

Original Article

A CROSS-SECTIONAL STUDY ON IMMUNIZATION STATUS OF SCHOOL GOING ADOLESCENTS IN INDORE, MADHYA PRADESH

Pulkit Ghelani¹, Sameer Inamdar², Savita Inamdar³**Financial Support:** None declared**Conflict of interest:** None declared**Copy right:** The Journal retains the copyrights of this article. However, reproduction of this article in the part or total in any form is permissible with due acknowledgement of the source.**How to cite this article:**

Ghelani P, Inamdar S, Inamdar S. A Cross Sectional Study on Immunization Status of School Going Adolescents in Indore, Madhya Pradesh. Natl J Community Med 2014; 5(1): 57-60.

Author's Affiliation:¹Junior Resident, Department of Pediatrics, BHRC, Indore; ²Associate Professor, Department of Medicine, SAIMS Medical College, Indore; ³Professor Emeritus, Department of Pediatrics, BHRC, Indore, Indore**Correspondence:**Dr Pulkit Ghelani
Email: pulkitghelani@yahoo.com**Date of Submission:** 15-11-13**Date of Acceptance:** 28-02-14**Date of Publication:** 31-3-14

ABSTRACT

Background: With the advent of a number of new vaccines in last decade and huge money invested in immunization program by Indian/International agencies, the results and outcome of these efforts needed to be studied and analyzed. School-age and adolescent age groups are still poorly covered areas in the field of immunization.**Approach:** To study exact impact of factors possibly affecting immunization coverage like gender bias against females, socio-economic status of family, maternal education and place of vaccination, this study was carried out in schools of Indore in 2000 school-going adolescents to determine vaccination coverage of candidates and awareness of the parents about various aspects of immunization.**Results:** Results suggested a statistically significant positive impact of socio-economic status ($p < 0.001$) and maternal education ($p < 0.001$) on the overall immunization coverage and didn't report any gender bias against the female candidates in immunization. Study also suggested a poor awareness of parents about optional vaccines and adolescent immunization.**Conclusion:** It is high time that the government makes necessary attempts to give a special focus on adolescent immunization and if possible, incorporate the immunization program into the school health program and also run special campaigns to cover the existing deficits in the immunization coverage to create a realistic opportunity to fulfill the dream of making India free of these VPDs one day.**Keywords:** Immunization, adolescent, School, maternal education

INTRODUCTION

Immunization program is one of the most cost-effective health strategies ever employed. The meaning of word immunization in 21st century has gone beyond the protection against 6 basic vaccine preventable diseases. Many new vaccines have come in market in during last decade. Many of the individuals, who have turned adults in last 10 yrs or so, have missed these new vaccines because of either lack of knowledge, non-availability or non-affordability. This vulnerable group creates a pocket of susceptible subjects in the society which hamper the possibility of eradication of vaccine preventable diseases. It is high time that we start special campaigns to cover these missing vaccination opportunities and also make the immunization program flexible enough to cover these deficits in immunization. Identifying the factors such as Socio-economic status of parents, educational status of the mother and responsible attitude of givers and takers of vaccine would ultimately affect the immunization coverage. It is, therefore, important to identify

the details of immunization coverage along with the cause of lacunae in it.

The main objective of our study was to determine the adolescent immunization status in Indore, Madhya Pradesh along with knowing the existence of gender bias in immunization coverage if at all it existed. We also intended to determine the impact of socioeconomic, educational status and awareness of parents on the immunization coverage.

MATERIAL AND METHODS

This study is a "cross-sectional study" done in Schools of Indore from January to June 2013. On the standard map of Indore district collected from Indore Municipal Corporation, the city was divided into 4 quadrants and then 7 schools from each of the 4 quadrants were selected. Out of the total 28 schools were selected for study, Private schools (9), Government schools (10) and Public-Private Partnership schools (9) were selected in equal numbers. Students not falling in the age

group of 10-18 years were excluded. The parents who had maintained the immunization cards were used in data collection. Students were considered as fully immunized if vaccinated against BCG, 3 doses of OPV and DPT and 1 dose of measles as recommended in UIP for the first year of life. They were considered partially immunized if he/she had missed any one or more of the vaccines recommended in UIP for the first year of life. He/she was considered unimmunized if he/she had not taken any of the vaccines recommended in UIP in the first year of life.

Data Collection: It was an interview based study done by circulating a questionnaire to parents of 2000 adolescents in schools of Indore. A convenient sample size of 2000 was selected and sampling method used was convenient sampling. Data was collected and analyzed using SPSS 17 Software Package and Windows Excel Sheet. P Value was generated, and a P value of < 0.05 was taken as significant and P valued > 0.05 was taken as non-significant. Test used to find the statistical significance was Chi-square test.

RESULTS

In our study, total of 2000 children were included, of which 1080 (54%) were males and 920 (46%) were females. Out of total of 2000 subjects studied, 740 (37%) children belonged to high socio-economic class whereas 760 (38%) and 500 (25%) children belonged to middle and lower socio-economic class respectively. Maximum number of children included in the study i.e. 700 (35%) belonged to mother with High school level education followed by 500 (25%), 340 (17%) and 260 (13%) mothers with education level up to Primary school, Graduation and Post graduation respectively. Lowest percentage of children 200 (10%) belonged to mothers who were illiterate. Out of total 2000 candidates in our study, 1240 (62%) of children were fully immunized, 680 (34%) children were partially immunized and 80 (4%) were unimmunized. Vaccination coverage was highest for OPV followed by BCG, DPT, Measles and it was lowest for HPV. (Table 3) Immunization coverage was 61.1% (for full immuni-

zation) in males as compared to 63% (for full immunization) females in all the age groups, with data for partial immunization also showing same trends (33.3% Vs 34.8%) in male Vs female suggesting the lack of significant gender bias (with a p value of 0.38) existing in immunization coverage in Indore city in last 8 yrs. The significant decrease in coverage for the first booster doses of OPV and DPT (48% for both) vaccines and even more for the second booster doses of these vaccines (28%) in comparison to coverage for OPV 1,2 and 3; DPT 1,2 and 3 doses (96% and 90% respectively) suggests lack of awareness in society regarding vaccination beyond infancy. And it is also reflected by the number (21.2%) of parents not aware of the vaccinations beyond 2 years. The full immunization coverage was much lower (41.7%) in candidates vaccinated at PHC in comparison to the other three places of vaccination (66.7% to 73.9%). And there was a statistically significant difference in full immunization coverage between average of Government centers (57.4%) and Private centers (70.5%) with a p value of <0.0001 suggesting that the coverage of immunization at Govt. centers is poor in comparison to the Private centers. The study identified significant association of parental education, socio-economic status of the parents; and negligence and unawareness of the parents were main reasons for low immunization coverage.

In the present study, the percentage of fully immunized adolescents in the age group 10-12 years was 66.7%; in the age group 13-15 years it was 56.5%; and 62.5% adolescents above 16 years were fully immunized. It was confirmed by the calculated non-significant 'p value' of 0.083 for 'Trend' of immunization coverage over 3 X 2 contingency table. It can also be seen from the above table that 61.1% males (660 out of 1080) and 63% females (580 out of 920) were fully immunized.

In the present study, full immunization coverage was highest for adolescents belonging to Middle socioeconomic class 71% followed by adolescents belonging to Upper class 67.6% and then Lower class 40%.

Table 1: Age-wise Immunization Status

Age (in yrs)	Full Immunization			Partial Immunization			Unimmunized			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
10-12	252 (35)	228 (31.7)	480 (66.7)	128 (17.8)	80 (11.1)	208 (28.9)	20 (2.8)	12 (1.7)	32 (4.4)	400 (55.6)	320 (44.4)	720
13-15	184 (27.4)	196 (29.2)	380 (56.5)	144 (21.4)	120 (17.9)	264 (39.3)	24 (3.6)	4 (0.6)	28 (4.2)	352 (52.4)	320 (47.6)	672
16-18	224 (36.8)	156 (25.7)	380 (62.5)	88 (14.5)	120 (19.7)	208 (34.2)	16 (2.6)	4 (0.7)	20 (3.3)	328 (53.9)	280 (46.1)	608
Total	660 (33)	580 (29)	1240 (62)	360 (18)	320 (16)	680 (34)	60 (3)	20 (1)	80 (4)	1080 (54)	920 (46)	2000

Figure in parenthesis indicate percentage

Table 2: Overall Immunization status for each Socioeconomic Class based on Updated Kuppaswami's Scale.(4)

SE Group	Full Immunization			Partial Immunization			Unimmunized			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Upper class	300 (40.5)	200 (27)	500 (67.6)	80 (10.9)	160 (21.6)	240 (32.4)	00	00	00	380 (51.3)	360 (48.7)	740
Middle class	260 (34.2)	280 (36.8)	540 (71)	140 (18.4)	80 (10.5)	220 (28.9)	00	00	00	400 (52.6)	360 (47.4)	760
Lower class	100 (20)	100 (20)	200 (40)	140 (28)	80 (16)	220 (44)	60 (12)	20 (4)	80 (16)	300 (60)	200 (40)	500
Overall	660 (33)	580 (29)	1240 (62)	360 (18)	320 (16)	680 (34)	60 (3)	20 (1)	80 (4)	1080 (54)	920 (46)	2000

Figure in parenthesis indicate percentage

The average of full immunization coverage of both upper and middle socio-economic class is 69% (1040 out of 1500) while that in Lower socio-economic class is 40% (200 out of 500). The difference between these two values is statistically significant (p value <0.0001 odd's ratio 3.39 with 95% confidence interval 2.749 - 4.184), suggesting that there is definite negative impact of lower socio-economic class on immunization coverage.

From the above table, it can be clear that the P value for most of the vaccines is highly significant (<0.001), suggesting that there is a direct association between socioeconomic status and the vaccination coverage.

Vaccines like Typhoid, Hepatitis A, Hib, Varicella, Pneumococcal, Rubella and HPV had 0% coverage in 1 or 2 class, so the p value could not be calculated for these vaccines.

Table 3: Association of socioeconomic status with Vaccines

	Upper*	Middle*	Lower*	P Value
BCG	100	97.36	84	<0.0001
OPV 1,2,3.	100	98.4	86.4	<0.0001
OPV 1 st booster	78.4	31.6	28	<0.0001
OPV 2 nd booster	5.4	13.2	4	<0.0001
DPT 1,2,3.	100	94.7	68	<0.0001
DPT 1 st booster	78.4	31.6	28	<0.0001
DPT 2 nd booster	5.4	13.2	4	<0.0001
Measles	84.3	78.4	34.4	<0.0001
MMR	81.1	52.6	36	<0.0001
Tetanus	62.2	36.8	28	<0.0001
Typhoid	35.1	0	0	--
Hepatitis B	62.2	28.9	24	<0.0001
Hepatitis A	35.1	0	0	--
Hib	18.9	5.2	0	--
Varicella	8.1	0	0	--
Pneumococcal	5.4	2.6	0	--
Rubella	10.8	0	0	--
HPV	2.7	0	0	--

*Socioeconomic class - Values are in percentage

Table 4: Maternal Education and Immunization Coverage

Education of Mother	Full Immunization			Partial Immunization			Unimmunized			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Illiterate	20 (10)	40 (20)	60 (30)	20 (10)	40 (20)	60 (30)	60 (30)	20 (10)	80 (40)	100 (50)	100 (50)	200
Primary School	140 (28)	100 (20)	240 (48)	180 (36)	80 (16)	260 (52)	00	00	00	320 (64)	180 (36)	500
High school	180 (26)	320 (46)	500 (71)	120 (17)	80 (11)	200 (29)	00	00	00	300 (43)	400 (57)	700
Graduate	160 (47)	60 (18)	220 (65)	20 (5.9)	100 (29)	120 (35)	00	00	00	180 (53)	160 (47)	340
Post graduate	160 (61)	60 (23)	220 (85)	20 (7.7)	20 (7.7)	40 (15)	00	00	00	180 (69)	80 (31)	260
Total	660 (33)	580 (29)	1240 (62)	360 (18)	320 (16)	680 (34)	60 (3)	20 (1)	80 (4)	1080 (54)	920 (46)	2000

Figure in parenthesis indicate percentage

In the present study found that maternal literacy has appreciable effect on immunization coverage. Only 30% children had received full immunization when mothers were illiterate.

Table 5: Awareness of the parents regarding various aspects of immunization

Question	Yes	No	No Response
Necessity of Booster doses	68.8	31.2	2
Awareness of Optional Vaccines	40.1	53.8	6.1
Necessity of Adolescent Vaccination	13.3	82.4	4.3

Figures are in percentage

Table 6-Opinion of parents regarding the age up to which a child should be vaccinated

Response	Frequency	%
Up to 2 years	354	17.7%
Up to 5 years	662	33.1%
Up to 10 years	718	35.9%
Up to 16 years	188	9.4%
Beyond 16 years also	78	3.9%
Total	2000	100

The immunization coverage increased as the education of the mothers increased with maximum percentage (84.6%) of children being fully immunized belonging to mothers who were postgraduates. It was also seen that none of the candidates with maternal education level of up to Primary school or more than that had any unimmunized child. It was statistically

proven also with a significant p value (<0.0001) for trend of the table for immunization coverage from Illiterate mothers to Post graduate mothers.

DISCUSSION

Although the overall immunization coverage has improved over last few years in India, School age and adolescent age group is a neglected area and has dismal immunization coverage.

UIP is one of the few 100 percent centrally sponsored family welfare programs and provides support for vaccine storage, training of medical and paramedical staff⁽²⁾. In spite of that, data regarding Immunization coverage found in this study is not satisfactory and needs a serious 'look in' by the government of India before finalizing the next Health planning by the Policy makers in the government.

Among all age groups, AIDS, TB and Malaria kill more than four million people a year; lower respiratory infections (mainly pneumonia) account for over four million deaths and diarrheal diseases account for over two million deaths⁽³⁾, in spite of these obviously threatening figures, coverage of vaccine like Pneumococcus (Pneumonia) is 3% only (Table 3), which is far below desired figures. One of the factors for this is the policy of categorizing this vaccine under optional vaccines (along with the cost factor) which has a negative impact regarding mentality and attitude of general public towards this vaccination. That's why one of the

recommendations from this study is to re-name these latest (and often costly) vaccines to 'Essential vaccines' or 'New vaccines' to change the mind set towards these vaccines.

Vaccines scheduled later than Measles especially beyond the first boosters of OPV and DPT have a very poor coverage. It is also confirmed by the data collected in our study as coverage for the BCG, OPV 3 doses, DPT 3 doses, Measles is approximating 84-100% while it falls down to 78% for 1st booster doses of OPV and DPT. It is even worse for 2nd boosters of OPV and DPT at 5 years with coverage of 5%. This suggests that the awareness coverage for vaccines has to be looked in to seriously and special awareness programs and campaigns should be run to improve the awareness about vaccination beyond 2 yrs and ultimately the coverage of these vaccination.

In our study, no gender bias against females exists (at least in Schools of Indore) in Immunization coverage which was comparable to a study in Kargil in 2005 by Gaash B, BhanR⁽⁴⁾. This finding was unlike the finding of a study done by Pande RP in 2003⁽⁵⁾ and Vinit Sharma and Anuragini Sharma⁽⁶⁾ which showed selected neglect of children with certain sex and birth order combinations that operate differentially for girls and boys. Similar gender bias was observed by Dalal A and Silveria MP (2005)⁽⁷⁾ and Nirupam S, Chandra R, and Shrivastava VK in a study done in Uttar Pradesh⁽⁸⁾. in their study on immunization status of children in Goa where higher number of females were unimmunized. The reason for this unexpected and uncommon finding in our study is not known.

The findings of low immunization coverage in females as compared to male is due to the discrimination against female in a study done by Vinit Sharma and Anuragini Sharma.⁽⁵⁶⁾ They stated that the higher immunization rates in male children is because they got more importance. This is contrary to a study done in Kargil (57) where coverage rates were similar in both boys and girls comparable to our study. The coverage rates for males were higher than females children in Jamnagar⁽⁴⁸⁾ and a higher number of females were unimmunized in Goa.⁽⁵⁵⁾ Similar sex bias was seen in the study done on immunization coverage in urban area of Uttar Pradesh by Nirupam S, Chandra R, and Shrivastava VK.⁽⁵⁸⁾

Immunization coverage has not shown any improvement over last 8 years in Indore city as suggested by the data in Table 1 and non significant value for trend (0.38) in the same table suggesting that the health services still needs to improve and government should take appropriate steps to achieve this. Contrary to the popular belief there was no gender bias against the females in immunization coverage. Reason for the same is not known.

Literacy level of parents (especially mother), socioeconomic status of the parents and place of vaccination has a significant impact over the overall immunization coverage with all these 3 tables showing significant 'p' values as described below the tables reconfirming the popular belief of actual need of improving the overall literacy to have long term positive impact over the immunization coverage. This result is comparable to a study done by Pande RP Yazbeck AS in 2003⁽⁹⁾ which showed the immunization coverage varying with socioeconomic status variations (along with regional inequality).

Place of vaccination has a significant impact over the overall immunization coverage as the drop-out rates were high in the candidates vaccinated at the PHC level and overall immunization coverage in those who started their vaccination at the PHC was much lower in comparison to the candidates who started their vaccination at the Private Hospital or clinic.

Lack of awareness regarding vaccination beyond 2 yrs (especially beyond 10 yrs) and optional vaccines is an issue of concern. Government should focus on this issue and put special emphasis over publicity and advertisement of vaccination beyond 2 years to improve the awareness in society.

Lack of awareness regarding vaccination beyond 2 yrs (especially beyond 10 yrs) and optional vaccines is an issue of concern. Government should focus on this issue and put special emphasis over publicity and advertisement of vaccination beyond 2 years to improve the awareness in society.

Limitations

As the data was collected on the basis of parental recall, there may be discrepancy between the observed and the actual immunization coverage. Help of PROs was taken in filling of the questionnaire in case of illiterate parents unable to fill the questionnaire.

As the city chosen for the present study is having an urban backdrop, similar studies to be concluded on a large scale including the rural setup of Madhya Pradesh and the result thus generated will give the better picture of immunization coverage.

The type of sampling used was convenient sampling.

REFERENCES

1. Elizabeth KE, Nutrition & Child Development, 4th Edition, Paras Medical Publisher, Hyderabad, 2010, pg 485
2. Government of India. Annual report of the Ministry of Health and Family Welfare, various issues (1992-3, 1996-7, 1997-8). Available at <http://mohfw.nic.in/reports/index.htm> (Accessed on August 25, 2013)
3. World Health Organization, Regional Office for South-East Asia. The global burden of diseases:2004 update, p12.
4. Gaash B, Bhan R. Immunization Status of Infants in Kargil. Indian Pediatrics. 2005;42:841-842.
5. Pande RP. Selective gender differences in childhood nutrition and immunization in rural India: the role of siblings. Demography. 2003 Aug;40(3):395-418.
6. Sharma V, Sharma A. Is the female child being neglected? Immunization in India, 2010.
7. Dalal A, Silveria M.P. Immunization Status of Children in Goa. Indian Pediatrics. 2005;42:401-402.
8. Nirupam S, Chandra R, Srivastava VK. Sex bias in immunization coverage in an urban area of U.P. Indian Pediatr. 1990 Apr;27(4):338-41.
9. Pande RP, Yazbeck AS. What's in a country average? Wealth, gender, and regional inequalities in immunization in India. SocSci Med 2003;57:2075-88.