Research Article

Assessment of immunization status among children aged 0–5 years at Surendranagar city, Gujarat

Pawan Kumar[1], Nitesh Patel[1], Girija P Kartha[1], Pratik Jasani[1], Hiren Koshiya[2]

[1]Department of Community Medicine, C. U. Shah Medical College, Surendranagar, Gujarat, India, [2]MBBS Student, C. U. Shah Medical College, Surendranagar, Gujarat, India

Correspondence to: Nitesh Patel, E-mail: niteshmpatel90@gmail.com

Received: April 25, 2018; **Accepted:** March 12, 2019

ABSTRACT

Background: Immunization is the most valuable indicator to assess the health services and outcomes of the population. Even though much is being done about improving immunization status by governmental and nongovernmental institutes, still there are some areas left with low immunization coverage. **Objectives:** The objectives of the study were (i) to assess the immunization status under 5 years age of children and (ii) to identify the reason for partial and unimmunized status. **Material and Methods:** The present study was carried out in Surendranagar city. A coverage evaluation survey was done among children aged 0–5 years, using the WHO 30 cluster survey methodology. **Results:** In our study 64% fully immunized, 30% partially immunized, and 6% unimmunized children were found. The association between education of the mother and immunization status of children was found statistically significant. A high percent of unimmunized children (15%) was found in Muslim families compared to Hindus (4%). **Conclusion:** The study revealed that the education of mother has an important role to play in health services utilization in the families and the difference was statistically significant. Muslim children were less vaccinated than Hindu children. Education and awareness campaigns for behavioral change can improve immunization coverage.

KEY WORDS: Immunization; Cluster Survey; Children; Education

INTRODUCTION

For child survival strategy and achieving sustainable development goal of ending preventable deaths of newborn and under-five children by 2030, immunization is the most crucial component of the Government of India.[1] The success of India's program is the eradication of poliomyelitis. In 2014, India and the 10 other countries of Southeast Asia were certified polio free.[2]

In developing countries, one of the most common causes of high childhood morbidity and mortality is vaccine-preventable diseases.[3] In 0–5 year's age group, immunization is a timely step for prevention of mortality and morbidity due to communicable diseases.[4]

To achieve the Millennium Development Goals on reducing child mortality, improving maternal health and fighting diseases immunization will play a significant role[5] and it is not only restricted to improvements in health and life expectancy but also play a role at community and national levels in social and economic matters.

Even though its a tremendous past success and promising future, immunization still remains an unfinished agenda.

India is the second most populous country in the world with the largest number of births – >26 million a year – and also contributes for >20% of child mortality worldwide. Around 9 million immunization sessions are organized each year to address these children. Although some improvement has

Access this article online	
Website: http://www.ijmsph.com	Quick Response code
DOI: 10.5455/ijmsph.2019.04130201812032019	

International Journal of Medical Science and Public Health Online 2019. © 2019 Nitesh Patel, *et al.* This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), allowing third parties to copy and redistribute the material in any medium or format and to remix, transform, and build upon the material for any purpose, even commercially, provided the original work is properly cited and states its license.

seen in the past few years, the country still holds the largest number of unimmunized children: 7.4 million.

There is still a lack of system to observe vaccine-preventable diseases in India. The coverage of vaccination varies significantly from state to state. Differences which are responsible for these variations are geographical, regional, rural-urban, poor-rich, and gender-related. Due to gender inequality and gender discrimination, girls receive fewer immunizations than boys and lower vaccination coverage was also seen among higher birth order infants.[6]

In spite of 20 years of efforts and millions of dollars poured into Universal Immunization Programme, only 63.9% of the infants in India are fully immunized (National Family Health Survey-IV) which is way far less than the desired goal of achieving 85% coverage. In Gujarat, half (50.4%) of children aged 12–23 months are fully vaccinated against the six major childhood illnesses: Polio, tetanus, tuberculosis, pertussis, and measles diphtheria.[7]

Slums are high-risk areas vulnerable for communicable disease transmission and India constitute about 25% of urban poor living in the slum areas. Slum areas are often the worst indicator of poor maternal and child health indicators than those of people living in other urban areas.[8]

Urban areas are growing rapidly which leads to the development of a wide range of slums, which are associated with problems such as overcrowding, poor sanitary conditions, and increasing infectious diseases. Immunization is the key weapon in preventing the vaccine-preventable disease in these slum areas which is constantly found low due to lack of awareness, illiteracy, ignorance, myths, and false beliefs.[9]

This study was carried out against this past experience with the aim of assessing the immunization status of under 5 years of the age group in Surendranagar city.

MATERIAL AND METHODS

A community-based cross-sectional study was carried out in 337 blocks of Surendranagar city, Gujarat, during the period of July–August 2016. The present study included a total 210 children (7 children from each cluster) under the age of 5 years using the WHO 30 cluster survey method. Information regarding immunization coverage was collected using a structured questionnaire. Data were entered into SPSS. To assess the immunization status, immunization card/ Mamta Card was checked for the details of unimmunized and Vitamin A. For Bacillus Calmette-Guérin (BCG), children between 12 and 24 months were examined for BCG scar. In case the missing immunization card, mothers of those children were interviewed. In the scenario of unreliable answers and failed to recall, the children were taken as "not immunized."

RESULTS

Information regarding immunization was collected from 210 children aged 0 to 5 years, among which 107 were male and 103 were female. The details are shown below.

Table 1 shows that around 67% of male children were completely immunized whereas around 61% of female children were completely immunized. The percentage of unimmunized children was higher among female children (8%) in comparison to male children (4%).

Figure 1 shows that Mamta Card or immunization record was available with 139 (66%) caregivers/mothers whereas it was not available in 71 (33.80%).

Figure 2 indicated that maximum individual vaccine coverage was seen highest for BCG (93%), followed by Pentavalent first dose (90%) and oral polio vaccine (OPV) first dose (89.05%) and lowest for Measles second dose (49.05%).

To improve the immunization coverage, Government of India has also launched Mission Indradhanush (MI) closely monitored by the Prime Minister Office. E-Mamta based tracking of children by Government of Gujarat along with revision of Routine Immunization (RI) Micro plans to cover 100% areas, Expansion of cold chain points, survey by family health welfare, concurrent monitoring of RI, MI to achieve maximum coverage. Still, only 135 (64.29%) children had been completely immunized, 63 (30%) children were partially immunized, and around 12 (6%) children were unimmunized [Table 2].

From Figure 3 noted that the main reason for partially/ non-immunization was due to fear of post-vaccination side effects (33.33%) followed by child sickness (30.60%). Other reasons were found that 12% of mothers not being contacted for vaccination, 9.30% of children were traveling away from

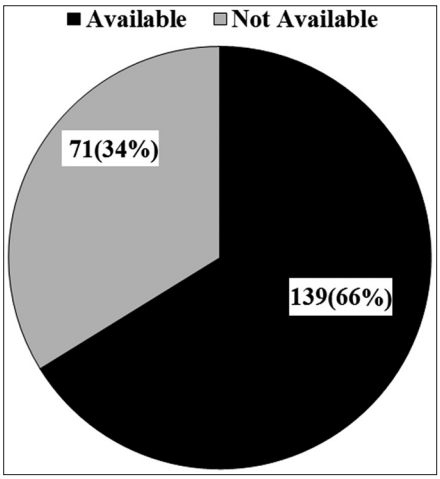

Figure 1: Distribution of children with availability of immunization card (n = 210)

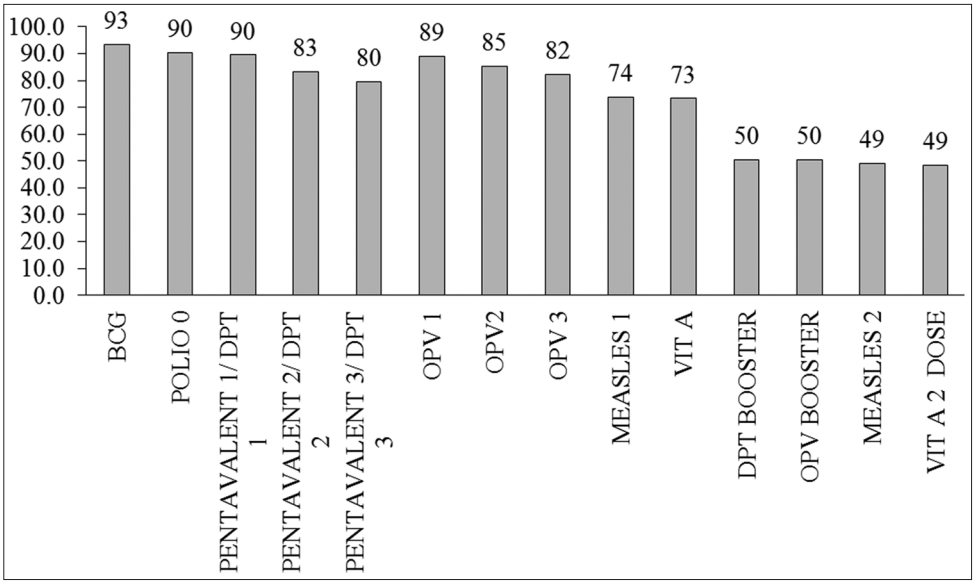

Figure 2: Distribution of children according to individual vaccine coverage (*n* = 210)

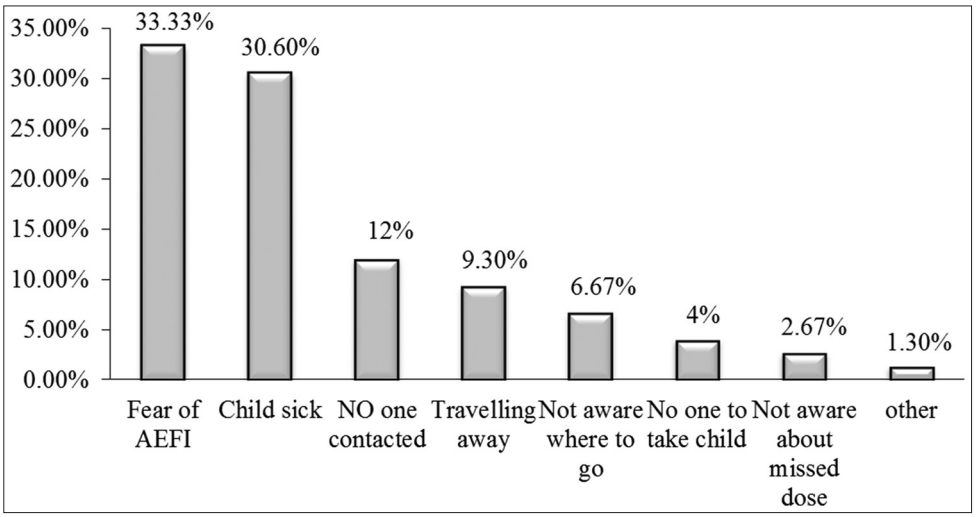

Figure 3: Various reasons for partial immunized/unimmunized status (*n* = 210)

Table 1: Association between gender and immunization status

Gender	Complete immunization	Partial immunization	Unimmunized	Total
Male	72 (67.2%)	31 (28.9%)	4 (3.7%)	107
Female	63 (61.1%)	32 (31%)	8 (7.7%)	103
Total	135	63	12	210

χ^2=1.874, *P*=0.391, df=2

Table 2: Children distribution according to the immunization status (*n*=210)

Immunization status	*n*	Percent
Complete	135	64.29
Partial	63	30.00
Unimmunized	12	5.71

home, and 6.67% of mothers were not aware of where to go for vaccination.

Table 3 shows that 67% and 63% of children belonging to the upper class and lower class were fully immunized, respectively. Partially immunized children were higher in the lower class (32%) as compared to the upper class (25%).

Among total complete immunized children, 112 (83%) children whose mothers were literate were fully immunized whereas only 23 (17%) children belonging to the illiterate mothers were fully immunized. Out of the 12 total unimmunized children, nearly 66.7% of children had mothers

Table 3: Association between socioeconomic status and immunization status

Socioeconomic status	Complete immunization	Partial immunization	Unimmunized	Total
Upper class	40 (66.6%)	15 (25%)	5 (8.3%)	60 (100%)
Lower class	95 (63.3%)	48 (32%)	7 (4.6%)	150 (100%)
Total	135	63	12	210

χ^2=1.782, *P*=0.410, df=2

Table 4: Association between education of mother and immunization status

Education of mother	Complete immunization	Partial immunization	Unimmunized	Total
Literate	112 (82.96%)	46 (73.01%)	4 (33.3%)	162
Illiterate	23 (17.03%)	17 (26.98%)	8 (66.6%)	48
Total	135 (100%)	63 (100%)	12 (100%)	210

χ^2=16.264, *P*=0.0002, df=2

Table 5: Association between religion and immunization status

Religion	Complete immunization	Partial immunization	Unimmunized	Total
Hindu	119 (65%)	56 (30.6%)	8 (4.3%)	183 (100%)
Muslim	16 (59.2%)	7 (25.9%)	4 (14.8%)	27 (100%)
Total	135	63	12	210

χ^2=4.784, *P*=0.091, df=2

Table 6: Dropout rates for different vaccines

Vaccines	Doses	Dropout rate (%)
BCG – Measles		20.91
Pentavalent/DPT	I–III	11.17
OPV	I–III	7.48

BCG: Bacillus Calmette-Guérin, OPV: *Oral polio vaccine,* DPT: D*iphtheria, pertussis, tetanus*

who were illiterate as compared to 33.3% of children whose mothers were literate. Mother's education plays a significant role in the immunization status of their children.

Tables 4 and 5 show that the percentage of full immunization in Hindu and Muslim children was 65% and 59%, respectively. A high percent of unimmunized children (14.8%) was found in Muslim families compared to Hindus (4.3%).

Table 6 indicates that the dropout rate for Measles compared to BCG was 21%. The dropout rate for Pentavalent I/ diphtheria, pertussis, tetanus (DPT) I – Pentavalent III/DPT III and OPV I – OPV III was observed to be 11% and 7%, respectively.

DISCUSSION

In this study, there were 64% of children who were completely immunized. Similar results were shown by Wadgave *et al.*[10] (64.28%), Kar *et al.*[11] (69.3%), and Yadav *et al.*[12] (60.8%). Partially immunized children in our study were 30%. Similar result was also obtained by Wadgave *et al.*[10] (25.95%), Manjunath *et al.*[13] (31.3%), Kadarkar *et al.*[14] (22.3%), and Nirupam *et al.*[15] (32.6%). There were 6% of children who were unimmunized. Similar findings were found by Wadgave *et al.*[10] (9.76%), Nair *et al.*[16] (4.2%), and Verma *et al.*[17] (13.4%).

In our study around 67.2%, male children were fully immunized in comparison to female children, i.e., 61.1%. Similar findings were also noted by Wadgave *et al.*,[10] Kumar *et al.*,[18] Tiwari *et al.*,[19] Kar *et al.*,[11] Yadhav *et al.*,[12] Bhandari *et al.*,[20] and Nirupam *et al.*[15]

The availability of immunization card in our study was 66%, similar findings were noted by Chaudhari *et al.*[21] (73.6%), while the availability of card was seen more in NFHS 4 Gujarat[7] and DLHS 4 Gujarat[22] which was 84.7% and 85.9%, respectively, and Tapare *et al.*[23] (81.25%) and Kadri *et al.*[24] (88.4%).

Maximum individual vaccine coverage was seen highest for BCG (93.33%); similar findings were noted by Kadarkar *et al.*[14] (96.10%), Koppad *et al.*[25] (100%), and NFHS 4 Gujarat[7] (90.6%).

The literacy level of the mother and better immunization status of the children was found to be associated. In the present study, 69% of children whose mothers literate were fully immunized as compared to 48% of children whose mothers were illiterate. Meenakshi *et al.*[26] in their study they reported that with increasing the literacy level of mothers, percentage for immunized infants appropriate for that age was also increased. Dahire *et al.*[27] also reported a relationship between education status of mothers to the level of immunization of the subject. In the present study, 48% of children of the illiterate mothers were fully immunized,

similar findings were observed by Wadgave *et al.*,[10] Kumar *et al.*,[18] Tiwari *et al.*,[19] and Yadhav *et al.*[12]

The most common reason in our study for partially and the unimmunized child was found fear of adverse event following immunization (AEFI) (33.33%); similar findings were noted by Kumar *et al.*[18] (28.8%) and Khargekar *et al.*[28] (40%), the finding was less in comparison with Punit *et al.*[29] (11.42%), Angadi[30] (12.87%), and Bhatt *et al.*[31] (10.1%) and the second most common reason was a child being ill mothers did not go for vaccination (30.60%); similar findings were noted by Kar *et al.*[11] (30.8%), and were less in comparison with Vohra *et al.*[32] (13.68%) and Angadi *et al.*[30] (11.88%), and were more in comparison with Bhatt *et al.*[31] (68.1%).

The present study shows that 66.6% children belonging to the higher socioeconomic group were fully immunized while the percentage in lower socioeconomic group was 63.3%, related findings were noted by Wadgave *et al.*[10] and Kar *et al.*[11]

There was not any significant association seen between religion and the immunization status of children in our study.

In the present study, dropout rate percentage for Measles compared to BCG was 21%, related findings observed by Jain *et al.*[33] (32.7%), DLHS 4 Surendranagar Gujarat[22] (27.8%), and Chaudhari *et al.*[21] (14.1%) while for Penta I/DPT I to Penta III/DPT III and OPV I to OPV III was observed 11% and 7%, respectively, similar findings noted by Garg *et al.*[34] (6.1%) but it was less in comparison with Jain *et al.*[33] (24.8%). For measuring the program continuity, dropout rates are calculated. For program continuity and follow-up of children in EPI, dropout rates between the first and third doses of DPT are the best program indicator. If the dropout rate found >10% in routine EPI programs that indicate a serious quality problem with the program and that need to be addressed.

CONCLUSION

Overall immunization coverage in the study was above the state average (NFHS-2015–2016). Availability of Mamta Card was around 66%. Coverage was highest for BCG followed by Penta/OPV and lowest for Measles second dose. A major reason for partially/non-immunization was fear of AEFI followed by child sickness. Although immunization has been the core component of children's health, still present study observed many children who are deprived of it. We identified a substantial dropout rate which shows the need for effective surveillance and tracking system. Education and awareness campaigns for behavioral change can improve immunization coverage. Education of mother has an important role to play in health services utilization in the families. Regular health education sessions and motivation through an encouraging and persuasive interpersonal approach, regular reminders, and removal of misconceptions prevailing among people and improving the quality of the services at the health facility will go a long way in improving the immunization coverage.

REFERENCES

1. Gavi and the Post Development Agenda; 2015. Available from: http://www.gavi.org/about/ghd/post2015. [Last accessed on 2016 Apr 24].
2. John TJ, Vashishtha VM. Eradicating poliomyelitis: India's journey from hyperendemic to polio-free status. Indian J Med Res 2014;137:881-94.
3. Encylopedia of the Nations. Asia and Oceania. Pakistan. Pakistan Health; 2007. Available from: http://www.nationsencyclopedia.com/Asia-and-Oceanea/Pakistan—Hlth.html. [Last cited on 2007 Dec 24].
4. Singh KK, Mathew MM, Bhalerao VR. Impact of community based immunization services. J Postgrad Med 1986;32:131-3.
5. Available from: http://www.unicef.in/Whatwedo/3/Immunization. [Last accessed on 2018 Mar 23].
6. WHO. Global Immunization Vision and Strategy 2006-2015. Geneva: WHO; 2005.
7. International Institute for Population Sciences. National Family Health Survey (NFHS-4), 2015-16. India, Gujarat: International Institute for Population Sciences; 2017.
8. Rao BT, Thakur JS. Vulnerability assessment in slums of union territory, Chandigarh. Indian J Community Med 2007;32:189-91.
9. Bhatt M. Assessment of immunization coverage. In: An Urban Slum Area of Davangere. Karnataka: Paper Presented in 32nd Annual National Conference of IAPSM; 2004. p. 106.
10. Wadgave HV, Pore PD. Missed opportunities of immunization in under-fives in adopted area of urban health centre. Ann Trop Med Public Health 2012;5:436-40.
11. Kar M, Reddaiah VP, Kant S. Primary immunization status of children in slum area of South Delhi-challenge reaching to urban poor. Indian J Community Med 2001;26:151-4.
12. Yadhav RJ, Singh P. Immunization status of children and mothers in the state of Madhya Pradesh. Indian J Community Med 2004;29:147-8.
13. Manjunath U, Pareek RP. Maternal knowledge and perceptions about the routine immunization programme-a study in a semiurban area in Rajasthan. Indian J Med Sci 2003;57:158-63.
14. Kadarkar KS, Tiwari SR, Velhal GD. Lots quality coverage survey technique for assessment of immunization performance and quality in an urban slum of Mumbai. Int J Community Med Public Health 2016;3:174-9.
15. Nirupam S, Chandra R, Srivastava VK. Sex bias in immunization coverage in the urban area of U.P. Indian Pediatr 1990;27:338-41.
16. Nair TN, Varughese E. Immunization coverage of infants-rural-urban difference in Kerala. Indian Pediatr 1994;31:139-43.
17. Verma J, Sachar RK, Prakash V, Jain GD, Sehgal R. Missed opportunities for immunization. Indian J Matern Child Health 1990;1:27-8.
18. 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. J Health Popul Nutr 2010;28:300-4.
19. Tiwari RR, Kulkarni PN. Delayed immunisation against vaccine preventable diseases-factors responsible among

children under 5 years of age. Indian J Med Sci 1999;53:212-5.
20. Bhandari B, Mandowasa SL, Gupta GK. Evaluation of vaccination coverage. Indian J Pediatr 1990;57:197-201.
21. Chaudhari CC, Gunjana G, Kelkar VS, Patel DA, Saiyed SM, Thakor N. Immunization status of 12-23 months children in urban slums of Ahmedabad city, Gujarat, India: A cross sectional study. Int J Adv Med 2016;3:816-9.
22. International Institute for Population Sciences. District level Health Survey (DLHS-4), 2015-16. Gujarat: International Institute for Population Sciences; 2017.
23. Tapare VS, Borle PS. Assessment of vaccination performance by lot quality technique in an urban community of Miraj. Indian J Community Med 2006;31:182-5.
24. Kadri AM, Singh A, Jain S, Mahajan RG, Trivedi A. Study on immunization coverage in urban slums of Ahmadabad city. Health Popul Perspect Issues 2010;33:50-4.
25. Koppad R, Kumar AS, Chandrashekar SV, Dhananjay KS. A cross sectional study on primary immunization coverage of children between the age group of 12-36 months under the national immunization programme in rural field practice area of Shimoga institute of medical sciences, Shimoga, Karnataka, India. Int J Community Med Public Health 2016;3:1310-4.
26. Meenakshi. Study of Socio Demographic Determinants Influencing Immunization Status of Infants in an Urban Slum of Delhi. Paper Presented in 32nd Annual National Conference of IAPSM; 2004. p. 78.
27. Dahire PL. Study of Some Socio Demographic Factors Related with Immunization Status of the Chidren in Jawalgaon Village. Paper Presented in 32nd Annual National Conference of IAPSM; 2004.
28. Khargekar NC, Khargekar VC, Shingade PP. Immunization status of children under 5 years in a tribal area, parol, Thane district. Natl J Community Med 2015;6:522-7.
29. Punith K, Lalitha K, Suman G, Pradeep BS, Kumar KJ. Evaluation of primary immunization coverage of infants under universal immunization programme in an urban area of Bangalore city using cluster sampling and lot quality assurance sampling techniques. Indian J Community Med 2008;33:151-5.
30. Angadi MM, Jose AP, Udgiri R, Masali KA, Sorganvi V. A study of knowledge, attitude and practices on immunization of children in urban slums of Bijapur city, Karnataka, India. J Clin Diagn Res 2013;7:2803-6.
31. Bhatt GS, Mehariya VM, Dave RK, Mahavadiya M, Rana M, Sharma R, *et al.* Immunization coverage in rural and urban field practice areas of a medical college of Gujarat. Natl J Community Med 2015;6:398-404.
32. Vohra R, Vohra A, Bhardwaj P, Srivastava JP, Gupta P. Reasons for failure of immunization: A cross-sectional study among 12-23-month-old children of Lucknow, India. Adv Biomed Res 2013;2:71.
33. Jain T, Veer J, Manjul B, Kumar G, Harivansh C, Kumar B, *et al.* A cross sectional study on the coverage of immunization in the slums of Western Uttar Pradesh, India. J Clin Diagn Res 2010;4:3480-3.
34. Garg SK, Singh JV, Bhatnagar M, Chopra H. Health appraisal of 1-6 years children in slum population of Ghaziabad city. Indian J Public Health 2000;44:35-6.

How to cite this article: Kumar P, Patel N, Kartha GP, Jasani P, Koshiya H. Assessment of immunization status among children aged 0–5 years at Surendranagar city, Gujarat. Int J Med Sci Public Health 2019;8(4):330-335.

Source of Support: Nil, **Conflict of Interest:** None declared.