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Study on Knowledge, Attitude and Practices concerning Immunization of under-five children in rural areas of Nalgonda

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ABSTRACT

Background: According to WHO records, 10.6 million children die yearly before the age of 5; while an estimated 1.4 million of those are due to diseases that could have been prevented by vaccines. Aim of this study is to assess the factors affecting immunization coverage of under 5 children in rural Nalgonda. **Materials and Methods:** The present study was a community based cross sectional study conducted in rural field practice areas of Kammineni Institute of Medical Sciences (KIMS) which is a private medical college in Nalgonda under the department of Community Medicine from July to September. 231 subjects were included in the study. Two stage random sampling technique was used to select the sample size. **Results:** It was observed that among 231 children, 208 were fully immunized while 15 were partially immunized and 8 were unimmunized. Male child was more fully immunized compared to the female child. This difference was found to be statistically significant. It was found that the first children of the family were more fully immunized compared to their other siblings. This association was found to be statistically significant. **Conclusion:** 90% of the children were fully immunized. Male children, first born children, Children of Literate and employed care takers have better immunization status compared to their counter parts. The care takers who were informed about immunization, who believed in it and who possess MCP card positively associated with full immunization status.

Key-words: Under-five children, Care takers, Immunization coverage, Socio-demographic factors, Rural areas

INTRODUCTION

Immunization is a powerful public health strategy for improving child survival, not only by directly combating key diseases that kill children but also by providing a platform for other health services.¹ Unlike most other health and development interventions, immunization does not just raise the chances that children will resist a disease, it virtually guarantees they will.² The historical success of eradicating the dreaded disease, Smallpox, prompted World Health Organization (WHO) to ask its member countries to launch immunization against six vaccine preventable diseases in its national immunization schedule. In May 1974, the WHO launched the Expanded Immunization Programme (EPI) globally, with focus on prevention of 6 vaccine-preventable diseases by the year 2000. In India, EPI was launched in 1978 and it was re-designated as the Universal Immunization Programme (UIP) in 1985, with a goal to cover at least 85% of infants.³ India has one of the lowest immunization rates worldwide despite a longstanding UIP that provides free childhood vaccines.⁴

According to WHO records, 10.6 million children die yearly before the age of 5; while an estimated 1.4 million of those are due to diseases that could have been prevented by vaccines.^{5,6} Worldwide, vaccines can save more than 3 million lives yearly; in addition to protecting million more people from diseases and disability.⁷

Providing community members with information on immunization, health education at facilities in combination with redesigned immunization reminder cards, regular immunization outreach with and without household incentives, home visits, and integration of immunization with other services may improve childhood immunization coverage in Lower- middle income countries.¹ Proper knowledge and practices of caretakers is essential to prevent under vaccination.⁸

Children are considered fully immunized if they receive one dose of BCG, three doses of DPT and polio vaccine each, and one measles vaccine within one year of age. In India, only 44% of children aged 12–23 months are fully vaccinated and about 5% have not received any vaccination at all.⁹ Against this backdrop of low vaccination coverage, significant variation exists in the estimated coverage for children aged 12–23 months across the 34 Indian states and Union Territories.

According to National Family Health Survey-4(2015-16) only 67.8% children of age 12-23 months were fully immunized (BCG, Measles and three doses each of polio and DPT) among urban population in Telangana while 68.3% were immunized among rural population.¹⁰ Aim of this is to study society's awareness about child vaccination and will also assess exposure to vaccine-safety-related information, concerns regarding vaccine safety, and

immunization-related knowledge, attitudes, and practices of parents and providers of children. Hence aim of this study is to assess the factors affecting immunization coverage of under 5 children in rural Nalgonda. Objectives of this study are 1) to determine the knowledge, attitude and practices with respect to immunization among respondents (mothers/ responsible guardians) of children aged below 5 years residing in rural practice area of Nalgonda. 2) to correlate demographic, social, maternal and infant related factors associated with incomplete immunization.

MATERIALS AND METHODS

The present study was a community based cross sectional study conducted in rural field practice areas of Kamineni Institute of Medical Sciences (KIMS) which is a private medical college in Nalgonda under the department of Community Medicine from July to September (2 months). The study population were care takers of under five children. Based on non-immunization reported by NFHS-4 (31.7%) sample size of the study is 203 with 20% of relative precision and 95% confidence level. 231 care takers of under five children were participated in the study. Two stage random sampling techniques used to select the sample size. There were 11 villages under RHTC of KIMS. In stage 1 five of eleven villages under RHTC were randomly selected and in stage 2, 231 care takers with children under the age of five were selected randomly and their addresses were noted using under five registers at Anganwadi center. Each care taker was contacted personally and information was obtained using semi-structured questionnaire. **Inclusion Criteria:** 1) Respondents (mothers/responsible guardians) of children under the age of five years. 2) Caretakers of both male and female children. 3) Permanent residents of selected villages. **Exclusion Criteria:** 1) Caretakers who did not consent. 2) Those who were not available even after two visits to their residence. **Data collection:** After taking informed consent, each study subject was interviewed using an oral pre tested, structured questionnaire which was formulated prior to the start of the study. A detailed demographic profile which included age and gender of the child; age, gender, marital status, relation to the child, religion, educational status and occupation of the care taker; family size, family type and family income was taken. Calculation of per capita income and classification of socio economic status was done as per revised B.G Prasad’s social classification¹¹

Data was also collected regarding the birth order of the child, belief in vaccination, place of vaccination, immunization status of the child, contraindication of vaccines and reasons for incomplete immunization and vaccination cards/MCP cards (Mother-child protection card).

The following definitions were used to classify immunization status¹²:

Fully immunized- A child who had completed the recommended EPI immunization schedule of

BCG, Hepatitis B, Pentavalent, IPV, Rota and OPV (3 doses) and measles vaccine before one year of age.

Partially immunized- A child who was not yet fully immunized

- a) Partially immunized but ‘up to date’: Child who had received immunization for which he/she was eligible by age criteria and
- b) Partially immunized and not ‘up to date’; child had not complete the doses of vaccine for his/her age as per schedule.

Unimmunized- A child who had not yet received any vaccine for the age, though eligible.

Data analysis: The data collected through a questionnaire was compiled on windows- EXCEL and analyzed by using SPSS 23rd version statistical software. Appropriate tests of statistical significance (chi square) were carried out to identify associations and results have been tabulated. **Ethical consideration:** Approval of Institutional Ethics Committee was obtained prior to the study. Informed consent from respondents was taken prior to the study. Education was provided to all the subjects in the study regarding the importance of immunization.

OBSERVATIONS AND RESULTS

From the table 1 it was observed that among 231 children, 208 were fully immunized while 15 were partially immunized and 8 were unimmunized.

Table 1: Immunization status of under five children in rural nalgonda. (n=231)

Variable	Number of children	Percentage
Fully immunized	208	90
Partially immunized	15	6.5
Unimmunized	8	3.5
Total	231	100

Table 2: Association of sociodemographic variables of the child with immunization status.

Socio demographic Variable	Fully immunized	Partially and non-immunized	Total subjects	‘p’ value, ODDs ratio and 95% CI	
Sex of the child	Male	119 (98.3%)	2 (1.7%)	121 (100%)	<0.001*
	Female	89 (80.9%)	12 (19.1%)	110 (100%)	
Birth order of the child	First	122 (96.1%)	5 (3.9%)	127 (100%)	<0.001*
	Second	73 (83.0%)	15 (17.0%)	88 (100%)	
	Third	13 (86.7%)	2 (13.3%)	15 (100%)	
	Fourth & above	0 (0.0%)	1 (100.0%)	1 (100%)	

*statistically significant

From the table 2 it was found that the male child was more fully immunized (98.3%) compared to the female child (80.9%). This difference was found to be statistically significant. It was found that the first children (96.1%) of the family were more fully immunized

compared to their other siblings. This association was found to be statistically significant.

Table 3: Association of sociodemographic variables of the caretaker with immunization status.

Socio demographic	Fully immunized	Partially immunized	Total (100%)	'p' value,OD Ds ratio and 95% CI
Age				
<20 Yrs	3 (75%)	1 (25.0%)	4	0.254
20-30 Yrs	179 (89.5%)	21 (10.5%)	200	
30-40 Yrs	22 (100%)	0 (0.0%)	22	
>40 Yrs	4 (80.0%)	1 (20.0%)	5	
Relation to the child				
Mother	195 (89.9%)	22 (10.1%)	217	0.346
Father	10 (100%)	0 (0.0%)	10	
Other	3 (75.0%)	1 (25.0%)	4	
Gender				
Male	13 (100%)	0 (0.0%)	13	0.217
Female	195 (89.4%)	23 (10.6%)	218	
Religion				
Hindu	200 (90.1%)	22 (9.9%)	222	0.906
Others	8 (88.9%)	1 (11.1%)	9	
education				
Illiterate	27 (81.8%)	6 (18.2%)	33	0.088
Literate	181 (91.4%)	17 (8.6%)	198	
occupation				
Employed	58 (100%)	0 (0.0%)	58	0.003*
Unemployed	150 (86.7%)	23 (13.3%)	173	
Family size				
≤4	111 (96.5%)	4 (3.5%)	115	0.01*
>4	97 (83.6%)	19 (16.4%)	116	
Family type				
Nuclear	137 (92.6%)	11 (7.4%)	148	0.182
Joint	69 (85.2%)	12 (14.8%)	81	
Three generation	2 (100%)	0 (0.0%)	2	
Upper	2 (100%)	0 (0.0%)	2	
Socio-economic status				
Upper middle	44 (97.8%)	1 (2.2%)	45	0.030*
Middle	69 (90.8%)	7 (9.2%)	76	
Lower middle	53 (82.8%)	11 (17.2%)	64	
Lower	19 (90.0%)	4 (10.0%)	23	

*statistically significant

Figure 1. Immunization status of under five children in rural Nalgonda

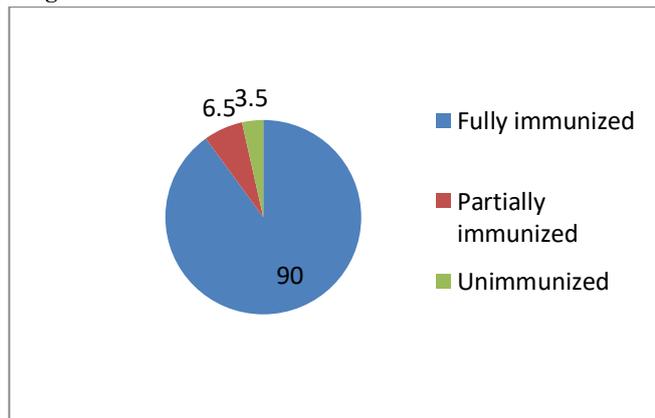


Table 4: Association of other factors with immunization status.

Other factors	Fully immunized	Partially immunized	Total	'p' value,OD Ds ratio & 95% CI
MCP card				
Present	197 (92.9%)	15 (7.1%)	212 (100%)	<0.001*
Absent	11 (57.9%)	8 (42.1%)	19 (100%)	
In favor of vaccination				
Yes	208 (97.7%)	5 (2.3%)	213 (100%)	<0.001*
No	0 (0.0%)	7 (100%)	7 (100%)	
Do not know	0 (0.0%)	11 (100%)	11 (100%)	
Government hospitals	190 (92.7%)	15 (7.3%)	205 (100%)	
Place of immunization				
Private clinics	15 (100%)	0 (0.0%)	15 (100%)	<0.001*
Both	3 (100%)	0 (0.0%)	3 (100%)	
Belief if vaccination prevents disease				
Yes	202 (97.6%)	5 (2.4%)	207 (100%)	<0.001*
No	2 (22.2%)	7 (77.8%)	9 (100%)	
Do not know	4 (26.7%)	11 (73.3%)	15 (100%)	
Belief if vaccination is harmful				
Yes	3 (15.8%)	16 (84.2%)	19 (100%)	<0.001*
No	205 (97.2%)	6 (2.8%)	211 (100%)	
Do not know	0 (0.0%)	1 (100%)	1 (100%)	
Informed about vaccination				
Yes	208 (90.4%)	22 (9.6%)	230 (100%)	0.001*
No	0 (0.0%)	1 (100%)	1 (100%)	
Source of information about vaccination				
ANM/A SHA	188 (94.0%)	12 (6.0%)	200 (100%)	<0.001*
Others	20 (64.5%)	11 (35.5%)	31 (100%)	

*= Statistically significant.

From the table 3 it was observed that the association between age of the caretaker and immunization status of the child was found to be statistically insignificant. It was found that male caretakers (100.0%) immunized their children more fully as compared to their female counterparts (89.4%). This association was shown statistically insignificant. All the children who had their fathers as caretakers were fully immunized while it was not the same with the mothers (89.9% of the children were fully immunized) or any other care takers (75.0% of the children were fully immunized). However, this correlation was not found to be statistically significant. A higher immunization coverage was seen in Hindus (90.1%) in comparison with the other religions (88.9%). This association was not statistically significant. Caretakers who were literate showed a better rate of immunization (91.4%) than the illiterate ones (81.8%). This association was not statistically significant. All the caretakers who were employed had their children fully immunized in contrast with the unemployed caretakers (86.7% of them showed a full immunization status of their children). This correlation was found to be

statistically significant. Families comprising 4 or less members showed higher immunization (96.5%) coverage as compared to families with members more than 4 (83.6%). This difference was found to be statistically significant. The association between immunization coverage and family type is summarized in table 5. This association was found to be statistically insignificant. It was found that 100.0% of upper socio economic class, 97.8% of upper middle class, 90.8% of middle class, 82.8% of lower middle class and 90.0% of lower class showed a full immunization status (Table 5). This association was found to be statistically significant. (p=0.030).

It was observed from the table 4 that a better immunization coverage was seen in families that had an MCP card in comparison with the families that did not have one (table 4). The difference was found to be statistically significant. Caretakers who were more in favor of vaccination got their children more fully immunized in comparison to those who weren't. This difference was found to be significant. Caretakers who got their children vaccinated at a private set up showed 100% full immunization while the caretakers that got their children vaccinated at a government set up showed a lesser full immunization (92.7%). This difference was found statistically significant. Caretakers who believed that vaccination prevents diseases (97.6%) got their children more fully vaccinated in comparison to those who do not (22.2%). This association was found to be significant. Caretakers who believed that vaccination is not harmful (97.2%) got their children more fully vaccinated in comparison to those who believed it was (15.8%). This association was found to be significant. Caretakers who were informed about vaccines showed a better immunization rate compared those who weren't. This association was found to be significant. The caretakers who were informed by ANM/ASHA got their children fully immunized more (94.0%) when compared to caretakers informed by other sources (64.5%) and this was found to be significant statistically.

DISCUSSION

Childhood immunization almost guarantees protection from many major diseases. It prevents 2 million deaths per year worldwide and is widely considered to be 'overwhelmingly good' by the scientific community.^{14,15} However, 2.5 million deaths a year continue to be caused by vaccine preventable diseases, mainly in Africa and Asia among children less than 5 years old.¹⁴

Thus, there is an urgent need to find ways to increase vaccination coverage and particularly to encourage parents to have their children vaccinated.¹⁶

The principal motive behind conducting this study was to assess the factors that influence the immunization coverage in rural Nalgonda of Telangana.

In this study, 90% (98.3% males and 80.9% females) of the children were fully immunized while 6.5% were partially immunized and 3.5% were unimmunized. This finding was higher compared to National Family Health

Survey-4(2015-16) which revealed that 68.3% were immunized among rural population of Telangana.¹⁰ Although, the rate of immunization obtained from this study was higher than that expected, there is a significant degree of gender bias, poor knowledge and misbelief in regard of immunization. The caretakers of the children may be targeted and educated regarding the benefits and efforts may be made to eradicate the false beliefs of the parents regarding the ill-effects in order to achieve 100% immunization of the society.

Sex of the child: In this study, it was found that the male children were more fully immunized (98.3%) compared to the female children (80.9%). This was in line with a study by Corsi et al whose findings indicated that, at the national level, girls have lower immunization coverage than boys. Gender differences in vaccination coverage are consistent and significant, but do not appear to have increased over time. Girls' coverage for every vaccine (antigen) lags behind boys' coverage in all years, but neither gender displays acceptable age-appropriate coverage levels for any vaccine (antigen).¹⁷ Another study by Singh PK et al showed that despite a decline in urban-rural and gender differences in immunization coverage, children residing in rural areas and girls remain disadvantaged. The inequality trend in immunization coverage implies that the increase in average immunization may not essentially assure the universal and equitable coverage of immunization services, especially to the poor or underserved groups¹⁸, in this case, rural children and girls. This difference in gender may be due to the male preference in the rural areas. In contrast, a study done by Angadi et al showed that the gender of the child was not significantly associated with the immunization status.¹³

Birth order of the child: In the present study, it was found that the first born child of the family was more fully immunized compared to children of higher birth orders. A similar kind of study done in Italy by Angelillo et al indicated that the birth order of the children predicts whether the children were age-appropriately vaccinated according to the mandatory vaccination programme. Indeed, for the children in the study, adherence to the vaccination schedule significantly decreased with the increasing number of older siblings.¹⁹ The association between family attributes and age-appropriate vaccination has already been reported previously in studies that have demonstrated a strong negative association between family size (a variable related to birth order) and vaccination status, since children from larger families are less likely to adhere to the mandatory vaccination schedule.^{20,21,22,23} This trend may have been observed because as the number of children increases, the burden on the family also increases too leading to the younger children being ignored.

Age of the caretaker: In our study, the caretakers belonging to the age group 30-40 years showed a better response in the immunization of their children compared to the caretakers of other age groups. A study conducted in Nigeria by Adenike et al showed a similar response

with majority of the respondents, both at the rural and urban areas being within the age range 26-30 years. The mean age was 31.40 ± 7.21 years in the rural area and (32.72 ± 6.77) years in the urban area.²⁴ However, a study conducted by Mareena et al showed that majority of the mothers belonged to the age group 26-30 (50.3%) and that the age of the mother significantly affects the knowledge regarding immunization.²⁵

Gender of the caretaker: It was found that male caretakers immunized their children fully as compared to their female counterparts. This association was shown statistically insignificant in accordance with a comparative study between India and Pakistan conducted by Subhani et al showed that in Pakistan, the female heads of the family had 0.645 less chance to immunize their children compared to the male heads while the situation in India was different as the female heads 1.140 more likelihood to immunize their children compared to the male heads.¹¹

Sex of the household head was found as a significant predictor of immunization as seen in studies conducted by Babalola in one of his studies.²⁶

Relation of the caretaker to the child: All the children who had their fathers as caretakers were fully immunized while it was not the same with the mothers (89.9% of the children were fully immunized) or any other care takers (75.0% of the children were fully immunized). However, this association was not found to be statistically significant. This was in contrast to a study conducted by Sharma et al which showed that mothers were significantly more likely to be aware about the day of routine immunization (RI) in the week, the number of visits required in infancy and the diseases covered under the RI programme in Delhi likely due to the small size of the study population.²⁷

Religion of the caretaker: A higher immunization coverage was seen in Hindus in comparison with the other religions. When the tests for statistical significance were applied, it was found not statistically significant. Previous vaccination studies^{28,29} that investigated effects of religion on vaccination coverage concluded that non-Hindu religions have poor vaccination outcomes. The lower coverage of full immunization among children of non-Hindu (Muslim) religion is probably because of some parents' mistaken beliefs on the ill-effects of vaccination.²⁹

The effect of religion on immunization status were also summarized in studies conducted by Joseph et al³⁰, Singh PK et al¹⁸ etc. This difference is observed because of a few orthodox beliefs that hinder the immunization of the child by preventing any form of medical intervention.

Education of the caretaker: literate caretakers showed a better rate of immunization of their children than the illiterate ones but this association was not statistically significant. As stated by K.Vikramet al³¹. this may be because educated mothers may have better knowledge of good medical practices and thus be more aware of the benefits of medical care. Maternal education has often been suggested to be the single most important factor

explaining differentials in child health outcomes. Mothers' education leads to better human, social, and cultural capitals which then help increase immunization rates for their children. In a study conducted by Nenna TB et al³², it was found that most of the mothers had tertiary or secondary education. This seemingly high literacy level may have influenced the knowledge of the reason for immunizing children.

Occupation of the caretaker: It was found that employed mothers immunized their children more fully and this finding was significantly in line with the results of the studies conducted by Adenike et al²⁴, Antai et al³³ showed that Mother's occupation is a factor that influences vaccination uptake and that being employed was significantly associated with higher likelihood of the child being fully immunized.

Socioeconomic status: The study revealed that children belonging to upper and upper middle classes showed a better immunization status. This was similar to results of a study by Joseph et al which indicated that monthly income of parents significantly affected the vaccination status. The number of partially vaccinated children was higher among parents having family income <10,000 Rs. per month. This is probably due to the fact that subjects of higher Socioeconomic classes have better access to health care facilities and hence the better immunization coverage.³⁰

MCP card: The presence of MCP card among the parents showed a higher full immunization coverage of their children but this parameter was not found to be statistically significant. A study by Birhanu in Ethiopia stated that as far as the practice on infant immunization is concerned, about 98.7% of mothers had and showed EPI card- an analogue of the MCP card on the spot of immunization.³⁴

Place of immunization: Caretakers visiting a private clinic showed 100% full immunization while the caretakers that got their children vaccinated at a government hospitals showed a lesser full immunization (92.7%) and this difference was found statistically significant. Joseph J et al in their study, reported that parents who attended private clinic were found to be aware of optional vaccines compared to parents who attended government hospitals. This knowledge has translated into practice as a higher proportion of parents (21%) who attended private clinic had opted for additional vaccines as compared to those who attended (6%) government hospital.³⁰ The reason for this could've possibly been the better availability of specific vaccines in those private institutions. However, this cannot be completely assessed due to the small sample size.

Belief if vaccination prevents diseases: The caretaker's belief in the potency of vaccination to prevent diseases significantly affected the immunization status. However, in a study done by Angadi et al, it was seen that although a vast majority of the respondents agreed on the fact that immunization was important to protect their children from diseases, most of them could not even name one disease that immunization provided protection against.¹³ Similar

findings were seen in the study conducted by Manjunath et al., who concluded that though many were aware of the importance of vaccination in general, specific information on importance of completing the schedule and knowledge on vaccine preventable diseases other than poliomyelitis were very limited.³⁵ In contrast, study by Benin et al, showed that the main reason for non-immunization of the child was the misbelief that the child would get the diseases anyway and that vaccine-preventable diseases are 'not so bad'.¹²

Belief if vaccination is harmful: In this study, the belief of the caretaker that immunization is harmful and the immunization status were insignificantly related. A study by Helen Petousis-Harris in New Zealand showed that caretakers expressed concern about the immediate pain associated with vaccination and fear that the vaccination could cause serious long-term damage to the child.³⁶

Source of information: ANM/ASHA workers acted as a major source of information regarding immunization and were responsible for a higher degree of full immunization status among the under-five children. Studies by Angadi et al¹³, BholaNath et al³⁷, MC Singh et al³⁸ and N Gulati et al³⁹ reported similar findings and stated that the sources of information regarding immunization among completely immunized children were found to be mainly health personnel and anganwadi workers.

Limitations: While the data collection was designed to be representing the rural population of Nalgonda, there could be some degree of bias in the sampling as only a few randomly selected caretakers were considered. This limits the insights that can be drawn from the data.

The data presented in the paper shows only the reality of the participating subjects and may not be extrapolated to the population as a whole.

CONCLUSIONS:It was concluded from the present study that 90% of the children were fully immunized. Male children had better immunization status compared to female children. First born children were showing better immunization status compared to children of other birth order. Children of Literate and employed care takers have better immunization status compared to illiterate and unemployed care takers. As family size and socioeconomic status were inversely associated with immunization status of children. The care takers who were informed about immunization, vaccines that prevent diseases, who believed in it and who possess MCP card positively associated with full immunization status of under five children.

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Limitations: Appropriate sampling method to assess the immunization coverage is cluster sampling technique. But because of logistics constraints two stage random sampling method was used to take the sample size.

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