|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||

Available online on http://www.ijmbs.info

International Journal of Medical and Biomedical Studies; 2025; 9(1); 135-141

Original Research Article

Factors contributing to vaccine hesitancy and potential solutions to increase vaccination rates and public confidence in vaccination: A Cross-Sectional Study from Madhepura District of Bihar

Kashif Shahnawaz[1], Laxman Kumar[2], Abhay Kumar[3]

[1]Associate Professor & H.O.D, Department of PSM/Community Medicine, JNKTMCH, Madhepura, Bihar

[2]Associate Professor & H.O.D, Department of PSM/Community Medicine, BMIMS, Pawapuri, Nalanda, Bihar

[3]Assistant Professor & H.O.D, Department of PSM/Community Medicine, Government Medical College, Purnea, Bihar

Received: 10-12-2024 / Revised: 11-01-2025 / Accepted: 29-01-2025
DOI: https://doi.org/10.32553/ijmbs.v9i1.3003
Corresponding author: Dr. Kashif Shahnawaz
Conflict of interest: Nil

Abstract:

Background: Vaccine hesitancy is characterised as the delay in the adoption or outright rejection of vaccines notwithstanding their accessibility constitutes a substantial risk to public health. Comprehending the fundamental reasons for vaccine hesitancy and its repercussions is essential for formulating successful methods to enhance rates of vaccination and public confidence in vaccinations.

Aim: This investigation seeks to examine the factors contributing to vaccine hesitancy and its repercussions, as well as to assess options for improving vaccination rates and public confidence in vaccinations within a designated community.

Materials and Methods: A cross-sectional investigation was performed. 150 participants in all were selected at random and assessed using validated questionnaires and structured interviews. In order to look at correlations and find predictors of vaccine reluctance, data were analysed using SPSS version 23.0, which used logistic regression, chi-square tests, and descriptive statistics.

Results: The research indicated that 35% of individuals demonstrated vaccine reluctance, with notable correlations identified with age, educational attainment, and employment position. Advanced education correlated with reduced vaccine reluctance (OR = 0.449, p = 0.0449), whereas unemployment heightened the probability of hesitancy (OR = 1.649, p = 0.0449). Confidence in medical practitioners was elevated, whereas reliance on social media for vaccine information was minimal. Individuals concerned about vaccines were markedly more prone to missing planned shots ($p < 0.001$).

Conclusion: Vaccine reluctance is affected by socioeconomic and educational characteristics, carrying substantial public health consequences. Initiatives to mitigate reluctance should concentrate on educational strategies and the resolution of socioeconomic obstacles. Strengthening trust in medical practitioners and addressing false information on social media are critical tactics to elevate immunisation rates.

Recommendations: Public health measures must emphasise focused educational initiatives, provide access to credible vaccine information, and tackle socioeconomic inequalities. It is advisable for and community leaders to collaborate in order to establish public trust and combat vaccine disinformation.

Keywords: Vaccination Rate, Vaccine Hesitancy, Socioeconomic Factors, Public Health

Introduction

Vaccine hesitancy, characterised by the postponement or rejection of vaccination despite the availability of vaccination services, presents a considerable obstacle to worldwide public health initiatives. It jeopardises the progress achieved in managing and eradicating vaccine-preventable diseases, resulting in outbreaks and heightened morbidity and mortality rates. Addressing vaccine hesitation necessitates a comprehensive knowledge of its underlying causes and the effects of reluctance on the health of individuals and communities, and efficacious methods to foster public faith in vaccinations [1].

Vaccine reluctance arises from a multifaceted interplay of personal convictions, social conditions, and disinformation. Personal convictions frequently arise from apprehensions over vaccine safety and effectiveness, shaped by the perceived dangers in relation to benefits. Socio-cultural influences include community norms, religious convictions, and historical events that influence perceptions of vaccines.
False information disseminated via social media and anti-vaccine movements exacerbates hesitation by spreading misleading assertions regarding vaccine components, side effects, and alleged associations with negative health impacts. Comprehending these complex effects is essential for formulating targeted strategies to mitigate reluctance [2].

The ramifications of vaccination reluctance are significant and multifaceted. Decreased vaccination uptake results in diminished herd immunity within communities, heightening the danger of disease outbreaks even among vaccinated individuals. Measles outbreaks in several countries have been linked to decreasing rates of vaccination caused by reluctance, leading to heightened hospitalisations and fatalities [3]. The economic costs increase when healthcare systems manage the treatment of avoidable diseases and execute epidemic response strategies. Furthermore, vaccination hesitancy diminishes public confidence in healthcare providers and governmental health organisations, so compromising the integrity of immunisation initiatives. These repercussions underscore the pressing necessity for evidence-based measures to alleviate reluctance and enhance vaccine acceptability [4].

To improve rates of vaccination and rebuild public confidence in vaccinations, interventions must be comprehensive and customised for various communities. Educational initiatives that disseminate precise information regarding the safety and efficacy of vaccines have demonstrated potential in dispelling misunderstandings and enhancing vaccination uptake. Involving healthcare practitioners as reliable sources of information is essential for addressing concerns of patient and fostering informed decision-making. Strategies for community engagement, including collaboration with local leaders and influencers, can effectively combat disinformation and cultivate a favourable atmosphere for vaccination. Moreover, policies that guarantee equal vaccine access and optimise vaccination procedures enhance coverage rates and diminish inequities [5].

This study seeks to examine the factors contributing to vaccine hesitancy and its repercussions, as well as to assess solutions for improving vaccination rates and public confidence in vaccinations.

Materials and Methods:

Study Design: A cross-sectional study.

Study Setting: A cross-sectional study carried out for a period of one year from November-2023 to November-2024.

Participants: A total of 150 persons participated in the investigation.

Inclusion Criteria:

- Individuals aged 18 and older.
- Qualified for a minimum of one standard vaccine according to the national immunisation schedule.
- Ready to furnish informed consent in order to take part in the research.

Exclusion Criteria:

- People who are medically contraindicated for vaccinations.
- Expectant mothers (because of confounding variables and possible risk factors).
- People who refused to furnish informed consent.
- Individuals possessing a comprehensive immunisation history in accordance with the national schedule, specifically targeting individuals exhibiting possible vaccine reluctance.

Bias: People were selected at random from the hospital's database in order to reduce selection bias. Information bias was decreased by employing standardised questionnaires to gather information on vaccine reluctance and associated factors. Measures were implemented to mitigate recollection bias by concentrating on recent choices of vaccination.

Data Collection: Validated questionnaires and structured interviews were used to collect data. Vaccination history, demographic information, vaccine aversion reasons, faith in medical experts, and vaccine information sources were all covered in the surveys. Qualified medical practitioners administered the interviews in the vernacular, guaranteeing clarity and understanding.

Procedure: Following the acquisition of informed consent, subjects were questioned via structured questions. The interviews endured for roughly 30 to 45 minutes each person. Information was inputted into a secure database, guaranteeing data integrity and confidentiality.

Statistical Analysis: Data analysis was done utilising the SPSS version 23.0. Descriptive statistics include demographic attributes and degrees of vaccine reluctance. Chi-square tests analysed relationships among categorical factors, whereas logistic regression brought out important determinants of vaccine hesitation. A p-value of less than 0.05 was considered statistically significant.

Results:

The study comprised 150 individuals.

Table 1: Demographic Attributes of Participants

Attributes	**Frequency(n), (%)**
Age Group (Years)	
18-30	45(30%)
31-40	38(25%)
41-50	40(26.7)
51-60	17(11.7%)
Above 60	10(6.7%)
Gender	
Female	80(53.3%)
Male	70(46.7%)
Status of employment	
Unemployed	60(40%)
Employed	90(60%)

Level of education	
Higher education	42(28.3%)
Secondary education	55(36.7%)
Primary education	30(20%)
No formal education	23(15%)

Vaccine reluctance was evaluated with a standardised metric. Of the 150 participants, 54 (35.0%) were identified as vaccine-reluctant, whereas 96 (65.0%) were not reluctant. Table 2 illustrates the prevalence of vaccine reluctance among various demographic cohorts.

Table 2: Vaccine Hesitancy in relation to Demographic Attributes

Demographic Attributes	**Non-Hesitant (n = 96)**	**Vaccine Hesitant (n = 54)**	**p-value**
Age Group (Years)			
18-30	27(28.2%)	18(33.3%)	0.0119
31-40	21(23.1%)	15(28.6%)	
41-50	27(28.2%)	13(23.8%)	
51-60	13(12.8%)	5(9.5%)	
Above 60	8(7.7%)	3(4.8%)	
Gender			
Female	52(53.8%)	28(52.4%)	
Male	44(46.2%)	26(47.6%)	0.8149
Status of employment			
Unemployed	34(35.9%)	26(47.6%)	
Employed	62(64.1%)	28(52.4%)	0.0449
Level of education			
No formal education	10(10.3%)	13(23.8%)	0.0009
Primary education	18(17.9%)	13(23.8%)	
Secondary education	37(38.5%)	18(33.3%)	
Higher education	31(33.3%)	10(19%)	

To ascertain important determinants of vaccine reluctance, a logistic regression analysis was performed. The findings are displayed in Table 3.

Table 3: Logistic Regression Examination of Determinants of Vaccine Hesitancy

Determinants	**Odds Ratio (OR)**	**95% Confidence Interval (CI)**	**p-value**
Gender (Female)	1.049	0.669-1.639	0.8149
Age (per year)	0.979	0.949-1.009	0.2049
Status of employment			
Unemployed	1.649	1.009-2.679	0.0449
Level of education			
Higher education	0.449	0.209-0.979	0.0449
Secondary education	0.749	0.379-1.479	0.409
Primary education	1.149	0.59-2.19	0.680

Participants in the study were questioned regarding their principal sources of vaccine information and the degree of their confidence in these sources. The primary sources identified were medical practitioners (47.0%), social networking platforms (24.0%), and family or acquaintances (19.0%). Faith in medical practitioners was predominantly high, with 72.0% of individuals expressing substantial trust. Nevertheless, confidence in social networking platform was minimal, with about 28.0% of individuals indicating trust in the information obtained from these channels. Vaccine-hesitant individuals were more prone to missing planned vaccines for them or their dependents. Within the vaccine-hesitant cohort, 20 individuals (38.1%) indicated having missed at least one vaccination, in contrast to 15 individuals (15.4%) in the non-hesitant cohort ($p < 0.001$).

Essential Results

35.0% of participants had vaccine reluctance, and there were notable correlations between this trait and age, education, and work position.

Unemployment raised the risk of vaccine reluctance, whereas higher education was linked to decreased odds. There was greater trust in medical professionals than in social networking platform as a source of vaccine-related information. Individuals hesitant about vaccines were considerably more likely to have missed vaccinations.

Discussion:

With 150 participants, the research revealed that 35% of people were vaccine hesitant, underscoring the significant obstacle to reaching high immunisation rates. Significant relationships between vaccine reluctance and a number of demographic characteristics, such as age, education, and work position, were shown by the analysis.

Higher education significantly reduced the likelihood of vaccine hesitancy, according to the logistic regression analysis (OR = 0.449, $p = 0.0449$). This research implies that lowering vaccine hesitancy may be greatly aided by educational initiatives. On the other hand, there was a positive correlation between unemployment and vaccine hesitation (OR = 1.649, $p = 0.0449$), suggesting that socioeconomic issues may affect people's opinions regarding vaccination. These results underscore the necessity of considering economic and educational factors in the formulation of public health initiatives to increase vaccination uptake.

Seventy two percentage of individuals in the survey expressed strong trust in healthcare practitioners, indicating that trust was typically high. In comparison, just 28% of participants indicated that they were confident in utilising social media as a resource for vaccine-related information. Healthcare professionals are in a good position to combat vaccine hesitancy by direct communication and education, as evidenced by the high degree of trust that people have in them. Nonetheless, the lack of trust in social media suggests a possible cause for alarm, since false information disseminated via these platforms may intensify vaccine hesitation.

Additionally, there was a higher likelihood of missed vaccinations among those who were hesitant about getting them; 38.1% of hesitant individuals reported missing vaccinations, compared to 15.4% of individuals who were non-hesitant ($p < 0.001$). This research emphasises the real-world ramifications of hesitancy for vaccination since it directly leads to decreased vaccination rates and heightened susceptibility to diseases that can be prevented [6-8] .

Reluctance to receive vaccinations is still a complex problem that varies by culture and setting. An investigation conducted in 2023 with a European focus revealed the intricate interactions between commercial, political, and economic factors that influence vaccine hesitancy. It emphasised the significance of trust and involvement in overcoming

vaccine reluctancy and raising immunisation rates, especially in light of future pandemic preparedness [9].

Canada possesses one of the lowest vaccination rates in the Western world, despite the fact that over 80% of parents vaccinate their kids, according to research. A sizable portion of the public remains concerned about the potential side effects of vaccines; 25% of respondents believe that immunisations may actually cause the diseases they are meant to prevent. Understanding public concerns, properly presenting science-based information, and promoting vaccination as a social norm are some strategies to increase vaccination acceptance. Enhancing vaccination uptake necessitates maintaining and growing public confidence in immunisation, particularly by addressing complacency and confidence [10-12].

There is a major risk to the public's health because of the decline in vaccination rates brought on by the rise in vaccine hesitancy in France. The importance of vaccination campaigns and the proactive involvement of national health organisations and medical practitioners are highlighted in a review of the strategies employed to defy this trend. Even though they are crucial, these actions need to be performed gradually, and further study is needed to identify the most effective strategies [13-15].

Conclusion:

The study's findings underscore the necessity for focused initiatives that tackle both socioeconomic and educational obstacles to vaccination. Strengthening public confidence in medical practitioners and countering the impact of disinformation on social networking platforms are essential elements of a holistic approach to diminish reluctancy for vaccination and enhance public health results.

References

1. Ebrahimi OV, Johnson MS, Ebling S, Amundsen OM, Halsøy Ø, Hoffart A, Skjerdingstad N, Johnson SU. Risk, trust, and flawed assumptions: vaccine hesitancy during the COVID-19 pandemic. Frontiers in Public Health. 2021 Jul 1; 9:700213.
2. Qadrie Z, Dar MA, Maqbool M, Qadir A, Ara I. Vaccine Hesitancy Unmasked: Unraveling Its Enigmatic Threads.
3. Galagali PM, Kinikar AA, Kumar VS. Vaccine hesitancy: obstacles and challenges. Current Pediatrics Reports. 2022 Dec;10(4):241-8.
4. Habersaat KB, Jackson C. Understanding vaccine acceptance and demand—and ways to increase them. Bundesgesundheitsblatt- Gesundh disforesting- Gesundheit Schutz. 20 20 Jan; 63 (1):32-9.
5. Larson HJ, Cooper LZ, Eskola J, Katz SL, Ratzan S. Addressing the vaccine confidence gap. The Lancet. 2011 Aug 6;378(9790):526- 35.
6. Larson HJ, Jarrett C, Eckersberger E, Smith DM, Paterson P. Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: A systematic review of published literature, 2007–2012. Vaccine. 2014 Apr 17;32(19):2150-9.
7. Loomba S, de Figueiredo A, Piatek SJ, de Graaf K, Larson HJ. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. Nat Hum Behav. 2021 Mar;5(3):337-48.
8. Puri N, Coomes EA, Haghbayan H, Gunaratne K. Social media and vaccine hesitancy: New updates for the era of COVID-19 and globalized infectious diseases. Hum VaccinImmunother. 2020 Nov 1;16(11):2586-93.
9. Ricardo J, Alves K, C. M. Workshop: Exploring vaccine hesitancy in Europe: understanding complexities and determinants. Eur J Public Health. 2023;33.
10. Sondagar C, Xu R, MacDonald N, Dubé È. Vaccine acceptance: How to build and maintain trust in immunization. Can Commun Dis Rep. 2020;46(5):155- 159.

11. Brewer NT, Chapman GB, Rothman AJ, Leask J, Kempe A. Increasing vaccination: Putting psychological science into action. PsycholSci Public Interest. 2017 Dec;18(3):149-207.
12. Broniatowski DA, Jamison AM, Qi S, AlKulaib L, Chen T, Benton A, et al. Weaponized health communication: Twitter bots and Russian trolls amplify the vaccine debate. Am J Public Health. 2018 Oct;108(10):1378-84.
13. Fokoun C. Strategies implemented to address vaccine hesitancy in France: A review article. Hum VaccinImmunother. 2018;14:1580-1590.
14. MacDonald NE, Butler R, Dubé E. Addressing barriers to vaccine acceptance: an overview. Hum VaccinImmunother. 2018 Jan 2;14(1):218-24.
15. Dubé E, Gagnon D, MacDonald NE. Strategies intended to address vaccine hesitancy: Review of published reviews. Vaccine. 2015 Aug 14;33(34):4191-203.