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"STUDY OF KNOWLEDGE, ATTITUDE AND PRACTICE OF MOTHERS ABOUT IMMUNIZATION OF CHILDREN UNDER 5 YEARS OF AGE AMONG MIGRANT WORKERS IN AND AROUND SURATHKAL, KARNATAKA"

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Introduction :

Vaccination is one of the most effective preventive measures for reducing child morbidity and mortality. Over the years, vaccines have proven to be a highly cost-effective public health intervention, minimizing avoidable human suffering, reducing healthcare expenditures, and mitigating economic consequences such as lower productivity and lost workdays. According to the WHO, vaccine-preventable diseases still cause 1.5 million child deaths annually, primarily due to inadequate vaccination coverage.[1]

The immunization program is a multi-sectorial activity. In recent years, India has achieved several significant landmarks in the field of immunization, including being certified as polio free in the year 2014[2] and for eliminating maternal and neonatal tetanus in 2015.[3]

India's immunization program is the largest in the world, covering 12 vaccine-preventable diseases in children. It has played a crucial role in reducing the under-five mortality rate from approximately 233 per 1,000 live births at independence to 63 in the first five decades[4] and further to 34.3 per 1,000 in 2019. The Universal Immunization Programme (UIP) in India vaccinates nearly 30 million pregnant women, 26 million infants, and about 100 million children under five annually.[5] These vaccinations are administered through nine million fixed, outreach, and mobile immunization sessions, with outreach sessions accounting for 59% of vaccinations provided by the public health system. Despite having 17% of the global under-five population, India accounted for 27% of global deaths in this age group in 2018.[6,7]

Though there has been improved accessibility of health care services in both urban and rural areas in recent years, nonetheless the consumption of health care services is low and ununiform among the diverse sectors of the society. [8.]

Migration may require adapting to the social and cultural norms of new places, which may influence migrants' children`s health too. Because maternal education encourages mothers to adopt health-seeking behaviors that improve child immunization, it has also been proposed that children of educated mothers are more likely to complete their vaccinations on schedule. [9.]
Studies are needed to assess child immunization determinants, particularly the link between maternal education and coverage. A multi-level qualitative and quantitative approach enables real-time interaction with stakeholders. The widely used Knowledge, Attitude, and Practice (KAP) survey is a key method for gathering such insights across different populations and settings.[10]
There are no KAP studies exist on child immunization among migrant workers in Surathkal Town. This study will assess factors like socioeconomic status, maternal age, parity, education, religion, delivery place, and child's sex on immunization. Findings may reveal key drivers, parental concerns, migrant needs, and influences on health behaviours.

Objectives:
1. To evaluate the immunization status of children under five years old among migrant populations.
2. To identify risk factors influencing immunization status, including maternal age, education level, socio-economic status, community beliefs, parity, place of delivery, and child's gender.
3. To assess the knowledge, attitudes, and practices of mothers regarding immunization for children under five among migrant workers in and around Surathkal, Mangalore.

Exclusion Criteria:
a) Children whose age could not be reliably verified as under five.
b) Mothers unwilling to disclose their child's immunization status.
c) Non-migrant children and those not accompanied by their mothers.

Materials and Methods:
Ethical clearance was obtained from the Institutional Ethics Committee of SIMS&RC (Ref: 2019/11/6/5). A convenient sampling technique was used, selecting eligible subjects from hospital OPDs and migrant settlements until the required sample size was reached.
Children visiting the OPD were screened, and parents provided informed consent. Additional subjects were identified through visits to anganwadi centers and migrant settlements. Anganwadi workers assisted in locating eligible children, and willing mothers were interviewed. Immunization history was verified using the Mother and Child Protection (MCP) booklet, anganwadi records, or vaccine site identification. If no data were available, the child's immunization status was categorized as "Unknown" and excluded from the study.

Demographic data were collected using a structured questionnaire. Mothers were educated on immunization, and unimmunized or partially immunized children were guided for schedule completion. Vaccination status was categorized as Unimmunized, Partially Immunized, Fully Immunized, or Unknown.

Data were entered into Epidata (version 3.1) and analyzed using SPSS 24.0. Chi-square and Fisher's Exact tests were applied to determine statistical associations between immunization status and other variables.

Result :

Table 1: Age distribution of the study subjects

Age categories	Frequency	Percent
up to 1 year	354	88.5
1 to 2 years	28	7.0
2 to 3 years	5	1.3
3 to 4 years	3	0.8
4 to 5 years	10	2.5
Total	400	100.0

Table 2: Educational status of mothers

			Immunization Status			Total
			Unimmunized	Partially Immunized	Fully Immunized	
Educational status	Illiterate	*Count*	7	27	8	42
		%	1.8%	6.8%	2.0%	10.5%
	Schooling	*Count*	0	123	114	237
		%	0.0%	30.7%	28.6%	59.2%
	PUC	*Count*	0	78	43	121
		%	0.0%	19.5%	10.8%	30.3%
	Graduate	*Count*	0	0	0	0
		%	0.0%	0%	0%	0%
	Post Graduate	*Count*	0	0	0	0
		%	0.0%	0%	0%	0%
	Total	*Count*	7	228	165	400
		%	1.8%	57.0%	41.3%	100.0%
	Chi-Square test, $\chi 2 = 80.974$ $p < 0.001$					

Table 15: Distribution of responses under Knowledge domain

		Immunization Status			Total
		Unimmunized	Partially Immunized	Fully Immunized	
Vaccines are given from birth					
Yes	*Count*	5	198	162	365
	%	**1.3%**	**49.5%**	**40.5%**	**91.3%**
No	*Count*	0	1	0	1
	%	**0%**	**0.3%**	**0%**	**0.3%**
Don't Know	*Count*	2	29	3	34
	%	**0.5%**	**7.3%**	**0.8%**	**8.5%**
Total	*Count*	7	228	165	400
	%	**1.8%**	**57%**	**41.3%**	**100%**
Vaccines are meant to prevent diseases					
Yes	*Count*	2	139	117	258
	%	0.5%	34.8%	29.3%	64.5%

No	*Count*	0	0	1	1
	%	0.0%	0.0%	0.3%	0.3%
Don't Know	*Count*	5	89	47	141
	%	1.3%	22.3%	11.8%	35.3%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
All children need to be vaccinated					
Yes	*Count*	0	148	132	280
	%	0%	37.0%	33.0%	71.3%
No	*Count*	2	76	31	109
	%	0.5%	19.0%	7.8%	27.3%
Don't Know	*Count*	5	4	2	11
	%	1.3%	1.0%	0.5%	2.8%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
There are different types of vaccines for different diseases					
Yes	*Count*	0	59	82	141
	%	0.0%	14.8%	20.5%	35.3%
No	*Count*	0	1	3	4
	%	0.0%	0.3%	0.8%	1.0%
Don't Know	*Count*	7	168	80	255
	%	1.8%	42.0%	20.0%	63.8%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%

	Immunization Status			**Total**
	Unimmunized	**Partially Immunized**	**Fully Immunized**	
In some health situations, vaccines should not be given.				
Yes *Count*	0	60	82	142
%	0.0%	15.0%	20.5%	35.5%
No *Count*	0	1	6	7
%	0.0%	0.3%	1.5%	1.8%
Don't Know *Count*	7	167	77	251
%	1.8%	41.8%	19.3%	62.8%
Total *Count*	7	228	165	400
%	1.8%	57.0%	41.3%	100.0%
Vaccination can be associated with adverse reactions.				
Yes *Count*	5	194	157	356
%	1.3%	48.5%	39.3%	89.0%
No *Count*	0	2	4	6
%	0.0%	0.5%	1.0%	1.5%
Don't Know *Count*	2	32	4	38
%	0.5%	8.0%	1.0%	9.5%
Total *Count*	7	228	165	400
%	1.8%	57.0%	41.3%	100.0%

Do you get to hear about special vaccination campaigns?					
Yes	*Count*	0	177	134	311
	%	0.0%	44.25%	33.5%	77.75%
No	*Count*	7	51	31	89
	%	1.8%	12.8%	7.8%	22.25%
Don't Know	*Count*	0	0	0	0
	%	0.0%	0.0 %	0.0 %	0.0%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
Vaccines are available in government setups free of cost					
Yes	*Count*	0	225	164	389
	%	0.0%	56.3%	41.0%	97.2%
No	*Count*	0	1	1	2
	%	0.0%	0.3%	0.3%	0.5%
Don't Know	*Count*	7	2	0	9
	%	1.8%	0.5%	0.0%	2.3%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
		Immunization Status			**Total**
		Unimmunized	**Partially Immunized**	**Fully Immunized**	
Vaccines schedule needn't be followed for getting best protection					
Yes	*Count*	2	31	5	38
	%	0.5%	7.8%	1.3%	9.5%
No	*Count*	0	51	33	84
	%	0.0%	12.8%	8.3%	21.0%
Don't Know	*Count*	5	146	127	278
	%	1.3%	36.5%	31.8%	69.5%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%

Distribution of responses under attitude domain

		Immunization Status			**Total**
		Unimmunized	**Partially Immunized**	**Fully Immunized**	
Do You Think Vaccination Is Important?					
Yes	*Count*	0	195	159	354
	%	0%	48.8%	39.8%	88.5%
No	*Count*	0	1	1	2
	%	0.0%	0.3%	0.3%	0.5%
Don't Know	*Count*	7	32	5	44
	%	1.8%	8.0%	1.3%	11%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
Do you believe vaccines are safer?					
Yes	*Count*	0	218	157	375
	%	0.0%	54.5%	39.3%	93.7%

No	*Count*	7	9	4	20
	%	1.8%	2.3%	1.0%	5 %
Don't Know	*Count*	0	1	4	5
	%	0.0%	0.3%	1.0%	1.3%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
Does seeing posters regarding vaccination motivate?					
Yes	*Count*	2	89	85	176
	%	0.5%	22.3%	21.3%	44.0%
No	*Count*	5	137	77	219
	%	1.3%	34.3%	19.3%	54.8%
Don't Know	*Count*	0	2	3	5
	%	0.0%	0.5%	0.8%	1.3%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
Will you believe the information circulated regarding vaccination in social medias?					
Yes	*Count*	5	89	50	144
	%	1.3%	22.3%	12.5%	36.0%
No	*Count*	0	60	80	140
	%	0.0%	15.0%	20.0%	35.0%
Don't Know	*Count*	2	79	35	116
	%	0.5%	19.8%	8.8%	29.0%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%

		Immunization Status			**Total**
		Unimmunized	**Partially Immunized**	**Fully Immunized**	
Did you face any obstacles from family members for vaccinating the child?					
Yes	*Count*	2	82	32	116
	%	0.5%	20.5%	8.0%	29.0%
No	*Count*	5	145	132	282
	%	1.3%	36.3%	33.0%	70.5%
Don't Know	*Count*	0	1	1	2
	%	0.0%	0.3%	0.3%	0.5%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
Do you get enough information regarding vaccination?					
Yes	*Count*	0	224	162	386
	%	0.0%	56.0%	40.5%	96.5%
No	*Count*	0	0	1	1
	%	0.0%	0.0%	0.3%	0.3%
Don't Know	*Count*	7	4	2	13
	%	1.8%	1.0%	0.5%	3.2%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
Do you think government needs to campaign more aggressive regarding vaccination?					
Yes	*Count*	0	58	84	142
	%	0.0%	14.5%	21.0%	35.5%
	Count	5	89	48	142

No	%	1.3%	22.3%	12.0%	35.5%
Don't Know	*Count*	2	81	33	116
	%	0.5%	20.3%	8.3%	29.0%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
Were you given clear instructions by healthcare workers regarding adverse effects following immunization?					
Yes	*Count*	0	227	163	390
	%	0.0%	56.8%	40.8%	97.6%
No	*Count*	0	1	1	2
	%	0.0%	0.3%	0.3%	0.5%
Don't Know	*Count*	7	0	1	8
	%	1.8%	0.0%	0.3%	2.1%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%

Table 17: Distribution of responses under Practice domain

		Immunization Status			**Total**
		Unimmunized	**Partially Immunized**	**Fully Immunized**	
Was immunization completed according to schedule?					
Yes	*Count*	0	14	157	171
	%	0.0%	3.5%	39.3%	42.8%
No	*Count*	7	213	8	228
	%	1.8%	53.3%	2.0%	57.0%
Don't Know	*Count*	0	1	0	1
	%	0.0%	0.3%	0.0%	0.3%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
Did you vaccinate your child during special vaccination drive days?					
Yes	*Count*	7	192	4	203
	%	1.8%	48.0%	0.8%	50.75%
No	*Count*	0	36	158	194
	%	0.0%	9.0%	39.5%	48.5%
Don't Know	*Count*	0	0	3	3
	%	0.0%	0.0%	0.8%	0.8%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%
Did you motivate anyone else to vaccinate their child?					
Yes	*Count*	0	147	131	278
	%	0.0%	36.8%	32.8%	69.4%
No	*Count*	7	79	33	119
	%	1.8%	19.8%	8.3%	29.8%
Don't Know	*Count*	0	2	1	3
	%	0.0%	0.5%	0.3%	0.8%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%

Does all of your family members support vaccination?					
Yes	*Count*	0	187	151	338
	%	0.0%	46.8%	37.8%	84.3%
No	*Count*	2	41	13	56
	%	0.5%	10.3%	3.3%	14.0%
Don't Know	*Count*	5	0	1	6
	%	1.3%	0.0%	0.3%	1.6%
Total	*Count*	7	228	165	400
	%	1.8%	57.0%	41.3%	100.0%

Among 400 study subjects, 256 (64%) were boys and 144 (36%) were girls. MCP cards were available for 295 (74%) mothers. The study population included 190 (47.5%) Hindus, 121 (30.3%) Muslims, 75 (18.8%) Christians, and 14 (3.5%) from other religions.

7(1.8%) children were unimmunized. 228 (57%) children were found to be partially immunized and didn't get all required vaccines as per age. The study revealed that only 165(41.3) children out of 400 were fully immunized as per age. 55.5% of the subjects admitted that they didn't opt for optional vaccines and 44.5% of the subjects didn't even know what optional vaccines are.

The study included 184(46%) of BPL card holders and 216(54%) of APL card holder's children. Out of 184 children of BPL card holders, 7(1.8%) were unimmunized, 122(30.5%) were partially immunized and 55(13.8%) were fully immunized. Out of 216(54%) APL card holders, 106(26.5%) of them were partially immunized and 110(27.5%) were fully immunized. The study found a statistically significant association between immunization status of the children and the socioeconomic status of the family members with χ 2 = 24.457 and $p < 0.001$.

Among the subjects, 35.8% were from nuclear families, 35.5% from joint families, and 28.8% from three-generation families. A statistically significant association was found between family type and child immunization status ($\chi^2 = 36.516$, $p < 0.001$), with unimmunized children mostly from nuclear families and partially immunized from joint families.

Out of all subjects, 63.5% had homemaker mothers, 16.1% had mothers working for daily wages, 11.3% were employed in private firms, and 9.3% were self-employed, with none in government jobs. Most partially and fully immunized children had homemaker mothers. A significant association was found between maternal occupation and child immunization status ($\chi^2 = 167.165$, $p < 0.001$).

The majority of mothers delivered at government hospitals (68.3%), while 29.5% delivered at private hospitals, and 1.7% had home deliveries. Most partially immunized children were born in government hospitals, while fully immunized children were mostly born in private hospitals ($\chi^2 = 66.00$, $p < 0.001$). No significant association was found between immunization status and place of residence.

In our study, 65% of participants preferred government hospitals, including 1.8% of unimmunized children. Among them, 42.3% were partially immunized, and 21% were fully immunized. Of the 35% who preferred private hospitals, 14.8% were partially immunized, and 20.3% were fully immunized. A statistically significant association was found between treatment preference and child immunization status ($\chi^2 = 17.360$, $p < 0.001$). Regarding vaccination reminders, 28.8% of mothers received them from Anganwadi workers, 36.3% from ASHA workers, and 0.8% from Auxiliary Nurse Midwives. Additionally, 34.3% were reminded through other sources such as media and neighbours.

Discussion

In our study, boys comprised 64%, and girls 36%, similar to Sinha S et al. but differing from Basti et al., who had an equal gender ratio. The sampling method and pandemic-related recruitment challenges likely caused this imbalance. Most subjects were infants (88%), with a mean age of 8 months (SD ±10), reflecting their higher illness frequency and hospital visits. Additionally, 30.3% of participants were Muslims, comparable to Basti BD's study (30%).

In a study by Francis MR et al., 94.2% of children received vaccinations at public hospitals. Vaccination cards were available for 94.3% of subjects. The proportion of fully vaccinated children

was 96.4% based on parental recall or vaccination cards and 84% when considering vaccination cards alone. Additionally, 16% were partially vaccinated, with only one child being completely unvaccinated.[11]

In our study, 73.8% of mothers retained MCP cards, likely due to the high proportion of infants needing frequent immunization. Similar results were found in other studies. [11,12,13] Partially immunized children were 57%, fully immunized 41.3%, and unimmunized 1.8%. Immunization rates vary by origin, healthcare access, and distance from facilities.

In a study done by Kumar S et al, 26.7% of the respondents had given their children optional vaccines.[14] Where as in the current study, none of the informers said optional vaccines were given. The prices of optional vaccines, awareness about it might be the reason for migrants not opting for optional vaccines.

In a study done by Basti BD et al, 83.25% of the mothers were literates.[13] In a study done by Ashwathi A et al, showed the majority of households—76.8%—earn less than 5,000 Indian rupees a month. Only 15% of women have completed high school or above, while 41% are illiterate. About 11% of the women were self-employed, 4% were working, and the majority (85%) were housewives or unemployed. [15.]

In a study by Selvaraj K et al., of the women 19.1% had less than a primary education, while 32.6% had more than a higher secondary education. 10.7% were employed, with the remainder being mothers who stay-at-home. The children were 23.7 ± 16.7 months old on average. [16]

In a study done by Srivastava AK et al, under modified BG Prasad Classification, the majority of children belonged to Class IV i.e. 53.7%. The majority of mothers (82.3%) were housewives. The highest educational qualification of mothers was found to be secondary education 33.5%. 16.2% mothers were illiterate. [12]

In a study done by Yadlapalli S.et al., I found that more than 50% of the mothers and around 20% of the fathers did not receive any formal education. [17] The present study's findings about migrant mothers` education showed that the majority of them had finished schooling, which was nearly 60%. At the same time 10.5% of the ladies were found to be illiterate.

The current study revealed 46% of the subjects were below poverty line and 56% were above poverty line. The financial status of the migrants can be generalized that most of them were financially not well, in spite of the APL card possession, they had a higher number of family members, which translates to increase in expenses. The most common reason for migration was better earning opportunities. Most of the migrant mothers were found to be home makers (63.5%) in the current study and the next highest numbers were of daily wage workers who constituted 16.1%. The proportion of delivery at home was exactly the same as the study findings of Srivastava AK et al[12].

The current study also revealed a statistically significant association of a child's immunization status with many factors like educational status of the mother, socio economic status of the family, type of the family, mother's occupation, place of delivery, choice of treatment and reminder from healthcare workers regarding immunization. Mother's education level appears to be significantly associated with immunization status. Similar results were found in study done by Girmay A et al.[18]

In this study, under knowledge domain 91% of mothers knew that vaccines should be given from birth, but not all understood their purpose. About one-third were aware that vaccines could be delayed due to certain health conditions. Nearly 90% knew about possible adverse reactions, likely due to healthcare workers providing explanations after immunization visits. Around 75% were aware of special vaccination campaigns, highlighting the need for more targeted efforts for migrant populations. However, nearly 70% were unaware that following the vaccine schedule is essential for optimal protection.

In the attitude domain, 88% of mothers had a positive outlook on vaccines, considering them important, and 94% believed they were safe, likely due to their own experiences with vaccinating their children. Social media influence on vaccination beliefs was evenly distributed. In 70% of migrant households, there were no obstacles to vaccination, while 30% faced difficulties, primarily financial.

Nearly 97% of mothers received clear advice on adverse effects, yet 99% said they would stop vaccinating if their child experienced pain, redness, swelling, or fever.
In the practice domain, only 42.8% of mothers completed vaccinations on time, indicating the need for improved adherence. Around 70% expressed willingness to motivate others for vaccination, likely due to effective campaigns. Additionally, 93% found the MCP card helpful in tracking vaccination dates, a finding consistent with other studies.

Limitations

Due to the pandemic, systematic subject enrollment was challenging. Some migrant mothers were illiterate, making it difficult to assess their knowledge. No reliable method exists to verify immunization status, as MCP cards may be incorrectly tagged or occasionally misplaced.

Conclusion

Migrant mothers face barriers like documentation issues, language difficulties, and mistrust in healthcare, hindering child immunization. Transient living worsens access and timeliness. Addressing this requires culturally sensitive education, improved vaccination access, and fostering trust to enhance knowledge and attitudes toward immunization.

References:

1. Kibreab, F., Lewycka, S. & Tewelde, A. Impact of mother's education on full immunization of children aged 12–23 months in Eritrea: population and health survey 2010 data analysis. BMC Public Health 20, 267 (2020). https://doi.org/10.1186/s12889-020 8281-0.
2. Ministry of Health & Family Welfare. WHO Certifies India as Polio Free. Available from:.2014.https://www.mea.gov.in/bilateral documents.htm?dtl/23154/WHO+Certifies+India+As+Polio+Free.
3. World Health Organization. WHO Felicitates India for Yaws, Maternal and Neonatal Tetanus Elimination. Available from:. 2016. https://www.who.int/south eastasia/news/detail/14-07-2016-who-felicitates-india-for-yaws-maternal-and-neonatal tetanus-elimination
4. Word Bank Database. Available online at: http://databank.worldbank.org/Data /Views/Variable Selection/SelectVariables.aspx?source= Health%20Nutrition%20and%20Population%20Statistics Accessed on September 12,2012. World Bank, India Mortality rate, under-5 (per 1,000 live births), available at https://data.worldbank.org/indicator/SH.DYN.MORT
5. Ministry of Health and Family Welfare, Government of India, Immunization Handbook for Medical Officers [Internet], Ministry of Health & Family Welfare Government of India, 2016 [cited 2019 October 25th]. Available from: http:// www.searo.who.int/india/publications /immunization_handbook2017/en/.
6. United Nations Department of Economic and Social Affairs Population Division. World population prospects: the 2019 revision. New York: United Nations; 2019.
7. Liu L, Chu Y, Oza S, Hogan D, Perin J, Bassani DG, et al. National, regional, and state level all-cause and cause-specific under-5 mortality in India in 2000-15: a systematic analysis with implications for the sustainable development goals. Lancet Glob Health. 2019;7(6):e721–e34. https://doi.org/10.1016/S2214-109X(19)30080-4.
8. Wani RT, Dar H, Raina ZA. Knowledge, Attitude and Practices of Mothers with Children Under Five years of Age About Vaccination. JMSCR. 2017;5(07):24449-54.
9. Balogun SA, Yusuff HA, Yusuf KQ, Al-Shenqiti AM, Balogun MT, Tettey P. Maternal education and child immunization: the mediating roles of maternal literacy and socioeconomic status. Pan Afr Med J. 2017;26 Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5491723/. [cited 2018 Jul 30]
10. Nilanjan Patra .Universal Immunization Programme In India: The Determinants Of Childhood Immunization. Dept. Of Economics, Delhi School Of Economics,Univ. Of Delhi, 1-29.

11. Francis MR, Nuorti JP, Kompithra RZ, Larson H, Balraj V, Kang G, Mohan VR. Vaccination coverage and factors associated with routine childhood vaccination uptake in rural Vellore, southern India, 2017. Vaccine. 2019 May 21;37(23):3078-87.
12. Srivastava AK, Shankar G. A study of immunization coverage and its determinants among under five children residing in urban field practice area of SN Medical college, Bagalkot, Karnataka, India. Indian J Forensic Community Med. 2017 Jan;4(1):48-52.
13. Basti BD, Ravi MR, Varaprasad D, Janakiraman P. Assessment of immunization status among under five children in a census town of South India. Int J Community Med Public Health 2019;6:3266-73.
14. Kumar S, Prabhu S, Jose AP, Bhat S, D Souza O, Narayana V. Assessment of under-five immunization coverage among the population of slum areas in Mangalore taluk, India. Int J Community Med Public Health 2017;4:781-6.
15. Awasthi A, et al., Maternal determinants of immunization status of children aged 12 23months in urban slums of Varanasi, India, Clinical Epidemiology and Global Health (2014), http://dx.doi.org/10.1016/ j.cegh.2014.07.004
16. Selvaraj K, Sarkar S, Daya A Praveena. Knowledge on routine pentavalent vaccines and socioeconomic correlates among mothers of children aged younger than 5 years in Urban Puducherry. Int J Med Sci Public Health 2015;4: 199-204.
17. Kusuma YS, Kumari R, Pandav CS, Gupta SK. Migration and immunization: determinants of childhood immunization uptake among socioeconomically disadvantaged migrants in Delhi, India. Tropical Medicine & International Health. 2010 Nov;15(11):1326-32.
18. Girmay A, Dadi AF. Full immunization coverage and associated factors among children aged 12-23 months in a hard-to-reach areas of Ethiopia. International journal of pediatrics. 2019 May 27;2019.