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VACCINATION COVERAGE AGAINST INFLUENZA AND PNEUMOCOCCAL INFECTIONS IN ADULTS WITH RESPIRATORY DISORDERS - NEED FOR COMPREHENSIVE INTERVENTION

Ajas Asharaf, Diya Elizabeth Manoj, Muhammed Shahzin, Nasreen Nassar, K. Ebenz Chalson, Nimshitha Abdul Muneer, Sona Sagi and Binai K. Sankar *

Department of Pharmacy Practice, Al Shifa College of Pharmacy, Perinthalmanna - 679325, Kerala, India.

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Correspondence to Author:
Binai Kochunni Sankar

Associate Professor,
Department of Pharmacy Practice,
Al Shifa College of Pharmacy,
Perinthalmanna - 679325, Kerala, India.

E-mail: Binai@alshifacollegeofpharmacy.ac.in

ABSTRACT: Adults with chronic respiratory conditions are at heightened risk for preventable lung infections, yet vaccine uptake against influenza and pneumococcal diseases remains suboptimal. This hospital-based cross-sectional study aimed to assess factors influencing vaccination coverage and identify individuals who may benefit from targeted interventions. A total of 118 adult patients attending an outpatient respiratory diseases clinic were surveyed using a self-developed questionnaire evaluating knowledge, attitudes, and practices related to vaccination. More than half of the participants recognised influenza as a risk factor for pneumonia and were aware of the corresponding vaccines. Interestingly, COVID-19 vaccination appeared to positively influence vaccine-related knowledge. Despite generally favourable attitudes, actual immunisation rates were low, revealing a gap between intention and practice. A key finding was the lack of proactive guidance from healthcare providers, which emerged as a significant barrier. Other obstacles included limited awareness and persistent safety misconceptions. While cost was not broadly perceived as a barrier, 44% expressed willingness to vaccinate only if it were offered free of charge. No significant correlation was observed between age and vaccination attitudes or practices, likely due to the limited sample size. The study underscores the urgent need for sustained educational efforts and stronger healthcare provider engagement to improve immunisation uptake among high-risk adults.

INTRODUCTION: Adults with chronic respiratory conditions, such as Chronic Obstructive Pulmonary Disease (COPD) and asthma, are more vulnerable to influenza and pneumococcal infections, both of which contribute significantly to global morbidity and mortality. These populations are at increased risk due to the underlying nature of their conditions, which compromise lung function and the body's ability to fight respiratory infections.

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This study aims to explore their knowledge, attitudes, and vaccination practices to inform the development of effective strategies that can optimize immunization rates and ultimately reduce the burden of these diseases [1]. Obstructive lung diseases like COPD and asthma are characterized by narrowed or obstructed airways, leading to impaired airflow and difficulty in breathing.

COPD is a heterogeneous lung disease marked by chronic respiratory symptoms, such as coughing, wheezing, and shortness of breath, along with airflow obstruction that worsens over time. In contrast, asthma is a persistent inflammatory condition that causes airway obstruction due to inflammation, and it may vary in severity from person to person.

Both conditions make individuals more susceptible to complications from infections like influenza and pneumonia [2].

Pneumococcal diseases, caused by *Streptococcus pneumoniae*, are a significant global health issue, with invasive pneumococcal disease (IPD) being a particularly severe manifestation. IPD occurs when the bacteria invade bodily fluids, while non-invasive pneumonia, which is typically a milder form of infection, can progress into IPD if left untreated. Pneumonia itself can be categorized based on its causative organisms, which include bacterial, viral, fungal, and parasitic pathogens, each of which presents different treatment challenges and risks to individuals with weakened respiratory systems [1].

Vaccination against influenza and pneumococcal diseases is critical for reducing the incidence of these infections, particularly among those with chronic respiratory conditions. The influenza vaccine, commonly referred to as the flu shot, is a preventive measure that protects against the seasonal influenza virus, which can lead to severe complications in individuals with compromised lung function. Similarly, the pneumococcal vaccine offers protection against infections caused by *Streptococcus pneumoniae*, which can lead to pneumonia, meningitis, and bloodstream infections. The Centers for Disease Control and Prevention (CDC) recommends the pneumococcal conjugate vaccines, PCV15 or PCV20, for adults aged 65 or older, or those with chronic health conditions who have never received a pneumococcal vaccine [3].

In India, vaccination practices and guidelines for healthy individuals vary depending on the region, though the Indian Academy of Paediatrics publishes clear immunization guidelines for children. However, there is a noticeable gap in established vaccination protocols for adults, particularly those with chronic respiratory conditions. By better understanding the knowledge, attitudes, and vaccination practices of adults living with these conditions, this study can contribute to the development of comprehensive immunization strategies tailored to the needs of this high-risk group. Such strategies would help increase vaccine uptake, prevent illness, and improve public health outcomes by ensuring that vulnerable populations receive the protection they need against influenza and pneumococcal diseases.

MATERIALS AND METHODS: The study utilized a hospital-based cross-sectional design and was conducted within the outpatient clinic of the Department of Respiratory Medicine at KIMS Al-Shifa Super Speciality Hospital, a 690-bed healthcare facility located in Perinthalmanna, Malappuram district, Kerala. The data collection spanned a six-month period, from November 2024 to April 2025. The study was approved by the Institutional Ethics Committee of KIMS Al Shifa Healthcare Pvt. Ltd. (Approval No: KAS:ADM:IEC:0109AB:23) on 27th November 2024. Informed consent was obtained from all participants. During this period, all patients who attended the outpatient clinic and met the inclusion criteria were enrolled in the study.

Data were gathered through direct interviews, using a validated questionnaire composed of 25 questions, categorized into three sections: knowledge (8 questions), attitudes (10 questions), and practices (7 questions) regarding the influenza and pneumococcal vaccines. The questionnaire was subjected to internal validation by subject matter experts to ensure content relevance and accuracy.

The inclusion criteria specified that participants had to be adults aged 18 years or older and capable of providing informed responses to the survey questions. Patients who were unwilling to provide consent were excluded from the study, as well as those who had received any dose of the pneumococcal or influenza vaccines within the previous three months, in order to eliminate the potential for confounding by recent vaccination status.

For data analysis, statistical procedures were performed using social science statistical software. The data were organized and tabulated in Microsoft Excel, and the results were presented using tables and graphs to provide clear insights. The association between categorical variables was examined using the Chi-square test and Analysis of Variance (ANOVA). A p-value of less than 0.05 was considered statistically significant, indicating that any observed differences or associations were unlikely to have occurred by chance, thereby

ensuring the reliability of the findings. This rigorous methodology allowed for an in-depth exploration of the knowledge, attitudes, and practices related to vaccination among adults with chronic respiratory conditions, with the ultimate aim of informing strategies to optimize immunization rates in this population.

RESULTS: The survey's findings provide important new information on participants' knowledge and opinions regarding vaccinations, influenza, and pneumonia. About 55.9% (66) of respondents are aware that influenza can result in pneumonia, and a comparable proportion (55.9%, 66) acknowledges the advantages of pneumococcal vaccinations for people with long-term illnesses. While 62.7% (74) believe that chronic lung disorders are a risk factor for pneumonia, 57.7% (68) said they had neither seasonal influenza nor pneumonia in the previous year. 57.6% (68) are aware that our hospital offers influenza vaccines, and more than half (58.4%, 69) have heard primarily about them.

Despite this, 54% (64) did not have the flu shot because they were unaware of it, and 68.7% (81) have not received a recommendation to do so from medical professionals. While 30% (35) voiced worries about adverse drug reactions (ADRs), 50% (59) had a positive attitude on vaccine safety. Furthermore, 53% (63) think the influenza vaccination is useful in preventing the virus, and 76% (90) agreed that masks assist reduce the spread of influenza. Notably, 35% (41) believe that drugs are a better way to prevent diseases than vaccines, and 44% (52) would accept the vaccine if it were provided for free. In order to boost vaccination uptake, our data highlight the necessity of raising awareness, making healthcare advice, and addressing worries about adverse drug reactions.

Diverse opinions regarding pneumococcal and flu vaccinations were found in the poll. While 24% (28 people) might think about getting a yearly flu vaccine and 36% (43 people) indicated interest in doing so, 13% (15 people) got vaccinated on medical recommendation, and 3% (4 people) volunteered. Furthermore, 5% (6 people) were referred by others, and 3% (4 people) had immunizations as a result of their jobs. 29% of people who stopped getting vaccinations did not know about the illness or the vaccine, and 21% had never received a vaccination recommendation. 44% (52 people) may think about it for upcoming immunization plans, and 24.4% (32 people) intend to. Just two people, or 1.6% of the population, had previously suffered an adverse reaction to a vaccine.

Furthermore, 11% (19 individuals) massaged the injection site, 4% (8 individuals) utilized over-the-counter drugs, 5% (9 individuals) performed random motions, and 34% (40 persons) were aware of steps to reduce the effects of the vaccine **Table 1, 2, 3.** An ANOVA analysis indicated no significant differences in attitude scores across age groups, suggesting that age did not substantially influence participants' attitudes toward influenza and pneumonia prevention **Table 4, 5.**

TABLE 1: KNOWLEDGE QUESTIONS AND THEIR RESPONSES

Knowledge Questions	Number (Total 118)	Percentage
K1) Influenza can be a cause of pneumonia		
Yes	66	56%
No	35	30%
Don’t know	17	14%
K2) During the past year, did you suffer from seasonal influenza or pneumonia?		
Yes	50	42%
No	68	58%
Don’t know		
K3) Have you heard of vaccines that could prevent Pneumonia and influenza		
Yes	69	58%
No	49	42%
K4) Pneumococcal vaccine are beneficial in chronic respiratory and other comorbid conditions		
Yes	66	56%
No	52	44%
K5) Do you have any disease condition that require regular visits to the hospital?		
Yes	47	40%

No	71	60%
Don't know		
K6) Vaccines are available in our hospital		
Yes	68	58%
No	50	42%
K7) Knowledge regarding vaccines improved after covid 19 vaccination		
Yes	64	54%
No	54	46%
K8) Doctor/health staff advise you to take flu vaccine		
Yes	37	31%
No	81	69%

TABLE 2: ATTITUDE QUESTIONS AND THEIR RESPONSES

Attitude Questions	Number "118"	Percentage
A1Wearing mask can limit the spread of influenza		
Agree	91	77%
Disagree	18	15%
Neutral	9	8%
A2) In general vaccines are safe		
Agree	59	50%
Disagree	25	21%
Neutral	34	29%
A3) Chronic lung diseases are considered as a risk factor for pneumonia		
Agree	74	63%
Disagree	9	7%
Neutral	35	30%
A4) ADRs are one of the reasons that pull back you from getting vaccinated		
Agree	35	30%
Disagree	50	42%
Neutral	33	28%
A5) Influenza vaccine is effective in preventing flu		
Agree	63	53%
Disagree	17	14%
Neutral	38	33%
A6) Will you consider taking these vaccines, if it is provided free of cost by the hospitals or government		
Agree	52	44%
Disagree	40	34%
neutral	26	22%
A7) Lack of awareness prevent you from getting vaccinated		
Agree	64	54%
Disagree	34	29%
Neutral	20	17%
A8) You often visit hospital to treat influenza		
Agree	19	16%
Disagree	70	59%
Neutral	29	25%
A9) Vaccines can save medical costs		
Agree	54	46%
Disagree	40	34%
Neutral	24	20%
A10) Administering medicines are effective in the prevention of infections rather than taking vaccines		
Agree	41	35%
Disagree	48	41%
neutral	29	24%

TABLE 3: PRACTICE QUESTIONS AND THEIR RESPONSES

Practice Questions	Numbers "118"	Percentage
P1) Are you interested in taking annual flu shots		
Yes	43	36%

No	47	40%
Maybe	28	24%
P2) The approach that led you to get vaccinated with the influenza/pneumococcal vaccine		
Job demand	4	3%
Advised by the physician	15	13%
Voluntarily vaccinated	4	3%
Recommended by others	6	5%
Other reason	89	75%
P3) The rationale for your decision to stop receiving vaccine		
High cost	6	5%
Not aware about the vaccine and disease	33	28%
Never been recommended	26	22%
Other	53	45%
P4) you intend to vaccinate in the future		
Yes	32	27%
No	30	25%
Maybe	54	46%
P5) Ever had an allergic reaction towards vaccination in the past		
Yes	2	2%
No	116	98%
P6) Are you aware of the actions to be taken to minimise the after effect of flu shot?		
Yes	40	34%
No	78	66%
P7) What all precautions will you do after taking vaccinations		
Massaging the injected site	19	16%
Taking OTC medicine	8	7%
Random movements	9	8%
Other	78	66%

TABLE 4: ATTITUDE SCORING BASED ON AGE

	Age Group					
	15-30	**30-45**	**45-60**	**60-75**	**75-90**	**Total**
N	39	26	31	13	9	118
$\sum X$	95	50	46	3	7	201
Mean	2.4359	1.9231	1.4839	0.2308	0.7778	1.703
$\sum X^2$	617	336	434	195	77	1659
Std.Dev.	3.1855	3.0974	3.4916	4.024	2.9907	3.3546

TABLE 5: RESULTS FOR THE ANOVA ANALYSIS

	Result Details			
Source	**SS**	**df**	**MS**	
Between-Age group	59.5776	4	14.8944	$F = 1.33891$
Within-Age group	1257.0411	113	11.1243	
Total	1316.6186	117		

DISCUSSION: A cross-sectional study was conducted over six months at a tertiary care hospital in Perinthalmanna, South India, with the participation of 118 individuals (56 males and 62 females) who had an average age of 43.9 years. The objective of this study was to assess the knowledge, attitudes, and practices (KAP) regarding influenza and pneumococcal vaccines among adults attending the outpatient respiratory medicine clinic. The findings from this study highlight the critical importance of immunization against respiratory diseases but also reveal that vaccine uptake remains significantly underutilized within this population. The study found that physician recommendations play a key role in influencing vaccination rates. However, only 31% of participants reported receiving a recommendation for vaccination, and only 12% had actually received the influenza or pneumococcal vaccine. These figures are notably lower when compared to the study conducted by Norah Alhatim, which reported a recommendation rate of 63.3% and vaccination uptake of a higher proportion [4]. While the awareness level of the

vaccines was moderate, with 58.4% of participants indicating they were familiar with the vaccines, this figure is still considerably lower than the 81.7% awareness reported by Alhatim [4]. Despite this moderate level of awareness, a substantial 76% of participants reported never having been vaccinated, which is consistent with findings from Neli M. Ermenlieva's study, where 70% of individuals had not received vaccinations [5]. Although the awareness about influenza and pneumococcal vaccines was moderate, the vaccination rate was still considerably low. Only 13% of respondents had received the vaccines following medical advice, which contrasts starkly with the 63.3% of individuals in Alhatim's study who received their vaccinations on the recommendation of healthcare providers [4]. When exploring the willingness to vaccinate, 44% of respondents expressed a higher willingness if the vaccines were provided for free. Furthermore, 33% stated that cost was not a significant barrier to receiving the vaccine. However, it was concerning that 29% of respondents had stopped receiving vaccinations due to a lack of awareness, which aligns with the findings of Yating You, where 43% of individuals did not pursue vaccinations because of a similar lack of awareness [6].

Regarding safety concerns, half of the respondents (50%) believed that vaccines were safe, although this belief varied across studies. For example, Waleed A. Zalloum's study reported a lower safety perception of 40%[7], while Zachary J. Madewell's research found a much higher safety belief of 95.5% [8]. This variation highlights the diverse perspectives on vaccine safety and the need for continued public education to address these concerns. Additionally, the study revealed that 54.2% of respondents reported an improvement in their knowledge about vaccines following COVID-19 vaccination, suggesting that the global pandemic has heightened awareness about the importance of immunization. A significant portion of participants (76%) also agreed that wearing masks could help limit the spread of influenza, reinforcing public health measures that can complement vaccination efforts. In contrast, only 3% of respondents cited job demands as a reason for vaccination, a notably lower proportion than found in Nguyen minh chau's study, where 37% of participants received the vaccine due to professional requirements. This difference points to varying motivations and behaviours regarding vaccination across different populations [9]. Adverse drug reactions (ADRs) emerged as a significant deterrent for vaccine uptake, with 30% of respondents reporting that fear of side effects influenced their decision not to vaccinate. This concern is similar to Matteo Ricco's findings, where 26% of participants indicated ADRs as a barrier to vaccination [10]. In addition, 40% of respondents in the current study reported being frequent hospital visitors for treatment related to the flu, a much higher percentage than Alhatim's study, which found that only 11.5% of participants had been hospitalized for flu-related issues [4]. The statistical analysis using ANOVA revealed no significant differences in attitudes based on age, indicating that age is not a major predictor of knowledge, attitudes, and practices (KAP) regarding influenza and pneumococcal vaccines. However, a significant association was found between age and the presence of chronic conditions that necessitate regular hospital visits, which is consistent with Rajesh Venkitakrishnan's findings among nursing staff [3].

In conclusion, this study highlights substantial gaps in both vaccine uptake and awareness, emphasizing the need for targeted educational interventions to enhance public knowledge and promote vaccination. Given the low rates of physician recommendations and the significant barriers to vaccination, there is an urgent need for healthcare providers to strengthen their efforts in recommending vaccines to high-risk populations. Future strategies should include distributing educational materials such as pamphlets or leaflets, addressing logistical barriers like cost and transportation, and tackling vaccine hesitancy through evidence-based communication. By addressing these gaps, it is possible to increase vaccination rates and reduce the public health burden associated with respiratory diseases.

CONCLUSION: Vaccination against influenza and pneumonia is a cornerstone of preventive healthcare, particularly for populations at heightened risk, such as individuals with chronic respiratory conditions. Despite the established benefits of these vaccines in reducing the burden of respiratory illnesses, the study reveals that knowledge, attitudes, and practices surrounding

vaccination are not significantly influenced by age. A notable proportion of the population, especially those with chronic lung diseases, remains unvaccinated due to a fundamental lack of awareness regarding the efficacy and availability of these vaccines.

The COVID-19 pandemic further emphasized the crucial role of vaccination in protecting public health, while also shedding light on persistent barriers to vaccine uptake. Misinformation, fear, and mistrust remain substantial obstacles that hinder the widespread adoption of vaccines, particularly in vulnerable groups. Addressing these challenges requires a multifaceted approach, with targeted educational initiatives and strategic communication designed to dispel myths, build trust, and promote the importance of vaccination.

This study underscores the critical knowledge gaps and negative attitudes toward vaccination as key factors impeding vaccine uptake. By implementing tailored interventions that address these issues, we can foster a more informed and positive public perception of vaccination.

Such efforts are vital not only for improving vaccination rates but also for enhancing public health outcomes, particularly among individuals at higher risk for influenza and pneumonia. Ultimately, increasing vaccination coverage is essential to safeguarding the health of vulnerable populations and preventing the spread of these potentially life-threatening diseases.

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