

Immunization Coverage and Its Determinants among Children in a Rural Community: A Case Study at Haroa CD Block North 24 Parganas, West Bengal

Abishek Paul

Guest Lecturer, Department of Geography, Chandraketurgarh Sahidullah Smriti Mahavidyalaya

Received: May 21, 2018

Accepted: July 12, 2018

ABSTRACT

Children of today are citizens of tomorrow, therefore it is very important to ensure proper health care of the children. Immunization is one of the most important public health interventions that decrease child morbidity and mortality. A cross sectional survey of selected house hold in Haroa block was conducted among children aged between 12 to 23 months. A total of 124 mothers were interviewed. Full immunization was recorded among 91 (73.39%) children. Immunization coverage was highest for DPT1 (90.2%) and lowest for Measles (66.4%). Immunization status of children's was significantly associated with place of deliveries, age of mothers, literacy of mothers, working status of mothers and ANC visit by mother.

Keywords: Immunization, coverage, mortality, Haroa

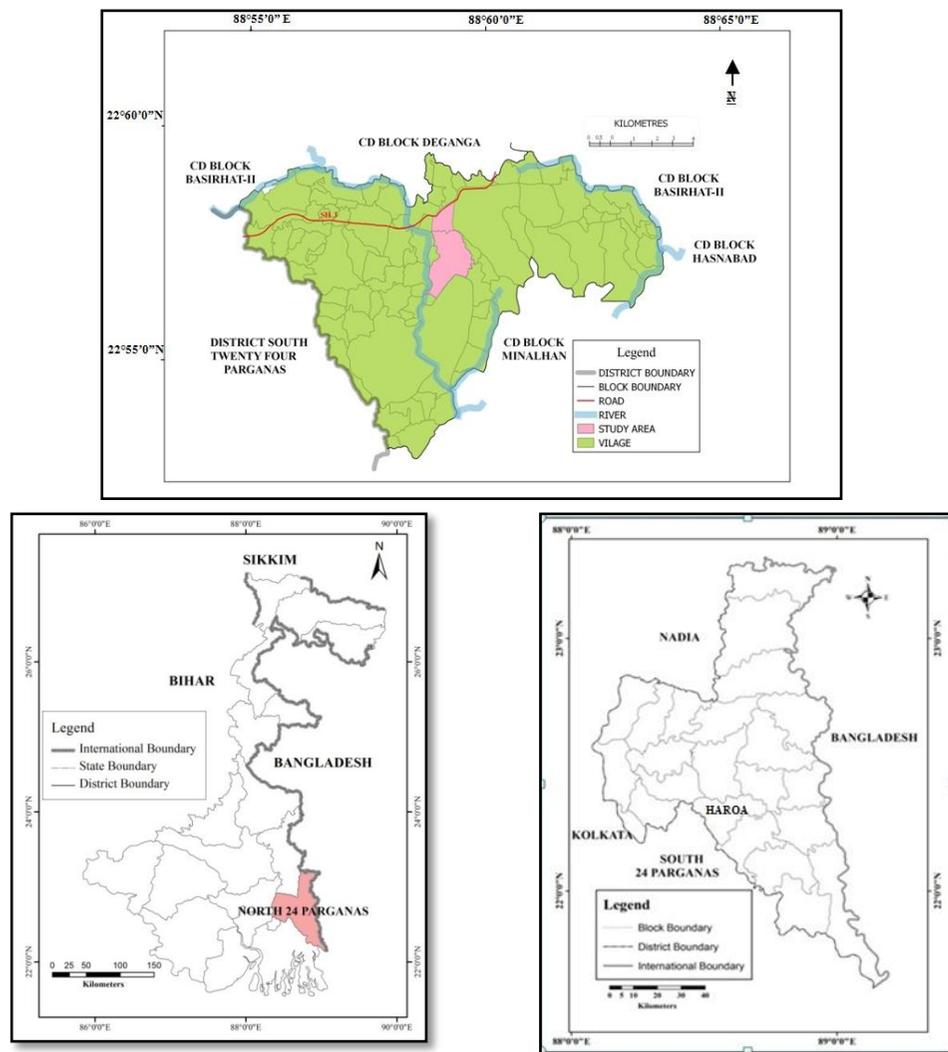
Introduction:

Immunization is the process whereby a person is made immune or resistant to an infectious disease. Immunization is one of the most cost effective public health interventions that have saved the lives of millions of children in the last several decades (**Basaleem et al., 2010**). Immunization is a proven tool for controlling and eliminating life-threatening infectious diseases and is estimated to avert between 2 and 3 million deaths each year. It is necessary to keep high level immunization coverage because of control and eliminate major preventable disease. It is estimated that about 2 million deaths occur globally each year from Vaccine preventable diseases with 1.5 million occurring in children under five years of age (**Adebayo et al., 2012**). The immunisation programme in India was flagged off in 1978 as Expanded Programme on Immunisation (EPI) WHO launched it globally in 1974. The objective was to reduce morbidity, mortality and disabilities by providing free vaccination services easily available to all eligible children and pregnant women by 1990 (**Patra, 2006**). Later, on November 19, 1985, the Universal Immunization Program (UIP) introduced in India with the objective to cover at least 85% of all infants by 1990 (**Lodha et al., 2000**). The percentage of children age 12-23 months who have received all basic vaccinations increased from 44 percent in 2005-06 to 62 percent in 2015-16 (**NFHS-4**). In West Bengal 84% of children age 12-23 months received all basic vaccinations

against six major childhood illnesses (tuberculosis, diphtheria, pertussis, tetanus, polio and measles) in NFHS-4, whereas only 64% have reported in NFHS-3. It has been tremendous increased during these periods. 98% of children have received a BCG vaccination, 88% Polio3, 93% DPT3 and 93% Measles (**NFHS-4**). In north twenty four parganas percentage of coverage about vaccinations are BCG(96.7%), 3 dose Polio (92.0%), 3dose DPT (90.9%), 1 dose measles (93.4%) and 3dose Hepatitis B (90.9%) (**NFHS-4**). Previous studies in Jalpaiguri and Darjeeling District of west Bengal revealed that 81.36% boys and 80.65% girls were immunized with BCG, 61.06% of boys and 61.92% of girls had received DPT, and immunization coverage of polio were 61.32% boys and 63.17% of girls (**Manna et al., 2009**). A study from Bankura district reported that 80.3% of children (80.9% male and 79.7% of female) were fully immunized (BCG, Measles and three doses each of DPT and OPV at 4 weeks interval excluding OPV-0) by first year of life (**Mandal et al., 2011**). People of rural area in Haroa block are comparatively illiterate and poor workers. Parents need to go for hard work every day to earn money for the feeding of their family member including children. Due to unawareness and ignorance they do not know the importance of immunization. Keeping in mind we wanted to detect immunization status of the children of economically poor class in the study area.

Objectives:

1. To analyze the socio-economic state of the mothers in study area.
2. To find out immunization coverage and its determinants among children.
3. To identify factors associated with full immunization coverage among children.

Figure: 1 STUDY AREA**Methods:**

A cross sectional survey of selected house hold in Haroa block was conducted between January and February 2018. Haroa is one of the important community development blocks under the Basirhat sub-division. Geographically, it covers 152.73 Sq. Kms. area and total population 214401(census 2011). Around 90 villages are included in this CD Blocks. Around 2 villages selected for the study. Those are Haroa, Khas Balandar. Health care services were provided primarily public health facilities through health centres and government hospitals. A sample size of 124 households with mothers and their children aged 12-23 months were taken from two selected villages of Haroa. A cluster sampling methods were used in this study to meet the required sample size and to be able to look for the role of different factors on the immunization status. House to house visit was made to collect data through interview technique. Respondents were interviewed through pre design semi structured questionnaire after being informed of the purpose of the study and after giving their verbal agreement to take part in the study. Socio demographic information was collected through face to face interviewed. Children immunization status was collected from the children immunization card or history of immunization uptake as provided by the mothers. With regards to child immunization status, 11 questions were selected from the National Family Health Survey (NFHS- 4). Child (gender, age, birth order, place of birth as well as types of delivery), mother (age, marital status, education level, type of occupation), father (education level, type of occupation) were considered as independent variables in the study area. Immunization coverage and dropout rates were accessed in this study area. A child was defined fully immunized if he had received one dose Bacillus-Calmette-Guerin (BCG), 3 doses of Diphtheria, Pertusis and Tetanus (DPT), and Hepatitis B and one dose of Measles vaccines at the time of data collection. Analysis of association between immunization status of child's, mother's and families socio

demographic characteristics was carried out and tested using Chi-square test, with 0.05 level as the cut-off value for statistical significance using the statistical package for social science (STATA) version 12.0.

Table: 1 Socio-demographic characteristics of the respondents (mothers)

Characteristi	N=124	%
Age group (years)		
<20	31	25.00
21-30	75	60.48
31-40	18	14.51
Family type		
Nuclear	98	79.03
joint	26	20.97
Level of education		
Illiterate	24	19.35
Primary	58	46.77
secondary	30	24.19
High school	12	9.68
Occupation		
Skilled worker	49	39.52
Unskilled worker	40	32.26
Housewife	29	23.39
Others	6	4.84
Religion		
Hindu	44	35.8
Muslim	78	62.8
Christian	2	1.4

Source: Field survey, 2018

Results:

Table: 1 shows the socio-demographic characteristics of mothers. Majority, 75(60.48%) were in the 21-30 years age group while the least represented age group was 31 -40 years accounting for 18(14.51%) mothers. Over 24(19.35%) are illiterate, 58(46.77%) primary and 30(24.19%) had secondary education. Nonetheless, a negligible number of respondents had attained above high school education (9.68%). Most respondents belong to nuclear family (79.03%) than joint (20.97%). Most of the women worked as a skilled worker like weaving (39.52%), some women worked as unskilled labour (32.26%). Muslim respondents constitute an overwhelming proportion, more than half of the respondents (62.8%), followed by Hindu (35.8%) and rest of them are Christian (1.4%).

Table 2: Background characteristics of children

Variable	No. (%)
Age group of child (in month)	
12-15	30 (24.29%)
16-19	68(54.76%)
20-23	26 (20.95%)
Sex of Child	
Male	55 (44.35%)
Female	69(55.65%)
Place of delivery	
Home	6(4.84%)

Govt. Hospital	90 (72.58%)
Block PHC	28(22.58%)
Birth Order	
1	49 (39.52%)
2	43 (34.76%)
3	20 (16.19%)
>3	12(9.52%)

Source: Field survey, 2018

Table:2 Shows A total of 124 children were visited those were belonged to age group 16-19 months (54.76%). Majority 55.65% were females. In the present study 72.58%% child were delivered in govt. Hospital and 22.58 % in Block Primary Health Centre. In the birth order of child, ≤ 2were 74.29% and >3 were 25.71%. Family size having family member’s ≤ 4 and > 5 were 49.52% and 50.48% respectively.

Table 3: Vaccination coverage and Immunization Status among study subjects

Antigen	Number (%)
BCG	91(73.6)
DPT1	112(90.2)
DPT2	96(77)
DPT3	95(76.6)
OPV0	82(66.6)
OPV1	108(87.5)
OPV2	94(75.9)
OPV3	96(76.8)
HBVA	106(85.5)
HBVB	104(84.3)
HBVC	88(71.4)
Measles	82(66.4)
Immunization status	Number (%)
Fully immunized	91 (73.39%)
Partially immunized	30 (24.19%)
Not Immunized	3(2.42%)

Source: Field survey, 2018

Figure: 2

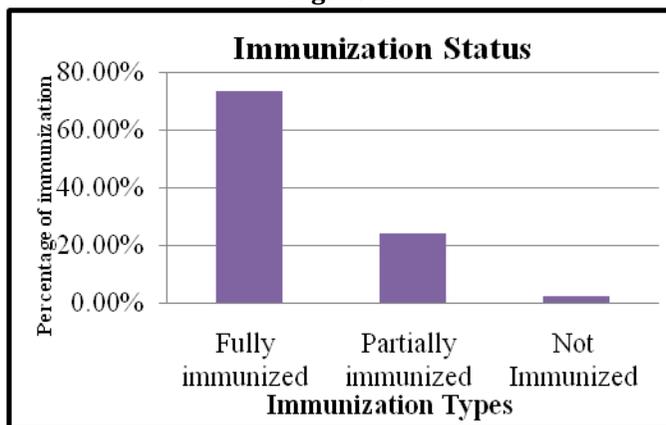


Table3: Regarding individual vaccine coverage in children, the coverage was highest for DPT1 (90.2%) and lowest for Measles (66.4%) for OPV1 & OPV3 it was 87.5% & 76.8% respectively. Looking at the immunization status of children it was found that majority (73.39%) of children were fullyimmunized,24.19%were partially immunized, while the corresponding figure for the non immunized child was 2.42%.

Table 4: Stated reasons for incomplete or no immunization

<i>Reason</i>	<i>No (%)</i>
Obstacles	
Mother too busy	75 (24.2)
Place of immunization too far	68 (21.9)
Travelled	25 (8.1)
Family problem, including illness of mothers	17 (5.5)
Vaccinator absent	16 (5.2)
Time of immunization not convenient	14 (4.5)
Child ill-not brought	13 (4.2)
Child ill-brought not given immunization	3(1.0)
Long waiting time	1(0.3)
Lack of information	
Unaware of need for immunization	47(38.6)
Unaware of need to return for 2nd or 3rd dose	23(7.4)
Fear of side reactions	17 (5.5)
Place and/or time of immunization unknown	16(5.2)
Lack of motivation	
Postponed until another time	35(11.3)
No faith in immunization	1(0.3)
Rumours	0

Source: Field survey, 2018

Table 4 has shown the major reasons for failure to immunize children. They were categorized into obstacles, lack of information and lack of motivation. Obstacles are further sub divided into several categories. This revealed the important information behind not getting immunization. 21.9% women said that place of immunization were far from their house they could not communicate properly. In all accounted for most of the reasons (75.2%) for failure to immunize children. In case of lack of motivation most of the mothers were unaware of need for immunization (38.6%), sometimes they thought there were not important to return 2nd or 3rd doses of immunization. For the reasons they did not go to the health centre. 11.3% women had no faith on immunization.

Variable	Fully Immunized Child No. (%)	Chi square test, d.f., P value
Age group of child (in month)		
12-15	37 (72.55%)	χ^2 = 0.6489, d.f = 2, p= 0.72
16-19	86 (74.78%)	
20-23	35 (79.55%)	
Sex of Child		
Male	38 (41.75%)	χ^2 = 4.48, d.f = 2, p= 0.10
Female	53 (58.24%)	
Place of delivery		
Home	2(2.19%)	χ^2 = 27.33, d.f = 4, p<0.00
Govt. Hospital	76 (83.51%)	

Block PHC	13(14.28%)	
Family Size		
< 4	70(76.92%)	$\chi^2 = 1.57, d.f = 2, p < 0.45$
> 5	21(23.07%)	
Immunization Card availability		$\chi^2 = 28.79, d.f = 2, p < 0.00$
Yes	72(79.12%)	
No	19(20.87%)	
Age group of mother in Years		
< 20	24(26.37%)	$\chi^2 = 8.54, d.f = 4, p = 0.05$
21-30	48 (52.74%)	
31-40	19(20.87%)	
Literacy of Mother		
Illiterate	10(10.98%)	$\chi^2 = 28.91, d.f = 6, p < 0.01$
Primary	39(42.85%)	
Secondary	30(32.96%)	
High School	12(13.18%)	
Working Status of mother		
Domestic Worker	29(31.86%)	$\chi^2 = 24.71, d.f = 6, p < 0.00$
Unskilled Labour	31(34.06%)	
House Wife	29(31.86%)	
Others	2(2.19%)	
ANC Visit		
Yes	67(73.62%)	$\chi^2 = 2.90, d.f = 1, p = 0.05$
No	24(26.37%)	

Source: Field survey, 2018

Table: 5 fully immunized female (58.24%) were more than male (41.75%). There was no correlation found between age and sex of the children on immunization status. Most of the women delivered in Govt. Hospital (83.51%) compared to that of Block PHC (14.28%). There was no correlation found between family size and immunization of children. Immunization Coverage was better in case of children who had their immunization card available ($p < 0.05$). Children of mothers aged 21-30 years old had the highest (52.74%) vaccination coverage as compare to other age groups, below 20 and 31-40 respectively (26.37%), (20.87%).. 90% of the children of literate mothers were fully immunized which was significantly higher than that of illiterate (10.98%) mothers ($p < 0.01$). significance relation was found between female occupation and immunization status. Association between the immunization status of children and ANC visited by mother was found to be significant ($p < 0.05$).

Discussion:

In the present study 73.39% children were fully immunized. In West Bengal & North Twenty Four Parganas (84%), (88.7%) are fully immunized as per NFHS-IV. In present study partially immunized children were 24.19 % whereas children not getting even single vaccination (not vaccinated) were 2.42%.The data was collected with the help of immunization card, examination of child and interview of mothers. Similar Study was conducted by (Yadav et al., 2006) fully immunized were 73.3%, partially immunized children 23.8% and not immunized 2.8% which is closer to this study. Study conducted by (Basaleem et al., 2010), Yemen showed 83.1% children had received all recommended doses of vaccine 10.4% had missed at least one dose and 6.5% were never immunized.

In the study sample 79.03% have immunization card and only 20.97% have no immunization card. It was found that Coverage was better in case of children who had their immunization card available. It helps mother to remember the immunization schedule. Similar results were shown in the studies conducted by **(Tapare et al., 2006)** and **(Kadri et al., 2010)** in Miraj and Ahmadabad, 81.25% and 88.4% of the mothers possessed the immunization card with them, respectively and **(Yadav et al., 2006)** for evaluation of immunization coverage in urban slums of Jamnagar city, showed that the immunization card was hold with 74.28% mothers of children aged 12–23 months.

Individual Vaccine coverage was observed BCG with coverage 73.6%, DPT1 90.2%, DPT2 and DPT3 77% and 76.6% respectively. According to NFHS-IV the district coverage was BCG 96.7%, DPT 90.3% according to NFHS-IV. From the study other vaccines coverage were like OPV1 87.5%, OPV2 75.9%, OPV3 76.8%, and HVB1 85.5%, HBV2 84.3%, HBV3 71.4%. From NFHS-IV in West Bengal Ninety-eight percent of children have received a BCG vaccination. However, about 90 percent have received other basic vaccinations (88% have received at least the recommended three doses of polio vaccine, 93% each have received the three recommended doses of DPT vaccine. Similar results were seen in study done by **(Gupta et al., 2013)** having highest coverage for BCG 98.57% then followed by OPV 96.34%, DPT 93.01% and least for Measles with coverage of 87.62%. Similar level of coverage was found in other studies by **(Kadri et al., 2010)**, **(Khokhar et al., 2005)** and **(Kar et al., 2001)** in urban slums of Ahmadabad and Delhi city, respectively.

In this study association between place of delivery and immunization status was found to be statistically significant. From this study it showed institutional delivery i.e. Government Hospital having higher proportion of fully immunized children (83.51%) in comparison to Block Primary Health Centre which was (14.28%) and this association was statistically highly significant. Similar findings were also observed in study done by **(Kulkarni and chavan, 2013)** in Mumbai city and **(Nath bhola et al., 2001)** in Lucknow.

It was observed that mothers having ANC visit had higher percentage of fully immunized children 73.26% compared to 26.37% for those who did not received ANC visits respectively. Similar results was observed in study done by **(Mutua K Martin et al., 2011)** in Nairobi, Kenya showed recipient of ANC and PNC care were associated with full immunization of their children.

Considering the mothers education with the immunization status, mothers were more likely to have fully immunized their children compared with those that had no formal education. Higher immunization coverage was also similar among children of mothers with higher educational status. Similar study was conducted in Mozambique by **(JV et al., 2008)**.

Conclusion:

Although immunization coverage is high, access to health care service is high in Haroa block; still 24.19% children did not have complete immunization. 20.87% did not have immunization card. Immunization is often cited as being one of the most cost-effective public health interventions. Hence, more surveys should be conducted so that such things are identified properly and proper actions can be taken. Also to rise general public awareness of the importance of immunization card as a vital record that helps them to make sure about different time periods of vaccination doses. That enhances them to provide complete immunization of their children.

Reference

1. Adebayo, B.E., Oladokun, R.E., Akinbami, F.O. (2012). Immunization coverage in a rural community in southwestern Nigeria. *Vaccines & Vaccination*, 3(4), 1-6.
2. Agarwal, N., Sharma, R.P., Chandra, S., Varma, P., Midha, T., Nigam, S. (2014). Immunization status and childhood morbidities as determinants of PEM among under Kanpur. *Indian Journal of Community Health*, 26(4), 396-400.
3. Barman, D., Dutta, A. (2013). Access and barriers to immunization in West Bengal, India: Quality matters. *Journal of Health, Population and Nutrition*, 31(4), 510-522.
4. Basaleem, H.O., Al-Sakkaf, K.A., Shamsuddin, K. (2010). Immunization coverage and its determinants among children 12-23 months of age in Aden, Yemen. *Saudi Medical Journal*, 31(11), 1221-1226.
5. Bhatt, G.S., Mehariya, V.M., Dave, R.K., Mahavadiya, M., Rana, M., Sharma, R., Kumar, P. (2015). Immunization coverage in rural and urban field practice areas of a medical college of Gujarat. *National Journal of Community Medicine*, 6(3), 398-404.
6. Buque, T.C., Mindra, G., Duncan, R., Jack, S.M. (2017). Immunization, urbanization and slums – a systematic review of factors and Interventions. *BMC Research Notes*, 17, 2-16.
7. Devasenapathy, N., Jerath, S.G., Sharma, S., Allen, E., Shankar, A.H., Zodpey, S. (2016). Determinants of childhood immunisation coverage in urban poor settlements of Delhi, India: a cross-sectional study. *BMJ Open*, 6(8), 1-12.

8. Government of India, Ministry of Health and Family Welfare. (2017). National Family Health Survey (NFHS-4). Retrieved from <http://rchiips.org/NFHS/NFHS-4Reports/India.pdf>
9. Gupta, P. K., Pore, P., & Patil, U. (2013). Evaluation of immunization coverage in the rural area of Pune, Maharashtra, using the 30 cluster sampling technique. *Journal of Family Medicine and Primary Care*, 2(1), 50-54.
10. Jani, J.V., De Schacht, C., Jani, I.V., Bjune, G. (2008). Risk factors for incomplete vaccination and missed opportunity for immunization in rural Mozambique. *BMC Public health*, 8, 161.
11. Kadri, A.M., Singh, A., Jain, S., Mahajan, R.G., Trivedi, A. (2010). Study on immunization coverage in urban slums of Ahmadabad city. *Health Population: Perspectives and Issues*, 33(1), 50-54.
12. Kar, M., Reddaiah, V.P., Kant, S. (2001). Primary immunization status of children in slum areas of south Delhi - The challenge of reaching the urban poor. *Indian Journal of Community Medicine*, 26, 151-154.
13. Khargekar, N.C., Khargekar, V.C., Shingade, P.P. (2015). Immunization status of children under 5 years in a tribal area, Parol, Thane district. *National Journal of Community Medicine*, 6(4), 522-527.
14. Khokhar, A., Chitkara, A., Talwar, R., Sachdeva, T.R., Rasanian, S.K. (2005). A study of reasons for partial immunization and non-immunization among children aged 12-23 months from an urban community of Delhi. *Indian Journal of Preventive & Social Medicine*, 36, 83-86.
15. Kulkarni, V., Chavan, M.K. (2013). A study to assess the immunization coverage in an urban slum of Mumbai by lot quality technique. **International Journal of Community Medicine and Public Health**, 3, 21-25.
16. Lauridsen, J., Pradhan, J. (2011). Socio-economic inequality of immunization coverage in India. *Health Economics Review*, 1(11), 1-6.
17. Lodha, R., Dash, N.R., Kapil, A., Kabra, S.K. (2000). Diphtheria in urban slums in north India. *Lancet*, 355(9199), 204. doi:[https://doi.org/10.1016/S0140-6736\(99\)04847-3](https://doi.org/10.1016/S0140-6736(99)04847-3).
18. Malhotra, A.K., Bhatnagar, M. (2013). Coverage evaluation of immunization status of 6 weeks-59 month old children in urban locality of distt. Hapur. *Indian Journal of Preventive & Social Medicine*, 44(3), 150-156.
19. Mallik, S., Mitra, S.P., Roy, A., Basu, S.S., Saha, A., Munsif, A.K. (2006). Malnutrition - A missed opportunity to treat at tertiary care. *Indian Journal of Community Medicine*, 31(3), 196-197.
20. Mamatha, M., Rao, V.N. (2015). Immunization coverage in India: A study by using NFHS-III data. *Indian Journal of Applied Research*, 5(12), 531-533.
21. Mandal, N.K., Sinhamahapatra, B., Sinha, N., Mukhopadhyay, D.K., Das, R., Biswas, A.B. (2011). Child immunization and vitamin a supplementation in the district of Bankura, West Bengal. *International Journal of Medical Science and Public Health*, 1(3), 22-26.
22. Manna, P.K., Chatterjee, K., De, D., Ghosh, D. (2009). Child immunization coverage of some rural belt in relation to socio-economic factors of Jalpaiguri and Darjeeling district of West Bengal. *Journal of Life Science*, 1(2), 91-95.
23. Mukherjee, S., Madhivanan, P., Li, T., Albatineh, A., Srinivas, V., Jaykrishna, P., Arun, A., Krupp, K. (2015). Correlates of completing routine vaccination among children in Mysore, India. *Journal of Infection and Public Health*, 8, 62-71.
24. Mutua, K. M., Muage, E.K., Ettarh, R.R. (2011). Childhood vaccination in informal urban settlements in Nairobi, Kenya: Who gets vaccinated? *BMC Public Health*, 11(6), 2-11.
25. Narkhede, V., Sinha, U., Bhardwaj, S.D., Pitale, S. (2012). Morbidity profile in under five children in urban slum area of Nagpur. *National Journal of Community Medicine*, 3(3), 442-446.
26. Nath, B., Singh, J.V., Awasthi, S., Bhushan, V., Kumar, V., Singh, S.K. (2007). A study on determinants of immunization coverage among 12-23 months old children in urban slums of Lucknow district, India. *Indian Journal of Medical Science*, 61, 598-606.
27. Oryema, P., Babirye, J.N., Baguma, C., Wasswa, P., Guwatudde, D. (2017). Utilization of outreach immunization services among children in Hoima District, Uganda: a cluster survey. *BMC Research Notes*, 10, 2-7.
28. Parashar, U., Tate, J., Arora, R., Kang, G. (2012). Prospects for routine childhood vaccination against rotavirus in India. *The National Medical Journal of India*, 25(5), 257-260.
29. Painkra, S.K., Verma, N., Bhawnani, D. (2014). Assessment of immunization coverage and its determinants in urban slums of Raipur city, Chhattisgarh. *National Journal of Medical and Dental Research*, 2(4), 20-26.
30. Pradhan, N., Ryman, T.K., Varkey, S., Ranjan, A., Gupta, S.K., Krishna, G., Swetanki, R.P., Young, R. (2012). Expanding and improving urban outreach immunization in Patna, India. *Tropical Medicine and International Health*, 17(3), 292-299.
31. Saiprasad, B., Mahajan, H., Kulkarni, R. (2013). Impact of health intervention on nutritional status of malnourished children in an urban slum of India. *International J Med Health Sci*, 2(2), 176-185.
32. Tapare, V.S., Borle, P.S. (2006). Assessment of vaccination performance by lot quality technique in an urban community of Miraj. *Indian Journal of Community Medicine*, 31(3), 181-182.
33. Yadav, S., Mangal, S., Padhiyar, N., Mehta, J.P., Yadav, B.S. (2006). Evaluation of Immunization Coverage in Urban Slums of Jamnagar City. *Indian Journal of Community Medicine*, 31(4), 300-301.