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Research Article

# Adult Vaccination for Preventing Communicable Diseases in an Urban Community of Delhi

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## I N F O

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## A B S T R A C T

*Introduction:* Vaccination is a cornerstone of public health; significantly reducing the burden of infectious diseases. While childhood immunisation programmes have made substantial progress, adult vaccination often receives less attention.

*Objective:* To assess the knowledge, attitudes, and practices concerning adult vaccination against infectious diseases among adults of an urban community in Delhi

*Methods:* Systematic random sampling was used to collect the required sample from an urban community. Data collection was done by using a self-designed pre-tested and pre-validated questionnaire. Data was entered and analysed in Microsoft Excel software for statistical processing and suitably presented. To determine the association, the chi-square test was employed. A p value of less than 0.05 was considered significant.

*Results:* The awareness regarding adult vaccination against communicable diseases was as high as 87%. Tetanus vaccine was the most commonly known (89%), followed by rabies (68%), hepatitis B (58%), influenza (21%) and pneumococcus (11%). 84% had received any vaccine during adulthood, tetanus being the most commonly received (83%). Lack of knowledge about the other available vaccines and lack of prescription by healthcare providers were identified as the major barriers to vaccination.

*Conclusion:* A high level of awareness and good acceptance was there for a few vaccines. Therefore, IEC for other vaccines for infectious diseases may be used in urban communities to generate demand.

**Keywords:** Adult Vaccination, Knowledge, Practices, Barriers, Communicable Diseases

## Introduction

Vaccination is one of the most effective public health interventions to prevent infectious diseases, and adult immunisation plays a vital role in protecting individuals against preventable diseases such as influenza, pneumonia, hepatitis, etc. While childhood immunisation programmes have made substantial progress, adult vaccination often receives less attention.[1] In India, a developing country, the number of deaths from infectious diseases continues to be as high as non-communicable diseases. Adults are increasingly affected by Vaccine-Preventable Diseases (VPDs) due to waning immunity from childhood vaccinations, shifting target age groups for several VPDs, prolonged travel, stressful lifestyles, and preventative negligence. Vaccination against communicable diseases in adults can reduce the burden of diseases in the most productive age groups.[2]

Until recently, the Government of India mainly focussed on childhood vaccination with no or negligible emphasis on adult immunisation other than the tetanus toxoid vaccine. No strategy to introduce or enhance adult vaccination in the country was provided by the National Vaccine Policy 2011.[3] But lately, more emphasis is laid on increasing the coverage of vaccines for adults. The widespread availability and acceptance of COVID-19 vaccine was a landmark in adult vaccination. The Government of India has incorporated vaccination against JE among adults in the routine immunisation programme in endemic districts. Rabies vaccine is made available at all levels of healthcare for animal bite victims by establishing anti-rabies clinics. An attempt is being made by private organisations and healthcare institutions to vaccinate their employees and students against hepatitis B and seasonal influenza.[4]

In urban settings, where populations are diverse and lifestyles are fast-paced, understanding the awareness and practices regarding adult vaccination for communicable diseases is crucial. In many urban communities, awareness and uptake of adult vaccines remain suboptimal. This is particularly evident in rapidly urbanising regions like Delhi, where increasing population density, lifestyle changes, and health disparities contribute to varying levels of awareness and engagement in vaccination practices. Previous studies have indicated a lack of awareness, misconceptions, vaccine hesitancy, missed opportunities, cost and limited access to vaccination services as barriers to improving immunisation rates among adults in urban settings.[5,6]

A centre was established for adult vaccination where hepatitis B and dT vaccinations were regularly provided at the OPD at VMMC & Safdarjung Hospital[7] catering for the study population. Therefore, it was pertinent to conduct a study to assess the level of awareness of adult vaccination for communicable diseases (except COVID-19) in an urban community of Delhi. Also, to assess the prevalence of adult vaccination for communicable diseases in the study population and to find out the factors associated with the level of awareness and adult vaccination so that an IEC programme could be designed.

## Methods

This study was cross-sectional and was conducted over a period of 6 months from April to September 2022. The study was carried out in a community catered by Vardhman Mahavir Medical College & Safdarjung Hospital (VMMC & SJH). The area was an urban village located in South Delhi with a high level of literacy and the majority of the population belonging to the upper middle to upper socio-economic class. The community had access to various levels of healthcare institutions ranging from primary to tertiary care hospitals.

The study population was all adult residents of the area who were able to comprehend and respond to survey questions. A semi-structured pre-tested and pre-validated questionnaire was designed. The Cronbach's alpha in the pilot study was 0.86.

As there were limited community-based studies on awareness of adult vaccination in India, the prevalence was assumed to be 50%. The sample size was determined to be 384 using the Cochrane formula, 95% confidence interval, and 5% absolute error. The ultimate sample size, after accounting for a 10% non-response error, was 444. The sampling unit was chosen using a methodical random sampling procedure. The sampling interval was calculated by dividing the number of households from the sample size, i.e. 2684/444, it came out to be 6. So, every 6th household was included in the study. If the household was locked or vacant then the next household was selected. The first house was selected randomly by a lottery system. The successive house was selected by adding a sampling interval to the previous house number. Simple random sampling through the lottery system was used in case there was more than one adult in the household.

Data was entered and analysed in Microsoft Excel software for statistical processing and suitably presented. The chi-square test was used to determine the association, and a p value of less than 0.05 was deemed significant. The qualitative data was reported as percentages.

Following the Institutional Ethics Committee's ethical clearance, the study was initiated. Participants' informed consent was obtained after they were fully informed about the study's purpose and goals. Data collected during the study was kept strictly confidential. The privacy of the study participants and confidentiality of information was ensured.

## Results

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Complete responses were obtained from 444 participants and they were included in the final analysis.

Table 1 presents the socio-demographic distribution of the study participants. It highlights a broad age range, with the majority of participants falling within the 18–45 age group (67%). In terms of educational attainment, most participants were graduates (41%), while a smaller proportion had lower educational levels. The socio-economic status (using the BG Prasad scale) indicated that the vast majority belonged to the upper socio-economic class (78%), with a small percentage in the lower socio-economic categories. Regarding occupation, a diverse mix was observed, with significant representation in skilled and technical roles, as well as homemakers and students.

**Table 1.Distribution of Study Participants according to Their Socio-Demographic Details**

N = 444

| Variable | Number of Participants | Percentage |
|---|---|---|
| **Age (years)** | | |
| 18–45 | 299 | 67.0 |
| 46–60 | 105 | 24.0 |
| > 60 | 40 | 9.0 |
| **Level of education** | | |
| Illiterate | 17 | 4.0 |
| Primary school | 29 | 7.0 |
| Middle school | 46 | 10.0 |
| High school | 121 | 27.0 |
| Graduate | 181 | 41.0 |
| Postgraduate and above | 50 | 11.0 |
| **Socio-economic status using BG Prasad scale (in Rs)** | | |
| Lower (< 1166) | 1 | 0.2 |
| Lower middle (1167–2253) | 13 | 2.9 |
| Middle (2253–3808) | 14 | 3.0 |
| Upper middle (3808–7769) | 69 | 15.9 |
| Upper (> 7770) | 347 | 78.0 |
| **Occupation** | | |
| Legislators, senior officials & managers | 3 | 0.6 |
| Professionals | 9 | 2.0 |
| Technicians and associate professionals | 95 | 21.4 |
| Clerks | 1 | 0.2 |
| Skilled workers and shop & market sales workers | 84 | 19.8 |
| Craft & related trade workers | 45 | 10.0 |
| Plant & machine operators and assemblers | 10 | 2.0 |
| Elementary occupation | 42 | 9.0 |
| Student | 64 | 14.0 |
| Homemaker | 91 | 21.0 |

**Table 2.Knowledge and Beliefs regarding Adult Vaccination for Communicable Diseases among Study Participants**

| Knowledge/ Belief | Responses | Number (Percentage) |
|---|---|---|
| Vaccination is meant for which age group? | Children | 57 (13.00) |
| | Adults | 12 (3.00) |
| | Both | 375 (84.00) |
| Heard about adult vaccination | Yes | 385 (87.00) |
| | No | 59 (13.00) |
| Knowledge regarding diseases against which vaccines are available for adults? (other than COVID-19) | Tetanus | 395 (88.96) |
| | Rabies | 301 (67.79) |
| | Hepatitis B | 256 (57.66) |
| | Influenza | 93 (20.95) |
| | Pneumococcus | 51 (11.49) |
| | Human papillomavirus | 48 (10.81) |
| | Herpes zoster | 32 (7.21) |
| | Meningococcal meningitis | 38 (8.56) |
| Aware of nearby vaccination centres for adults | Yes | 416 (94.00) |
| | No | 28 (6.00) |
| Belief that adult vaccination can prevent infectious diseases | Yes | 342 (77.00) |
| | No | 9 (2.00) |
| | Not sure | 93 (21.00) |

A majority of participants (84%) correctly recognised that vaccination is meant for both children and adults (Table 2). However, a small proportion (3%) believed that vaccination is only for adults, and 13% believed that vaccination is solely for children. This indicates a general understanding of the importance of adult vaccination. A high level of awareness regarding adult vaccination is evident, with

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87% of participants reporting that they have heard about adult vaccination. The study participants demonstrated substantial knowledge about adult vaccines. Because of widespread awareness regarding the COVID-19 vaccine, it was excluded from the analysis as it could bias the results. Tetanus vaccine was the most commonly known (89%), followed by rabies (68%) and hepatitis B (58%). Awareness dropped for other vaccines, with influenza (21%) and pneumococcus (11%) being less well-known. The awareness of vaccines like herpes zoster (7%) and meningococcal meningitis (8%) is even lower, indicating a gap in knowledge about vaccines that could prevent common adult diseases.

94% of participants were aware of a nearby vaccination centre for adults. The majority of participants (77%) believed that adult vaccinations can prevent diseases. However, there was a minority (21%) who were unsure about the effectiveness of adult vaccinations, and a small percentage (2%) who did not believe in their preventive power.

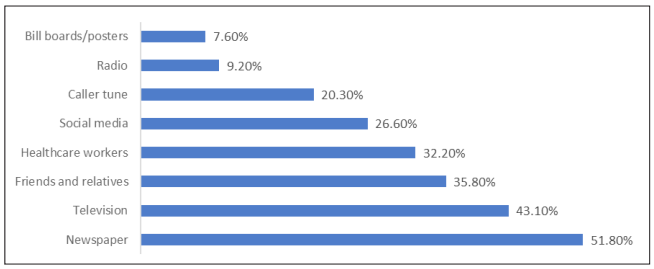


**Figure 1.Sources of Information regarding Adult Vaccination for Communicable Diseases**

Figure 1 reveals that newspapers (51.8%) and television (43.1%) were the most influential sources of information regarding adult vaccines, indicating the continued dominance of traditional mass media in public health communication. Personal networks, including friends and relatives (35.8%), and healthcare workers (32.2%), also played significant roles. Social media (26.6%) was also reported as an important source. Caller tune messages (20.3%), radio (9.2%), and billboards/ posters (7.6%) had relatively limited impact.

**Table 3.Practices regarding Adult Vaccination for Communicable Diseases among Study Participants**

| Practice | Response | Number (Percentage) |
|---|---|---|
| Whether received any vaccine after 18 years of age (N = 444) | Yes | 372 (84.00) |
| | No | 72 (16.00) |
| Name of vaccines received after 18 years (other than COVID-19 vaccine) | Tetanus | 310 (83.00) |
| | Hepatitis B | 126 (34.00) |
| | Influenza | 34 (9.00) |
| | Pneumococcus | 5 (1.30) |
| | Human papillomavirus | 2 (0.50) |
| | Herpes zoster | 3 (0.80) |
| Place of receiving the vaccine | Government setup | 301(81.00) |
| | Private setup | 71(19.00) |
| Reason for taking vaccine (N = 372) | Campaign in the area | 112 (30.00) |
| | Prescribed by doctor | 176 (47.00) |
| | Animal bite | 17 (5.00) |
| | Heard in a healthcare centre | 67 (18.00) |
| Reason for not taking vaccine (N = 72) | Did not know | 47 (65.00) |
| | Was not advised | 13 (18.70) |
| | Ignored it, thinking it was not necessary | 11 (15.00) |
| | Vaccine not available in the nearest healthcare centre | 1 (1.30) |

Table 3 provides a comprehensive overview of adult vaccination practices among the study participants. A significant majority (84%) of the participants had received at least one vaccine (other than the COVID-19 vaccine) after the age of 18 years. The acceptance of the COVID-19 vaccine was found to be very high with 95% of participants having received the vaccine. 92% of respondents agreed about a positive change in their perception of adult vaccination after COVID-19.

Other than the COVID-19 vaccine, tetanus was the most commonly received vaccine (83%). Almost one-third (34%) had received hepatitis B vaccine and acceptance of other vaccines was found to be minimal. The majority of participants (81%) had utilised government facilities for getting the vaccination. Doctor's prescriptions (47%) were the primary reason participants sought vaccination. The most common reason for not receiving vaccines was a lack of awareness (65%). A smaller proportion attributed non-vaccination to not being advised by a healthcare provider or perceiving vaccines as unnecessary.

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**Table 4.Association of Various Factors with Vaccination Status of Study Participants**

| Factor | Vaccinated (N = 372) n (%) | Non-Vaccinated (N = 72) n (%) | $\chi^2$ (p Value) |
|---|---|---|---|
| **Gender** | | | |
| Men | 251 (83.9) | 48 (16.1) | 0.0178 (0.89) |
| Women | 121 (83.4) | 24 (16.6) | |
| **Level of education** | | | |
| Till high school | 173 (81.2) | 40 (18.8) | 1.979 (0.159) |
| Above high school | 199 (86.1) | 32 (13.9) | |
| **Socio-economic class** | | | |
| Lower & lower middle | 6 (42.8) | 8 (57.2) | 95.846 (< 0.001) |
| Middle & upper middle | 44 (53.0) | 39 (47.0) | |
| Upper | 322 (92.8) | 25 (7.2) | |
| **Type of healthcare facility frequently visited** | | | |
| Allopathic | 330 (85.7) | 55 (14.3) | 3.220 (0.0727) |
| AYUSH | 42 (76.4) | 13 (23.6) | |
| **Frequency of visiting a healthcare facility** | | | |
| Once a month or less | 55 (88.7) | 7 (11.3) | 1.287 (0.256) |
| Two or more times in a month | 317 (83.0) | 65(17.0) | |
| **Suffering from any chronic medical condition** | | | |
| Yes | 165 (86.0) | 27 (14.0) | 1.15 (0.282) |
| No | 207 (82.1) | 45 (17.9) | |
| **Perception that adult vaccines can prevent infectious diseases** | | | |
| Yes | 309 (90.3) | 33 (9.7) | 47.25 (< 0.0001) |
| No or not sure | 63 (61.8) | 39 (38.2) | |
| **Knowledge of nearby healthcare facility** | | | |
| Yes | 357 (85.8) | 59 (14.2) | 20.077 (<0.00001) |
| No | 15 (53.6) | 13 (46.4) | |

The possible association of various factors with the vaccination status of participants was analysed. There was no significant association of gender and different levels of education with vaccination. However, a highly significant association between socio-economic class as per BG Prasad scale and vaccination status ($p < 0.01$) was observed. Vaccination rates were much higher among the upper socio-economic class compared to the lower classes. Similarly, a highly significant association was found ($p < 0.01$) between the perception that adult vaccines can prevent infectious diseases and vaccination status. Those who believe vaccines are effective are much more likely to be vaccinated. Participants with knowledge of local healthcare services are more likely to be vaccinated ($p < 0.001$). The type of health facility primarily visited, frequency of visits, and presence of any chronic medical conditions were not found to be significantly associated with the status of vaccination (Table 4).

## Discussion

A high level of awareness regarding adult vaccination is evident, with 87% of participants reporting that they have heard about it for communicable diseases. This reflects a positive trend in information dissemination about adult immunisation within the community. Other studies have reported a lower level of awareness with only 26% of participants having heard about adult vaccination in Southern India.[8] Rathi and Sharma have quoted that over 80% of Indian adults lack awareness about adult vaccination.[2] Another research reveals that more than two-thirds of participants were unaware that vaccines are not only for children.[5]

Our study indicated that knowledge was highest for the tetanus vaccine (88.96%) and lowest for herpes zoster vaccine (7.21%). It suggests that while awareness of vaccines like influenza or tetanus is relatively high, knowledge about vaccines like HPV, shingles, or pneumococcal remains limited. These findings are consistent with those of another research by Bhattacharyya and Shahabuddin which indicated that while vaccines like tetanus and rabies were commonly recognised, awareness of vaccines such as influenza, pneumococcal, and human papillomavirus was significantly lower.[9] Although other authors have reported a very low level of knowledge about this. Kanugula et al. have reported that 77% of participants believed adult vaccination could prevent diseases, while 21% were uncertain. A high proportion of subjects (96%) believed that vaccines are cost-effective as reported by other researchers.[8]

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The present study found that television and newspapers were major sources of information about adult vaccines, followed by information from friends and health workers. Social media (26.6%) was gaining traction, highlighting its potential for reaching tech-savvy and younger audiences, though it currently lagged behind traditional media. Other authors have cited healthcare providers and the internet as important sources of information regarding adult vaccination.[10–12]

After the COVID-19 pandemic, people have become more aware and their acceptability towards vaccination among adults has been enhanced. 95% of participants had received the COVID-19 vaccine, which reflects a positive attitude and high acceptance of this vaccine among the study population. 92% of respondents agreed about a positive change in their perception of adult vaccination after the COVID-19 pandemic. A significant majority (84%) of participants reported receiving at least one vaccine (other than COVID-19) after the age of 18 years, suggesting a generally positive attitude or accessibility toward adult immunisation in this population. This is relatively high compared to broader national data suggesting lower overall adult vaccination rates.[13,14]

However, 16% did not receive any vaccines as adults, indicating a potential gap in awareness, access, or motivation that could be targeted for improvement. Tetanus vaccination (83%) was by far the most common, likely due to routine recommendations or emergency prophylaxis for wounds. Hepatitis B (34%) had a substantial uptake, reflecting increasing awareness of its importance, possibly driven by public health campaigns or workplace requirements in healthcare and other sectors. This may be a result of more focus on these two vaccines for adults as per government guidelines.[15]

Vaccines like influenza (9%), pneumococcus (1.3%), herpes zoster (0.8%), and human papillomavirus (0.5%) were far less commonly reported. These vaccines are critical for specific age groups, at-risk populations, or diseases with significant morbidity, but their low uptake highlights either a lack of awareness, limited access, or lower prioritisation in public health campaigns targeting adults. The results are similar to another study that mentioned tetanus toxoid, anti-rabies vaccine, and yellow fever vaccines as the most utilised.[15]

The major role played by government healthcare facilities in adult vaccination reflects the pivotal role of public health infrastructure in delivering vaccines. This dominance might also suggest affordability as a motivating factor. A smaller proportion (19%) relied on private healthcare settings, indicating that private providers are a secondary option, likely utilised by individuals with better financial resources or limited access to government services. Doctor's prescriptions (47%) were the primary reason participants sought vaccination. This underscores the trust in healthcare providers and their influence on health decisions, emphasising the need for clinicians to proactively recommend adult vaccinations. Campaigns in the area (30%) also played a significant role, reflecting the effectiveness of targeted public health initiatives in improving vaccine uptake. Healthcare centre awareness (18%) indicates that incidental exposure to information at medical facilities can lead to vaccination, highlighting the need to optimise these opportunities further. Animal bites (5%), though less common, emphasise the role of vaccinations in post-exposure prophylaxis.

When enquired about the reasons for not vaccinating, lack of knowledge (65%) was the predominant reason, pointing to a critical gap in health education regarding the benefits and availability of adult vaccinations. This suggests a need for community-wide educational campaigns. The absence of advice from healthcare providers (18.7%) suggests missed opportunities in clinical interactions, where providers could play a more active role in recommending vaccines. Vaccine unavailability (1.3%) was the least cited reason, indicating that supply issues were not a major barrier in this setting. Researchers from India have mentioned lack of awareness, lack of provider recommendations, vaccine hesitancy, fear of side effects, and cost as major barriers to adult vaccination.[6, 16–20] A study from Pakistan has also reported a lack of awareness as a major cause of less vaccine uptake.[21]

The study revealed key factors influencing the status of vaccination for communicable diseases among adults. Socioeconomic class plays a significant role, with higher vaccination rates observed in individuals from upper socio-economic classes. Existing research shows evidence of lower uptake of vaccines among people from lower socioeconomic backgrounds.[13,22] Additionally, a strong belief in the efficacy of adult vaccines in preventing infectious diseases is associated with a higher likelihood of vaccination. Knowledge of nearby healthcare facilities also correlates strongly with vaccination rates, suggesting that access to healthcare information may encourage vaccination. Interestingly, the study found no significant association between gender, education level, frequency of visiting healthcare facility, or the presence of chronic conditions with vaccination status. This differs from other studies, such as that by Rizvi and Singh, where these factors were found to influence vaccination uptake.[23] This contrast suggests that while socio-economic factors are consistently linked to vaccination behaviour, other individual factors may play a more complex or context-dependent role. The findings of this study highlight the importance of targeting socio-economic disparities and enhancing vaccine awareness to improve vaccination coverage.

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One of the limitations of the study is the coverage of a single community which limits the generalisability of findings. A bigger sample and wider population coverage-based study could be more beneficial for policy decisions for adult vaccination. Also, since this is an exploratory study, a qualitative approach might provide a deeper insight into the community's perspective regarding adult immunisation.

## Conclusion

The study reveals a good overall awareness regarding adult vaccines for communicable diseases, although there is still a significant knowledge gap regarding some adult vaccines, such as influenza, pneumococcus, and others, highlighting the need for further educational interventions to increase awareness of these vaccines. The traditional media like newspapers and TV were the most important sources of information regarding this. There was a widespread acceptance of COVID-19 and Tetanus vaccines among the study population but only a meager proportion had received other vaccines. Lack of knowledge about the vaccine and lack of prescription by health care providers were identified as the major barriers to vaccination. The study underscores the significant impact of socioeconomic status and vaccine efficacy beliefs on adult vaccination rates. Addressing socio-economic disparities and vaccine awareness, are crucial for improving vaccination coverage and public health.

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