

DETERMINANTS OF MEASLES VACCINATION COVERAGE AND PREVENTIVE PRACTICES AMONG MOTHERS ATTENDING A TERTIARY CARE HOSPITAL

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ABSTRACT

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Background: Measles is a very contagious viral illness and a significant contributor to child illness and death, which can be prevented with vaccination. It persists when protection falls short of herd immunity. Uptake is affected by maternal education, socioeconomic position, and access to healthcare. In Bangladesh, disparities remain evident despite advancements, especially among rural and marginalized communities. This research seeks to evaluate factors influencing measles vaccination rates and preventive behaviors among mothers visiting a tertiary care hospital. **Materials and Method:** This cross-sectional research took place at Patuakhali Medical College Hospital, Bangladesh (2025–2026) with 250 mothers chosen consecutively from the OutPatient Department (OPD). Information on sociodemographic characteristics, measles vaccination history, knowledge, and practices were gathered through a standardized questionnaire with card verification when possible. Chi-square and logistic regression analyses were conducted using SPSS, and informed consent along with ethical approval was obtained. **Results:** Out of 250 mothers, the majority were aged 20–29 years (52.8%), resided in rural regions (61.2%), and belonged to a low socioeconomic status (49.6%). In total, 64.8% of children received complete vaccinations, 23.2% were partially vaccinated, and 12.0% did not receive any vaccinations. Knowledge was satisfactory (56.8%) and practices were fair (55.2%). Complete vaccination showed a strong connection with maternal education, living in urban areas, antenatal care, and knowledge ($p < 0.05$), with knowledge being the most significant predictor. **Conclusion:** The coverage for measles vaccination was inadequate. Maternal education, awareness, antenatal care, and practices had a significant impact on vaccination, with awareness being the most influential predictor. Enhancing maternal knowledge and healthcare utilization is crucial to boost coverage.

Keywords: Measles, Vaccination, Preventive Practices, Mothers, Tertiary Care Hospital.

INTRODUCTION

Measles is a widespread viral infectious illness and a significant contributor to child mortality, causing more than one million fatalities worldwide annually¹. In 2020, there were 149,796 reported cases of measles globally².

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This disease leads to fever, maculopapular rash, coughing, coryza, and conjunctivitis. It may result in serious issues like encephalitis, severe pneumonia, and death, particularly in young children, malnourished individuals, and those with weakened immune systems^{3,4}.

In response to vaccine-preventable diseases, the World Health Organization (WHO) launched the Expanded Program on Immunization (EPI) in 1974 to strengthen global vaccination coverage⁵. The measles vaccine, developed in 1963 from an attenuated Edmonston strain, remains the cornerstone of global measles prevention efforts and has significantly reduced disease burden worldwide⁶. Achieving and sustaining high vaccination coverage is essential for disease elimination, with herd immunity for measles requiring approximately 92%–95% coverage with two doses of the vaccine^{7,8}. In endemic settings, the first dose is typically administered at 9 months of age, followed by a second dose at 15–18 months⁹.

Measles continues to be prevalent in various low-income areas because of inadequate vaccination rates and fragile health systems. When vaccination rates dip below the herd immunity level, outbreaks persist, highlighting ongoing deficiencies in routine immunization services¹⁰. Vaccination coverage for measles is affected by various factors across different levels, with maternal education playing a crucial role. Mothers with education are more inclined to grasp the advantages of vaccines, adhere to schedules, and guarantee prompt immunization for their children¹¹.

Worldwide research indicates that measles vaccination rates are closely linked to maternal education, socioeconomic conditions, and availability of healthcare services. A multi-country study revealed notable disparities in routine immunization, showing lower coverage for children from less affluent families and those with restricted access to maternal and child health services¹². Furthermore, antenatal care utilization has been identified as a critical predictor of complete childhood immunization, including measles vaccination, as it enhances maternal awareness and exposure to preventive health information¹³.

In Bangladesh, recent studies have reported improvements in measles vaccination coverage; however, inequities persist, particularly among rural, less educated, and economically disadvantaged populations. Evidence suggests that maternal healthcare-seeking behavior, including antenatal care attendance and institutional delivery, is significantly associated with higher immunization uptake¹⁴. Nevertheless, disparities in vaccination coverage continue to exist, reflecting gaps in health service delivery and maternal awareness¹⁵.

Although national-level surveys have provided important insights into vaccination coverage trends, there is limited facility-based evidence exploring maternal determinants and preventive practices in tertiary care settings. Understanding these factors is essential for identifying context-specific barriers and improving immunization strategies. Therefore, this study aims to assess the determinants of measles vaccination coverage and preventive practices among mothers attending a tertiary care hospital in Bangladesh.

MATERIALS AND METHOD

Study design, setting and period

This hospital-based cross-sectional analytical study was conducted at Patuakhali Medical College Hospital, a tertiary care facility in southern Bangladesh. Data were collected from mothers attending the OPD of Medicine. The study was carried out over six months, from August 2025 to February 2026.

Participants

Mothers attending the OPD who had at least one child aged 9 months to 5 years were eligible. Mothers who were seriously ill, unable to respond, or unwilling to provide consent were excluded.

Sample size and sampling

A total of 250 mothers were included using a consecutive sampling technique, whereby all eligible participants presenting during the study period were recruited until the sample size was reached.

Data collection

Data were collected using a structured, pre-tested, interviewer-administered questionnaire covering sociodemographic characteristics, vaccination status, maternal knowledge, and preventive practices. Vaccination status was verified through vaccination cards where available; otherwise, maternal recall was used. Selection bias was minimized through consecutive sampling. Recall bias was reduced by cross-checking vaccination cards when available. Interviewer bias was minimized through training and standardized data collection procedures.

Variables

The primary outcome variable was measles vaccination status (fully vaccinated, partially vaccinated, not vaccinated). Independent variables included maternal age, education, residence, socioeconomic status, antenatal care (ANC) visits, maternal knowledge, and preventive practices.

Statistical analysis

Data were analyzed using SPSS version 25. Descriptive statistics were presented as frequencies and percentages. Associations between categorical variables were assessed using the Chi-square test. Variables with $p < 0.05$ in bivariate analysis were entered into multivariate logistic regression to identify independent predictors. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were reported.

Ethical considerations

Ethical approval was obtained from the Institutional Review Board of Patuakhali Medical College. Written informed consent was obtained from all participants, and confidentiality was maintained throughout the study.

RESULTS

A total of 250 mothers attending the OPD of Medicine of Patuakhali Medical College Hospital were included in the study. The findings are presented under sociodemographic characteristics, measles vaccination coverage, maternal knowledge, and preventive practices.

Sociodemographic Characteristics of Respondents

Table 1 shows the sociodemographic profile of the study participants. Among the 250 mothers included in the study, the majority were aged 20–29 years (52.8%), followed by 30–39 years (28.8%). Only 11.2% were below 20 years and 7.2% were aged 40 years or above. Regarding education, 34.4% had primary education, while 34.8% had secondary education. About 14.0% of mothers had no formal education, and 16.8% had higher secondary education or above. Most participants were from rural areas (61.2%), and nearly half of the respondents belonged to a low socioeconomic status group (49.6%).

Table 1: Sociodemographic Characteristics of Respondents (n = 250)

Characteristics	Frequency (n)	Percentage (%)
Age (years)		
<20	28	11.2
20–29	132	52.8
30–39	72	28.8
≥40	18	7.2
Education level		
No formal education	35	14.0
Primary	86	34.4
Secondary	87	34.8
Higher secondary and above	42	16.8
Residence		
Rural	153	61.2
Urban	97	38.8
Socioeconomic status		
Low	124	49.6
Middle	98	39.2
High	28	11.2

n=number of mothers who participated in the study

Measles Vaccination Coverage

Figure 1 presents the overall measles vaccination status among children. Among the 250 children, 64.8% were fully vaccinated, having received both doses of the measles-containing vaccine (MCV1 and MCV2). Additionally, 23.2% were partially vaccinated, while 12.0% of children had not received any measles vaccine dose. This indicates that more than one-third of children had incomplete or no protection against measles.

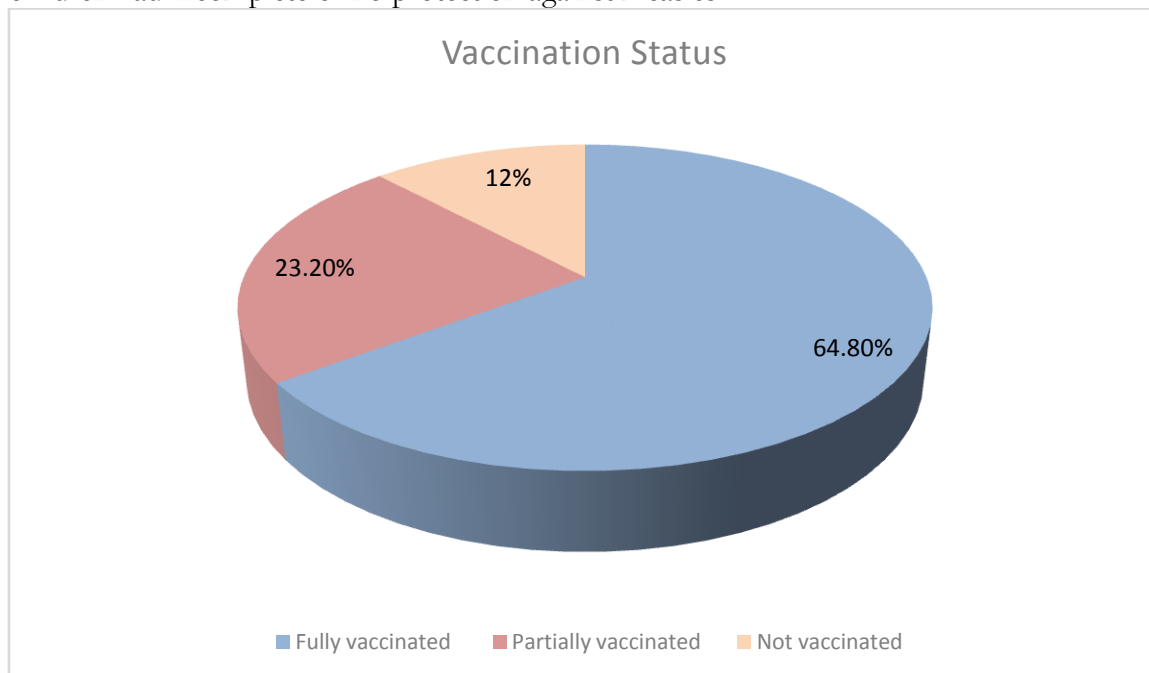


Figure 1: Measles Vaccination Coverage Among Children (n = 250)
Determinants of Full Vaccination (Bivariate Analysis)

Table 2 presents the association between selected maternal and health service factors with full measles vaccination coverage. Full vaccination coverage was significantly higher among mothers with secondary or higher education (75.2%) compared to those with primary or no education (54.5%) ($p = 0.001$). Similarly, children of mothers residing in urban areas (76.3%) had significantly higher vaccination coverage than those from rural areas (60.1%) ($p = 0.002$). Antenatal care (ANC) attendance showed a strong association; mothers with ≥ 4 ANC visits had higher full vaccination coverage (80.4%) compared to those with fewer visits (56.8%) ($p < 0.001$). Furthermore, mothers with good knowledge regarding measles demonstrated higher vaccination coverage (81.0%) compared to those with poor knowledge (50.2%) ($p < 0.001$).

Table 2: Determinants of Full Measles Vaccination Coverage (Bivariate Analysis)

Factors	Full Vaccination of the child (%)	<i>p</i> -value
Maternal education (Secondary+)	75.2	<0.001
Maternal education ($\leq$ Primary)	54.5	
Urban residence	76.3	0.002
Rural residence	60.1	
Antenatal care ≥ 4 visits	80.4	<0.001
Antenatal care <4 visits	56.8	
Good knowledge on measles	81.0	<0.001
Poor knowledge	50.2	

Note: The p -value was calculated using the Chi-square test. A p -value of <0.05 was considered statistically significant.

Maternal Knowledge Regarding Measles Prevention

Table 3 shows findings related to maternal knowledge. Most mothers (83.2%) correctly identified that measles is preventable through vaccination. However, only 58.4% were aware of the correct vaccination schedule. Knowledge regarding complications of measles was moderate (68.8%), while awareness of transmission routes was relatively lower (55.2%). Overall, only 56.8% of respondents demonstrated good knowledge regarding measles prevention.

Table 3: Maternal Knowledge Regarding Measles Prevention (n = 250)

Knowledge Indicators	Correct Response n (%)
Aware measles is preventable by vaccine	208 (83.2)
Knows recommended vaccination schedule	146 (58.4)
Knows complications of measles	172 (68.8)
Aware of transmission mode	138 (55.2)
Overall good knowledge score	142 (56.8)

n=number of mothers who participated in the study

Preventive Practices Among Mothers

Figure 2 shows preventive practices related to measles. A majority of mothers (73.6%) reported maintaining vaccination cards for their children. Regular immunization follow-up was practiced by 68.0% of respondents. Avoidance of contact with infected individuals was reported by 65.2%, and 62.0% practiced regular hand hygiene. Overall, 55.2% of mothers demonstrated good preventive practices, while the rest had suboptimal practices regarding measles prevention.

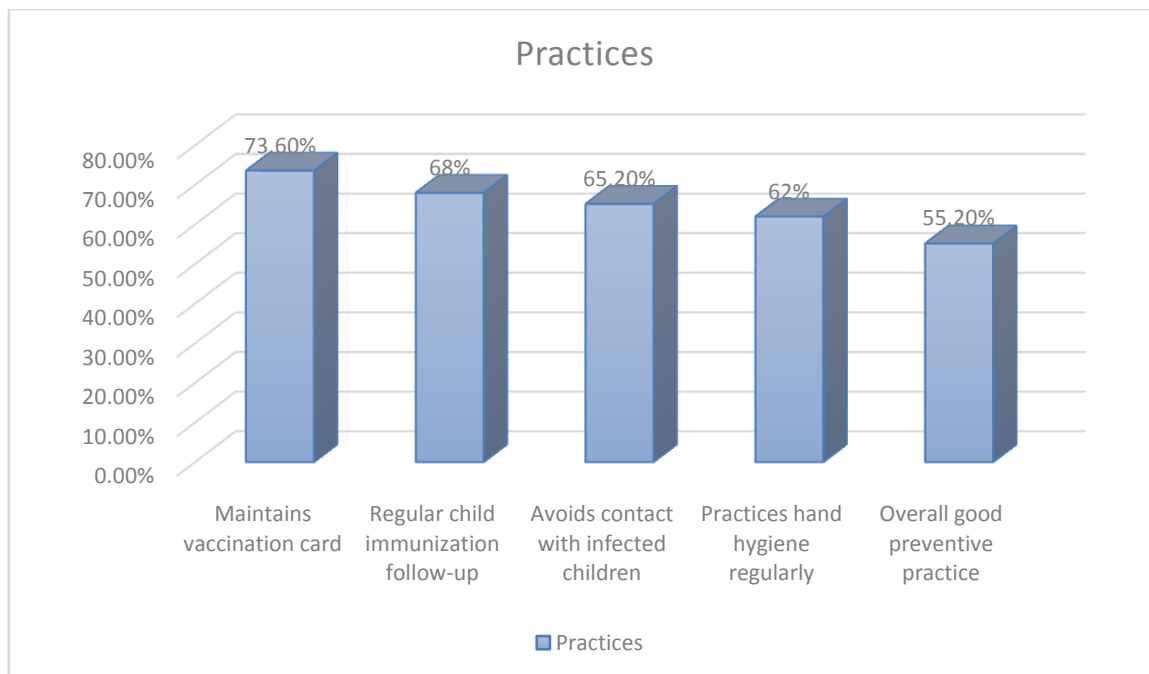


Figure 2: Preventive Practices Among Mothers (n = 250)

Determinants of Full Vaccination

Table 4 shows the results of multivariate logistic regression analysis. After adjusting for potential confounders, maternal knowledge remained the strongest predictor of full vaccination (AOR = 3.08, 95% CI: 1.86–5.08, $p < 0.001$). Mothers with secondary or higher education were significantly more likely to fully vaccinate their children (AOR = 2.32, 95% CI: 1.38–3.89, $p = 0.001$). Adequate antenatal care (≥ 4 visits) also showed a strong positive association (AOR = 2.68, 95% CI: 1.57–4.55, $p < 0.001$). Urban residence remained a significant determinant (AOR = 1.76, 95% CI: 1.05–2.96, $p = 0.032$), indicating higher vaccination coverage among urban populations.

Table 4: Multivariate Logistic Regression of Determinants of Full Vaccination

Variable	AOR	95% CI	<i>p</i> -value
Maternal education (Secondary+)	2.32	1.38–3.89	0.001
Urban residence	1.76	1.05–2.96	0.032
ANC ≥ 4 visits	2.68	1.57–4.55	<0.001
Good knowledge	3.08	1.86–5.08	<0.001

Note: AOR = Adjusted Odds Ratio; CI = Confidence Interval; ANC = Antenatal Care; Multivariate logistic regression was performed. $p < 0.05$ considered significant.

Association Between Preventive Practices and Full Measles Vaccination

Table 5 shows significant association was observed between maternal preventive practices and full measles vaccination. Children of mothers with good preventive practices had higher full vaccination coverage (78.3%) compared to those with poor practices (48.2%). Incomplete vaccination was more common among mothers with poor practices (51.8%). This difference was statistically significant ($p < 0.001$), indicating that better preventive practices are strongly associated with higher vaccination uptake.

Table 5: Association between Preventive Practices and Full Measles Vaccination (n = 250)

Preventive Practices	Fully Vaccinated n (%)	Not Fully Vaccinated n (%)	Total (n)	<i>p</i> -value
Good practice	108 (78.3)	30 (21.7)	138	<0.001
Poor practice	54 (48.2)	58 (51.8)	112	
Total	162 (64.8)	88 (35.2)	250	

Note: The *p*-value was calculated using the Chi-square test. A *p*-value of <0.05 was considered statistically significant. n=number of mothers who participated in the study

DISCUSSION

In this study, the majority of mothers were between 20–29 years old, possessed primary or secondary education, resided in rural locations, and almost half belonged to low socioeconomic status. Comparable results were observed in a hospital study conducted in Bangladesh, where children from rural regions and families with low socioeconomic status and limited education had a higher incidence of measles, emphasizing the impact of sociodemographic disadvantages on susceptibility to measles ¹⁶.

In this study, measles vaccination rates were at 64.8%, with 23.2% partially vaccinated and 12.0% unvaccinated, reflecting inadequate and uneven protection. Comparable results were observed in Bangladesh, where complete immunization rates stay beneath ideal levels because of socioeconomic and healthcare accessibility differences ¹⁷.

Complete measles vaccination rates were markedly higher among mothers with secondary education, living in urban areas, receiving adequate antenatal care (≥ 4 visits), and possessing good knowledge, emphasizing that maternal education, healthcare access, and awareness are crucial factors influencing immunization rates. Comparable results were noted in Bangladesh, where individual factors (like maternal education and awareness) and community-level aspects (such as living area and service access) greatly affected childhood immunization rates, including measles vaccination, underscoring the multi-tiered nature of vaccination influences ¹⁸. Maternal knowledge was fair, with deficiencies in grasping the vaccination schedule and transmission, although there was strong awareness of vaccine prevention. Comparable findings were noted by Devi et al., 2025 who discovered minimal initial knowledge on measles prevention that increased following health education, highlighting the significance of awareness initiatives ¹⁹.

In this study, 55.2% of mothers demonstrated effective preventive practices, showing comparatively higher rates for maintaining vaccination cards and following up on immunizations. Hussein et al. 2022 reported comparable results, revealing that parental preventive measures related to MMR vaccination were inadequate despite awareness, highlighting a disconnect between knowledge and practice and the necessity for enhanced health education and follow-up ²⁰.

This research indicated that maternal knowledge, antenatal care, education, and urban living were significant predictors of complete measles vaccination, with knowledge being the most influential factor. In a similar vein, Boulton et al. found that socioeconomic factors like maternal education, income, and living conditions significantly affect complete childhood vaccination in Bangladesh, showing reduced coverage in underprivileged populations ²¹.

This study indicated a notable link between maternal preventive behaviors and complete measles vaccination, showing greater coverage in mothers with effective practices versus those with ineffective practices. In the same way, Phadke et al.2016 noted that low vaccination compliance and refusal are closely associated with a higher risk of measles and other diseases that can be prevented by vaccines, emphasizing the significance of proactive preventive actions for full immunization²².

In general, measles vaccination rates were insufficient and strongly linked to maternal education, knowledge, antenatal care utilization, and preventive measures, with increased awareness and healthcare accessibility enhancing complete immunization

CONCLUSION

The study revealed that measles vaccination rates for children were inadequate, showing significant deficiencies in complete immunization. Maternal education, the use of antenatal care, knowledge, and preventive measures were key factors influencing vaccination status, with maternal knowledge being the most significant predictor. These results emphasize the necessity for enhanced maternal education, better health-seeking behavior, and increased awareness initiatives to boost measles vaccination rates in Bangladesh.

CONFLICT OF INTEREST

There is no conflict of interest.

REFERENCES

1. Hu Y, Wang Y, Chen Y, Liang H, Chen Z. Measles vaccination coverage, determinants of delayed vaccination and reasons for non-vaccination among children aged 24-35 months in Zhejiang province, China. *BMC Public Health*. 2018;18(1):1298. doi: 10.1186/s12889-018-6226-7.
2. Mamuti S, Tabu C, Marete I, Opili D, Jalang'o R, Abade A. Measles containing vaccine coverage and factors associated with its uptake among children aged 24-59 months in Cherangany Sub County, Trans Nzoia County, Kenya. *PLoS One*. 2022 ;17(2):e0263780. doi: 10.1371/journal.pone.0263780.
3. Bankamp B, Kim G, Hart D, Beck A, Ben Mamou M, Penedos A, et al. Global Update on Measles Molecular Epidemiology. *Vaccines (Basel)*. 2024;12(7):810. doi: 10.3390/vaccines12070810.
4. Dattani S. Measles leaves children vulnerable to other diseases for years. *Our World in Data*. 2025. Available from: <https://archive.ourworldindata.org/20251125-173858/measles-increases-disease-risk.html> [(accessed on 2nd February 2026)]
5. Plans-Rubió P. Vaccination Coverage for Routine Vaccines and Herd Immunity Levels against Measles and Pertussis in the World in 2019. *Vaccines (Basel)*. 2021;9(3):256. doi: 10.3390/vaccines9030256.
6. Perry RT, Halsey NA. The clinical significance of measles: a review. *J Infect Dis*. 2004;189 Suppl 1:S4-16. doi: 10.1086/377712.
7. World Health Organization. Eliminating measles and rubella and preventing congenital rubella infection: WHO European Region strategic plan 2005–2010. World Health Organization. Regional Office for Europe; 2005. Available from: <https://iris.who.int/items/84bee361-7472-420d-b82a-b4495da74272> [(Accessed on 3rd February 2026)]
8. Vandermeulen C, Roelants M, Theeten H, Van Damme P, Hoppenbrouwers K. Vaccination coverage and sociodemographic determinants of measles-mumps-rubella vaccination in three different age groups. *Eur J Pediatr*. 2008;167(10):1161-8. doi: 10.1007/s00431-007-0652-3.

9. mondiale de la Santé O, World Health Organization. Measles vaccines: WHO position paper–April 2017–Note de synthèse de l’OMS sur les vaccins contre la rougeole–avril 2017. *Weekly Epidemiological Record*= *Relevé épidémiologique hebdomadaire*. 2017;92(17):205-27.
10. Tariku MK, Worede DT, Belete AH, Bante SA, Misikir SW. Attack rate, case fatality rate and determinants of measles infection during a measles outbreak in Ethiopia: systematic review and meta-analysis. *BMC Infect Dis*. 2023;23(1):756. doi: 10.1186/s12879-023-08757-0.
11. Rammohan A, Awofeso N, Fernandez RC. Paternal education status significantly influences infants' measles vaccination uptake, independent of maternal education status. *BMC Public Health*. 2012;12:336. doi: 10.1186/1471-2458-12-336.
12. Restrepo-Méndez MC, Barros AJ, Wong KL, Johnson HL, Pariyo G, França GV, et al. Inequalities in full immunization coverage: trends in low- and middle-income countries. *Bull World Health Organ*. 2016;94(11):794-805B. doi: 10.2471/BLT.15.162172.
13. Lakew Y, Bekele A, Biadgilign S. Factors influencing full immunization coverage among 12-23 months of age children in Ethiopia: evidence from the national demographic and health survey in 2011. *BMC Public Health*. 2015;15:728. doi: 10.1186/s12889-015-2078-6.
14. Haque SMR, Islam MR, Tisha S, Swarna SS, Baset KU, Bari W. Role of maternal health-seeking behaviour on complete measles vaccination coverage in Bangladesh: evidence from Bangladesh Demographic and Health Survey. *BMJ Open*. 2026;16(4):e106039. doi: 10.1136/bmjopen-2025-106039.
15. Jahan Y, Moriyama M, Rahman MM, Shahid ASMSB, Rahman A, Hossain N, et al. Changing trends in measles vaccination status between 2004 and 2014 among children aged 12-23 months in Bangladesh. *Trop Med Int Health*. 2020;25(4):475-482. doi: 10.1111/tmi.13366.
16. Rahat F, Abiduzzaman AF, Khanam M, Choudhury AM. Socio-demographic profile and complications of measles in children: a hospital based study. *Dhaka Shishu (Children) Hosp J*. 2022;38(2):84-8. doi:https://doi.org/10.3329/dshj.v38i2.70591
17. Kundu S, Kundu S, Seidu AA, Okyere J, Ghosh S, Hossain A, et al. Factors influencing and changes in childhood vaccination coverage over time in Bangladesh: a multilevel mixed-effects analysis. *BMC Public Health*. 2023;23(1):862. doi: 10.1186/s12889-023-15711-x.
18. Sarder MA, Lee KY, Keramat SA, Hashmi R, Ahammed B. A multilevel analysis of individual and community-level factors associated with childhood immunisation in Bangladesh: Evidence from a pooled cross-sectional survey. *Vaccine X*. 2023;14:100285. doi: 10.1016/j.jvacx.2023.100285.
19. Devi TK, Gautam M, Thomas M, Dixon N. Enhancing knowledge and attitudes towards measles prevention among mothers of under-five children. *IntJNursing Edu Res*. 2025;13(1):10-4. doi: [10.52711/2454-2660.2025.00002](https://doi.org/10.52711/2454-2660.2025.00002)
20. Hussein SZ, Mardia N, Amirah M, Hashim R, Abu Bakar SH. Knowledge and Practice of Parents Towards Measles, Mumps and Rubella Vaccination. *Malays J Med Sci*. 2022;29(3):90-98. doi: 10.21315/mjms2022.29.3.9.
21. Boulton ML, Carlson BF, Power LE, Wagner AL. Socioeconomic factors associated with full childhood vaccination in Bangladesh, 2014. *Int J Infect Dis*. 2018;69:35-40. doi: 10.1016/j.ijid.2018.01.035.
22. Phadke VK, Bednarczyk RA, Salmon DA, Omer SB. Association Between Vaccine Refusal and Vaccine-Preventable Diseases in the United States: A Review of Measles and Pertussis. *JAMA*. 2016;315(11):1149-58. doi: 10.1001/jama.2016.1353.