An Evaluation of the Measles Rubella Mass Vaccination Program in Schools of Meerut Cantonment 2018 and Assessment of Parents KAP towards Program

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Abstract

Background: Measles Rubella campaign is global effort to eliminate measles and control of rubella by vaccinating to children of 9 months to below 15 years of age group. The purpose of this study is to estimate the post campaign level of MR vaccination coverage carried out in Meerut cantonment (2018-19) and to study how the patterns of personal attitudes of mothers are linked to the decision making process for MR vaccination.

Methodology: Cross sectional study carried out in 27 schools with target population of 30950, initially consent for vaccination with few demographic details has been distributed to parents through school administration, based on responses classified three groups, group 1 positive attitude, group 2 fearful attitude and group 3 critical attitude further we used Latent class analysis and for the subgroups 5% of group 2 and group 3 participant groups multinomial logistic regression analysis used for finding the strength of association and descriptive statistics, mean, median and percentages are applied in the analysis.

Results: Target reached 89.9% and missed opportunity 10.10%, LCA Biggest group are with fearful attitude followed with positive and critical. Odds ratio of all variables calculated.

Conclusion: Media communication has to reach in population to all religion groups of people explaining to social media rumors and monitoring by doctors directly increase the acceptance and vaccination rates.

Keywords: *MR- Measles Rubella, LCA-Latent Class Analysis, MDG 4-Millennium Development Goal, CRS-Congenital Rubella syndrome, MRV-Measles Rubella Vaccine.*

Introduction

Measles is a highly contagious viral disease. It remains an important cause of death among young children globally and congenital rubella syndrome (CRS) responsible for irreversible birth defects. After the success of making South East Asian Region (SEAR) polio-free, the World Health Organization (WHO) has geared up its focus toward elimination of other vaccine-preventable diseases like Measles and Rubella. Some of the important changes are replacing the two doses of measles vaccination with measles-rubella (MR) vaccination and mass immunization of children with the age group of 9 months to 15 years with MR vaccine.

Measles remains a significant cause of morbidity and mortality worldwide. Of the estimated 1,22,000 global measles deaths in 2012, 43% occurred in the South-East Asia Region and India alone accounted for 14%.. The importance of measles prevention and control to the achievement of MDG 4 (Millennium Development Goal) is reflected in the key indicator of measles immunization coverage as a measure of progress towards this MDG[(1)].

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Current and recently circulating measles genotypes appear to be primarily D5 in Myanmar and Thailand, D8 in Bangladesh, India and Nepal and D9 in Indonesia and Myanmar. In addition, D4 (commonly associated with Europe) has been identified in India and Nepal, D7 in India. G2 in Indonesia and Thailand and G3 in Indonesia. It is important to note that specimens for virus detection are collected rarely during measles and rubella outbreaks and the actual genotype distribution is therefore unknown. Although rubella is a mild disease, rubella infection during early pregnancy can severely affect the fetus, resulting in spontaneous abortion, stillbirth or an infant born with a combination of birth defects known as CRS (Congenital Rubella Syndrome). In 2010, an estimated number of 103 000 infants with CRS were born globally, of which 46% were in the South-East Asia Region. As for rubella, the number of reported rubella cases was 6670 in 2012 and 9405 in 2013. Most cases were reported from Bangladesh (3034), India (2568), Indonesia (2456), Nepal (755) and Thailand (539) in 2013. Rubella genotypes include 2B in Bangladesh, India, Nepal and Sri Lanka and 1E in Sri Lanka. Elimination of measles will contribute to achieving Sustainable Development Goal's target 3.2 which, among others, aims to end preventable deaths of newborns and children under five years of age by 2030[(2)].

The first phase of measles-rubella vaccination campaign has been successfully completed during February 2017 in five states, namely, Tamil Nadu, Karnataka, Goa, Lakshadweep and Puducherry. More than 3.3 crore children were vaccinated, reaching out to 97% of the intended age group. The campaign was carried out in schools, community centres and health facilities. The next round was taken up in 8 states/UTs (Andhra Pradesh, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Himachal Pradesh, Kerala, Telangana and Uttarakhand) during August 2017, aiming to cover 3.4 crore children. Since the launch in 2017, the MRV campaign has covered nearly 20 crore children in 30 states and Union Territories [(3)].

The Measles-Rubella campaign is a part of global efforts to reduce illness and deaths due to measles and rubella/CRS (congenital rubella syndrome) in the country. Measles immunization directly contributes to the reduction of under-five child mortality and in combination with rubella vaccine. It will control rubella and prevent CRS. A MR campaign refers to a mass vaccination campaign organized to introduce a MR vaccine. MR vaccination campaign targets a wide age group of children (9 months to <15 years). The target age group depends on the susceptibility profile of the population. During the introduction campaign, all children in the target age group receive an additional dose of the vaccine, regardless of previous vaccination status or history of illness[(4)].

There is no structured communications strategy at regional and country levels and vaccine hesitancy observed recently in India and Indonesia during wide-age MR campaigns posed unique challenges. Appropriate advocacy and program communication strategies and tools are critical to furthering MR efforts and prevent vaccine resistance and vaccine hesitancy issues[(5)]. In view of elimination of Measles and Rubella our study focused on hesitancy issues, which helps in future for mass campaigns supplementary immunization activities especially in schools.

Methodology

It is a population based cross sectional study conducted in Meerut cantonment. With total 27 schools with target population of 30950 school children from class nursery to 10th standard. Consent form has been distributed to mothers 20 days prior to the vaccination programme through schools. Consent form consists of demographic variables as mentioned in Table-1

Based on responses classified three groups, group 1 positive attitude (Parents submitted consent form in < 4 days), group 2 fearful attitude (Parents submitted consent form in 5 to 7 days) and group 3 critical attitude (Parents submitted consent form > 7 days) further we used Latent class analysis for the subgroups 5% of group 2 and group 3 participants. After 10 days, questionnaires have been distributed proportionately to 5% of group 2 (Fearful attitude) and group 3 (Critical attitude) groups to assess the knowledge on vaccination programme after consent for participation. Questionnaire consists of 6 set of questions asked on 5 point Likert scale. Group 1 positive attitude excluded to avoid bias. Microsoft Excel utilised for evaluation of vaccination programme and Statistical software SPSS 21.0 used for analysis the data. Multinomial Logistic Regression Analysis (MRA) and descriptive statistics applied to generalise logistic to multiclass variables. The outcome of analysis measure the participant's attitude with demographic variables. Participant groups coded as 1, 2 and 3 and critical attitude group i.e Code 3 took as reference category in multinomial logistic regression analysis to compare

with positive and fearful attitude. Odds ratios and 95% confidence interval (CI) are presented for all variables. To assess the Knowledge of respondents regarding to 5 Point Likert scale, Mean and Median calculated.

Results

Total target population in the cantonment 32054 (School children: 30950, Outreach areas: 795, Construction sites: 309), total children vaccinated 28904 (93.38%). Particularly numbers of school children alone immunized successfully with MR vaccine are 27824 out of 30950 (89.89%). The LCA presented three class of parents, the groups labelled as per there time based response. The highest group are those having fearful attitudes n= 12071 (39%), followed with positive attitude n=9904 (32%) and critical attitude n=8975 (29%).Fig 1

Analysis performed on 7 variables includes parental attitudes comparing each variable with all subgroups and there odds ratio. The knowledge pattern measured among 5% sample of Fearful and critical attitude group.

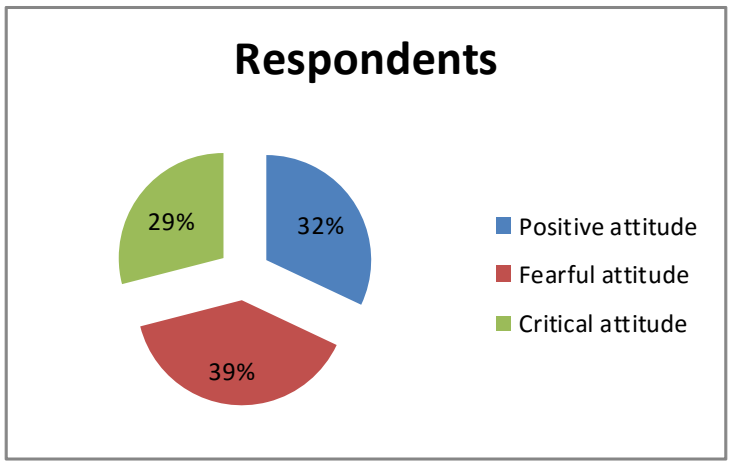

Fig 1. Participants Attitude towards Vaccination

Age Variable (Table - 1 and 2): Most of the age interval group to be 31-35 (46%),Fig 2 the age interval analysed and compared group wise taking critical group as reference and there Odds ratio also measured**.**

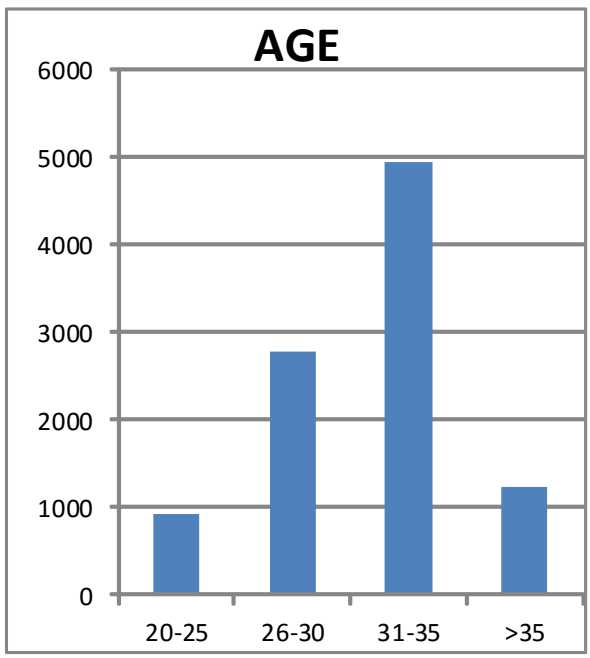

Fig 2. Age Distribution of the participants

Positive attitude group: P value is not significant and Odds ratio <1 which suggests as the age interval increases chances to be more in critical attitude group. **Fearful attitude group:** P value is not significant and Odds ratio>1 suggests as the age increases less like to be under Critical attitude group.

Religion variable (Table - 1 and 2): Most respondents belonging to Hindu (76.05%) followed with Muslim and Christian religion.

Positive attitude group: P value is not significant and Hindu religion less likely to be under critical attitude group. **Fearful attitude group:** P value is not significant and Hindu and Christian religion less likely fall under Critical attitude group.

No of Children in Family (Table - 1 and 2): The majority of the respondent families has single child in there family and odds ratio assessed with positive and fearful attitude. In both attitude groups P value not significant but Odds ratio suggests as no of children increases less likely to fall under critical attitude group.

Education (Table - 1 and 2): Majority of the education level of our respondents belongs to the below matriculation level. P Value is significant in both groups (Positive and Fearful) and Odds ratio suggests as low education level participants likely to fall under critical group.

Employment (Table - 1 and 2): 99.95% of respondents are belonging home maker compared with employed group. P value is significant but odds ratio suggests homemakers likely to fall under critical attitude.

Vaccination card status (Table - 1 and 2): 51.81% of the respondents doesn't have vaccination cards of the children's. P Value is not significant in both groups but Odds ratio suggests availability (maintenance) of vaccination card with parents less likely to fall under category of Critical attitude.

Source of information about immunization programme in the school (Table - 1 and 2): Majority of the source about immunization programme is received after consent form followed with other sources like media, family, friends, hospitals etc.,. P Value is not significant for both sources of information among fearful group but odds ratio of source of media shows very high number which suggests more the media awareness less likely to be critical attitude. P value of fearful group is significant for source of information through consent form and odds ratio for all source of information is <1 likely to be fall under critical attitude.

An assessment of Knowledge: (Table 3 and 4)

Fearful attitude: The mean values range from 2.15-4.77 and the median score ranged from 2-5

Critical attitude: The mean values range from 2.28-4.99 and the median score ranged from **2-5**

Respondents justified the delay due to fear of vaccine harm and non-availability of parents during injectable vaccination in schools. Whereas positive signs towards the Doctor monitoring for campaign having child best interest may have been increased acceptance rate and encouragement to government programmes for future generation.

Table 1: Attitudes towards vaccination

Characteristics of Respondents		Attitude				Odds ratio for Positive attitude and Critical attitude as reference			
		Group 1 Positive	Group 2 Fearful	Group 3 Critical	Total	β	P value	OR	95% CI
Age	20-25	928	1238	1548	3714	-1.204	0.288	0.3	0.33-2.763
	26-30	2785	4024	3714	10523	-.894	.360	.409	0.060-2.764
	31-35	4952	5881	3404	14237	-.223	.815	.800	0.123-5.202
	>35	1238	929	309	2476	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Religion	Hindu	8022	9053	6462	23537	.223	.831	1.250	0.162 - 9.674
	Muslim	1188	2293	1974	5455	-.405	.733	.667	0.065 - 6.871
	Christian	693	724	539	1956	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-

Characteristics of Respondents		Attitude				Odds ratio for Positive attitude and Critical attitude as reference			
		Group 1 Positive	Group 2 Fearful	Group 3 Critical	Total	β	P value	OR	95% CI
No Of Children	1	7329	8208	5959	21496	.875	.488	2.400	0.202- 28.451
	2	2179	3259	2369	7807	.693	.604	2.000	0.146- 27.447
	> or = 3	1.28%-396	603	646	1645	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Education	Below the Matriculation	3863	7484	7001	18348	17.875	.000	0.001	0.001 - 0.001
	Matriculation	5546	4346	1930	11822	-16.13	.000	0.001	0.00 - 0.001
	Degree and Above	495	241	45	781	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Employment	Home Maker	9834	12024	8965	30823	-15.21	.991	0.0001	0.000-0.0001
	Employed	70	47	10	127	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Vaccination Card Status	Available	6339	5794	2782	14915	1.445	.008	4.242	1.451- 12.40
	Not Available	3565	6277	6193	16.35	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Source of Information about Immunization Program in School	Through this Consent Form	9607	11467	8706	29780	-.032	1.000	.969	0.001 - 0.002
	Media	198	483	178	859	16.292	.998	11897297	-
	Others (Friends, Neighbours, Hospitals)	99	121	90	310	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-

Table 2: Attitudes towards vaccination

Characteristics of Respondents		Attitude				Odds ratio for Fearful attitude and Critical attitude as reference			
		Group 1 Positive	Group 2 Fearful	Group 3 Critical	Total	β	P value	OR	95% CI
Age	20-25	928	1238	1548	3714	-.629	.58	.530	0.057- 4.91
	26-30	2785	4024	3714	10523	-.238	.812	.788	0.111-5.600
	31-35	4952	5881	3404	14237	.288	.772	1.333	0.191- 9.311
	>35	1238	929	309	2476	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Religion	Hindu	8022	9053	6462	23537	.438	.674	1.550	0.202-11.91
	Muslim	1188	2293	1974	5455	.288	.800	1.333	0.144-12.36
	Christian	693	724	539	1956	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
No Of Children	1	7329	8208	5959	21496	.262	.801	1.300	0.168-10.05
	2	2179	3259	2369	7807	.452	.684	1.571	0.178-13.86
	> or = 3	1.28% - 396	603	646	1645	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-

Characteristics of Respondents		Attitude				Odds ratio for Fearful attitude and Critical attitude as reference			
		Group 1 Positive	Group 2 Fearful	Group 3 Critical	Total	β	P value	OR	95% CI
Education	Below The Matriculation	3863	7484	7001	18348	-16.488	.000	0.0006	0.001-0.001
	Matriculation	5546	4346	1930	11822	-15.684	.000	0.001	0.001-0.001
	Degree And Above	495	241	45	781	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Employment	Home Maker	9834	12024	8965	30823	.000	.000	1	1.00- 1.00
	Employed	70	47	10	127	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Vaccination Card Status	Available	6339	5794	2782	14915	.747	.146	2.111	0.772- 5.77
	Not Available	3565	6277	6193	16.35	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-
Source of Information about Immunization Program in School	Through This Consent Form	9607	11467	8706	29780	-17.763	0	0.0001	0.001- .002
	Media	198	483	178	859	-.924	1.000	.397	0.001- .002
	Others (Friends, Neighbours, Hospitals)	99	121	90	310	-	-	1	-
	Total	9904	12071	8975	30950	-	-	-	-

Table 3: 5% in Group 2 Fearful Attitude Participants Responses in Likert Point Scale

Items	Frequency (n=603)					F4+F5	Mean	Median
	1	2	3	4	5			
1. Does Measles and Rubella diseases lead to death	30(5%)	54(9%)	97(16%)	151(25%)	271(45%)	422(70%)	3.96	4
2. Does this vaccine gives protection against these diseases	30(5%)	48(8%)	121(20%)	205(34%)	199(33%)	404(67%)	3.82	4
3. Vaccine will not harm at any cost	175(29%)	253(42%)	109(18%)	42(7%)	24(4%)	66(11%)	2.15	2
4. Do you think parents not required beside children for vaccination programme in schools	181(30%)	271(45%)	24(4%)	91(15%)	36(6%)	127(21%)	2.22	2
5. Do you think SIA (School immunization activities) will encourage and support govt. to initiate many health related programmes for future generations	13(2%)	6(1%)	36(6%)	96(16%)	452(75%)	548(91%)	4.61	5
6. Do you think Doctors in charge of vaccinations have Childs best interest at heart	6(1%)	7(1%)	12(2%)	72(12%)	506(84%)	578(96%)	4.77	5

*f4+5: frequency (f4+5) of participants who selected agree or strongly agree regarding the 6 characteristics in Likert point scale. *5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree and 1=Strongly Disagree. *n=Number of participants.

Table 4: 5% in Group 3 Critical Attitude Participants Responses in Likert Point Scale

Items	Frequency (n=450)					F4+F5	Mean	Median
	1	2	3	4	5			
1. Does Measles and Rubella diseases lead to death	36(8%)	22(5%)	135(30%)	95(21%)	162(36%)	257(57%)	3.72	4
2. Does this vaccine gives protection against these diseases	18(4%)	86(19%)	121(27%)	126(28%)	99(22%)	225(50%)	3.45	4

Items	Frequency (n=450)					F4+F5	Mean	Median
	1	2	3	4	5			
3. Vaccine will not harm at any cost	148(33%)	131(29%)	99(22%)	41(9%)	31(7%)	72(16%)	2.28	2
4. Do you think parents not required beside children for vaccination programme in schools	144(32%)	135(30%)	99(22%)	41(9%)	31(7%)	72(16%)	2.29	2
5. Do you think SIA (School immunization activities) will encourage and support govt. to initiate many health related programmes for future generations.	22(5%)	18(4%)	36(8%)	68(15%)	306(68%)	374(83%)	4.37	4
6. Do you think Doctors in charge of vaccinations have Childs best interest at heart	0	45(1%)	13(3%)	45(10%)	387(86%)	432(96%)	4.99	5

*f4+5: frequency (f4+5) of participants who selected agree or strongly agree regarding the 6 characteristics in Likert point scale. *5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree and 1=Strongly Disagree. *n=Number of participants.

Discussion

Joint effort of District immunization officer of Meerut, Station health organization of Meerut cantonment and Principals of all schools a realistic achievement has been accomplished in organising mass Measles Rubella immunization programme. The key success of campaign is appropriate micro and macro planning. Various painting, poem competitions in schools before and after vaccinations has become interesting ingredient for success along with additional surveillance, IEC activities etc.

Comparison with similar campaigns conducted nationally and internationally: Demographic variables like literacy and religion associated with non-immunization in study carry out Canton of Aargau, Switzerland[6], similarly MMR immunization carried out in Bhutan[7]. Parents hesitance to immunization is due to overlook of vaccination card and not aware of proper vaccination schedule[8]. Higher proportion of employed mothers able to show fully immunization to their children due to better understanding of importance of elimination of diseases[9].Another review of study carried out Pune suggests mass media campaign and continuous IEC strategies increases the knowledge quotient among women and school children which will contribute in long term foe better healthy society[10].

Conclusion

The perception of the mother is clearly emblematic and accepted the supervision of doctor for mass injectable immunization campaign in schools, conjointly further shown response to bring many such campaigns in future for upcoming generations. These campaigns not only prevent the killer diseases also easy to achieve the elimination which is evident after success of making country polio free and also reducing the disease burden against diphtheria, pneumonia, diarrhoea and many other vaccine preventable diseases.

Ethical Committee Clearance: Institutional Ethical Committee Clearence Taken.

Source of Fundind: Self.

Conflict of Intrest: Nil

References

1. Strategic plan for measles elimination and rubella and congenital rubella syndrome control in the South-East Asia Region, 2014-2020 [Internet]. World Health Organization. World Health Organization; 2015 [cited 2018Feb12]. Available from: http://apps.who.int/iris/handle/10665/205923.
2. Health in 2015: from MDGs to SDGs [Internet]. World Health Organization. World Health Organization; 2015 [cited 2018Feb16]. Available from: https://www.who.int/gho/publications/mdgs-sdgs/chapter3_snapshots/en/.
3. National Operational Guidelines 2017 (Second Edition) [Internet]. 2017 [cited 2019Mar5]. Available from: http://www.itsu.org.in/wp-content/downloads/Measlesrubellavaccineoperationalguidelines.pdf
4. Smith PJ, Marcuse EK, Seward JF, Zhao Z, Orenstein WA. Children and Adolescents Unvaccinated Against Measles: Geographic Clustering, Parents'

Beliefs, and Missed Opportunities [Internet]. Public health reports (Washington, D.C. : 1974). Association of Schools of Public Health; 2015 [cited 2019Mar6]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/26327727

5. Midterm review of the "Strategic plan for measles elimination and rubella and congenital rubella syndrome control in the South-East Asia Region: 2014–2020" [Internet]. World Health Organization. World Health Organization; 2014 [cited 2019Feb12]. Available from: https://apps.who.int/iris/handle/10665/279993
6. Weiss C, Schröpfer D, Merten S. Parental attitudes towards measles vaccination in the canton of Aargau, Switzerland: a latent class analysis [Internet]. BMC infectious diseases. BioMed Central; 2016 [cited 2019Apr2]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/27514620
7. Giri BR, Namgyal P, Tshering K, Sharma K, Dorji T, Tamang C. Mass measles rubella immunization campaign: bhutan experience [Internet]. Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine. Medknow Publications; 2011 [cited 2019Apr3]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3180934/
8. Upadhye JV, Marathe SM, Mandlik MR, Upadhye AJ, Upadhye JJ. Awareness and practices of parents about immunization of children in the age group 2-5 years. International Journal of Contemporary Pediatrics. 2018;5(5):1909..
9. Kanma-Okafor O, Adefolalu O, Balogun M. Maternal knowledge, attitude and compliance regarding immunization of under five children in Primary Health Care centres in Ikorodu Local Government Area, Lagos State. Journal of Clinical Sciences. 2019;16(1):7..
10. Effect of an Information, Education and Communication (IEC ... [Internet]. 2016 [cited 2019 May 1]. Available from: https://www.researchgate.net/publication/326331004_Effect_of_an_Information_Education_and_Communication_IEC_approach_on_the_knowledge_quotient_KQ_among_school_students_in_Pune_on_immunization_Indian_Journal_of_Public_Health_by_Journal_of_Dental_and_Me.