

## Research Article

# Impact of gender and mother education status on the immunization status of children in rural areas of Bijapur district, Karnataka, India

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## ABSTRACT

**Background:** Every child has the right to know and be cared for by his or her parents. The responsibility for the child's well-being relies on both parents and the society. Since the ancient times, it is the gender that determines the position of a child in the Indian society. Gender is a common term whereas gender discrimination is meant for women, because females are more often the victims. Objectives of the study were to assess the impact of gender and mother education status on the immunization status of children in the rural areas of Bijapur district.

**Methods:** A community based cross-sectional study was conducted in the rural areas of Bijapur district from the 1<sup>st</sup> December 2013 to 30<sup>th</sup> November 2014. A total of 207 children in the age group of 12-23 months from the villages across the district were included in the study as per the immunization coverage guidelines. The data was collected in pretested, semi-structured questionnaire and analyzed using SPSS version-21.

**Results:** Overall 63.3% (68.8% male & 57.2% female) of children was fully immunized and the association between male and female was not statistically significant. The dropout rate for all the individual vaccines was high in the female children. Mother's education had significant difference for getting male children fully immunized. The prevalence of gender bias among fully immunized children was 11.6% favoring towards the male children.

**Conclusions:** Though the vaccination coverage of Bijapur district has improved over the years, the coverage is still lagging behind the state average as well as universal immunization programme target of 85% coverage. Gender of the child is one of the factors for the overall lesser coverage of immunization as more number of males was fully immunized than female children.

**Keywords:** Gender, Immunization, Rural area, Literacy, Vaccine

## INTRODUCTION

One of the most significant contributions of the medical fraternity to mankind is the advent of vaccines. Immunization is one of the most cost effective interventions for disease prevention known to man and it plays a significant role in the reduction of morbidity and mortality due to infectious diseases, especially in developing countries. In May 1974, the World Health

Organization (WHO) launched its "Expanded Programme on Immunization" (EPI) against six, most common, Vaccine Preventable childhood Diseases (VPDs) which include diphtheria, tetanus, pertussis, tuberculosis, poliomyelitis and measles. The government of India launched its EPI in January, 1978. The UIP was launched on November 19<sup>th</sup>, 1985 and was dedicated to Lt. Smt. Indira Gandhi. It was launched with two vital components: immunization of pregnant women against

tetanus and immunization of infants against the six EPI target diseases.<sup>1,2</sup>

Gender is a common term whereas gender discrimination is meant for women, because females are more often the victims. Denial of equality, rights and opportunity and supplement in any form on the basis of gender is gender discrimination. Gender discrimination is due to the attitude and behaviour of the society towards the girl child. The girl child faces the neglect of the family in the form of a failure to provide her the basic necessities of life in terms of food, clothing, love, shelter, supervision, education and medical care. Differential treatment of the boys and girls within families can be attributed to the social religious, cultural and economic returns that sons provide to their parents relative to daughters.<sup>3</sup> A clear understanding of past trends, current situation and future plans is the need of the hour. Gender differences in health care between girls and boys are the direct consequence of discrimination against females in seeking health care. In India, discrimination of girls in both preventive (immunization) and curative (treatment of illness) care are also reported with varying degrees amongst the states.

The NFHS-1, NFHS-2 and NFHS-3, all show that the percentage of fully vaccinated male children was higher than female children. The percentage of fully vaccinated male children was 36.7%, 43.1% and 45.3% in NFHS-1, NFHS-2 and NFHS-3 respectively, while the corresponding coverage for female children was 34.1%, 40.9% and 41.5% respectively.<sup>4-6</sup> The child Disparity Index for Immunization was at 0.049, 0.039, 0.067 in NFHS-1, NFHS-2 and NFHS-3 respectively.<sup>7</sup> Within this scope on hand, this study was undertaken to review the impact of gender and mother education status on the immunization status of children aged between 12-23 months of age in the rural areas of Bijapur district of Karnataka state of India.

## METHODS

A community based cross-sectional study was conducted in the rural areas of Bijapur district of Karnataka State over a period of one year extending from the 1<sup>st</sup> December, 2013 to 30<sup>th</sup> November 2014 amongst 207 children in the age group of 12-23 months.

### Inclusion criteria

Children aged 12-23 months with a responsible person for key information regarding immunization and children who are permanent residents of the study area.

### Exclusion criteria

Children whose parents/guardians are not willing to participate in the study and children whose parents/guardians could not be contacted even after three visits.

## Study population and collection of data

A total of 207 children in the age group of 12-23 months from the villages across the Bijapur district were included in the study. Multiphase sampling technique was used. Bijapur district has five talukas. Two primary health centers were selected from each taluka by using simple random sampling (lottery method). A total of ten primary health centers were selected. From each of these primary health centers using simple random sampling (lottery method), one village was selected for the study. Hence totally ten villages across the Bijapur district were selected for the purpose of study. Proportionate sample size for the corresponding village was calculated based on the population of that village. A landmark (temple, school, Panchayat office etc.) in the center of the village was identified. After selecting the street randomly near the landmark, starting from the right side of the street house to house visit was done and data was collected from the household who had children less than five years of age till the predetermined sample size subjects was obtained. The 12-23 month age group was chosen for analysis because both international and Government of India guidelines specify that children should be fully immunized by the time they complete their first year of life. In households where there were two or more eligible children, information was taken only for the youngest eligible child as this yields the most recent information. Since immunization cards were not commonly available and the dates of vaccination were not available for most children, the study calculated 'crude' immunization coverage based on evidence from either 'card plus/or history'.<sup>[8]</sup>

Statistical analysis: SPSS version-21 (Statistical Package for Social Sciences) was used to analyze the data. Data was presented in the form percentages, graphs and figures. Statistical tests such as Z test for difference between two proportions and Chi square test was also applied to the data. Statistical significance was set at  $P \leq 0.05$ .

## RESULTS

The immunization status was assessed for the children between the age group of 12-23 months.

**Table 1: Distribution of children based on the status of immunization.**

Status of immunization	Gender				Total
	Male	%	Female	%	
Fully immunized	75	68.8	56	57.2	131(63.3%)
Partially immunized	33	30.3	41	41.9	74(35.7%)
Unimmunized	01	0.9	01	0.9	02(1%)
<b>Total</b>	<b>109</b>	<b>100</b>	<b>98</b>	<b>100</b>	<b>207(100%)</b>
Pooled Chi square = 3.02, df=1, p=0.082					

As shown in Table 1 that, out of 207 children in the age group of 12-23 months 109 (52.7%) male and 98 (47.3%) female children were present in the study. The percentage of fully immunized male children was higher when compared to females and the association was found to be

statistically not significant. In our study nearly 160 (77.3%) infants (83.5% males and 70.4% females) had immunization card and the association was found to be statistically significant.

**Table 2: Distribution of children based on immunization status against individual vaccines.**

Vaccines	Male (n=109)		Female (n=98)		Total (n=207)		Z value, P value
	N	%	N	%	N	%	
<b>BCG</b>	<b>98</b>	<b>89.9</b>	<b>86</b>	<b>87.8</b>	<b>184</b>	<b>88.9</b>	<b>Z=0.49, P=0.62</b>
OPV 1	108	99.1	98	100	206	99.5	Z=-0.95, P=0.34
OPV 2	100	91.7	94	95.9	194	93.7	Z=-1.23, P=0.21
<b>OPV 3</b>	<b>88</b>	<b>80.7</b>	<b>70</b>	<b>71.4</b>	<b>158</b>	<b>76.3</b>	<b>Z=1.57, P=0.11</b>
DPT 1	108	99.1	93	94.9	201	97.1	Z=1.79, P=0.07
DPT 2	99	90.8	88	89.8	187	90.3	Z=0.25, P=0.80
<b>DPT 3</b>	<b>90</b>	<b>82.5</b>	<b>69</b>	<b>70.4</b>	<b>159</b>	<b>76.8</b>	<b>Z=2.06, P=0.03*</b>
HEP B 1	101	92.7	81	82.1	182	87.9	Z=2.20, P=0.02*
HEP B 2	89	81.7	78	79.6	167	80.7	Z=0.37, P=0.71
<b>HEP B 3</b>	<b>75</b>	<b>68.8</b>	<b>56</b>	<b>57.1</b>	<b>131</b>	<b>63.3</b>	<b>Z=1.73, P=0.08</b>
<b>Measles</b>	<b>85</b>	<b>77.9</b>	<b>74</b>	<b>75.5</b>	<b>159</b>	<b>76.8</b>	<b>Z=0.42, P=0.67</b>

It was observed from Table 2 that the coverage of BCG vaccine was at 88.9% (89.9% for males and 87.8% for females). The coverage for OPV 3 was 76.3% (80.7% for males and 71.4% for females), DPT 3 was 76.8% (82.5% for males and 70.4% for females) and Hepatitis B 3 was 63.3% (68.8% for males and 57.1% for females). The coverage for measles vaccines was 76.8% (77.9% for males and 75.5% for females). The coverage for individual vaccines was found to be slightly higher among males when compared to female children.

**Table 3: Dropout rate of immunization.**

Dropout rates	Male (%)	Female (%)	Total (%)
BCG to Measles	13.2	13.9	13.6
DPT 1 to DPT 3	16.6	25.8	20.9
OPV 1 to OPV 3	18.5	28.5	23.3
Hep B 1 to Hep B 3	25.7	30.8	28.1

It was observed from Table 3 that the dropout rate of vaccination for female children was found to be higher than the male children. The dropout rate from BCG to Measles was 13.6% (13.2% for male and 13.9% for female). The dropout rate from DPT 1 to DPT 3 was 20.9% (16.6% male and 25.8% for female). The dropout rate from OPV 1 to OPV 3 was 23.3% (18.5% for male and 28.5% for female). The Hep B 1 to Hep B 3 dropout rate was 28.1 (25.7% for male and 30.8% for female).

On applying Chi square test it was found that as mother's age increases the association of mother age with status of

immunization was found to be statistically not significant for both males (P=0.07) and females (P=0.31).

On applying chi square test it was found that as mother's education increases the association of mother education with status of immunization was found to be statistically significant for males (P=0.0007) and not significant for females (P=0.706). The socioeconomic level of the family had no significant relations with the immunization status of the children.

**Table 4: Adjusted odds ratio for immunization status.**

Immunization status	Gender*	Among literate mothers#	Among illiterate mothers#
Adjusted odds ratio^	0.33	0.03	0.08

^Male as reference variable

\*Odds ratio adjusted to mother's age, education and occupation.

#Odds ratio adjusted to mother's age and occupation.

On applying binary logistic regression test for status of immunization and the gender of the child, the chance of getting fully immunized was 77% less for the female children when compared to male children. Among literate mothers, the chance of getting fully immunized was 97% less for the female children when compared to male children. Among illiterate mothers, the chance of getting fully immunized was 92% less for the female children when compared to male children (Table 4).

## DISCUSSION

A total of 207 children between the age group of 12 to 23 months were elicited for immunization status. In the present study, the fully immunized male children were 68.8% and 57.2% female children, which are similar to the study done by Valekar S<sup>9</sup> and Mahyavanshi DK et al.<sup>10</sup> In the study done by Sheth JK et al.,<sup>11</sup> Mandal S et al.<sup>12</sup> and Gupta PK et al.<sup>13</sup> the results were higher but lower in the studies done by Gupta RS et al.<sup>14</sup> and Jose AP<sup>15</sup> when compared with our findings.

The percentage of fully immunized children was higher in our study when compared to NFHS-3 data and UNICEF 2009 Survey. The dropout rate of vaccination from BCG to Measles was 13.2% for males and 13.9% for females in our study, which is higher than the results of the other studies done by Sheth JK et al.<sup>11</sup> and Gupta PK et al.,<sup>13</sup> but low compared to study done by Jose AP.<sup>15</sup>

The dropout of immunization from OPV1 to OPV3 in our study was 18.5 for males and 28.5 for females, which is higher than the results of the study done by Sheth JK et al.,<sup>11</sup> Gupta PK et al.<sup>13</sup> and Jose AP.<sup>15</sup> The dropout rate from DPT 1 to DPT 3 in our study was 16.6% for males and 25.8% for females, which is higher when compared to results seen in the study done by Sheth JK et al.<sup>11</sup> and Gupta PK et al.<sup>13</sup> but low when compared to the study done by Jose AP.<sup>15</sup>

The dropout rate from Hep B 1 to Hep B 3 in our study was 25.7% for males and 30.8% for females. Though the percentage of children receiving first dose of the vaccine was high among both the gender, the follow up doses decreased more among the female children than the males. There was greater reduction with Hep B compared to BCG, OPV and DPT, may be due to the fact that Hep B was introduced recently and there may be lack of availability of vaccines. The chances of female children getting full immunized when compared to males was less in our study which is similar to the other studies,<sup>11,13</sup> which can be attributed to the high affinity, care and precaution taken for the male children than female children. The ignorance of the parents due to lack of awareness about the benefits of immunization among the mothers and coupled with the expectation of the health workers to visit their houses for immunization as practice under National Pulse Polio Programme and hence felt no need to go to the immunization center can be the reason for lesser coverage of immunization in our study.

## CONCLUSION

Though the vaccination coverage of Bijapur district has improved over the years, the coverage is still lagging behind the state average as well as Universal Immunization Programme target of 85% coverage. Gender of the child is one of the factors for the overall lesser coverage of immunization as more number of males was fully immunized than female children. Other

factors like ignorance regarding the advantages of vaccinations, time and place of immunization sessions and most importantly the attitude of the people that health workers will come to home for immunization as practiced under Pulse Polio Programme and hence no need to go for immunization sessions. Though the first dose of OPV, DPT, HEP B is received by higher proportions among both the gender, the follow up doses are missed by the majority. However the dropout rate for individual vaccines was also high for female children when compared to male children. Gender bias favoring the male children was noticed among the fully immunized children.

The immunization card is a valuable source of information and a reliable method to monitor the immunization status of each child. Health personnel should ensure that every child is issued an immunization card and the mothers must be advised regarding the importance of keeping it safe and bringing it for subsequent immunizations. Lack of motivation is another reason for immunization failure. The use of influential individuals in spreading awareness like sports persons, celebrities and religious leaders has proven to work wonders in the pulse polio programme. Efforts like intensified social mobilization by health workers can help to resolve the problem of dropout. Auxiliary nurse midwife and the Anganwadi worker are the major source of information for immunization and their participation is required for improving the immunization of the children. Therefore, they should be given refresh entraining at regular intervals so that their knowledge regarding immunization is kept fresh and updated. Coverage can be improved by increasing the accountability of the health personnel with regards to providing immunization and increasing immunization coverage within a fixed time period.

## Limitations

The study done calculates the crude coverage using "card plus history" as majority of the children did not have an immunization card. Efforts have been made to avoid recall bias by taking extensive history regarding doses. In spite of this, chance of recall bias still exists. WHO recommends coverage surveys to be conducted within a span of one month to give the best picture regarding immunization activities in a given areas. However, these surveys require extensive manpower support.

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