

“Coverage and timeliness of vaccination among children between 12- 23 months in a migrant worker’s community in Gurugram- A Cross Sectional Study”

Rahul Kumar Yadav<sup>1</sup>, Ankita Singh<sup>2</sup>

1-Indian Institute of Public Health, Delhi, Affiliated to Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Trivandrum.

2-School of Biotechnology, Jawahar Lal Nehru University, New Delhi

IJSER

## Abstract

---

**Title:** Coverage and timeliness of vaccination among children's between 12- 23 months in a migrant worker's community in Gurugram- A Cross-Sectional Study.

**Introduction:** Vaccination has a great impression on reducing child mortality and morbidity by the outbreak of vaccine-preventable diseases. The purpose of the study is to find out the vaccination coverage of children ages of 12-23 month and the effect of social determinants on partial and full vaccination among migrant's community in Kanhai village of Gurugram city.

**Methods:** In this cross-sectional study, we conducted interviews with 75 mothers/care-givers of 12-23 month's children in an urban migrant locality in Kanhai village of Gurugram city of Haryana. Three contiguous clusters with migrant settlements were selected on the basis of density and accessibility (convenience sampling). Descriptive analysis of factors associated with partial vaccination was done using Stata 14.1.

**Results:** The vaccination coverage information reported from vaccination card was 43 percent and from mother recall 57 percent out of 75 participants who were parents of children aged 12-23 months. The first dose of vaccination of BCG, OPV-0 and Hep B-0 was 100 percent at the birth. Other doses of vaccines were 73 ,71 and 68 percent for OPV-1, Penta-1 &Rota-1, Penta-2, Rota-2, & OPV-2 and Penta-3, Rota-3, and OPV-3 respectively. Vaccination for measles was 57 percent. All the vaccines were given on time. The dropout rate of 1<sup>st</sup> to 3<sup>rd</sup> dose was 73 to 68 percent. Full vaccination as per recommendation was given to 57 percent of children. Lack of parent education was associated with the partial vaccination.

**Conclusion:** The full vaccination coverage was close to national average but higher than state average. Education and communication with parents will improve their knowledge and trust in vaccination

**Keywords** Childhood vaccination, Migrants, Child health, India

## **Introduction**

Childhood vaccination is considered a cost-effective and safe public health intervention to reduce the morbidity and mortality associated with childhood infectious diseases (Sharma V, 2015). Every year due to immunization, two to three million deaths of under five-year children are averted (UNICEF, 2018). All countries in the world have an immunization programme to deliver selected vaccines to the targeted beneficiaries, especially focusing on pregnant women, infants, and children, who are at high risk of diseases preventable by vaccines (Dharmalingam A, 2017). South Asian countries have made impressive progress in reducing mortality. Polio is eradicated in almost every country except Pakistan, Afghanistan which are polio-endemic countries (World Health Organization, 2019). Most of the South Asian countries like Bangladesh, Bhutan, Nepal, Sri Lanka, and the Maldives have succeeded in improving the routine immunization coverage to a higher level (Hasman A, 2016). India has the largest number of births in the world that accounts for more than 26 million a year, furthermore, infectious diseases have a share of 20 percent in child mortality (UNICEF immunization survey, 2012).

## **Vaccination Coverage and its determinants**

Vaccination coverage in India is steadily improving. According to the National Family Health Survey (NFHS-4), 62 percent of children age of 12-23 month has received all basic vaccination in 2015-16. Coverage of all basic vaccinations under the UIP varies considerably by state and union territory. The coverage is lowest in Nagaland (35 percent) and Arunachal Pradesh (38 percent) and highest in Puducherry, Punjab, Lakshadweep, and Goa (88-91 percent) (NFHS 4, 2015-16). The effectiveness of immunization programs in India relies on multiple factors. Social determinants play a major role in the success of immunization coverage. They have the potential to affect the immunization level in a drastic manner. Socioeconomic status of the household, health awareness, female illiteracy, maternal access to healthcare, social characteristics like caste and religion, lack of awareness and social-cultural beliefs are some of the determinants which result in low or partial

coverage of immunization (Devasenapathy N, 2016). Additionally, unavailability of proper equipment in healthcare delivery platforms and issues with cold chain management are identified causes for low vaccination (Pakhare A et al., 2014). Poor progression in immunization uptake is due to issues at multiple levels which are more pronounced at programme and community levels. These may include gender, birth order, the area of residence, parental education, religion, caste, access to healthcare, and community's literacy level (Singh S, 2018). Lack of awareness, insufficient level of empowerment of women and mothers with no or low literacy levels majorly serve as barriers which in turn affect the vaccination coverage in India (Kumar D, 2010; Vohra et al., 2013).

There is increased accessibility of healthcare services in both urban and rural areas, still, utilization of healthcare services is low by different segments of the society (Mathew JL, 2012). Migrants living in urban slums are at greater risk of under immunization and are therefore susceptible to vaccine preventable diseases (Sharma V, 2015). Migrant population living in urban slums not only possess low healthcare indicators they turn out to be the most neglected and vulnerable segment in terms of reception of healthcare and other services (Subramanian SV, 2006). The degree of access to health care depends on the interplay between the vulnerability of the population and the access to healthcare services (Obrist B, 2007). There is an urgent need to focus on efforts to address these issues in order to improve immunization coverage in deprived, vulnerable sections of the society.

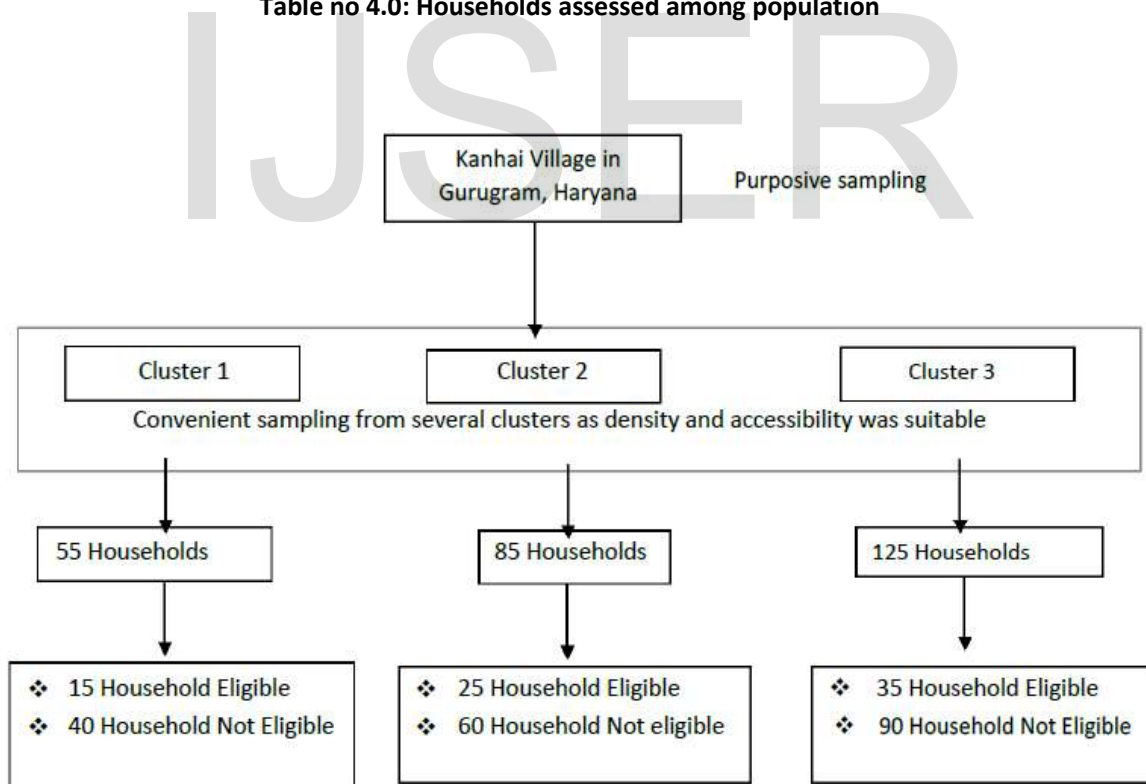
## **Material and Methods**

This cross sectional community based descriptive study was conducted in migrant's colony in Kanhai village of Gurugram city. This study was conducted in Kanhai urban village in the Gurugram city of Haryana, India. According to census 2011, the number of people living in the district has grown 1514805 (Census 2011) from around 870539 (census 2001). The total area of the Gurugram district is 1253.07 sq. km. Kanhai village located in Sector 45 of Gurugram City. The target population were mothers or guardian of children between 12 to 23 months and residing in Kanhai village. All households with children between 12-23 were eligible for this survey if the

respondent was willing. The expected prevalence of complete immunization was 24% based on NFHS 4, Gurugram district data (<http://rchiips.org/nfhs>). To measure this prevalence with 90% power the required sample size was 75 children (n-master software). However, due to logistic and time concerns, only 265 households were assessed of which 75 eligible households were found who completed the survey.

Kanhai urban village consisted of several disorganized clusters of which three contiguous clusters with migrant settlements were selected (convenience sampling). Clusters is defining as a group of people positioned or occurring closely together. the three chosen clusters are bordered by two main roads (80 feet and 60 feet road). The right side of the road has commercial, and high-end residential colonies. researcher visited every household in these clusters to enquire about the presence of a child between 12 to 23 months. If the household was found to be eligible then the purpose of the survey was informed and was requested to participate. Verbal consent was obtained from willing participants. Figure 3 describes the number of households approached and the number completed.

**Table no 4.0: Households assessed among population**



The data collection and management are structured questionnaire consisting of the open and closed question was prepared in English and translated to Hindi (Annexure 2). The questionnaire captured the following themes: Sociodemographic information, recall of ANC and delivery details, any recent childhood illness (Respiratory and Diarrheal illness) vaccination information through

vaccination card, the presence of community health workers or NGO in the area, challenges faced during immunization and any other barriers for vaccinating their child. Two types of information were collected for vaccination. The type of vaccine and time of vaccination. The timeliness was recorded as either early/on time/late. The window period to consider as early or late was  $\pm 2$  weeks from the actual scheduled date of vaccination. Data collected by paper forms were entered into MS Excel. Data was further imported to STATA 14.1 for further processing before analysis.

Descriptive statistics were used to present the data on socio-demographic information, antenatal checkup and delivery details, current child illness and access to health care during illness, and presence of community health worker. Continuous variables were expressed as mean and SD or median and IQR based on their distributional properties. Categorical variables were expressed as frequencies and percentages. Vaccine completion and timeliness among those vaccinated are presented for each dose of vaccine. I have presented the outcomes of the study as frequency and percentage under the following themes like complete vaccination, partial vaccination, vaccination coverage status, dropout of vaccines, timeliness of vaccines. Univariable analysis was done to look at factors associated with complete vaccination. Open-ended questions were categorized as themes and presented.

## Results

The information on sociodemographic, lifestyle and childhood morbidity was collected with the help of 75 participants. Information gathered on sociodemographic characteristics is tabulated in Table 4.1. Majority the predominant population belonged to Hindus: 80 Percent; The major family type was nuclear: 90 percent; the majority of the migrants were from Bihar and other states: 42-33 percent to percent; the common piped water was consumed by 82 percent of the population, houses with one room and separate kitchen were 92 and 4 percent respectively, and the mean household size was 4.8. (refer to Table 4.1). The average monthly income found was between INR 5001 to 10000 (88 percent) and only 10 percent earning was above INR 10000. The household assets were determined in terms of percentage as television (32 percent), normal mobile (94 percent), smartphone (76 percent), cycle (48 percent), bikes (10 percent), fans (42 percent), cots (13 percent), fridges (4 percent) and type of cooking fuel in the household was Bio-Fuel (41 percent) and LPG (59 percent).

**Table no 4.1: Households profile of the study population**

<b>Households Characteristics</b>	<b>N=75 Eligible Households</b>	<b>Complete Vaccination</b>	<b>Incomplete Vaccination</b>
Religion (%)			
Hindu	60 (80)	35 (58.3)	25 (41.6)
Muslim	15 (20)	8 (53.3)	7 (46.6)
Caste (%)			
Do not tell	28 (37.3)	18 (64.3)	10 (35.7)
OBC	23 (30.7)	15 (65.2)	8 (34.8)
SC/ST	22 (29.3)	8 (36.4)	14 (63.6)
General	2 (2.7)	2 (100)	8 (34.9)
Family type (%)			
Nuclear	68 (90.7)	39 (57.3)	29 (42.6)
Joint/Extended	7 (9.3)	4 (57.1)	3 (42.8)
Mean household size (SD)	4.8 (1.2)	4.8 (1.31)	4.7 (1.1)
Type of household (%)			
Kuccha	28 (37.3)	12 (42.8)	16 (57.1)
Semi Pucca	47 (62.7)	31 (65.9)	16 (34)
State from Migration (%)			
Bihar	32 (42.7)	17 (53.1)	15 (46.8)
Uttar Pradesh	18 (24.0)	11 (61.1)	7 (38.9)
Others State	25 (33.3)	15 (46.8)	10 (41.7)
One room house (%)	69 (92.0)	41 (59.4)	28 (40)
Separate kitchen (%)	3 (4.0)	1 (33.3)	2 (66.6)
Common Latrine (%)	74 (98.7)	1 (100)	42 (56.7)
Drinking water (%)			
Common Piped water	62 (82.7)	35 (56.4)	27 (43.5)
Tanker	8 (10.7)	4 (50)	4 (50)
Bottled	5 (6.7)	4 (80)	1 (20)
Metered Electricity (%)	8 (10.7)	6 (75)	2 (25)
Cooking Fuel (%)			
Bio Fuel	31 (41.3)	15 (49.3)	16 (51.6)
LPG	44 (58.7)	28 (63.6)	16 (36.3)
Monthly income (%)			
<5000	2 (2.7)	1 (50)	1 (50)
5001-10000	66 (88.0)	37 (56)	29 (43.9)
10001-20000	7 (9.3)	5 (71.4)	2 (28.5)
Household assets (%)			
TV	24 (32.0)	14 (58.3)	10 (41.6)
Normal Mobile	71 (94.7)	41 (57.7)	30 (42.2)
Smart Mobile	57 (76.0)	33 (57.8)	24 (42.1)
Cycle	36 (48.0)	20 (55.5)	16 (44.4)
Bike	8 (10.7)	5 (62.5)	3 (37.5)
Fan	32 (42.7)	21 (65.5)	11 (34.4)
Cot	10 (13.3)	8 (80)	2 (20)
Fridge	3 (4.0)	3 (100)	0
Socio-economic Categories			
Low	11 (34.4)	12 (27.9)	0.15
	14 (43.7)	13 (30.23)	

Middle	7 (21.9)	18 (41.8)	
High			

In this survey both parents, as well as other guardians were respondent but mothers had been more cooperative and responsive, about 98 percentages. There was a large variation in literacy rate among the parents out of which about 73 percent (three-fourth) mothers were not able to read or write, and 70 percent of which never ever had gone to school and only 27 percent mothers were able to read. On the other side, about 44 percent fathers were able to read and write. All the characteristics of parents which affect the immunization are mentioned in detail in the table no 4.2.

**Table no 4.2: characteristics of parents/respondents of the study population**

Respondent characteristic	All	Complete Vaccination	Incomplete Vaccination
Respondent (%)			
Mother	73 (97.3)	43 (58.9)	30 (41.1)
Father	1 (1.3)	0	1 (100)
Guardian	1 (1.3)	0	1 (100)
Literacy of mother (%)			
Can't read/write	54 (72.9)	27 (50)	27 (50)
Read and Write	11 (14.8)	8 (72.7)	3 (27.2)
Read only	9 (12.1)	8 (88.8)	1 (11.1)
Education of mother (%)			
No school	52 (70.7)	25 (48.8)	27 (51.9)
Primary	11 (14.7)	9 (81.8)	2 (18.1)
Secondary/ Senior Secondary	11 (14.7)	9 (81.8)	2 (18.1)
Mother occupation (%)			
Not working	64 (86.9)	37 (57.8)	27 (42.1)
Daily Labour	2 (2.7)	1 (50)	1 (50)
Self Employed	6 (8.1)	4 (66.6)	2 (33.3)
Salaried	2.70 (2.7)	1 (50)	1 (50)
Literacy of father (%)			
Can't read/write	22 (29.7)	14 (63.6)	8 (36.3)
Read and write	33 (44.9)	18 (54.5)	15 (45.5)
Read only	19 (25.8)	11 (57.8)	8 (42.1)
Education of father (%)			
No schooling	21 (28.8)	12 (57.1)	9 (42.8)
Primary	38 (51.5)	20 (52.6)	18 (47.3)
Secondary/ Snr Sec.	10 (13.5)	9 (90)	1 (10)
Graduate and above	5 (6.6)	2 (40)	3 (60)
Father occupation (%)			
Not working	1 (1.5)	1 (100)	0
Daily Labour	29 (39.2)	14 (48.2)	15 (51.7)
Self Employed	34 (45.9)	23 (67.6)	11 (32.2)
Salaried	10 (13.5)	5 (50)	5 (50)



Antenatal and delivery practices of mothers are shown in Table 4.3. In this survey, the birth order of the second child was 41 percent. The delivery of children at public hospitals was 81 percent and 52 percent at native places. Out of 75, 70 (93 percent) mothers received Tetanus Toxoid dose from a government facility.

**Table no 4.3: Antenatal care and delivery practices of mothers**

<b>Pregnancy and delivery details</b>	<b>N= 75</b>	<b>Complete</b>	<b>Incomplete</b>
Mean of child age in months (SD)	19.10 (5.7)	19 (5.86)	18 (5.49)
Male child	38 (50.7)	22 (57.8)	16 (42.1)
Birth order (%)			
1	22 (29.3)	9 (40.9)	13 (59)
2	31 (41.3)	21 (67.7)	10 (32.2)
3 or more	22 (29.3)	13 (81)	9 (28)
Birth Place (%)			
Native	39 (52.0)	22 (56.4)	17 (43.5)
Delhi NCR	36 (48.0)	21 (58.3)	15 (41.6)
Delivery Place (%)			
Home	13 (17.3)	8 (61.5)	5 (38.4)
Public Hosp.	61 (81.3)	34 (55.7)	27 (44.2)
Private Hosp.	1 (1.3)	1 (100)	0
ANC visit number (%)			
0	5 (6.7)	2 (40)	3 (60)
1	13 (17.3)	7 (53.8)	6 (46.1)
2	45 (60.0)	25 (55.5)	20 (44.4)
3 or more	12 (16.0)	9 (81.8)	3 (60)
Place of ANC checkup (%)			
Home	12 (16.9)	6 (50)	6 (50)
Public Hospital	58 (81.9)	35 (60.3)	23 (39.6)
Private Hospital	1 (1.4)	1 (100)	0
IFA Tablet during pregnancy (%)	64 (85.3)	36 (56.2)	28 (43.7)
Received Tetanus (%)	70 (93.3)	41 (58.5)	29 (41.4)
Post-partum visits to Hospital			
Mother only	10 (13.3)	5 (50)	5 (50)
Both (mother & child)	23 (30.7)	15 (65.2)	8 (34.7)
None	42 (56.0)	23 (54.7)	19 (45.2)

Childhood vaccination in public hospital was 97 percent and the practice of health workers for informing about vaccination to households was 37 percent. As per our survey, only 3% said of vaccination camps being held in in Kanhai village. Almost 90 percent of mothers had no problem during vaccination of their children but 10 percent had informed about fever and swelling and 10 percent of mothers faced problem as overcrowding or waiting during vaccination in the health centers. only 42 percent of mothers were there who had a vaccination card for their child vaccination.

**Table no 4.4: Status of vaccination in children aged 12-23 months**

Vaccine name	Vaccinated (%)	Timeliness (On time)(%)
BCG	75 (100)	75 (100)
OPV-0	75 (100)	75 (100)
Hepatitis B	75 (100)	75 (100)
Penta 1/Rota-1/OPV-1	55 (73.3)	55 (100)
Penta-2/Rota-2/OPV-2	53 (70.7)	53 (100)
Penta-3/Rota-3/OPV-3	51 (68)	51 (100)
Measles	43 (57.3)	43 (100)

Since only a single dose of BCG, OPV-0 and HepB-0 are given within 24 hours after birth of a child that is termed as birth dose and the vaccination of those vaccines found to be 100 percent. Other doses of vaccines were 73 ,71 and 68 percent for OPV-1, Penta-1 & Rota-1, Penta-2, Rota-2, & OPV-2 and Penta-3, Rota-3, and OPV-3 respectively. Vaccination for measles was 57 percent. All the vaccines were given on time. The dropout rate of 1<sup>st</sup> to 3<sup>rd</sup> dose was 73 to 68 percent. Full vaccination as per recommendation was given to 57 percent of children. The vaccination information was collected through vaccination card and or by mother recall. And the dropout rate of OPV 1-3 (32 percent), Pentavalent 1-3 (27 percent), Rotavirus 1-3 (27 percent).

**Factors associated with incomplete vaccination**

Only parental education was associated with incomplete vaccination. When mothers of children who did partial vaccinate their children were asked about the reason for not

vaccinating they mentioned, that they were not aware of all doses of vaccination schedule n=43. health center was far away as said by 4 mothers and 6 mothers said waiting time and 8 mother's response of children were found fever during vaccination.

**Table no 4.5: Sociodemographic characteristics associated with vaccination**

Sociodemographic factors information	Complete	Incomplete	OR (95% CI)	P value
Religion				
Hindu	25 (78.1)	35 (81.4)	1.22 (.39- 3.81)	0.72
Non-Hindu	7 (21.8)	8 (18.6)	1	
Literacy of mothers				
Read/write	4 (12.9)	16 (36.1)	2.99 (.25- 35.33)	0.06
Don't read or write	27 (87.1)	27 (62.7)	.37 (.08- 1.56)	
Place of childbirth				
Home	5 (15.6)	8 (18.6)	1.27 (.32- 4.33)	0.73
Hospital	27 (84.3)	35 (81.4)	1	
Community Health Workers				
Yes	23 (71.8)	36 (83.7)	2.01 (.65- 6.15)	0.21
No	9 (28.1)	7 (16.2)	1	
Gender of the child				
Male	16 (50)	22 (51.1)	1.04 (.41- 2.61)	0.92
Female	16 (50)	21 (48.8)	1.3 (.68- 2.51)	
Birth order				
First child	13 (40.6)	9 (20.9)	.48 (.13- 1.75)	0.06
Second or higher	19 (59.3)	34 (79.0)	1.47 (.43- 5.0)	
Anganwadi				
Yes	13 (40.6)	16 (37.2)	1.24 (.48- 3.23)	0.76
No	19 (59.3)	27 (62.7)	1.23 (.69- 2.20)	

**Discussion**

Childhood vaccination coverage among urban migrants reveals that a large proportion of children and particularly recently migrated children did not receive a full course of vaccination. The present study showed that the majority of migrant respondents were Hindu, literate and employed.

The major finding of the study was based on childhood vaccination coverage of mothers and their antenatal and delivery practices. All of the mothers were fully immunized against tetanus and vitamins tablets. Amongst the place of deliveries, 17 percent were at home and the remaining 82 percent were at the government hospitals. The proportion of fully immunized children in the present study was 45 percent that is much higher than

the 23 percent of the NFHS-4 for Gurugram. Children of mothers who reported less income had higher vaccination coverage. However, most studies reported better vaccination status among high-income households.

In other studies, the percentage of mothers received TT dose ranged from 40 percent to 90 percent in the states such as Delhi NCR, Ahmadabad, and Maharashtra. The percentage of TT dose in Gurugram is reported to be 89 percent (NHFS-4, 2015) but in our study, we reported dose to be 93 percent. The percentage of women who had three or more antenatal care visits in our study was estimated at 81 percent in Gurugram where it was 38 percent according to NFHS-4 in 2015. Children of employed women in the present study were less immunized probably because of the employed mothers could not get the time to take the children for vaccination which is consistent with many other studies. (Sharma S, 2016).

### **Conclusion and recommendation**

Childhood vaccination coverage is an important and evolving public health problem. Since the vaccine-preventable diseases are more in low-middle income countries. Vaccination childhood coverage has to measure to understand, evaluate and monitor the real scenario. Our study is an important contribution to assess the vaccine coverage in migrants of the urban area in India.

The mothers of children were well aware of the importance of vaccination and were positive about it. The role of vaccination was acknowledged as important means towards disease prevention. There was no association found between immunization coverage, maternal age, number of children, husband education and employment.

### **Recommendation**

The finding indicate that parents make vaccination coverage choice based on many factors, these factors may change over time and proper information need to fit the needs of the population. It is important to understand the scope of vaccination program and scope of problem and for the development of vaccination coverage strategies to increase the vaccination coverage.

## Acknowledgement

It is matter of pride for me to express my gratitude and regards to my honorable guide, Dr Niveditha Devasenapathy. I would also like to thank IIPH-D faculty members and my colleagues for their support

## References

1. Bassani DG, Jha P (2010) 'Causes of Neonatal and child mortality of India: Nationally representative mortality survey', HHS Public Access, 376(9755), pp. 1853-1860 [Online]. Available at: [www.ncbi.nlm.nih.gov/pmc/articles/PMC3042727/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3042727/) (Accessed: 9th April 2019).
2. Dharmalingam A, NS Raghupathy, M Sowmiya, D Amudharaj, HM Jehangir (2017) 'Immunization knowledge, attitude and practice among mothers of children from 0 to 5 years', International Journal of Contemporary Pediatrics, 4(3).
3. Government of India. Multi-Year Strategic Plan for Universal Immunization Program in India (2005-2010). New Delhi: Ministry of Health and Family Welfare; 2005.
4. Hasman A, Noble DJ (2016) 'Childhood Immunization in South Asia - overcoming the hurdles to progress', Perspectives in Public Health, 136(5), pp. 273-277.
5. Immunization | UNICEF [WWW Document], n.d. URL <http://unicef.in/whatwedo/3/immunization> (accessed 3.30.19).
6. insecurity: a framework for analysis and action. PLoS Med 2007; 4: 1584–8.
7. Kumar D, Aggarwal A, Gomber S. Immunization status of children admitted to a tertiary-care hospital of north India: reasons for partial immunization or non-immunization. Journal of Health Population and Nutrition. 2010;28: 300-4.
8. Kusuma Y, 2010, Y.S., Kaushal, S., Sundari, A.B., Babu, B.V., 2018. Access to childhood immunization services and its determinants among recent and settled migrants in Delhi, India. Public Health 158, 135–143. <https://doi.org/10.1016/j.puhe.2018.03.006>

9. Lakshminarayanan, S., Jayalakshmy, R., 2015. Diarrheal diseases among children in India: Current scenario and future perspectives. *J. Nat. Sci. Biol. Med.* 6, 24–28.  
<https://doi.org/10.4103/0976-9668.149073>

IJSER

10. Mathew JL. Inequity in childhood immunization in India: a systematic review. *Indian Pediatr* 2012; 49: 203-23
11. Ministry of family health and welfare, Government of India (2016) Mission Indradhanush, Available at: <https://www.nhp.gov.in/mission-indradhanush> (Accessed: 2nd April 2019).
12. MW, Mayumana I, Schulze A, Mshinda H. Access to health care in contexts of livelihood
13. NHM (2015) Mission Indradhanush Operational Guidelines.
14. Obrist B, Iteba N, Lengeler C, Makemba A, Mshana C, Nathan R, Alba S, Dilip A, Hetzel
15. Pakhare, A.P., Pawar, R., Lokhande, G.S., Datta, S.S., 2014. Does seasonal migration for sugarcane harvesting influence routine immunization coverage? A cross-sectional study from rural Maharashtra. *Indian J. Public Health* 58, 116–120. <https://doi.org/10.4103/0019-557X.132288>
16. Premnarayan (2018) Universal Immunization Programme, New Delhi: Ministry of Health and Family Welfare, Government of India.
17. Sharma V 2015, V., Singh, A., Sharma, V., 2015. Provider's and User's Perspective about Immunization Coverage among Migratory and Non-Migratory Population in Slums and Construction Sites of Chandigarh. *J. Urban Health Bull. N. Y. Acad. Med.* 92, 304–312. <https://doi.org/10.1007/s11524-015-9939-2>
18. Sharma, S., S, 2016, 2016. Incomplete Immunization Coverage in Delhi: Reasons and Solutions | OMICS International [WWW Document]. URL <https://www.omicsonline.org/open-access/incomplete-immunization-coverage-in-delhi-reasons-and-solutions-2167-1079-1000240.php?aid=79456> (accessed 3.30.19).