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Assessment of Status, Awareness, and Attitude Associated with Childhood Immunization in Delhi – NCR, India

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Abstract

Introduction: Immunization is a preventive measure that reduces the occurrence of diseases and child mortality rate. India has made significant progress in this area and continuous efforts are being made to promote a large-scale immunization process for several life-threatening diseases. **Aim:** Our study was aimed at finding out the immunization coverage and awareness, among mothers, in Delhi – NCR through a sample of 400 respondents. **Materials and Methods:** The study was conducted through questionnaire-cum-interview and snowball sampling method and included 400 respondents who were mothers having at least one child below 6 years of age. **Results:** We found that a large percentage of respondents (97.25%) had immunized their children for the recommended vaccines. Mother's education and occupation were the major influencing forces, with educated and professionally working mothers fairing better, highlighting the importance of female literacy. The full immunization coverage for all five vaccines was 69.27%. Hospitals and doctors were the major sources of information (55.5%) about immunization and more than half of the respondents (55.25%) got their children immunized in government hospitals. Gender of child and economic status of the family were not significant factors affecting immunization. The major factors for not immunizing or delaying the immunization of children were lack of motivation and the busy routine of parents. **Conclusion:** Female literacy is a major factor influencing immunization success, it should be targeted and not only awareness campaigns but also incentive-based strategies should be employed to create awareness and encourage parents. Complete and timely vaccination of children can protect them from grave diseases and also stop outbreaks of many diseases.

Keywords: Attitude, Awareness, Childhood immunization, Delhi – NCR, Infectious diseases

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Introduction

Immunization is one of the most effective health-care practices that confer immunity against infectious diseases. It is considered to be a cost-effective key intervention that can reduce the number of death among young children.[1] India has an infant mortality rate of 34.3/1000 live births as per data provided by Sample Registration System, Government of India.[2] Immunization can act as a shield that can lower the mortality rate substantially and lessen the economic burden in long run. The World Health Organization has been working tremendously with countries and partners to improve global vaccination coverage.

A child is considered fully immunized if he or she receives all the recommended vaccines as per the national immunization schedule. The immunization program in India dates back to 1978 when an expanded program was launched that was renamed as Universal Immunization Program (UIP) in 1985. The major leap in this direction came when the now-called Child Survival and Safe Motherhood Program was included in the ambit of the National Reproductive and Child Health Program.[3]

Every year, UIP caters to the vaccination need of 2.65 crore children and 2.9 crore pregnant women against 12 vaccine-preventable diseases in India.[4,5] By 2015–16, UIP was able to fully immunize only up to 62% of eligible children.[6] Overall, the immunization rate has increased over the past decades but the improvement has been mainly observed in the high focus group states, that is, Uttarakhand, Uttar Pradesh, Rajasthan, Bihar, Jharkhand, Chhattisgarh, Madhya Pradesh, Odisha, and Assam.[7] Due to low childhood vaccination rates, Mission Indradhanush (MI), a periodic intensification of the routine immunization program, was launched by the Government of India which aimed to vaccinate 90% of infants by 2020. It was followed by Intensified MI (IMI), which aimed to increase immunization coverage even in vulnerable and inaccessible populations. IMI 2.0, launched in December 2019, focused on hard-to-reach tribal populations and IMI 3.0 was launched on February 19, 2021, to achieve 90% full immunization coverage in all districts of the country and sustain the coverage by strengthening the immunization system.[4,5]

In spite of such immunization programs, the goals of immunization coverage have still not been achieved satisfactorily. A variety of barriers can influence the immunization coverage of children such as the gender of the child, proximity to the health-care center, family structure and household assets, and expenditure. Furthermore, the educational background of parents, especially of mothers, parental knowledge toward vaccination, and ill effects of vaccination could be some of the factors that may affect full immunization.[8-10] Hence, explicit studies are required to assess the status perspectives, knowledge, and factors responsible for low levels of immunizations. Such study can help the country in monitoring data at sub-national (state/UT) levels that are critical in

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prioritization, tailor vaccination strategies, and operational plans to address immunization gaps.

Materials and Methods

The study was carried out from November 2018 to December 2019 in Delhi – NCR with a sample size of 400. The inclusion criteria for the study were married women who had at least one child below 6 years of age. A pretested structured questionnaire was prepared and shared with the respondents. The data were collected using questionnaire-cum-interview and using the snowball sampling method.[11] Mothers provided data based on their memory and also by showing immunization cards of their children. Participation in the study was purely voluntary and informed written consent was taken from all the respondents. Along with collecting the data, mothers were also apprised about the significance of immunization of their children and their role in protecting future generations.

Our study was divided into the following sections:

1. Demography: This section included the age of mothers at the time of their first delivery, family structure, annual family income, educational background of mother and father, and occupation of mother and father.
2. Awareness about immunization: This section provided information about the source of information about immunization, health facilities near home, and general awareness about immunization.
3. Status of immunization: This section dealt with the information about the place of immunization, status about immunization with the vaccines for common diseases, etc.
4. Factors affecting immunization of children: This section provided information about the relationship between immunization and education of mother, annual family income, and other factors.

The data, thus collected, were tabulated and analyzed using MS Excel.

Results

Demography

The age of the respondents ranged from 20 to 50 years. A majority of respondents (106; 26.5%) became mothers at the age of 22–24 years and most of the respondents belonged to nuclear families (254; 63.5%). Most of the mothers (142; 35.5%) and fathers (161; 40.25%) were graduates. Majority of mothers were unemployed (181; 45.25%) while majority of fathers were professionals (306; 77%). The annual family income of majority of respondents was 1–5 lakhs [Table 1]. Majority of mothers were homemakers (257; 64.25%) followed by professional (90; 22.5%) and unskilled (53; 13.25%) workers.

Awareness about Immunization

Most of the respondents received information about immunization from hospitals or doctors (222; 55.5%) followed by government advertisements (129; 32.25%) [Figure 1]. It is worth mentioning here that respondents received information from more than 1 sources. The majority of the respondents (351; 87.75%) had health facilities in the nearby areas of their residence while 49 (12.25%) did not have a nearby health facility. Three hundred and sixty-eight respondents (92%) knew the immunization schedule of their children and 345 (86.25%) had immunization cards for their children. Interestingly, 379 respondents (94.75%) had immunized their children with vaccines out of which 257 (64.25%) had immunized with government-sponsored vaccines.

Status of Immunization

In our study, 221 (55.25%) respondents got their child immunized at government hospitals while 156 (39%) approached private pediatricians for immunization. Other than these, the respondents also consulted homeopathic doctors (9; 2.25%), Unani (9; 2.25%), and Ayurveda (5; 1.25%) for getting their child vaccinated. The majority of homemakers (120; 66.30%; *n*=181) and mothers doing unskilled labor (40; 70.18%; *n*=57) got their children immunized from government hospitals while a majority of mothers doing professional jobs (101; 62.35%; *n*=162) preferred private clinics.

Two hundred and forty-nine (62.25%) respondents had immunized their children for all five vaccines, that is, bacillus Calmette–Guérin (BCG), injectable polio vaccine (IPV), measles, measles-mumps-rubella (MMR), and diphtheria-tetanus-pertussis (DPT), while 140 (35%) had done partial immunization and only 11 (2.75%) did not vaccinate their children at all. Of 213 male children and 187 female children, 133 (62.44%) and 115 (61.50%) were fully immunized, respectively, as per their eligibility; 72 (33.8%) male and 68 (36.36%) female children were partially immunized while only 8 (3.76%) male and 4 (2.14%) female children were not immunized. Among respondents who had a 1-year-old child, only 14 (36; 38.89%) got their child vaccinated for BCG (against tuberculosis), IPV (against polio), MMR, and DPT. Among the respondents who had a 2-year-old child, 43 (*n*=64; 67.19%) got their child vaccinated for all five vaccines. The overall vaccination coverage for all five vaccines was 69.27% [Table 2].

Factors Affecting Immunization of Children

Of the 371 (92.75%) respondents, who knew about the immunization schedule, a majority (123; 33.15%) belonged to group with annual family income of 1–5 lakhs. Out of 381 (95.25%) respondents who had immunized their children, maximum (122; 32.02%) belonged to group whose annual family income was 1–5 lakhs. Three hundred and forty-six (86.75%) respondents had immunization cards and out of these, majority (112; 32.28%)

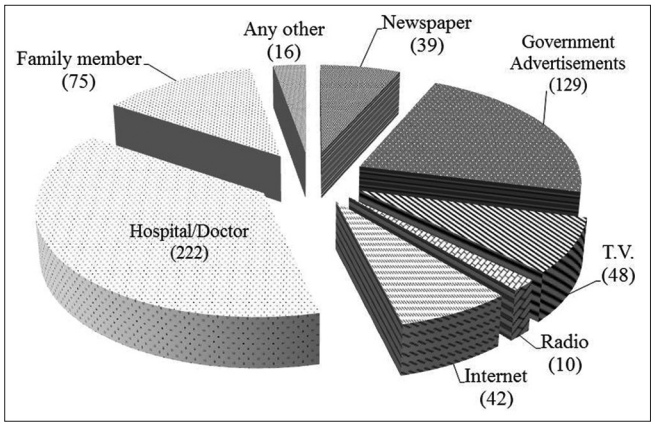

Figure 1: Source of information about immunization (*n*=400)

belonged to the group with annual family income of 1–5 lakhs. Similarly, out of 320 (80%) respondents who vaccinated their child on time, maximum (103; 32.19%) belonged to the same group (1–5 lakhs) [Figure 2].

Among the respondents who were aware of the immunization schedule of their children, majority were graduates followed by postgraduates, senior secondary, and secondary education. Of the mothers who had immunized their children (379; 94.75%), maximum were graduates followed by postgraduates. Furthermore, among mothers who had given government-sponsored vaccines to their children, again majority were graduates. Finally, among 62.25% of mothers who had immunized their child for all vaccines, 110 (44.18%) were graduates followed by postgraduates (80; 32.13%) [Table 3].

We observed that 235 (58.75%) respondents did not delay immunization of their children while 165 delayed immunizations. Among the factors that affected the timely immunizations, the dominant factor was lack of motivation to vaccinate the child (45; 11.25%) followed by a busy schedule of parents (43; 10.75%) [Table 4]. Among the mothers who had their children fully vaccinated (249; 62.25%), a majority were homemakers (187; 75.1%) followed by professionals (50; 20.08%) while those whose children were partially vaccinated (140; 35%), the majority (61; 43.57%) were homemakers followed by almost an equal number of professional (40; 28.57%) and unskilled (39; 27.85%) mothers, respectively. All the professional working mothers had either fully (50; 55.56%) or partially (40; 44.44%) vaccinated their children. Among homemakers, a majority (187; 72.76%) had fully vaccinated their children and 61 (23.74%) had partially vaccinated while among unskilled working mothers, the majority had done partial vaccination (39; 73.58%) of their children.

Discussion

India has the largest immunization program in the world.[5] As immunization protects children from common childhood diseases, it significantly reduces the child mortality rate, especially in developing and underdeveloped countries. There is a strong relationship between the education, attitude, and awareness of the mother and immunization of the child.[12,13] We report that in our study, 74.5% of respondents became mothers in the age range of 19–27 years and 5% became mothers when they were 16–18 years

Table 1: Demography of respondents (*n*=400; data expressed as number and percentage)

Age of mother at the time of birth of the first child (in years)	*n (%)*	*Education*	*Mother, n (%)*	*Father, n (%)*
16–18	20 (5)	Uneducated	30 (7.5)	9 (2.25)
19–21	92 (23)	Primary	19 (4.75)	13 (3.25)
22–24	106 (26.5)	Secondary	46 (11.5)	32 (8)
25–27	100 (25)	Senior secondary	59 (14.75)	49 (12.25)
28–30	62 (15.5)	Graduate	142 (35.5)	161 (40.25)
31–33	13 (3.25)	Postgraduate	104 (26)	136 (34)
34–40	7 (1.75)			
Family structure	*n (%)*	*Occupation*	*Mother, n (%)*	*Father, n (%)*
Joint	146 (36.5)	Unemployed	181 (45.25)	12 (3)
Nuclear	254 (63.5)	Unskilled	57 (14.25)	80 (20)
		Professional	162 (40.5)	306 (77)
Economic status	*<1 lakh*	*1–5 lakhs*	*5–10 lakhs*	*>10 lakhs*
n (%)	75 (18.75)	126 (31.5)	115 (28.75)	84 (21)

Table 2: Status of vaccination of children for selected vaccines (n=397*)

Age (in years)	*1 year*	*2 years*	*3 years*	*4 years*	*5 years and above*
Number of children	36	64	62	68	167
Vaccines					
BCG	21 (58.33*)	17 (26.56)	11 (17.74)	10 (14.71)	36 (21.56)
IPV	22 (61.11)	11 (17.19)	16 (25.81)	11 (16.18)	35 (20.96)
Measles	4 (11.11)	13 (20.31)	6 (9.68)	7 (10.29)	15 (8.98)
MMR	-	13 (20.31)	6 (9.68)	9 (13.24)	28 (16.77)
DTP	15 (41.67)	16 (25)	11 (17.74)	9 (13.24)	29 (17.37)
All of these	14 (38.89)	43 (67.19)	47 (75.81)	53 (77.94)	118 (70.66)

*Note: Out of 400, three respondents did not fill this information

Table 3: Relationship between education of mother and selected parameters of awareness about vaccination (*n*=400; data expressed as number and percentage of respondents in parenthesis)

Education of mother	*Uneducated*	*Primary*	*Secondary*	*Senior secondary*	*Graduate*	*Postgraduate*
Do you know about immunization schedule? (Yes: 368; 92%)	15 (4.08)	16 (4.35)	38 (10.33)	56 (15.22)	139 (37.77)	104 (28.26)
Have you immunized your child with vaccines? (Yes: 379; 94.75%)	21 (5.54)	17 (4.49)	38 (10.03)	58 (15.3)	141 (37.2)	104 (27.44)
Have you given government-sponsored vaccines? (Yes: 257; 64.25%)	15 (5.84)	16 (6.23)	36 (14.01)	45 (17.51)	92 (35.8)	53 (20.62)
Have you done full immunization of your child? (Yes: 249; 62.25%)	8 (3.21)	4 (1.61)	20 (8.03)	27 (10.84)	110 (44.18)	80 (32.13)

Table 4: Factors responsible for not getting child vaccinated on time (*n*=400; data expressed as number and percentage of respondents in parenthesis)

Factors	*Joint family (n=146), n (%)*	*Nuclear family (n=254), n (%)*	*Total (n=400), n (%)*
Belief that vaccine can have adverse effects on child	4 (2.73)	5 (1.97)	9 (2.25)
Parents were busy	14 (9.58)	29 (11.42)	43 (10.75)
Lack of facility in the locality	6 (4.11)	12 (4.72)	18 (4.5)
Child was unwell during the period of vaccination	6 (4.11)	10 (3.94)	16 (4)
Lack of motivation to vaccinate child	16 (10.96)	29 (11.42)	45 (11.25)
Lack of knowledge about vaccination	7 (4.79)	10 (3.94)	17 (4.25)
Any other	10 (6.85)	15 (5.91)	25 (6.25)
Immunization was not delayed	83 (56.84)	144 (56.69)	227 (56.75)

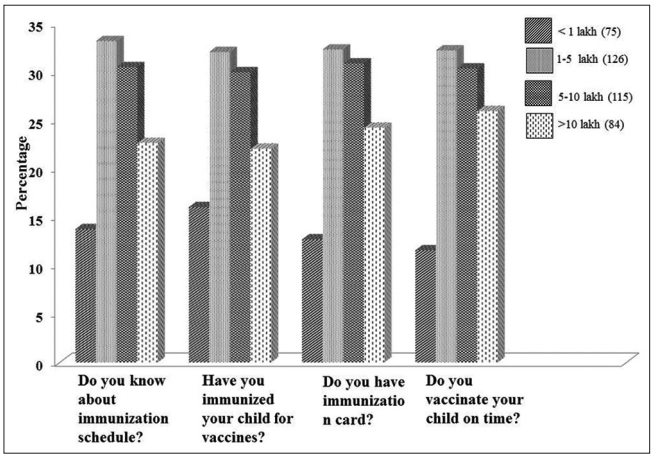

Figure 2: Economic status and awareness about immunization (*n*=400)

old. Adolescent motherhood is more common in low- and middle-income countries and is associated with increased infant and maternal morbidity and neonatal mortality.[14,15] The reason for this could be the immaturity of adolescent mothers to understand the significance of immunization for their children as they might not be emotionally and psychologically ready for their own or their child's health needs.

Further, we observed that most of the respondents received information about immunization from hospitals or doctors, indicating that mothers are approaching hospitals/doctors for their proper treatment during pregnancy or childbirth. Government advertisements also created some awareness among respondents, but still, the mothers do not have awareness about the diseases from which their children would be protected after immunization.[16] We also found that majority of the respondents had health facilities in nearby areas of their residence. Nearby health facilities make it convenient for mothers to immunize their children, even in the absence of fathers or other family members as they do not have to depend on others to ferry them to the clinic or hospital. The awareness about immunization schedule was high among mothers as 92% of the respondents had this knowledge and 97.25% had immunized their child for recommended vaccines. This might be the result of IMI, which resulted in a 37% increase in immunization coverage by 2017 and raised the proportion of fully immunized children from 50.5% to 69%.[17]

We also found that 64.25% of the respondents had immunized their children with government-sponsored vaccines. More than half of the respondents got their children immunized at government hospitals followed by a good number who preferred private pediatricians. Unlike homemakers and unskilled mothers, who preferred government hospitals for immunization, mothers with professional jobs preferred private clinics. The reason to choose private clinics for immunization could be attributed to two major factors – first, convenience to reach the clinic and second, preferred time for immunization.[18,19] Both these factors were the highlight of our study as they affected the motivation of respondents to immunize their children.

A majority of the respondents (62.25%) had fully immunized their children while 35% had done partial immunization, due to various reasons. Only 2.75% of respondents did not vaccinate their child for any vaccine. Further, we observed that irrespective of the sex, children were equally vaccinated, either fully or partially in spite of a significantly low child sex ratio in Delhi, that is, 871/1000 in 2018.[20] This indicates that gender disparity in India with respect to immunization is getting reduced over time.[21] Among the respondents who had a 1-year-old child, only 38.89% got their child vaccinated for BCG, IPV, measles, MMR, and DPT while 67.19% of 2-year-old children were vaccinated for these five vaccines. About 70–78% of children, who were 3 years and above, were vaccinated for all five vaccines. In our sample population, the vaccination coverage for BCG and IPV was 23.93% each, followed by 20.15% for DPT, 15.11% for MMR, and 11.34% for measles. The full immunization coverage for all five vaccines was 69.27%. Children who were 4 years old had better immunization coverage (77.94%) followed by 3 years old (75.81%) and 5 years old (70.66%). Hence, the vaccination coverage varied with the age of the child and the type of vaccine. It is noteworthy that the immunization coverage is different district wise in India and the national coverage was only 62% for full immunization in 2015–16.[6,22] BCG had the highest national immunization coverage (92%), followed by measles (81%), DPT (78%), and polio (73%) in 2015–16.[22] In addition to the regular recommendations of the vaccines for infants, the Advisory Committee on Vaccines and Immunization Practice of the Indian Academy of Pediatrics also recommended immunization of infants with hepatitis B vaccine, diphtheria, and tetanus toxoids and whole-cell pertussis vaccine or diphtheria, tetanus and acellular pertussis vaccine DTaP, IPV, rotavirus vaccine, MMR, and typhoid conjugate vaccine in 2018.[23]

Furthermore, it was also observed that among the mothers who knew about immunization schedule (92%), had immunized their children (94.75%), given government-sponsored vaccines to their children (64.25%), and had immunized their child for all the necessary vaccines (62.25%), the majority were graduates followed by postgraduates. These findings suggest that the education of mothers plays an important role in immunization coverage of children and a similar observation has been reported in Eritrea, East Africa.[12] However, in our study, we also found that

graduate mothers were more active in immunizing their children than postgraduate mothers, an observation that is different from expectations.

The occupation of the mothers also influenced immunization coverage. Among the mothers who got their children fully vaccinated, 75.1% were homemakers while 20.08% were professionals. About 43.57% of homemakers partially immunized their children but an equal percentage of unskilled and professional mothers did so. However, it is noteworthy that 100% of the professionally working mothers did vaccinate their children, whether complete or partial. Other similar studies have also reported that the education of mother, family structure (nuclear or joint), working status of mother, and annual family income are some of the important factors that are associated with the status of vaccination of children.[8,24]

According to NFHS data of 2015–16, in Delhi, 68.6% of infants in the age range of 12–23 months were fully immunized.[25] Although, this is significant progress, consistent efforts are required to achieve the target of full immunization. There are various other factors that might influence immunization coverage. In our study, it was found that the major factor for not getting the child immunized on time was lack of motivation among the parents (11.25%) followed by a busy routine of parents (10.75%) which also steered them to private clinics for vaccination. Thus, it was not the lack of awareness or health facility or any misconception about the vaccines that stopped the parents from immunizing their children. The family structure, whether nuclear or joint, did not influence the immunization of the children, as per our study. Nonetheless, 56.75% of respondents reported that immunization was not delayed for their children. However, there is a pressing need to address the issue of motivation for immunization through programs with the help of health-care professionals to achieve full immunization coverage.[17,26]

We also observed that professional working mothers preferred to immunize their children at private clinics (101; 62.35%) while unskilled working mothers (40; 70.18%) and homemakers (120; 66.3%) preferred government hospitals. Regarding timely immunization of children, it was observed that 149 (91.98%) professional mothers, 135 (74.59%) homemakers, and 35 (61.4%) unskilled working mothers vaccinated their children on time. The unskilled working respondents were comparatively less punctual for the immunization schedule of their children which might be due to the less awareness about the importance of immunization of children. As far as giving government-sponsored vaccines is considered, we found that among the respondents, 45 (78.95%) unskilled working mothers approached for government-sponsored immunization program followed by homemakers (119; 65.75%) and professional working mothers (95; 58.64%). This suggests that more educated mothers did not prefer government-sponsored vaccines and they consulted private pediatricians for immunization of their children. The free or subsidized immunization programs of the Government of India generally attract people with lower annual family income for their health needs as the private sector vaccination services are costly.[18]

Conclusion

We conclude that the childhood immunization coverage for five vaccines in Delhi – NCR was 69.27%, above the national average of 62% as reported in 2015–16. Gender was not a hindrance toward equal rights to immunization. Although the majority of respondents became mothers between 19 and 27 years of age, we also observed respondents who became mothers in their adolescence. The education of mothers and their occupation influenced the immunization of their children. Government-sponsored vaccines were preferred by homemakers and unskilled mothers while professional mothers opted for vaccines from private pediatricians. The major reason that stood out in our study for not getting their child timely vaccinated was lack of motivation followed by the busy routine of parents. Anganwadis may be roped in and incentive-based strategies can be employed to motivate parents for immunization. Serious efforts should be made in this direction at state, district, and regional levels and to improve the accessibility to vaccines, additional vaccination centers may be added.

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