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Original Research Article

Limiting factors for snail's pace success of immunization

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ABSTRACT

Background: The practice of immunization dates back to hundreds of years. Buddhist monks drank snake venom to confer the immunity against snake bite. World Health Organization (WHO) covers broad scope of global activities in order make the globe free of vaccine preventable diseases. Many surveillance activities are going on, in order to fulfill the aim of disease free globe.
Methods: Children admitted to the Pediatric ward of Belgavi Institute of Medical Sciences were enrolled and parents/ guardians were enquired about the vaccination the child received and their knowledge about immunization and interpretation was done to find out the reasons for snail's pace of successful elimination of the vaccine preventable diseases.
Results: Out of 630 participants, 364 had partial immunization and 12 (1.9%) were un- immunized. Poor knowledge being the first reason found in 247 (67.9%) children. No visit by the health worker was the 2nd reason found in 220 (60.4%) children and child illness was the third reason in 116 (31.9%) children.
Conclusions: In order to increase the rates of immunization in the community, improving the knowledge of community, about the benefits of immunizing their children as well as empowering the grass root health workers in immunizing the children of their locality can help us achieve a nation free of vaccine preventable diseases.

Keywords: Complete immunization, Partial immunization, Un-immunization

INTRODUCTION

Vaccines are major contribution to public health. Vaccine preventable diseases like Diphtheria, Tuberculosis, Pertussis, Tetanus, Measles, Polio, rubella, hepatitis B. etc. are still responsible for around 5 lakh deaths with significant annual deaths of under five children in India.[1]

The higher prevalence of vaccine preventable diseases despite of enormous investment of money, human resources and the time in immunization programs necessitates the need for Surveillance of implantation of immunization program. Therefore, creating epidemiological database and surveillance system becomes a pre-requisite for the successful immunization.[2]

Thus the objective of this study is to conduct a study utilizing the admitted children in hospital, to find out the reasons in detail for not immunizing the children completely.

METHODS

Study type

A cross sectional study.

Study place

Belagavi Institute of Medical Sciences BELAGAVI. Karnataka. India.

Study period

August 2018 to July 2019.

Selection criteria of the patients

Inclusion criteria

All the children aged less than 16 years admitted in Pediatrics ward in BIMS, Belagavi.

Exclusion criteria

Children enrolled during previous visit.

Procedure

The data was collected by interviewing the parents/guardians accompanying all the children below 16 years of age admitted in Pediatrics department, BIMS hospital, Belagavi - a teaching hospital.

630 children were enrolled into the study after obtaining a written consent from parents/ guardians. Children particulars like name, age, sex, address, religion and socioeconomic class [modified Kuppuswamy classification] were documented.[7] The immunization history was obtained from parents [guardians] using a pre-tested questionnaire. The evaluation of immunization was done according to Universal Immunization Programme. Any document pertaining to immunization like Tayi card/ health card were considered for a reliable immunization history. In the absence of the same, parents' [guardians'] history was relied upon. Other methods of assessment were, looking for BCG scar, the month in which the vaccines were given and if given, how many were given, the site of vaccine and whether vitamin A was given along with vaccine. The child's immunization status was then classified as completely immunized if the child had received all doses of vaccine according to Universal Immunization Programme. Classified as partially immunized, even if a single dose as per his/her age was missed and classified as un-immunized if the child failed to receive even a single vaccination dose. In case, the child was partially / un- immunized then, an effort was made in detail to know the various reasons for not immunizing the child. Overall assessment was made to find out the reasons for failing immunization.

Ethical approval

Ethical approval was taken from the Ethical committee of Belagavi Institute of Medical Sciences. Belagavi.

Statistical analysis

Data was entered into Microsoft excel data sheet and was analysed using Statistical package for social sciences (SPSS) 22 version software.[3] Categorical data was represented in the form of frequencies and proportions. Continuous data was represented as mean and standard deviation.[4]

Graphical representation of data

Microsoft excel and Microsoft word was used to obtain various types of graphs such as bar diagram, pie diagram.

p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.[5]

Statistical software

MS excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data.[6]

RESULTS

Table 1 shows the various socio-demographic factors of 630 children enrolled in our study along with important information that only 56.7% possessed the immunization document.

Table 1: Sociodemographic factors.

Socio-demographic factors		Number of children	%
Age (in years)	<1	260	41.3
	1-5	234	37.1
	6-10	87	13.8
	11-16	49	7.8
	Total	630	100
Sex	Male	345	54.8
	Female	285	45.2
Domicile	Urban	112	17.8
	Rural	518	82.2
Immunization document possessed?	Yes	357	56.7
	No	273	43.3

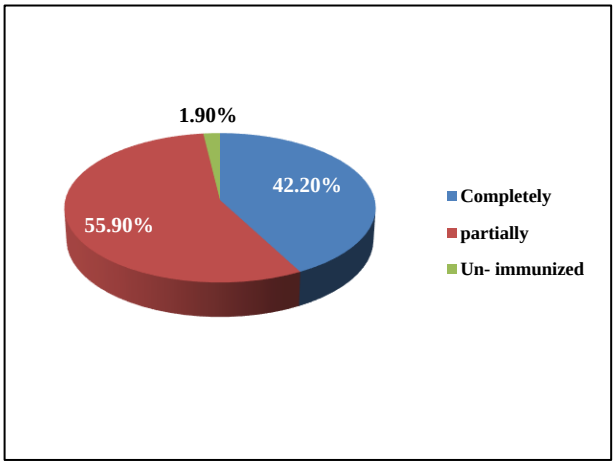

Figure 1: Immunization status among children.

Figure 1 shows that though large number of children are immunized, most are partially immunized 352 (55.90%) and only 266 (42.20%) are completely immunized.

Table 2 shows a significant 'p' value and as the age increased number of completely immunized children decreased while that of partially immunized increased indicating decreased immunization in older children.

Table 2: The association of age with immunization status.

Age (years)	Completely immunized	Partially immunized	Un-immunized	Total
	N (%)	N (%)	N (%)	N (%)
< 1	105 (40.4)	154 (59.2)	1 (0.4)	260 (100)
1 to 5	129 (55.1)	98 (41.9)	7 (3.0)	234 (100)
6 to 10	25 (28.7)	58 (66.7)	4 (4.6)	87 (100)
11 to 16	7 (14.3)	42 (85.7)	0 (0.0)	49 (100)
Total	266 (42.2)	352 (55.9)	12 (1.9)	630 (100)

χ 2 =49.44, df =6, p <0.001*

Table 3: The association of sex with immunization status.

		Complete (C)	Partial (P)	Un-immunized (U)	Total
		N (%)	N (%)	N (%)	N (%)
Sex	Female	136 (47.7)	142 (49.8)	7 (2.5)	285 (100)
	Male	130 (37.7)	210 (60.9)	5 (1.4)	345 (100)
	C/P/U	266 (42.2)	352 (55.9)	12 (1.9)	630 (100)

χ 2 =7.963, df =2, p =0.019*, shows a significant 'p' value and females outnumbered males in complete and un-immunization.

Table 4: The association of rural/urban residence with immunization status.

	Completely immunized	Partially immunized	Un-immunized	Total
	N (%)	N (%)	N (%)	N (%)
Rural	198 (38.22)	311 (60.04)	9 (1.74)	518 (82.22)
Urban	68 (60.71)	41 (36.61)	3 (2.68)	112 (17.78)
Total	266 (42.22)	352 (55.87)	12 (1.9)	630 (100)

X^2=20.509 and p<0.001 *, shows a significant 'p' value and urban children were better immunized than rural children.

Table 5: The association of socio-economic status (modified kuppuswamy classification) with immunization status.[7]

Immunization status	Modified Kuppaswamy Classification				
	Class 2	Class 3	Class 4	Class 5	Total
	N (%)	N (%)	N (%)	N (%)	N (%)
Completely immunized	0 (0.0)	18 (52.9)	193 (46.2)	55 (31.1)	266 (42.2)
Partial immunized	1 (100.0)	16 (47.1)	221 (52.9)	114 (64.4)	352 (55.9)
Un- Immunized	0 (0.0)	0 (0.0)	4 (1.0)	8 (4.5)	12 (1.9)
Total	1 (0.2)	34 (5.4)	418 (66.4)	177 (28)	630 (100)

χ2 =20.89, df=6, p=0.002*, shows a significant 'p' value and children of higher socioeconomic class had better immunization status. (Better SES) class 1 > class 2 > class3 > class 4> class 5 (Poor SES).

Table 6: The association of possession of immunization document with immunization status.

Immunization Document	Completely immunized N (%)	Partially immunized N (%)	Un-immunized N (%)	Total N (%)
Yes	172 (48.2%)	183 (51.3%)	2 (0.5%)	357 (56.7%)
No	94 (34.4%)	169 (61.9%)	10 (3.7%)	273 (43.3%)
Total	266 (42.2%)	352 (55.9%)	12 (1.9%)	630 (100%)

X^2=17.88 and p<0.001 *, shows a significant 'p' value and children who possessed immunization document had better immunization status.

Table 7: Association of place of delivery with immunizaton status.

Place of delivery	Completely immunized	Partially immunized	Un- immunized	Total
	N (%)	N (%)	N (%)	N (%)
Hospital	261(43.94)	330 (55.56)	3 (0.51)	594 (94.29)
Home	5 (13.89)	22 (61.11)	9 (25)	36 (5.71)
Total	266 (42.22)	352 (55.87)	12 (1.9)	630 (100)

X^2 =114.368 and p<0.001*, shows a very significant 'p' value and children born at Hospital were better immunized.

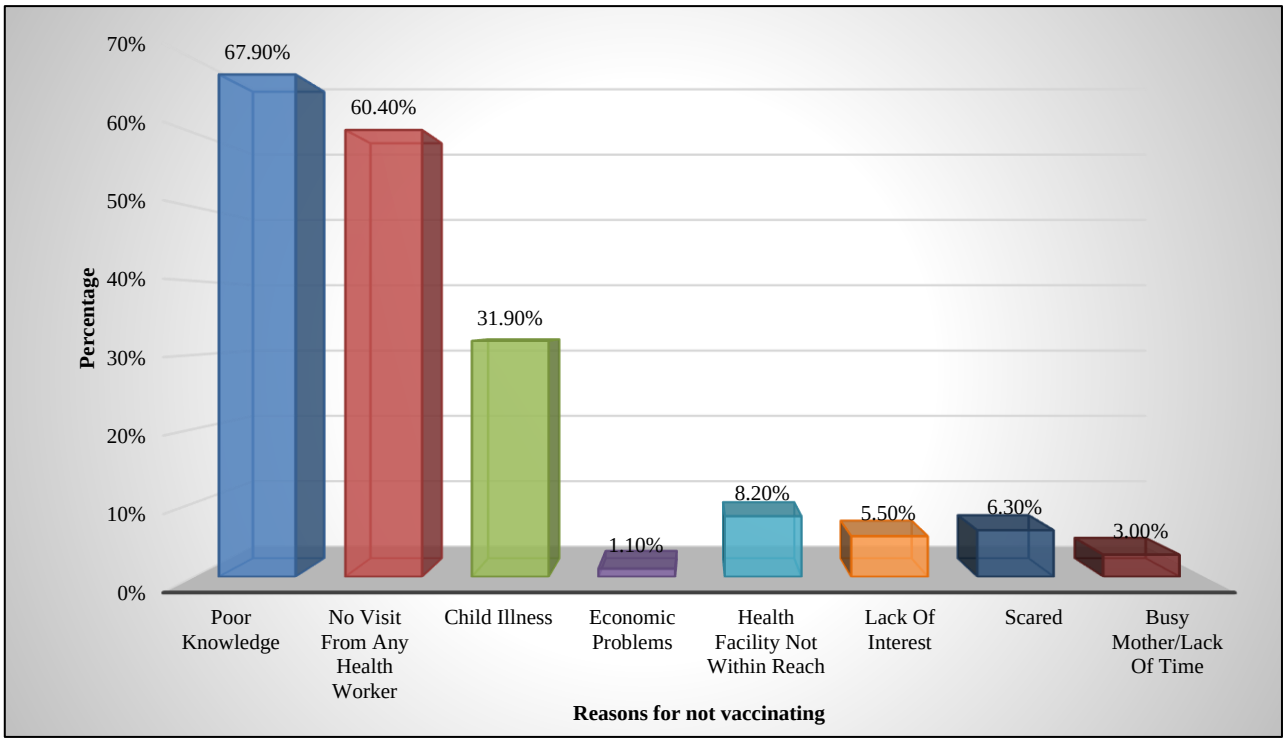

Figure 2: Reasons for partial and un-immunization.

Figure 2 shows that, in our study, most common reason for not vaccinating the children were, poor knowledge 247 (67.9%), no visit from any health worker 220 (60.4%), child illness116 (31.9%) and others.

DISCUSSION

Tracking and sharing information gives a vital tool for understanding immunization coverage. Statistics on the immunization trends are used to monitor the performance of services at local, national and international levels. They guide campaigns to eradicate polio, control measles and eliminate neonatal tetanus. They find the weak parts of the system and reveal the areas where focused attention and extra resources may be required. When deciding whether to introduce or withdraw a vaccine, immunization levels and trends are one of important considerations.[8]

Different methods are being tried to get information about the immunization status. Agencies like the (Global Alliance for Vaccines and Immunization) GAVI Alliance, often consider immunization coverage levels, when reviewing applications for financial and technical support, although coverage estimates alone are insufficient to constitute a sole criterion for determining whether a national immunization program has achieved certain performance levels.[9]

As per NFHS (National Family Health Survey), NFHS-2 (1998-99) showed 42%, NFHS-3 (2005-06) showed 43.5% and NFHS-4 (2015-16) showed 60.2% immunization coverage. As per this, there was slight improvement from NFHS 2 to NFHS 3. But significant increase of immunization coverage from NFHS 3 to 4 was noticed.[10,11] However unlike our study, which is a hospital based study and covers 1 to 16 years of age, NFHS Data covers the age group of 12-23 months only, and is a community based study as in most of other studies.

Studies carried out in different parts of U.P. and adjoining states of North India, observed complete immunization rates of 30%, 44% and 33.3%. Interestingly, the studies conducted in and around Delhi showed higher rates, varying from 69% to over 71%, though one of them had a figure as low as 25%.[12-14]

Immunization status among the children

Recent immunization coverage evaluation survey, has shown some improvement in the all-India immunization coverage levels.[18] National Family Health Survey had also reported that; proportion of fully immunized children had increased from 36% in 1st survey (1992) to 42% in 2nd survey (1998). From 43.5% in 3rd survey (2006) to 60.2% in 4th (2016) survey. But these figures vary widely across regions, states and strata of society depending on socioeconomic factors and availability of health care facility.

In our study 266 (42.2%) children were fully immunized comparable to a study done by Nath B et al at Lucknow, where 44% were completely immunized and Aggarwal et al, where 41.4% were completely immunized.[16,20] But in a study conducted by Kumar et al only 17.84% were completely immunized.[19]

Age of the child

In our study, first age group (<1 year) and second age group (1-5years), showed complete immunization of 105 (40.4%) and 129 (55.1%) respectively. Whereas, it sharply decreases in third (6-10 years) and fourth age groups (11-16 years) that is 25 (28.7%) and 7 (14.3%) respectively. This observation shows an important inference that, the immunization of children at younger age is better than later in their age. Hence there is a need to promote booster vaccination. Similar results were noted in the study conducted by Agarwal et al.[10]

Sex of the child

A feature of developing countries particularly worrying is, the adverse ratio of the number of women to that of men. Gender discrimination is seen and a higher value is accorded to the male child in our society. Thus the girl child is one of the most deprived groups, not only in terms of social status and access to education but also nutrition and health. In our study, among 285 females, 136 (47.7%) were completely immunized, 142 (49.8%) were partially immunized and 7 (2.5%) were un-immunized. Among males (345), 130 (37.7%) were completely immunized, 210 (60.9%) were partially immunized and 5 (1.4%) were un-immunized. These results are contradictory to studies conducted by Yadav et al, who stated that the coverage levels in males (63.7%) were better than in females (57.1%), and also study conducted by Kar, et al, which revealed 70.7% of males were fully immunized compared to females where 29.3% were immunized.[7,21,47] Study by Nirupam et al, revealed males (39%) had better immunization than females (30%).[21]

Residence

There is difference between rural and urban population, in various factors like literacy, socioeconomic levels, occupation, access to health facility etc.

Our study shows that children from urban localities were better completely immunized 68 (60.71%) than rural localities 198 (38.22%) similar to study conducted by Dharwad et al, in Shimla which showed 84.3% of urban and 57.5% of rural children were fully immunized.[23]

Another study conducted by Bashir in Kargil also showed better immunization among children of urban (72%) than rural (62%).[24] Study by Singh et al revealed that Urban children (74%) outnumbered rural children (69%) in attaining the higher immunization level.[5] In all the above-mentioned studies, immunization of children from urban locality outnumbers that of rural localities. Hence immunization is better in urban areas than rural areas, probably due to easy accessibility and better health care facility, better health awareness and higher standard of living.

Socioeconomic status

In our study, we found that the immunization rates increased with better socioeconomic status. Children belonging to medium (85%) and high socioeconomic status (90%) tend to have 10% to 15% higher levels of immunization coverage compared to children of low socioeconomic status (71.7%) as mentioned in a study conducted by Khokar et al.[13]

Possession of immunization document

In a study conducted by, Saxena et al 31.8% possessed immunization cards and Kumar et al study showed 74.4% had immunization cards and concluded that the immunization cards were found in a higher percentage of completely immunized than in partially and non-immunized children.[15,19] Similar results were found in our study in which among those who were completely immunized, 172 (48.2%) possessed immunization document and 94 (34.4%) did not possess immunization document. Out of 630 children, 357 (56.7%) possessed immunization document. Among them, 172 (48.2%) were completely immunized, 183 (51.3%) were partially immunized and 2 (0.5%) were un-immunized. Out of 273 (43.3%) who did not possess any immunization document, 94 (34.4%) were completely immunized, 169 (61.9%) were partially immunized and 10 (3.7%) were un-immunized. This shows that rates of complete immunization were higher among those who possessed immunization document and rates of partial and un-immunization was higher among those who did not possess any immunization document.

Place of birth

Present study shows that the immunization status of children has significant association with place of delivery. Our study shows that children born at hospital 261 (43.94%) were better immunized than those born at home 5 (13.89%) which is similar to study conducted by Chhabra et al.[25] in villages of Delhi, where 58.2% of

hospital born and 34.6% of home born children were fully immunized. Both the above studies are comparable in the fact that hospital born children are more likely to receive complete immunization than those born at home.

Reasons for not vaccinating the child

Our study revealed that the common reasons for not vaccinating the children were poor knowledge 247 (67.9%), no visit from health worker 220 (60.4%) and child illness 116 (31.9%).

Reasons for not vaccinating a the child revealed by our study were comparable to study conducted by Kurane.[26] In a study by Kurane et al, the various reasons were poor knowledge about immunization schedule in 191 (18.32%), unwell child in 109 (16%), lack of interest in 77 (11%), misconception in 32 (4.5%), health facility not within reach in 7 (1%), time in-convenience in 74 (10%), concern for loss of wages in 105 (15%), busy parents in 140 (20%) and scared for adverse effects following immunization in 154 (22%).

In our study, out of 364 who were partially and un-immunized, poor knowledge about the immunization and vaccination schedule was the most common reason 247 (67.9%), no visit from health worker was the second most common reason 220 (60.4%) and child illness 116 (31.9%) was the third most common reason for not vaccinating a child. Children having minor illnesses can be given the immunization. Minor illnesses like mild fever, cold are not the contraindications for vaccination.[27] The fourth common cause was Health facility not within reach 30 (8.2%), when the parents lived in fields they could not bring the child to the health facility for vaccination. 23 (6.3%) of the parents were scared of the side effects of vaccination like BCG adenitis, convulsions after DPT vaccine. 20 (5.5%) had missed immunization, this was due to death of either parent.11 (3%) missed the vaccination because the mother was busy. 4 (1.1%) Children also missed the immunization since parents had to lose their daily wages. Other reasons were misconceptions in 2 (0.5%), 2 (0.5%) parents thought that the vaccine would be given in the school and hence no need to get vaccination and Multiple reasons in 17 (4.7%).

Limitations of the study

As this is a hospital-based study, it does not represent the community. Documentary evidence was not available in 273 (43.3%) children.

CONCLUSION

Our study is an effort to improve the rates of complete immunization by studying the children admitted in our hospital which concludes that since the main reasons for failure of immunization were poor knowledge of parents and not being visited by health workers, improving the knowledge and hence changing the attitudes of the parents and the grass root workers and the community at large, the community can be completely immunized against vaccine preventable diseases. Various activities like education, media, advertising benefits and safety of immunization at public places, sending reminders to parents and health workers by using MCTS (Mother and Child Tracking System) number etc can be undertaken.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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