



Pharmacists Attitude and Perceived Barriers toward Providing Vaccination Services

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Vaccination has significantly reduced the global burden of infectious diseases, preventing millions of deaths annually. Despite the availability of effective vaccines, suboptimal vaccination coverage remains a challenge, limiting the full realization of vaccination benefits. With their expertise in medication management and patient education, pharmacists play a crucial role in public health, particularly in vaccination services. But, due to low involvement of pharmacist specially Community Pharmacist who is available to public more than the other health care professionals effect the success and coverage of target immunization.

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Objective: This study aimed to evaluate the attitude and perceived barriers among community pharmacists in providing immunization services at community pharmacies in Lahore, Pakistan.

Methods: This cross-sectional observational study was conducted in a different community pharmacy in Lahore city. A validated questionnaire was used for this study with a Cronbach alpha value of 0.721. The students of pharm-D distributed the questionnaire to pharmacists in various community pharmacies. The study assessed attitudes and barriers using a Likert scale and examined the impact of demographics such as gender, education, and work experience on these variables. Statistical Package for Social Science (SPSS) ver. 25.0 was used to analyze the data. Post-hoc pairwise comparison of chi-squared test for different variables with attitude and perceived barriers in community pharmacists is done.

Results: The results revealed that male pharmacists had a slightly more positive attitude toward vaccinations than females, although the difference was not statistically significant ($p = 0.094$). Pharmacists with PhDs demonstrated a higher enthusiasm for providing vaccination services, which was attributed to their advanced knowledge. Full-time pharmacists exhibited better attitudes than part-time pharmacists, although this difference was also not statistically significant ($p = 0.161$). A key finding was the positive influence of vaccine availability, particularly Hepatitis B, on pharmacists' attitudes, with a statistically significant p-value of 0.003. However, several barriers persist, including inadequate training, lack of public trust, and limited vaccine access. These barriers were consistent across genders, as both male and female pharmacists reported similar challenges ($p = 0.928$).

Conclusion: In conclusion, community pharmacists in Lahore demonstrate positive attitudes toward providing vaccination services. However, addressing the barriers to vaccination administration is essential for optimizing the pharmacists' involvement in vaccination programs. The study highlights the need for targeted education and policy interventions to address these barriers and enhance pharmacists' roles in vaccination services, ultimately improving public health outcomes in Pakistan.

Keywords: Pharmacists' attitudes; vaccination services; perceived barriers; community pharmacy; public health initiatives.

1. INTRODUCTION

According to the World Health Organization, vaccination has significantly reduced the impact of infectious diseases, preventing nearly 2.5 million deaths annually [1]. The incidence, prevalence, and severity of diseases such as polio, chicken pox, hepatitis A and hepatitis B have declined since the introduction of vaccinations [2]. However, despite the availability of effective vaccines, suboptimal vaccination coverage across different age groups remains a concern, hindering the full realization of the health benefits of vaccinations [3].

Pharmacists play a crucial role in collaborative care and disease control through their expertise in medication management and patient education [4]. Pharmacists work alongside physicians and other healthcare providers in collaborative care models to optimize patient outcomes [5]. They contribute by conducting medication reviews, ensuring drug adherence, and monitoring for potential drug interactions or adverse effects [6]. Pharmacists also play a pivotal role in disease prevention and control through vaccination programs and health screenings [7].

Being accessible healthcare professionals, pharmacists educate patients on the importance of vaccinations, administer vaccines where authorized, and promote public health initiatives aimed at reducing the spread of infectious diseases [8]. Moreover, pharmacists are increasingly involved in chronic disease management, providing counseling on lifestyle modifications, medication adherence, and monitoring disease progression [9]. Their comprehensive knowledge of medications and interactions enables pharmacists to serve as valuable resources in interdisciplinary healthcare teams, enhancing overall patient care and contributing significantly to disease prevention and management efforts [4].

The role of pharmacists in healthcare has evolved beyond dispensing medications to encompass a broader range of responsibilities, such as pharmaceutical care, including the provision of immunization services [10]. Pharmacists, as accessible and trusted healthcare professionals, have emerged as critical stakeholders in addressing these gaps. With expanded roles in vaccine administration, pharmacists can enhance vaccination efforts,

improve public health outcomes, and reduce healthcare disparities [11]. However, the integration of pharmacists into vaccination programs varies significantly worldwide, influenced by regulatory structures, healthcare policies, and professional perspectives [12].

In Pakistan, pharmacists' role in providing immunization services remains underutilized, despite the potential benefits of involving them more fully in vaccination programs [13, 14]. The country faces unique challenges in its healthcare infrastructure, including limited vaccine access, public mistrust in community pharmacists, and inadequate professional training [15]. These barriers not only affect the ability of pharmacists to contribute to vaccination efforts but also impact the overall success of public health initiatives aimed at controlling vaccine-preventable diseases [16]. Addressing these barriers is essential to maximizing the role of pharmacists in enhancing vaccination coverage and improving public health outcomes [17].

This study explores the perspectives of pharmacists in Pakistan regarding their willingness to administer vaccines and the obstacles they face in effectively participating in vaccination campaigns [18]. Pakistan's varied healthcare system and distinct challenges provide a valuable case study for examining the involvement of pharmacists in public health endeavors, particularly in vaccination [19, 20]. It aims to highlight both the opportunities and obstacles, guiding policymakers, healthcare providers, educators, and researchers in developing strategies [21]. The strategies that may enhance pharmacists' role in promoting immunization and achieving public health objectives in Pakistan and beyond [22].

2. METHODOLOGY

This research study employed a cross-sectional design to evaluate the attitudes and perceived barriers among community Pharmacists regarding providing immunization services in Lahore. The total participants were 97 Pharmacists from different community pharmacies in the targeted city of Lahore. Participants were diverse in terms of age, gender, race, qualifications, and years of practice. The sample size $n=97$ was finalized using the convenient sampling method. This study was conducted from June 10, 2024, to August 23, 2024. The study utilized a validated

questionnaire with a Cronbach alpha value of 0.721.

2.1 Inclusion Criteria

The study included all pharmacists available at community pharmacies who were willing to participate and complete the distributed form.

2.2 Exclusion Criteria

1. The exclusion criteria include all pharmacists other than registered pharmacists working at community pharmacies.
2. Pharmacists who are unwilling to participate or unavailable during working hours are excluded.

2.3 Data Collection Method

The questionnaire was designed to evaluate pharmacists' attitudes and perceived barriers to providing vaccine services at different community pharmacies in Lahore. Experts in clinical pharmacy and pharmacy practice validated it. After validation and necessary revisions, the final survey questionnaire comprised 23 questions categorized into attitude and perceived barrier sections. The first part of the questionnaire included demographic details such as gender, age, qualification, years of practice, and job duration. Section A utilized a Likert scale scored from 1 to 5, with a strongly disagree score of 1, a disagree score of 2, a neutral score of 3, an agree score of 4, and a strongly agree score of 5 for answering the questions related to pharmacists' attitudes regarding vaccine administration. Section B utilized a Likert scale (strongly disagree, disagree, neutral, agree, strongly agree) for the perceived barriers-based questions.

2.4 Statistical Analysis

The collected data were entered into SPSS version 21 for analysis. Descriptive statistics were conducted to determine the quantitative data's percentage, frequency, mean, and standard deviation. The data's normality was assessed using the Kolmogorov-Smirnov test and by checking the skewness and kurtosis values. After confirming the data's normality, parametric tests were performed, such as the one-way ANOVA. A p-value of less than 0.05 was considered statistically significant.

3. RESULTS

This study includes 97 community pharmacists from different community pharmacies in Lahore, Pakistan. Table 1 presents the socio-demographic details of the respondents. The study evaluates the impact of different demographics on attitudes and perceived barriers to providing immunization by community pharmacists. Approximately 67.0% of the males were part of the study. 87.6% of the approached population were Graduates, while the others had a Master's (11.3%) and PhD (1.0%) degree. More detailed information can be obtained from Table 1.

Male pharmacists who participated in this study had slightly more positive attitudes as compared to the females. Similarly, the ones with a PhD degree (57.00) have a better attitude in providing immunization services at community pharmacies in contrast to Graduates (53.77) and other degrees (54.00) ($P = 0.001$, $\phi +0.352$). The more time a pharmacist spends (54.18) at the pharmacy, the better the pharmacist has attitude is compared to the part-timers (52.92). Conversely, no significant association was found between availability and unavailability of vaccines in regarding providing immunization ($P = 0.14$). More details can be found in Table 2.

Table 1. Represents the demographic information of the community pharmacist (N=97)

| | |
|-------------------------------------|------------|
| Age in years | |
| Age | 30.6±12.67 |
| Gender | |
| Male | 65(67.0) |
| Female | 32(33.0) |
| Area | |
| Lahore | 97(100) |
| Qualification | |
| Graduation | 85 (87.6) |
| Masters | 11 (11.3) |
| Ph.D | 1(1.0) |
| Duration of Job | |
| Part time | 27 (27.8) |
| Full time | 70 (72.2) |
| Years of Practice | |
| 1-2 Years | 39 (40.2) |
| 2-3 Years | 14 (14.4) |
| 3-4 Years | 29 (29.9) |
| More | 15 (15.5) |
| Types of Immunizations | |
| Available | 66 (68.0) |
| Unavailable | 31 (32.0) |
| Hepatitis A | |
| Yes | 48(49.5) |
| No | 49 (50.5) |
| Hepatitis B | |
| Yes | 44 (45.4) |
| No | 53 (54.6) |
| DTaP Vaccine | |
| Yes | 7 (7.2) |
| No | 90 (92.8) |
| Polio | |
| Yes | 10 (10.3) |
| No | 87 (89.7) |
| Pneumococcal | |
| Yes | 11 (18.6) |
| No | 79 (81.4) |
| Haemophilus Influenza Type B | |

| | |
|---------------------|-----------|
| Age in years | |
| Yes | 11 (11.3) |
| No | 86 (88.7) |
| Chicken Pox | |
| Yes | 19 (19.6) |
| No | 78 (80.4) |
| MMR | |
| Yes | 12(12.4) |
| No | 85(87.6) |
| Influenza | |
| Yes | 39 (40.2) |
| No | 58 (59.8) |

Table 2. Post-hoc pairwise comparison of chi-squared tests for different variables with attitude of community pharmacist among 97 community pharmacists

| Variables | Mean (SD) | F Statistics | P Value | Eta |
|------------------------------------|--------------|--------------|---------|-------|
| Gender | | | | |
| Male | 54.30 (3.70) | 2.865 | 0.094 | 0.029 |
| Female | 52.87 (4.32) | | | |
| Area | | | | |
| Lahore | 53.83 (3.95) | | | |
| Qualification | | | | |
| Graduation | 53.77 (3.75) | 0.334 | 0.717 | 0.007 |
| Masters | 54.00 (5.56) | | | |
| Ph.D | 57.00 | | | |
| Duration of Job | | | | |
| Part time | 52.92 (3.64) | 1.995 | 0.161 | 0.021 |
| Full time | 54.18 (3,95) | | | |
| Practice of Years | | | | |
| 1-2 years | 51.74 (4.11) | 7.39 | 0.000 | 0.193 |
| 2-3 years | 54.78 (2.96) | | | |
| 3-4 years | 55.31 (3.11) | | | |
| More | 55.53 (3.95) | | | |
| Types of Immunizations | | | | |
| Available | 54.24 (4.02) | 2.21 | 0.14 | 0.023 |
| Unavailable | 52.96 (3.71) | | | |
| Hepatitis A | | | | |
| Yes | 54.41 (3,42) | 2.07 | 0.15 | 0.021 |
| No | 53.26 (4.37) | | | |
| Hepatitis B | | | | |
| Yes | 55.11 (3.45) | 9.117 | 0.003 | 0.088 |
| No | 52.77 (4.06) | | | |
| DTaP | | | | |
| Yes | 53.28 (4.88) | 0.144 | 0.70 | 0.002 |
| No | 53.87 (3.90) | | | |
| Polio | | | | |
| Yes | 55.00 (4.28) | 0.96 | 0.328 | 0.10 |
| No | 53.70 (3.92) | | | |
| Pneumococcal | | | | |
| Yes | 54.11 (5.35) | 0.107 | 0,745 | 0.001 |
| No | 53.77 (3-69) | | | |
| Hemophilus influenza type B | | | | |
| Yes | 54.36 (5.92) | 0.22 | 0.64 | 0.002 |
| No | 53.76 (3.67) | | | |

| Variables | Mean (SD) | F Statistics | P Value | Eta |
|----------------------|--------------|--------------|---------|-------|
| Chicken Pox | | | | |
| Yes | 54.15 (5.33) | 0.156 | 0.694 | 0.002 |
| No | 53.75 (3.58) | | | |
| MMR | | | | |
| Yes | 56.25 (3.38) | 5.330 | 0.02 | 0.053 |
| No | 53.49 (3.92) | | | |
| Influenza flu | | | | |
| Yes | 53.76 (4.41) | 0.018 | 0.894 | 0.00 |
| No | 53.87 (3.65) | | | |

Compared to male pharmacists (44.09), more female pharmacists (45.09) feel hesitant about providing immunization services

Table 3. Post-hoc pairwise comparison of chi-squared tests for different variables with perceived barriers faced by community pharmacists among 97 community pharmacists

| Variables | Mean (SD) | F Statistics | P Value | Eta |
|------------------------------------|--------------|--------------|---------|-------|
| Gender | | | | |
| Male | 44.98 (5.81) | 0.008 | 0.928 | 0.00 |
| Female | 45.09 (4.99) | | | |
| Area | | | | |
| Lahore | 45.02 (5.53) | | | |
| Qualification | | | | |
| Graduation | 44.76 (5.36) | 0.912 | 0.405 | 0.019 |
| Masters | 46.54 (6.81) | | | |
| Ph.D. | 50.00 | | | |
| Duration of Job | | | | |
| Part time | 44.07 (5.53) | 1.096 | 0.298 | 0.011 |
| Full time | 45.38 (5.52) | | | |
| Practice of Years | | | | |
| 1-2 years | 44.38 (5.35) | 0.461 | 0.710 | 0.015 |
| 2-3 years | 45.14 (4.62) | | | |
| 3-4 years | 45.96 (5.39) | | | |
| More | 44.73 (7.14) | | | |
| Types of Immunizations | | | | |
| Available | 45.07 (5.53) | 0.20 | 0.887 | 0.00 |
| Unavailable | 44.90 (5.51) | | | |
| Hepatitis A | | | | |
| Yes | 45.12 (5.40) | 0.033 | 0.855 | 0.00 |
| No | 44.91 (5.71) | | | |
| Hepatitis B | | | | |
| Yes | 45.13 (5.95) | 0.035 | 0.852 | 0.00 |
| No | 44.92 (5.21) | | | |
| DTaP | | | | |
| Yes | 38.14 (6.44) | 12.125 | 0.00 | 0.121 |
| No | 45.55 (5.12) | | | |
| Polio | | | | |
| Yes | 44.50 (9.41) | 0.098 | 0.755 | 0.001 |
| No | 45.07 (4.98) | | | |
| Pneumococcal | | | | |
| Yes | 42.61 (7.72) | 4.335 | 0.040 | 0.044 |
| No | 45.56 (4.80) | | | |
| Hemophilus influenza type B | | | | |
| Yes | 42.27 (8.10) | 3.127 | 0.080 | 0.032 |
| No | 45.37 (5.07) | | | |
| Chicken Pox | | | | |

| Variables | Mean (SD) | F Statistics | P Value | Eta |
|----------------------|--------------|--------------|---------|-------|
| Yes | 42.10 (7.29) | 6.965 | 0.10 | 0.068 |
| No | 45.73 (4.80) | | | |
| MMR | | | | |
| Yes | 42.91 (7.15) | 2.00 | 0.161 | 0.021 |
| No | 45.31 (5.25) | | | |
| Influenza flu | | | | |
| Yes | 44.05 (5.66) | 2.02 | 0.158 | 0.021 |
| No | 45.67 (5.39) | | | |

4. DISCUSSION

The present study provides valuable insights into the attitudes and perceived barriers of community pharmacists in Lahore, Pakistan, regarding providing vaccination services. Male pharmacists exhibited a slightly more positive attitude towards administering vaccines than their female counterparts, with mean scores of 54.30 and 52.87, respectively. However, this difference was not statistically significant ($p = 0.094$). This is consistent with findings from a similar study conducted in Saudi Arabia, where male pharmacists also showed a higher intent to provide immunization services than females [23]. These gender-based differences could be attributed to cultural factors, societal expectations, and work environments, which may impact female pharmacists' participation in immunization services.

Pharmacists with a PhD degree demonstrated a notably higher enthusiasm for vaccination, with a mean attitude score of 57.00, in contrast to those with bachelors or master's degrees. Although the difference was not statistically significant ($p = 0.717$), this trend could be related to the higher level of knowledge and expertise that PhD holders possess, enabling them to understand the importance of vaccination better. This finding aligns with the literature, highlighting advanced knowledge's role in motivating healthcare professionals to participate actively in public health campaigns [24].

A significant finding of this study is that full-time pharmacists exhibit a better attitude towards vaccination than part-time pharmacists, though this difference was not statistically significant ($p = 0.161$). This may be explained by full-time pharmacists' greater time commitment and exposure, allowing them to stay more informed about public health interventions such as vaccination campaigns. This is consistent with the literature, which suggests that more engaged pharmacists are better positioned to influence public health [25].

One of the study's key findings is that the availability of vaccines, particularly Hepatitis B, influences pharmacists' attitudes significantly. Pharmacists who offered the Hepatitis B vaccine had a higher mean attitude score (55.11) than those who did not (52.77), with a significant p -value of 0.003. This suggests that the ability to provide vaccines directly enhances pharmacists' confidence and willingness to participate in vaccination services. This aligns with a global trend, where access to vaccines was found to impact healthcare professionals' attitudes toward vaccination positively [26].

Despite the generally positive attitudes among pharmacists, several barriers persist. The study highlights that gender does not significantly influence perceived barriers, with similar mean scores for males and females regarding willingness to provide vaccines (44.98 vs. 45.09, $p = 0.928$). This finding indicates that other factors, such as professional workload, training, and public trust in pharmacists as vaccinators, may play a more critical role in shaping pharmacists' participation in vaccination programs. A similar study was conducted in Malaysia, showing that pharmacists have a few factors that act as a barrier, including inadequate training, lack of support, and resource cost [27].

Compared to international studies, the barriers identified in Pakistan, such as lack of access to vaccines, insufficient training, and public skepticism, are consistent with challenges observed in other countries. A systematic review conducted by Yemeke et al. (2021) found similar barriers in low—and middle-income countries, where pharmacists faced professional training and resource constraints [7].

Furthermore, the availability of specific vaccines, such as Hepatitis B, was associated with a higher mean attitude score (55.11) compared to pharmacists who did not offer this vaccine (52.77), with a statistically significant p -value of 0.003. This finding aligns with the idea that the availability of vaccines can positively influence

pharmacists' attitudes, potentially because pharmacists with access to vaccines feel more empowered to administer them [28].

Overall, the study highlights that while community pharmacists in Lahore demonstrate a generally positive attitude toward providing vaccination services, several barriers persist. These include limited vaccine access, insufficient training, and public skepticism about pharmacists' roles as vaccinators. Addressing these barriers through targeted education and policy changes could enhance pharmacists' participation in vaccination programs, ultimately improving public health outcomes in Pakistan.

5. CONCLUSION

In conclusion, while pharmacists in Lahore demonstrate a positive attitude toward providing vaccination services, similar to their counterparts in other countries, addressing barriers like training, vaccine access, and public trust is essential to improving their participation in vaccination programs. Solutions should involve targeted education and policy interventions to align public perception with the potential role pharmacists can play in public health efforts.

6. LIMITATIONS OF THE STUDY

The study was conducted among a relatively small sample of pharmacists in Lahore, which limits the generalizability of the findings to other regions of Pakistan. A larger sample size across multiple cities could provide more comprehensive data.

7. RECOMMENDATION

Policymakers should consider expanding the role of pharmacists in public health initiatives by introducing legislation that supports community pharmacy-based vaccination programs. This could include giving pharmacists the legal authority to administer vaccines in more healthcare settings. Moreover, specialized training and continuous professional development programs for pharmacists should be conducted to improve their knowledge and confidence in providing vaccination services. This can address the gaps in knowledge and increase public trust in pharmacists as vaccinators.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models

(ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

ETHICAL APPROVAL AND CONSENT

The Lahore Medical and Dental College Human Ethics Committee approved the study protocol, including demographic authorization, on July 15, 2022. The Faculty Research Committee also reviewed and granted ethical clearance for the study. All respondents provided written informed consent, and their information was kept confidential for research purposes.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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