regard to its patient profile as well as social, culture and economic background of subjects.

Our study has several limitations. This is a retrospective study based on out-patient records. There is a chance that the real number of subjects who actually had indications for vaccination would have been still higher had they been prospectively evaluated for indications in a systematic fashion. We did not discriminate between subjects who received polysaccharide versus conjugate vaccine and did not stick to dual agent vaccination. This is crucial considering PPV23-induced hypo responsiveness and its implications in designing highly effective vaccination schedules for the optimal protection

for high-risk individuals, which has been a topic of controversy in recent years.^[13] Further, we have assumed that out-patient records that have not mentioned the reason for non-administering vaccine are due to overlooking of indications by medical team. Accepting all these drawbacks, the study still has the merit of being a unique work describing vaccination practices in Indian respiratory hospitalised patients.

CONCLUSIONS AND RECOMMENDATIONS

The vast majority of patients attending the pulmonology outpatient clinic with respiratory ailments had one or more indications for pneumococcal vaccination. The adherence rate to vaccination protocols in the present study has been modest. Vaccination rate across various studies have been variable owing to differences in study population and rate in excess of 80% have been quoted in in-patients. Overlooking the extrapulmonary indications is an important cause of non-adherence in pulmonary outpatient practice. Concerns over efficacy and side effects prove to be stumbling blocks. Focus also needs to be given to conducting research on heterogeneous patient populations as well as social, economic and cultural settings.

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