A CROSS SECTIONAL STUDY ON FACTORS INFLUENCING DELAYED CHILDHOOD IMMUNIZATION AMONGST CHILDREN ATTENDING IMMUNIZATION CLINIC AT A TERTIARY CARE HOSPITAL

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Abstract:
Delayed Immunization has become a major concern limiting progress towards attaining high immunization coverage in India. Delayed Immunization increases the risk of vaccine preventable disease along with increased risk of never fully completing the vaccination course. To study the factors influencing delayed immunization amongst children attending immunization clinic at tertiary care hospital. The study was conducted from 1st August 2018 to 31st October 2018. The study showed that out of 270 children, 42.6% (116) had delayed immunization, of which 58.21% (67) (p=0.162) were male children.
Out of all the factors causing delay, 10.8% inconvenient timings of OPD, 4.3% unavailability of vaccines, 2.9% adverse reactions following vaccinations strongly influenced delayed immunization. The study underlines the need for an effective counselling on importance of timely immunization by creating awareness in the form of posters, advertisements, etc.

Keywords: Delayed immunization, Health Care

Introduction:

Epidemics, a word so grave, would act as a grave, for many coming under the blanket of diseases like diphtheria, tetanus and many such infectious diseases. Infants and children are the easy prey of these infectious diseases and are prone to catch them because of immunity constraints. There are many diseases which are in control due to the timely vaccinations injected at proper time acting as a preventive measure against these killer diseases. Education, and revenant economic conditions of the society as whole and that of the child's parent have a significant impact on the awareness and willingness to bring a child for immunization.

Child Survival is a challenge in many developing nations. It is dependent on many factors including vaccination. Vaccination is one of the most cost-effective public health interventions against vaccine-preventable diseases. Immunization has saved over 20 million lives in the last two decades. More than 100 million infants are immunized each year. Global mortality attributed to measles decline by 78% from an estimated 733,000 deaths in 2000 to 161,260 deaths in 2008. The prevalence of polio had decline dramatically since 1990. The number of polio cases worldwide as of 2009 was 1606 and as of May 2010 it was 115 [2].

The current Schedule for vaccination is:
At Birth: BCG, OPV0, HepB0
6 weeks: OPV1, Pentavalent 1, IPV 1
10 weeks: OPV2, Pentavalent 2
14 weeks: OPV3, Pentavalent 3, IPV2
9 months: MR, Vitamin A (First Dose) [1]

Even though vaccines are provided free of cost at all government health centers, the immunization coverage in India is as low as 62.0% [6], Delayed Immunization increases the risk of vaccine preventable disease along with increased risk of never fully completing the vaccination course. In a study conducted by Fatima. R .Rahji and Chizoma .M. Ndikom (sept 2013) on "Factors influencing compliance with immunization regimen among mothers in Ibadan Nigeria " it was found that 62.8% complied fully while 37.2 % did not.[3] There are numerous factors like higher birth order of children, being unmarried, being in the lowest wealth quintile, living area, etc. lead to delayed uptake of vaccine.[7],[8]. Thus, the study was undertaken to assess the factors influencing delayed immunization in children under one year of age.

Research Methodology:

A cross sectional study was conducted amongst Children attending immunization clinic at a tertiary care hospital .The immunization clinic under study attends an average of 350 children per month and it is open from Monday to Saturday except on Sundays and public holidays. The clinic provides immunisation services as per Universal Immunisation

Program adopted by Government of Maharashtra. The study was conducted from August 2018 to October 2018. During the time period, around **900** children under one year of age attended the immunization clinic.

For convenient purpose **30%** of these children were taken for sampling. Using systematic random sampling technique every **3rd** child was taken as the sample, making the sample as

270. Immunisation schedule delayed for BCG, OPV 0, Hep B0, Pentavalent 1/2/3, OPV 1/2/3, IPV 1/2, measles and vitamin A1 was studied. Purposively only mothers who accompanied their children at immunization clinic were interviewed through pre structured questionnaire. From the immunisation card possessed by mothers, date of vaccination was verified. Those who did not carry immunisation card, then from immunisation registry record dates of immunisation were verified. This included the demographic factors, immunisation history, dates of previous immunisation, distances to health facility, maternal information antenatal records and delivery history were collected from their mothers. Education was classified according to Indian Standard Classification of Education[5] and socioeconomic status was classified using the modified B G Prasad Classification.[4]

Data analysis: Data analysis was done using SPSS version 20.0. The qualitative variables were expressed in percentages and the quantitative variables were expressed in terms of mean and standard deviation . To test the significance Chi-square was applied.

Results: 270 mothers accompanying children were interviewed. Following results were Obtained:

Table no.1:

Demographic Variables	Particulars	Frequency	Percentage
Gender	Male	127	47
	Female	143	53
Education	Illiterate	64	23.7
	Secondary	142	52.6
	Graduate	64	23.7
Occupation	Housewife	211	78.1
	Working	59	21.9
Socio Economic Status	Lower upper & lower	98	36.3
	Middle & Middle Upper	119	44.07
	Upper & Upper Middle	53	19.6
No of ANC visits	<= 6	128	47.4
	>6	142	52.6
Birth order	1st	55	20.37
	2nd	104	38.5
	3 and more	111	41.2

From the above table no. 1 it was observed that out of all the children , 127 (47%) were males and 143 (53%) were females. Out of all the mothers accompanying children, 64 (23.7%) were illiterate, 142 (52.6%) completed secondary education, 64(23.7%) were graduates. Out of all 211 (78.1%) were housewives and 59 (21.9%) were working. 98 (36.3%) mothers belonged to lower upper and lower class , 119(44.1%) in middle and middle upper and 53 (19.6%) in upper and upper middle class as per modified B.G. Prasad classification. It was observed that 128 (47.4%) mothers did less than 6 ANC visits, 142(52.6%) mothers did more than 6 ANC visits. It was observed that 55(20.37%) had birth order one, 104 (38.5) had birth order two and 111 (41.2) had birth order of more than three.

Table no. 2
Gender of Child * Group

Gender of Child	Group		Total
	Delayed	On Time	
Female	50 (18.5%)	78 (28.9%)	128 (47.4%)
Male	66 (24.4%)	76 (28.1%)	142 (52.6%)
Total	116 (43.0%)	154 (57.0%)	270 (100.0%)

Chi-Square Value	Degree of Freedom	P value	Association
1.511	2	0.219	Not Significant

From the above table no. 2, it was observed that out of all the female children 50(18.5%) had delayed immunization . similarly, out of all the male children 66 (24.4%) had delayed immunization.

To test the significance , chi square was applied. No Statistical significance was seen been gender of child and timeliness of immunization.

Table no.3:

Crosstab

Education	Group		Total
	Delayed	On Time	
1)Illiterate	21 (7.8%)	44 (16.3%)	65 (24.1%)
2)Secondary	59 (21.9%)	81 (30.0%)	140 (51.9%)
3)Graduate	36 (13.3%)	29 (10.7%)	65 (24.1%)
Total	116 (43.0%)	154 (57.0%)	270 (100.0%)

Chi-Square Value	Degree of Freedom	P value	Association
7.143	2	0.028	Significant

From the above table no. 3 it was observed that out of all the illiterate mothers accompanying children 44 (16.3%) showed on time immunization, out of all the graduate mothers 36 (13.3%) showed delayed immunization. To test the significance , chi square was applied. Statistical significance was seen been education of mother and timeliness of immunization.

Table no. 4

Socioeconomic Status	Group		Total
	Delayed	On Time	
Lower Upper & Lower	40 (14.8%)	59 (21.9%)	99 (36.7%)
Middle & Middle Upper	54 (20.0%)	65 (24.1%)	119 (44.1%)
Upper & Upper Middle	22 (8.1%)	30 (11.1%)	52 (19.3%)
Total	116	(43.0%)	270 (100.0%)

Chi-Square Value	Degree of Freedom	P value	Association
0.557	2	0.757	Not Significant

From the above table no. 4 it was observed that mothers belonging to lower and upper lower class 40 (14.8%) showed on time immunization. Similarly mothers belonging to upper class showed 22(8.1%) delayed immunization. To test the significance, chi square was applied. No Statistical significance was seen been socioeconomic status and timeliness of immunization.
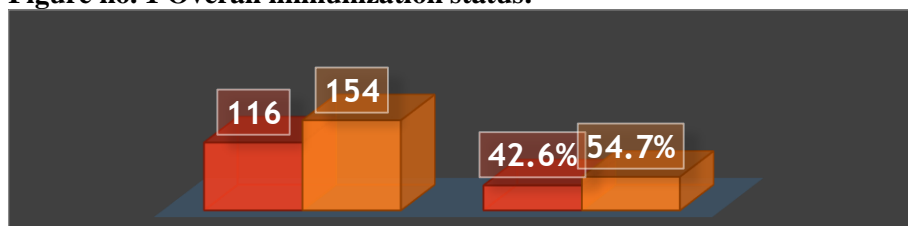
Table no. 5

Crosstab

No. of Visits	Group		Total
	Delayed	On Time	
1)<= 6	66 (24.4%)	62 (23.0%)	128 (47.4%)
2)> 6	50 (18.5%)	92 (34.1%)	142 (52.6%)
Total	116 (43.0%)	154 (57.0%)	270 (100.0%)

Chi-Square Value	Degree of Freedom	P value	Association
7.345	2	0.007	Significant

From the above table no. 5 it was observed that mothers who had done <= 6 ANC visits showed 66(24.4%) of delayed immunization and those who did >6 ANC visits 50 (18.5%) showed delayed immnuization. To test the significance , chi square was applied. Statistical significance was seen been number of ANC visits and timeliness of immunization.

Figure no. 1 Overall immunization status:

From the above figure it was observed that from overall immunization , 57.4% were on time for vaccination, 42.6% were delayed.

Table no. 6
Causes of delay in immunization as mentioned by mothers:

Causes of Delayed Immunization	Percent
Adverse Reaction following Vaccination	2.9
Child was sick	9.3
Health centre too far from home	8.5
Inconvenient Timings of OPD	10.8
NA	57
Not Aware of Vaccination	4.7
Vaccine Not Available	4.3
religious belief	2.5

It was observed from the above table no. 8 that 10.8% mothers could not bring child for vaccination due to inconvenient timings of OPD, 4.3% unavailability of vaccines, 2.9% adverse reactions following vaccinations, 9.3% child was sick. NA (not applicable) 57% refers to the children who were immunized on time thus having no cause for delay in immunization.

Discussion:

This cross-sectional study showed that 57.4% were vaccinated on time without any delay and 42.6% of the children were delayed. In a study conducted by Fatima. R .Rahji and Chizoma .M. Ndikom on Factors influencing compliance with immunization regimen among mothers in Ibadan Nigeria ,62.8% of children received vaccine on time, which was higher as compared to our study.[3] In a study conducted by Holambe VM et al at a tertiary care center of Maharashtra, 66% of the babies presented on time for vaccination, which was higher as compared to our study.[9] Delayed vaccination was more in male children (24.4%) as compared to female children (18.5 %) in our study. Similar findings were found by Holambe VM et al that females were vaccinated more (53.08%) on time as compared to males (46.92%) and this association was not significant (p value = 0.479).[9]

In our study Mothers with higher education group got more delayed immunization for children as compared to lower education group. In contrast it was observed by Sadoh AE et al conducted a study on Nigerian infants that mothers with higher education got more timely immunization.[10]

In this study, working mothers made more delayed vaccinations for their babies as compared to housewives. In contrast to study conducted by Rahji F R et al found that housewives showed less compliance for immunisation than working mothers.[11]

In the study on time vaccination was more in lower socioeconomic classes (21.9%) as compared to higher classes (11.1%) and the difference was insignificant. In contrast to the study conducted by Sadoh AE et al where on time vaccinations was more in higher classes.[10] In the study Mothers with more than 6 ANC visits had significantly more (34.1%) on time vaccinations for their children as compared to mothers with less than 6 ANC visits (23%). A study conducted by Bisiriyu L et al in Nigeria observed similar results where women with more than 4 ANC visits got 50.8% full vaccination as compared to women with less than 4 ANC visits (12.5%).[12] In our study a significant difference was seen in delay in vaccination for children with lower birth order , this can be explained by the fact that with high parity mothers are more experienced and are aware of vaccinations . Another study conducted by Nilanjan Patra in three states of India (Bihar, Tamil Nadu and West Bengal) found association of lower birth order with delayed vaccination, which is similar to our study findings.[13] In our study causes of delay as mentioned by mothers were found to be 10.8% inconvenient timings of OPD which may be due to restricted working hours at hospital or there being no one to accompany the child for vaccination during those hours, 4.3% unavailability of vaccines which may be due to lack of supply or failure of cold chain, 2.9% adverse reactions following vaccinations which can raise fear in the

minds of mothers, 9.3% child was sick , 4.7% were not aware of vaccination , 2.5% had some religious believes hampering vaccinations. All these factors strongly influenced delayed immunization.

Conclusion and Recommendations:
In this study, an unexpectedly high proportion of delayed immunization was found in male children, children of upper class, in children of graduate mothers. Also, factors like inconvenient timings of OPD, adverse reactions following immunization, etc strongly influenced delayed immunization. The study underlines the need to encourage mothers for on time immunization through rigorous immunization awareness/campaigns on benefits of immunization in the form of posters, advertisements, etc.

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