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# Prevalence of under-nutrition among under five children and its associated factors in urban area of Municipal Corporation of Nanded

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**Abstract**
**Introduction:** Nutrition of the pre-schoolers is of prime importance as they are most vulnerable to under-nutrition.
**Objective:** 1) To estimate the prevalence of under-nutrition among under five children (6-60 months). 2) To study of associated factors causing under-nutrition.
**Material and methods:** The present study was a community based cross sectional study. Probability Proportional to Size Cluster Sampling Technique was used for selecting the sample. Statistical analysis was done using SPSS 16.0 version for chi-square test and percentages. The confidence limit for significance was fixed at 95% level with p-value <0.05.
**Results:** According to the WHO classification of undernutrition, overall prevalence of underweight was 47.4%, stunting 39.7% and wasting 24.4%.
**Conclusion:** From this study it was concluded that less than half of children were underweight, nearly one third were stunted and one fourth of children were wasted.

**Keywords:** Undernutrition, under five children, underweight, stunting, wasting

## Introduction

Children are nature's gift and the fountain of life. They are our future and are supremely important asset of nation.[1] Pre-schoolers in India constitute 15% of the total population as against 7% in the developed countries of the world. Nutrition of these pre-schoolers is of prime importance as they are most vulnerable to deficiency/ malnutrition [2].

In National Family Health Survey-3 (NFHS-3) conducted in 2005-06 used three standard indices of physical growth according to World Health Organization (WHO) growth standards to describe the nutritional status of children are Height-for-age (stunting), Weight-for-height (wasting), Weight-for-age (underweight) [3].

Globally, an estimated 165 million under five children, or 26%, were stunted in 2011 [4]. In India almost half of under five children (48%) are stunted and 43% are underweight. Wasting is quite a serious problem in India, affecting 20% of under five children. Very few under five children are overweight [3]

As far as the Maharashtra State is concerned, deaths due to the malnutrition seem to be high in tribal dominated districts e.g. Gadchiroli, Amaravati, Yavatmal, Chandrapur and Bhandara etc. [5] People have very less knowledge about causes of under-nutrition and also less aware regarding role of weaning, immunization, literacy status of parent, birth spacing etc in growth and development of children. In this context as no such study was conducted in this study area, the present study was conducted to study the prevalence of under-nutrition and the socio-demographic factors associated with under-nutrition among under five (6 to 60 months) children.

## Material and Methods

The present study was a community based cross sectional study carried out in an urban area of Municipal Corporation of Nanded constituting 4,30,733 population during July 2011 to December 2013. Pilot study was done in Ward No. 2 in an urban area of Municipal Corporation of Nanded. After analysis of pilot study, the necessary changes were

incorporated in the proforma. Probability Proportional to Size Cluster Sampling Technique was used for selecting the sample [6, 7] As per Hungama survey report 2011, the prevalence of under five children suffering from underweight was 42% [8]. Sample size was estimated by using prevalence of underweight 42% with 10% of allowable error at 95% of confidence interval. So the calculated sample size was 552 and 20% of sample size (i.e.110) was added to 552 to compensate for loss due to non-response, hence final sample size was 660. The sample size of the study included all the 660 children from clusters was randomly selected proportionate to the size of population of that cluster. House to house visits were made to collect the required data regarding each child from the parent after taking informed consent and anthropometric measurements of these under 5 children were done by using standard technique like weight for age, height for age, weight for height as the indicators of the malnutrition with reference to NCHS standards [4, 5].

**Inclusion criteria**

1. All children of above 6 months and below 5 years.
2. Children residing in the study area for more than or 6 months during study.

**Exclusion criteria**

1. Children who were found to be physically handicapped with either upper limbs or lower limbs and their anthropometric measurements could not be recorded were excluded from the study.

**Ethical Considerations**: The approval was obtained from the Institutional Ethics Committee of the college. The informed consent was obtained from the parents/care takers of study subjects.

**Statistical Analysis:** The data was collected on the predesigned questionnaire and entered in the Excel Sheet 2007 and analysis was done using SPSS 16.0 version. The data was analyzed by using percentages and chi-square test. The significant p value was considered when it is <0.05.

**Results**

In the present study, out of 660 children, 30 were not included due to various reasons like non-availability, handicapped, non-cooperative, not willing to participate, lock doors etc. Hence 630 subjects were studied and results were as follows.

According to the WHO classification of under-nutrition overall prevalence of underweight, stunted and wasted was 47.5%, 39.7% and 24.4 respectively. The prevalence of mild underweight, mild stunting and mild wasting was 225 (35.7%), 189 (30.0%) and 108 (17.1%) respectively and prevalence of severe underweight, severe stunting and severe wasting was observed 74 (11.7%), 61 (9.7%) and 46 (7.3%) respectively (Table 1).

Out of 630, the highest prevalence of underweight, stunting and wasting were 65(72.2%), 55(61.1%) and 50(55.6) respectively in children of age 6-12 months. The association between underweight, stunting and wasting of study subjects with respect to age was statistically highly significant ($p<0.01$). Prevalence of underweight, stunting and wasting was higher among females (53.2%, 43.9 & 25.6%) than males (42.2%, 35.9% & 23.4%) respectively. The association between underweight and sex was statistically significant ($p<0.05$). But the association between stunting and wasting with sex were not statistically significant. ($p>0.05$)

The highest prevalence of underweight, stunting and wasting were found to be 115(53.7%), 121(56.5%) and 62(29.0%) respectively in Hindu children compared to other religions. The association of underweight, stunting and wasting were statistically highly significant with religion.

Fathers of 34 children had expired, Prevalence of underweight, stunting and wasting in these 34 children was found to be 15 (44.1%), 11 (32.4%) and 10 (29.4%) respectively. The prevalence of underweight, stunting and wasting were found to be highest in 37(92.5%), 33(82.5%) and 31(77.5%) in children of illiterate father compared to literate father. This association between literacy status and under-nutrition was statistically highly significant ($p<0.01$). Similarly, mothers of 18 children had expired, prevalence of underweight, stunting and wasting in these 18 children was found to be 7 (38.9%), 6 (33.3%) and 3 (16.7%) respectively. The prevalence of underweight, stunting and wasting were found to be highest 39(78.0%), 32(64.0%) and 30(60.0%) in children of illiterate mother compared to literate mother. The association of underweight, stunting and wasting were statistically highly significant with literacy status of mother ($p<0.01$).

The prevalence of underweight, stunting and wasting were found to be highest 150(53.8%), 146(52.3%) and 81(29.0%) in children of unskilled worker father compared to skilled and professional father. The association of underweight and occupation of father was not statistically significant ($p>0.05$), but association of stunting and wasting were statistically significant with occupation of father ($p<0.05$). Similarly, the prevalence of underweight, stunting and wasting were found to be highest 86 (68.8%), 86(68.8%) and 55(44.0%) in children of unskilled worker mother compared to housewife, skilled and professional mother. The association of underweight, stunting and wasting were statistically highly significant with occupation of mother ($p<0.01$).

The prevalence of underweight, stunting and wasting was found to be higher in nuclear family compared to joint family. This association between underweight and type of family was statistically not significant ($p>0.05$). But the association of stunting and wasting were statistically highly significant with type of family ($p<0.01$).

The highest prevalence of underweight was found to be 171 (60.6%) in children of socio-economic class V followed by 103 (49.8%) in class IV. The highest prevalence of stunting was found to be 170 (60.3%) in children of socio-economic class V followed by 65 (31.4%) in class IV. The highest prevalence of wasting was found to be 105 (37.2%) in children of socio-economic class V followed by 37 (17.9%) in class IV. The association of underweight, stunting and wasting were statistically highly significant with socioeconomic status of family ($p<0.01$).

The highest prevalence of underweight was found to be 11 (91.7%) in children of initiated weaning at the age more than 12 months followed by 74 (68.5%) in children of initiated weaning at the age of 9 to 12 months. The association was statistically highly significant ($p<0.01$). The highest prevalence of stunting was found to be 10 (83.3%) in children of initiated weaning at the age more than 12 months. The association was statistically highly significant

($p$<0.01). The highest prevalence of wasting was found to be 8 (66.7%) in children of initiated weaning at the age more than 12 months. The association was statistically highly significant ($p$<0.01).

The highest prevalence of underweight, stunting and wasting were found to be higher in children of family size more than 4, birth order more than 4, birth interval less than 24 months and no immunization. The association was statistically highly significant ($p$<0.01). (Table 2)

**Discussion**

The present study was the part of postgraduate dissertation of first author which was submitted to University in 2013.

In the present study, the prevalence of underweight (47.5%) in our study was similar with the findings of Bisai S *et al*. [9] and Abedi AJ *et al*. [10] but not consistent with the findings of several studies [1, 11-16]. Findings of the prevalence of stunting (39.7%) in our was consistent with Mathad V *et al*, [14] Anwar F *et al*. [16]. Findings were not consistent with several studies [1, 9-13, 17-18]. Similarly, findings of the prevalence of wasting (24.4%) were similar with several studies [1, 9-10, 12, 14] and not similar with some studies [11, 13, 16, 18].

Association between age and under-weight, stunting and wasting was statistically significant in our study. Findings of age and underweight in our study were similar with Stalin P *et al*[15] and not similar with some studies [11, 12, 16, 19]. Findings between age and stunting in our study were contrast with some studies [11, 12, 16, 20]. Findings of age and wasting were similar with Anwar F *et al*. (2013) [16] and contrast with some studies [11, 12, 20]. This might be a reason due to age group who were more affected was 6 months to 12 months, which was the period of beginning of weaning. As there were chances of infection or spread of communicable disease which would have occurred due to faulty weaning practices.

Association between sex and under-weight & stunting was statistically significant in our study. Findings were similar with Kumar SA *et al*. [1], Sengupta P *et al*. [11] and contrast with Bisai S *et al*. [9], Anwar F *et al*. [16]. Findings of stunting with relation to sex were similar with Kumar SA *et al*. [1], Sengupta P *et al*. [11], Das S *et al*. [13] and not similar with some studies [9, 12, 16, 17]. Findings of wasting with relation to sex were similar with Sengupta P *et al*. [11] and not similar with some studies [1, 9, 16]. The higher prevalence of underweight among females might be due to the more preference is given to birth of male child in India. And also there is negligence towards female child for the provision of better quality food and health facilities.

The association between underweight, stunting and wasting with respect to religion was statistically significant but Mathad V *et al*. [14] found that the prevalence rate of underweight was not statistically associated with religion.

The chi-square test showed the association between underweight, stunting and wasting with respect to literacy status of father was statistically highly significant ($p$<0.01). Findings of literacy status of father and under-nutrition of the present study were similar with some studies [14, 20]. In yesteryears, only mother had to look after kids and kitchen as the father had to go out for the work in India. Now the scenario has changed tremendously in terms of child rearing wearing practices, father is also taking part in child care.

The association between underweight with respect to literacy status of mother was statistically highly significant ($p$<0.01). Findings were similar with Sengupta P *et al*. [11], Das S *et al*. [13] and were not similar with Mathad V *et al*. [14]. The association between stunting with respect to literacy status of mother was statistically highly significant ($p$<0.01). Findings were similar with Sengupta P *et al*. [11], Das S *et al*. [13]. The association between wasting with respect to literacy status of mother was statistically highly significant ($p$<0.01). Findings were similar with Sengupta P *et al* [11], Das S *et al*. [13], Bhavsar S *et al*. [20]. As the education of mother increases, the nutritional status of child is also better. Educated mothers are more conscious about their children's health.

The association between underweight, stunting and wasting with respect to occupation of father was statistically significant ($p$<0.05), which was similar with Chakraborty *et al*. [21] and contrast with Sengupta P *et al*. [11]. The prevalence of underweight, stunting and wasting was found to be highest in children of working mother compared to housewife were similar with Das S *et al*. [13]. This might be due to the children are at risk whose both the parents are working.

The association between underweight with respect to type of family in study children was not statistically significant ($p$>0.05) but the association between stunting and wasting with respect to type of family was statistically highly significant ($p$<0.01). Underweight and stunting shows similar finding and wasting had contradictory finding with Sengupta P *et al*. [11]. As there is no care taker in nuclear family other than parents, this might be a reason for the increased prevalence of under nutrition in nuclear family as compared to joint family.

The association between underweight, stunting and wasting with respect to socio-economic status of study children was statistically highly significant which was similar with several studies [14, 19, 20]. The prevalence of undernutrition was indirectly proportional to socio-economic status. This might be due to the class V families could not spend the out of pocket expenditure towards healthy food items and health care.

In the present study, Family size of more than 4 was identified as a risk factor for underweight, stunting and wasting; this could be due to lack of awareness or lack of counselling regarding family planning practices. Findings were similar with Sengupta P *et al*. [11], Bhavsar S *et al*. [20].

The highest prevalence of underweight, stunting and wasting was found in children of birth order more than 4, which were similar with several studies [13, 20, 22]. As the birth order increases, the family budget might disturb while investing the money to take care of children.

The birth interval of less than 24 months showed highly statistically significant and the longer birth interval showed inverse relationship with the prevalence of underweight, stunting and wasting. Findings were similar with Sengupta P *et al*. [11], Farid-ul-hasnain *et al*. [17]. This study shows that delayed start of weaning was significantly associated with underweight, stunting and wasting. Findings were similar with Sengupta P *et al*. [11], Farid-ul-hasnain *et al*. [17]. This might be due to breastfeeding is not adequate for the babies of more than six months. Thus beginning of weaning should be started at the completion of six months. If there is delay in the initiation of weaning at the proper age, there may be dietary insufficiency to the child which will lead to the under nutrition.

The association between underweight, stunting and wasting with respect to immunization status of study children was statistically highly significant in the present study and also shows immunization of children is protective against under-nutrition. Findings were similar with Kumar SA *et al*. [1], Sengupta P *et al*. [11], Bhavsar S *et al*. [23] and contrast with Abedi AJ *et al*. [10]. Immunization prevents the child against six preventable diseases. This is also essential for the adequate growth and development of the child.

**Table 1:** Distribution of Study subjects according to WHO classification of under-nutrition (n=630)

| Indices | Normal (-2SD & above) | Under-nutrition (<-2SD to <-3SD) | |
|---|---|---|---|
| | | Mild Undernourished (<-2SD to -3SD) | Severely Undernourished (<-3SD) |
| Weight/Age (Underweight) | 331(52.5) | 225(35.7) | 74(11.7) |
| Height/Age (Stunting) | 380(60.3) | 189(30.0) | 61(9.7) |
| Weight/Height (Wasting) | 476(75.6) | 108(17.1) | 46(7.3) |

(Figures in parenthesis denote percentages)

**Table 2:** Nutritional status of study subjects according to Socio-demographic factors (n=630)

| Socio-demographic factor | | Total | Weight for Age (Underweight) | Height for Age (Stunting) | Weight for Height (wasting) |
|---|---|---|---|---|---|
| Age (months) | 6-12 | 90(14.3) | 65(72.2) | 55(61.1) | 50(55.6) |
| | 13-24 | 150(23.8) | 75(50.2) | 54(36.0) | 34(22.7) |
| | 25-36 | 141(22.4) | 65(46.1) | 74(52.5) | 29(20.6) |
| | 37-48 | 136(21.6) | 56(41.1) | 46(33.8) | 31(22.8) |
| | 49-60 | 113(17.9) | 38(33.6) | 21(18.6) | 10(8.9) |
| | Total | 630(100) | 299(47.5) | 250(39.7) | 154(24.4) |
| | | | $\chi^2$ = 33.45 df=4 *P*<0.01 | $\chi^2$ = 50.73 df=4 *P*<0.01 | $\chi^2$ = 63.65 df=4 *P*<0.01 |
| Sex | Male | 329(52.2) | 139(42.2) | 118(35.9) | 77(23.4) |
| | Female | 301(47.8) | 160(53.2) | 132(43.9) | 77(25.6) |
| | Total | 630(100) | 299(47.5) | 250(39.7) | 154(24.4) |
| | | | $\chi^2$ = 7.49 df=1 P=0.006 | $\chi^2$ = 4.19 df=1 P=0.041 | $\chi^2$ = 0.403 df=1 P=0.525 |
| Religion | Hindu | 214(34.0) | 115(53.7) | 121(56.5) | 62(29.0) |
| | Muslim | 196(31.1) | 105(53.6) | 69(35.2) | 52(26.5) |
| | Buddhist | 189(30.0) | 64(33.9) | 52(27.5) | 38(20.1) |
| | Others | 31(4.9) | 15(48.4) | 8(25.8) | 2(6.5) |
| | Total | 630(100) | 299(47.5) | 250(39.7) | 154(24.4) |
| | | | $\chi^2$ = 20.34 df=3 *P*<0.01 | $\chi^2$ = 41.24 df=3 *P*<0.01 | $\chi^2$ = 10.20 df=3 P=0.017 |

*(Figures in parenthesis denote percentages)

**Table 3:** Nutritional status of study subjects according to Literacy status and occupation of parents (n=630)

| Literacy and occupation of parents | | Total | Weight for Age (Underweight) | Height for Age (Stunting) | Weight for Height (wasting) |
|---|---|---|---|---|---|
| Literacy status of Father* | Illiterate | 40(6.7) | 37(92.5) | 33(82.5) | 31(77.5) |
| | Primary School | 66(11.1) | 56(84.8) | 53(80.3) | 28(42.4) |
| | Middle school | 140(23.5) | 48(34.3) | 55(39.3) | 22(15.7) |
| | High School | 125(21.0) | 66(52.8) | 46(36.8) | 29((23.3)) |
| | Intermediate | 139(23.3) | 59(42.4) | 44(31.7) | 30(21.58) |
| | Graduate | 86(14.4) | 18(20.9) | 8(9.3) | 4(4.65) |
| | Total | 596(100) | 284(47.7) | 239(40.1) | 144(24.2) |
| | | | $\chi^2$ = 106.3 df=5 *P*<0.01 | $\chi^2$ = 113.0 df=5 *P*<0.01 | $\chi^2$ = 98.00 df=5 *P*<0.01 |
| Literacy status of Mother | Illiterate | 50(8.2) | 39(78.0) | 32(64.0) | 30(60.0) |
| | Primary School | 127(20.8) | 61(48.0) | 79(62.2) | 31(24.4) |
| | Middle school | 217(35.5) | 116(53.5) | 76(35.0) | 51(23.5) |
| | High School | 173(28.3) | 59(34.1) | 50(28.9) | 37(21.4) |
| | Intermediate | (34(5.6)) | 15(44.1) | 6(17.6) | 1(2.9) |
| | Graduate | 11(1.8) | 2(18.2) | 1(9.1) | 1(9.1) |
| | Total | 612(100) | 292(47.7) | 244(39.9) | 151(24.7) |
| | | | $\chi^2$ = 38.98 df=5 *P*<0.01 | $\chi^2$ = 63.04 df=5 *P*<0.01 | $\chi^2$ = 46.31 df=5 *P*<0.01 |
| Occupation of Father | Unskilled | 279(46.8) | 150(53.8) | 146(52.3) | 81(29.0) |
| | Semiskilled | 196(32.9) | 81(41.3) | 51(26.0) | 31(15.8) |
| | Skilled | 75(12.6) | 35(46.7) | 34(45.3) | 31(41.3) |
| | Professional | 46(7.7) | 18(39.1) | 8(17.4) | 1(2.2) |

| | | | | | |
|---|---|---|---|---|---|
| | Total | 596(100) | 284(47.7) | 239(40.1) | 144(24.2) |
| | | | $\chi^2$ = 8.85 df=4 P=0.065 | $\chi^2$ = 45.24 df=4 *P*<0.01 | $\chi^2$ = 35.47 df=4 *P*<0.01 |
| Occupation of Mother | Housewife | 465(76.0) | 196(42.2) | 153(32.9) | 92(19.8) |
| | Unskilled | 125(20.4) | 86(68.8) | 86(68.8) | 55(44.0) |
| | Semiskilled | 10(1.6) | 6(60.0) | 4(40.0) | 3(30.0) |
| | Skilled | 7(1.1) | 3(42.9) | 0(00.0) | 0(00.0) |
| | Professional | 5(0.8) | 1(20.0) | 1(20.0) | 1(20.0) |
| | Total | 596(100) | 284(47.7) | 239(40.1) | 144(24.2) |
| | | | $\chi^2$ = 30.82 df=5 *P*<0.01 | $\chi^2$ = 58.92 df=5 *P*<0.01 | $\chi^2$ = 34.42 df=5 *P*<0.01 |

*(Figures in parenthesis denote percentages)

**Table 4:** Nutritional status of study subjects according to Family related factors (n=630)

| **Family related factors** | | **Total** | **Weight for Age (Underweight)** | **Height for Age (Stunting)** | **Weight for Height (wasting)** |
|---|---|---|---|---|---|
| Type of Family | Nuclear | 287(45.6) | 141(49.1) | 144(50.2) | 81(28.2) |
| | Joint | 343(54.4) | 158(46.1) | 106(30.9) | 73(21.3) |
| | Total | 630(100) | 299(47.5) | 250(39.7) | 154(24.4) |
| | | | $\chi^2$ = 24.08 df=2 P=0.300 | $\chi^2$ = 24.63 df=2 *P*<0.01 | $\chi^2$ = 28.52 df=2 *P*<0.01 |
| Socio-economic Status | Class I | 8(1.3) | 0(00.0) | 1(12.5) | 0(00.0) |
| | Class II | 21(3.3) | 3(14.3) | 2(9.5) | 2(9.5) |
| | Class III | 112(17.8) | 22(19.6) | 12(10.7) | 10(8.9) |
| | Class IV | 207(32.9) | 103(49.8) | 65(31.4) | 37(17.9) |
| | Class V | 282(44.8) | 171(60.6) | 170(60.3) | 105(37.2) |
| | Total | 630(100) | 299(47.5) | 250(39.7) | 154(24.4) |
| | | | $\chi^2$ = 71.33 df=4 *P*<0.01 | $\chi^2$ = 105.6 df=4 *P*<0.01 | $\chi^2$ = 54.83 df=4 *P*<0.01 |
| Family Size | 1 | 58(9.2) | 13(22.4) | 13(22.4) | 7(12.1) |
| | 2 | 114(18.1) | 26(22.8) | 49(43.0) | 14(12.3) |
| | 3 | 302(47.9) | 156(51.7) | 112(37.1) | 64(21.2) |
| | ≥4 | 156(24.8) | 104(66.7) | 76(48.7) | 69(44.2) |
| | Total | 630(100) | 299(47.5) | 250(39.7) | 154(24.4) |
| | | | $\chi^2$ = 67.59 df=3 *P*<0.01 | $\chi^2$ = 13.92 df=3 *P*<0.01 | $\chi^2$ = 48.74 df=3 *P*<0.01 |

*(Figures in parenthesis denote percentages)

**Table 5:** Nutritional status of study subjects according to birth order, birth interval, age of weaning and immunization status (n=630)

| | | **Total** | **Weight for Age (Underweight)** | **Height for Age (Stunting)** | **Weight for Height (wasting)** |
|---|---|---|---|---|---|
| Birth Order | 1 | 114(18.1) | 23(20.2) | 41(36.0) | 17(14.9) |
| | 2 | 224(35.6) | 99(44.2) | 63(28.0) | 34(15.2) |
| | 3 | 187(29.7) | 86(46.0) | 76(40.6) | 49(26.2) |
| | ≥4 | 105(16.7) | 91(86.7) | 70(66.7) | 54(51.4) |
| | Total | 630(100) | 299(47.5) | 250(39.7) | 154(24.4) |
| | | | $\chi^2$ = 99.88 df=3 *P*<0.01 | $\chi^2$ = 45.17 df=3 *P*<0.01 | $\chi^2$ = 57.73 df=3 *P*<0.01 |
| Birth Interval (months) | <24 | 112(2.7) | 97(86.6) | 75(67.0) | 58(51.8) |
| | 24-36 | 267(51.7) | 119(44.6) | 90(33.7) | 56(21.0) |
| | >36 | 137(26.6) | 60(43.8) | 44(32.1) | 23(16.8) |
| | Total | 516(100) | 276(53.5) | 209(35.5) | 137(26.6) |
| | | | $\chi^2$ = 63.09 df=2 *P*<0.01 | $\chi^2$ = 30.99 df=2 *P*<0.01 | $\chi^2$ = 47.53 df=2 *P*<0.01 |
| Age of weaning (months) | 4-6 | 182(28.9) | 81(44.5) | 95(52.2) | 50(27.5) |
| | 7-9 | 328(52.1) | 133(40.5) | 80(24.4) | 61(18.6) |
| | 9-12 | 108(171) | 74(68.5) | 65(60.2) | 35(32.4) |
| | >12 | 12(1.9) | 11(91.7) | 10(83.3) | 8(66.7) |
| | Total | 630(100) | 299(47.5) | 250(39.7) | 154(24.4) |
| | | | $\chi^2$ = 35.53 df=3 *P*<0.01 | $\chi^2$ = 72.48 df=3 *P*<0.01 | $\chi^2$ = 22.27 df=3 *P*<0.01 |
| Immunization status | Fully Immunized | 557(88.4) | 241(43.3) | 205(36.8) | 122(21.9) |
| | Partially Immunized | 62(9.8) | 47(76.8) | 36(58.1) | 24(38.7) |
| | Unimmunized | 11(1.7) | 11(100.0) | 9(81.8) | 8(72.7) |
| | Total | 630(100) | 299(47.5) | 250(39.7) | 154(24.4) |
| | | | $\chi^2$ = 36.08 df=2 *P*<0.01 | $\chi^2$ = 18.84 df=2 *P*<0.01 | $\chi^2$ = 22.66 df=2 *P*<0.01 |

*(Figures in parenthesis denote percentages)

## Conclusions

From this study it was concluded that less than half of children were underweight, nearly one third were stunted and one fifth of children were wasted.

Thus study reported the risk factors responsible for the undernutrition were age group of 6-12 months, female child, illiterate father, illiterate mother, unskilled worker (Father and mother), nuclear family, Socio-economic class V, family size ≥ 4, birth order ≥4, birth interval <24 months, initiation of weaning >12 months and unimmunized children.

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