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Role of per-capita income and occupational structures in determining the nutritional status of children under five years: A study in rural areas of Panipat district

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Abstract

Nutritional status among children under five years is determined through various factors. Per-capita income and occupational structure are the two important factors among those factors. The present study is based on primary data and conducted in rural areas of Panipat district. The study examines the nutritional status in children less than five years among rural areas of Panipat district among different income groups and different occupational structures. The study also examines the relationship between per-capita income and nutritional status of children less than five years among rural areas of Panipat district. Nutritional status of children under five years is measured with anthropometric approach and z-score value of height-for-age, weight-for-height and weight-for-age is calculated with the help of WHO Anthro Software, version 3.2.2. It is found that highest prevalence of stunted (44.94 percent), wasted (36.63 percent) and underweight (44.04 percent) is found in children belongs to those families who engaged in primary activities. However, lowest prevalence of stunted (20.00 percent), wasted (17.14 percent) and underweight (17.14 percent) is found in children belongs to those families who engaged in tertiary activities. It is also found that the lowest prevalence of stunted (27.75 percent), wasted (21.47 percent) and underweight (27.75 percent) is found in high monthly per-capita income group while the highest prevalence of stunted (59.89 percent), wasted (42.78 percent) and underweight (57.22 percent) is found in low monthly per-capita income group. It indicates that the prevalence of stunted, wasted and underweight is decreased as monthly per-capita income increased. Further it is also found that per-capita income is positively correlated with z-scores of weight-for-age, height-for-age and weight-for-height. However, is found significantly (0.01 level of significance) correlated with weight-for-height as well as weight-for-age in rural areas of Panipat district.

Keywords: Per-capita income, occupational structure, anthropometric approach, nutritional status, stunted, wasted, underweight and overweight/obese

Introduction

Poor nutritional status among children under five years is a major problem of all countries around the world. In India, approximately 6 crore children are found underweight (Murarkar, S. 2020) [6]. As per Global Hunger Index 2021 report of IFPRI (International Food Policy and Research Institute), India ranked 107 out of total 121 countries. In India, among children under five years, the prevalence of stunted found 38.40 percent, prevalence of wasted found 21.00 percent and the prevalence of underweight found 35.80 percent (NFHS, 2015-16). Haryana is one of the richest states of the country in production of food grain crops. But Haryana is also suffering from the problem of malnutrition. Haryana is at 16th position in prevalence of stunted, 21st in prevalence of wasted and 15th position in the prevalence of underweight among under five years children in 2015-16. Children are an important segment of our society. They are considered as future of the nation. A healthy child population leads to a healthy youth in future. So, it is our duty to nourish our child population properly (Sandeep and Renu Arya, 2018) [7].

Per-capita income and occupational structure are the two important factors which control the nutritional status of children less than five years. In the present research, an effort is made to examine the role of per-capita income and occupational structure in determining the nutritional condition of children under five years among rural areas of Panipat district.

Objectives

The present research has been conducted to full fill the following objectives:

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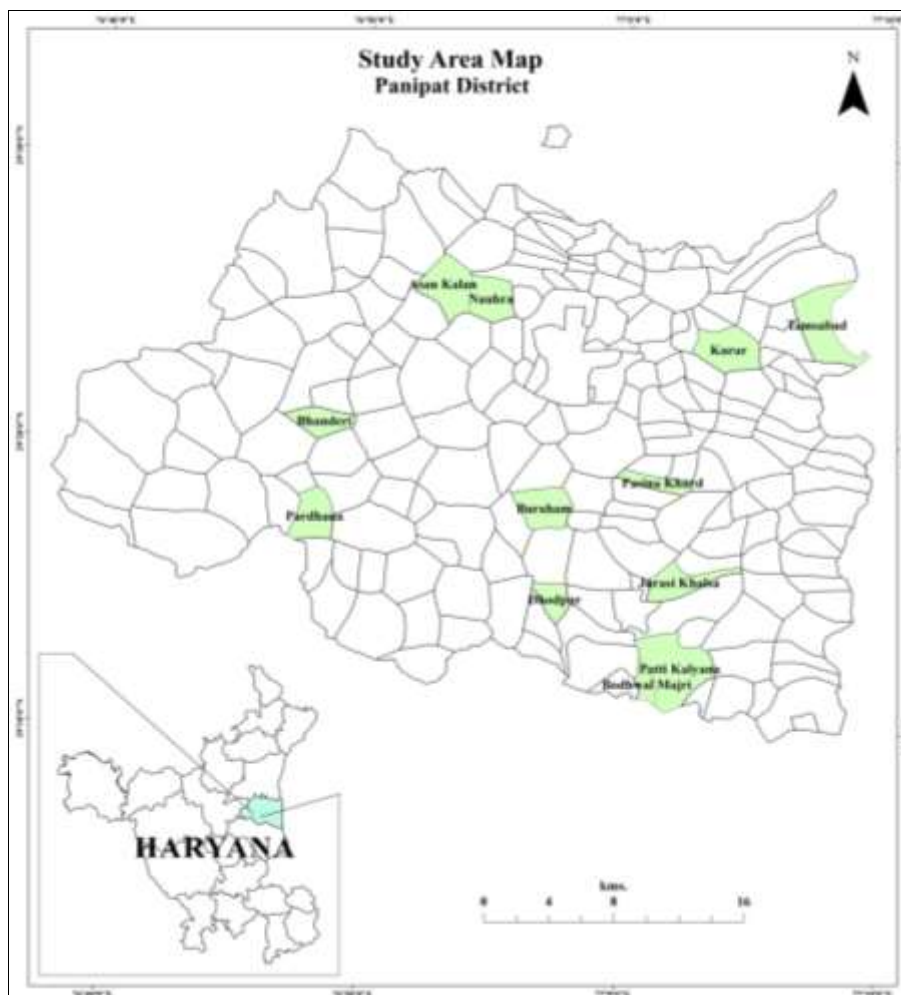
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1. Examines the per-capita income and occupational structure in rural areas of Panipat district.
2. Examines the nutritional status among children under five years in the rural areas of Panipat district among different occupational structures.
3. Examines the nutritional status of children under five years in the rural areas of Panipat district among different income groups.
4. Examines the relationship between per-capita income and nutritional status of children under five years in the

rural areas of Panipat district.

Study area

Present study covers rural areas of Panipat district. Panipat district lies between 29° 09' 50'' N to 29° 31' 38'' N latitude and 76° 37' 51'' E to 77° 09' 51'' E longitudes. Panipat is situated on G.T. Road (also known as Shershah Suri Marg), 90 kilometres north of Delhi. Map.1 represents the study areas map.



Map 1: Study area map Panipat District

Panipat district boundaries are touched by other districts of Haryana on their three sides, these districts are, Karnal in the northern, Jind in the western and Sonapat in the southern. Panipat district forms the boundary of Uttar Pradesh state across the Yamuna river in the east. It spread over an area of 1268 square kilometres (Statistical Abstract of Haryana, 2020-21) ^[2].

Data source and methodology

As per NFHS-4 (2015-16) in the prevalence of underweight, wasted and stunted in rural areas of Haryana, Panipat district have the worst position. The present study covers rural areas of Panipat district. The study is based on primary data source, collected with the help of a well-structured schedule. On the bases of socio-economic and health indicators, data has been collected from 12 villages (Tamsabad, Nauhra, Asan Kalan, Bhandari, Pardhana, Dhodpur, Pasina Khurd, Kurar, Bursham, Bodhwal Majri,

Patti Kalyana, Jurasi Khalsa). Among these 12 villages, 633 children (324 females and 309 males) were surveyed for examine the nutritional condition of children under five years with the help of anthropometric approach in the rural areas of Panipat district. Data has been analyzed with the help of general statistical techniques. Relationship between per-capita income and nutritional status of children less than five is measured with the help of IBM SPSS Statistics 21 software and represented with the help of appropriate tables.

Per-capita income and occupational structure in rural areas of Panipat district

Present study examines the status of per-capita income in rural areas of Panipat district. For a clear understanding, the per-capita income is categorized in three groups i.e. high, moderate and low. The result is presented with the help of following table:

Table 1: Monthly Per-Capita Income Group in the Rural Areas of Panipat District

Income Group (Monthly Per-Capita Income in Rs.)	Male children's Family (in percent)	Female children's Family (in percent)	Total Families (in percent)
Low (< 2,000)	28.48	30.56	29.54
Moderate (2,000 to 3,000)	43.04	37.65	40.28
High (>3,000)	28.48	31.79	30.17
Total	100.00	100.00	100.00

Source: Field Survey

Table 1 represents in rural areas of Panipat district, 29.54 percent families have less than 2,000 rupees per-capita income while 30.17 percent families have more than 3,000 rupees per-capita income. Highest percentage share for per-capita income is found in moderate income group. 40.28

percent families have 2,000 rupees to 3,000 rupees per-capita income.

Further, the study also examined the occupational structure of families in rural areas of Panipat district. The result is represented with the help of following table 2:

Table 2: Occupational Structure of Families in Rural Areas of Panipat District

Occupation Structure	Male children's Family (in percent)	Female children's Family (in percent)	Total Families (in percent)
Primary	69.90	70.68	70.30
Secondary	19.09	18.21	18.64
Tertiary	11.00	11.11	11.06
Total	100.00	100.00	100.00

Source: Field Survey

Table 2 shows maximum families engaged in primary occupational structure (70.30 percent). However, 11.06 percent families engaged in tertiary occupational structure while 18.64 percent families found engaged in secondary occupational structure. It clearly represents that maximum families engaged in primary occupational structure in rural areas of Panipat district while minimum share of

occupational structure is found in tertiary occupational structure.

Further the study examined the status of monthly per-capita income with reference to occupational structure in rural areas of Panipat district. The result is represented with the help of following figure:

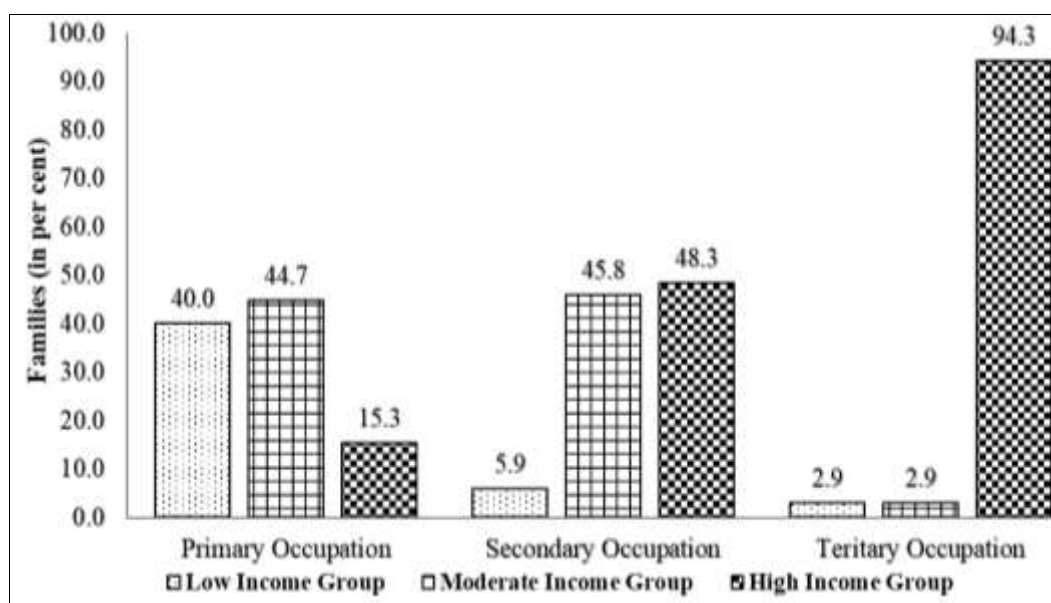
**Fig 1:** Status of Monthly Per Capita Income in Different Occupational Structures in Rural Areas of Panipat District

Fig.1 clearly represents that in primary occupational structure the highest share is found for moderate income group (44.7 percent) while the lowest share is found for high income group. In secondary occupational structure and tertiary occupational structure, the highest percentage share is found for high income group. In Secondary occupational structure lowest share is found for low income group (5.9 percent) and in tertiary occupational structure, lowest share is found for low income group (2.9 percent) and moderate income group (2.9 percent).

Nutritional status of children under five years in different occupational structures in rural areas of Panipat district

Present study examined the nutritional status of children under five years in different occupational structures in rural areas of Panipat district. For this purpose, prevalence of underweight, wasted, stunted and overweight/obese is assessed. The following figure shows the prevalence of stunted, wasted, underweight and overweight/obese in different occupational structures in rural areas of Panipat district.

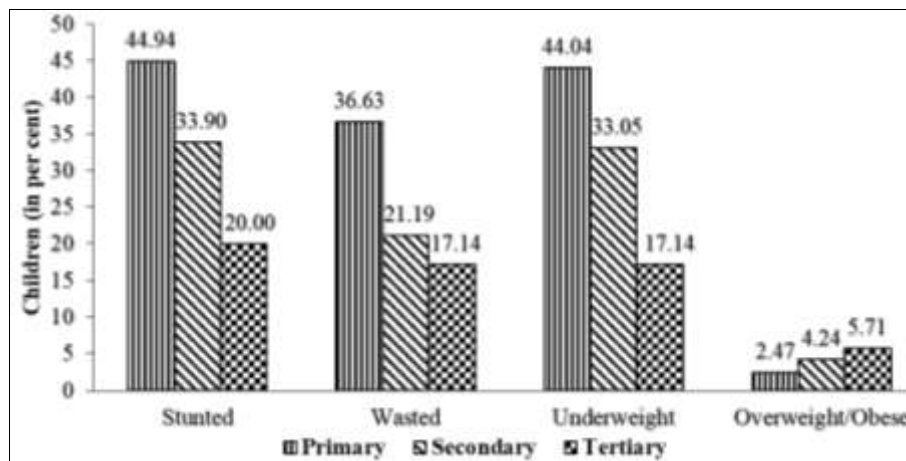


Fig 2: Nutritional Status of Children Under Five Years in Different Occupational Structures in Rural Areas of Panipat District

Fig. 2 represents that highest prevalence of underweight, stunted and wasted is found in those children whose families are engaged in primary occupations and lowest prevalence of underweight, wasted and stunted is found in those children whose families are engaged in tertiary occupations. On the other side, in the prevalence of overweight/obese, the situation is totally reverse. The highest prevalence of

overweight/obese found in those children whose families are engaged in tertiary occupations whereas, the lowest prevalence is found in those children whose families are engaged in primary occupations.

Table 3 represents gender-wise nutritional status of children less than five years among different occupational structures in rural areas of Panipat district.

Table 3: Gender-wise Nutritional Status of Children Under Five Years among Different Occupational Structures in Rural Areas of Panipat District

Occupational Structure	Children (in percent)					
	Stunted (in percent)			Severely Stunted (in percent)		
	Male	Female	Total	Male	Female	Total
Primary	41.20	48.47	44.94	18.06	16.59	17.30
Secondary	27.12	40.68	33.90	13.56	23.73	18.64
Tertiary	11.76	27.78	20.00	5.88	11.11	8.57
	Wasted			Severely Wasted		
Primary	34.26	38.86	36.63	10.19	9.17	9.66
Secondary	27.12	15.25	21.19	13.56	6.78	10.17
Tertiary	5.88	27.78	17.14	2.94	8.33	5.71
	Underweight			Severely Underweight		
Primary	40.74	47.16	44.04	18.06	20.96	19.55
Secondary	32.20	33.90	33.05	18.64	10.17	14.41
Tertiary	8.82	25.00	17.14	2.94	11.11	7.14
	Overweight/Obese			Obese		
Primary	2.78	2.18	2.47	0.46	0.87	0.67
Secondary	1.69	6.78	4.24	0.00	0.00	0.00
Tertiary	2.94	8.33	5.71	0.00	2.78	1.43

Source: Field Survey

Table 3 represents that highest prevalence of stunted is found in those children whose family is engaged in primary occupational structure (44.94 percent). On the other side lowest prevalence of stunted is found in those children whose family are engaged in tertiary occupational structure (20.00 percent) followed by children belongs to those families who engaged on secondary occupational structure (33.90 percent). Gender-wise comparison represents that in all three occupational structures i.e. primary, secondary and tertiary, the prevalence of stunted found high in female children as compared to male children. In the prevalence of severely stunted highest prevalence is found in those children whose family engaged in secondary occupational structure (18.64 percent) followed by those children whose family engaged in primary occupational structure (17.30 percent) while the lowest prevalence is found in those children whose family engaged in tertiary occupational

structure (8.57 percent). Gender-wise comparison revealed that in primary occupational structure the prevalence found high in male children (18.06 percent) as compared to females (16.59 percent). On the other side whose family engaged in secondary and tertiary occupational structure the prevalence found high in females (secondary: 23.73 percent and tertiary: 11.11 percent) as compared to males (secondary: 13.56 percent and tertiary: 5.88 percent) in rural areas of Panipat district.

Table 3 also revealed that the highest prevalence of wasted is found in those children whose family engaged in primary occupational structure (36.63 percent) while the lowest prevalence is found in those children whose family engaged in tertiary occupational structure (17.14 percent) followed by those children whose family engaged in secondary occupational structure (21.19 percent). Gender-wise comparison represents that the prevalence of wasted found

high in female's for primary occupational structure (38.86 percent) and tertiary occupational structure (27.78 percent) as compared to male children whose family engaged in primary occupational structure (34.26 percent) and tertiary occupational structure (5.88 percent). On the other side among those children whose family engaged in secondary occupational structure, the prevalence of wasted found high in males (27.12 percent) as compared to females (15.25 percent). It is also found that the prevalence of severely wasted found high in those children whose family engaged in secondary occupational structure (10.73 percent) followed by the children whose family engaged in primary occupational structure (9.66 percent) while the lowest problems of severely wasted is found in those children whose family engaged in tertiary occupational structure (5.71 percent). Gender-wise comparison of the prevalence of severely wasted revealed that the prevalence is found high in females (8.33 percent) as compared to males (2.94 percent) for tertiary occupational structure while in primary occupational structure and secondary occupational structure the prevalence of severely wasted found high in male (primary: 10.19 percent and secondary: 13.56 percent) children as compared to females (Primary: 9.17 percent and secondary: 6.78 percent).

Further, Table 3 revealed that the prevalence of underweight is also found high in those children whose family engaged in primary occupational structure (44.04 percent) followed by the children whose family engaged in secondary occupational structure (33.05 percent) while the lowest prevalence is found in those children whose family engaged in tertiary occupational structure (17.14 percent). Gender-wise comparison represents that the prevalence of underweight found high in female as compared to males for all three occupational structure groups. It is also revealed in the Table 3 that highest prevalence of severely underweight is found in those children whose family engaged in primary occupational structure (19.55 percent) followed by those children whose family engaged in secondary occupational structure (14.41 percent) while the lowest problems of severely underweight is found in those children whose family engaged in tertiary occupational structure (7.14 percent). Gender-wise comparison represents that the problem of severely underweight found high in males (18.64 percent) as compared to females (10.17 percent) for those children whose family engaged in secondary occupational structure. On the other side for primary occupational

structure and tertiary occupational structure the prevalence found high in females (primary: 20.96 percent and tertiary: 11.11 percent) as compared to males (primary: 18.06 percent and tertiary: 2.94 percent).

It is found that the prevalence of overweight/obese is found high among those children whose family engaged in tertiary occupational structure (5.71 percent) followed by those children whose family engaged in secondary occupational structure (4.24 percent) while the lowest prevalence of overweight/obese is found in those children whose family engaged in primary occupational structure (2.47 percent). Gender-wise analysis represents that the prevalence of overweight/obese is found high in male children (2.78 percent) as compared to female children (2.18 percent) for primary occupational structure group. However in secondary occupational structure group and tertiary occupational structure group the prevalence of overweight/obese is found high in females as compared to males. Further it is also found that 0.67 percent children belongs to primary occupational structure and 1.43 percent children belongs to tertiary occupational structure found suffering from the problem of obesity while none of the child belongs to secondary occupational group found suffering from the problem of obesity. Gender-wise comparison represents that the prevalence of obesity found 0.87 percent in females as compared to 0.46 percent in males for primary occupational structure. However in tertiary occupational structure, none of the male child found suffering from the problem of obesity while 2.78 percent female children found suffering from the problem of obesity.

Nutritional status of children under five years in different income groups in rural areas of Panipat district

Present study also examined the nutritional status of children under five years in different income groups in rural areas of Panipat district. For this purpose, prevalence of underweight, wasted, stunted and overweight/obese is examined with reference to monthly per-capita income. For a better interpretation, monthly per-capita income is categorized in three group's i.e. low income group (< 2,000 rupees), moderate income group (2,000-3,000 rupees) and high income group (>3,000 rupees). The prevalence of wasted, stunted, underweight and overweight/obese in different income groups is represented with the help of following figure:

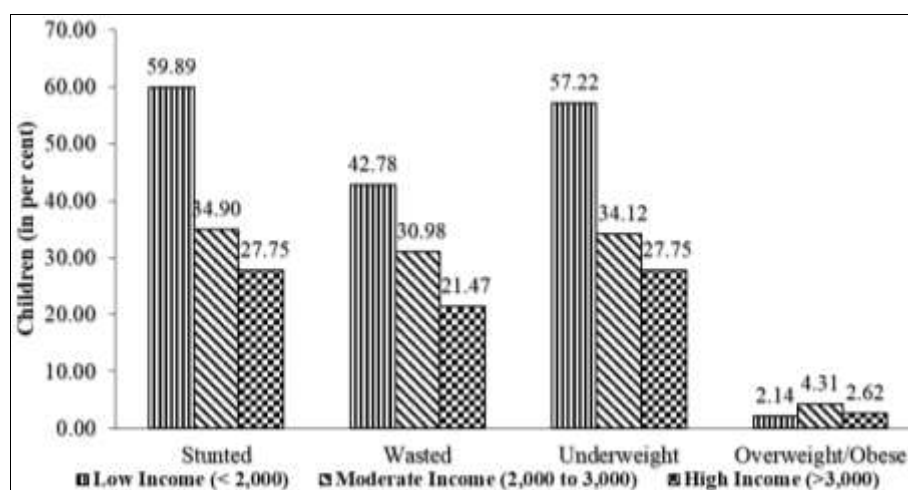


Fig 3: Nutritional Status of Children under Five Years in Different Income Groups in Rural Areas of Panipat District

Fig. 3 clearly represents that the prevalence of wasted, stunted and underweight is decreased as monthly per-capita income increased. However, the situation is different for the prevalence overweight/obese. The prevalence of overweight/obese is found high in Moderate income group

followed by high income group. Lowest prevalence of overweight/obese is found in low income group.

Table 4 represents gender-wise nutritional status of children under five years in different income groups in rural areas of Panipat district.

Table 4: Nutritional Status of Children under Five Years in relation to Different Income Groups in Rural Areas of Panipat District

Income Group (Monthly Per-capita Income in Rs.)	Children (in percent)					
	Stunted			Severely Stunted		
	Male	Female	Total	Male	Female	Total
Low (< 2,000)	55.68	63.64	59.89	21.59	22.22	21.93
Moderate (2,000 to 3,000)	32.33	37.70	34.90	15.79	16.39	16.08
High (>3,000)	19.32	34.95	27.75	10.23	13.59	12.04
	Wasted			Severely Wasted		
	Male	Female	Total	Male	Female	Total
Low (< 2,000)	37.50	47.47	42.78	11.36	7.07	9.09
Moderate (2,000 to 3,000)	30.83	31.15	30.98	11.28	10.66	10.98
High (>3,000)	20.45	22.33	21.47	6.82	7.77	7.33
	Underweight			Severely Underweight		
	Male	Female	Total	Male	Female	Total
Low (< 2,000)	53.41	60.61	57.22	22.73	27.27	25.13
Moderate (2,000 to 3,000)	33.08	35.25	34.12	17.29	15.57	16.47
High (>3,000)	21.59	33.01	27.75	9.09	11.65	10.47
	Overweight/Obese			Obese		
	Male	Female	Total	Male	Female	Total
Low (< 2,000)	2.27	2.02	2.14	0.00	2.02	1.07
Moderate (2,000 to 3,000)	3.76	4.92	4.31	0.75	0.00	0.39
High (>3,000)	1.14	3.88	2.62	0.00	0.97	0.52

Source: Field Survey

Table 4 revealed that highest prevalence of stunted is found in low income group (59.89 percent) followed by moderate income group (34.90 percent). Lowest prevalence of stunted is found in high income group i.e. 27.75 percent. It is also found that the prevalence of stunted found high in females as compared to males for all three income groups. Studying gender-wise, it is found that the highest difference in the prevalence of stunted between female and male is found in high income group i.e. 15.63 percent followed by low income group (7.96 percent). Table 4 also revealed that the prevalence of severely stunted found high in low income group (21.93 percent) whereas, lowest prevalence of severely stunted is found in high income group (12.04 percent). The prevalence of severely stunted is also found high in female as compared to males for all income groups. Further, Table 4 represented that the prevalence of wasted decreased as the income level increased. Lowest prevalence of wasted is found in children belongs to high income group (21.47 percent) followed by moderate income group (30.98 percent). Gender-wise analysis represents that the influence of wasted found high in females as compared to males for all three income groups. On the other side the prevalence of severely wasted among children less five years in rural areas of Panipat District found high in moderate income group (10.98 percent) followed by low income group (9.09 percent). The lowest prevalence of severely wasted among children less than five years is found in children belong to high income group. It is also found that the prevalence of severely wasted found high in males as compared to females for low and moderate income groups. However it is found high in females as compared to males for children belong to high income group. Table 4 also represents that the prevalence of underweight is also found high in children belongs to low income group (57.22 percent) followed by moderate income group (34.12 percent). Lowest prevalence of underweight is found in children belongs to high income group (27.75 percent). It is also found that the situation of children belongs to low income group is worse. 60.61 percent females and 53.41 percent male children belong to

low income group found underweight. However the prevalence of underweight is found high in females as compared to males for all three income groups. In the prevalence of severely underweight, condition of children belongs to low income group (25.13 percent) is poor as compared to children belong to moderate income group (16.47 percent) and high income group (10.47 percent). The prevalence of severely underweight found high in females as compared to males in low and high income group. However for children belongs to moderate income group the prevalence of severely underweight is found high in males as compared to females.

Table 4 indicates that the effect of overweight/obese among children under five years in rural areas of Panipat district found high in moderate income group (4.31 percent). The lowest prevalence of overweight/obese is found in children belong to low income group (2.14 percent) followed by children belongs to high income group (2.62 percent). The prevalence of overweight/obese is found high in females as compared to males for moderate and high income groups. However, it is found high in males as compared to females for children belong to low income group. The prevalence of obesity is found high in children belongs to low income group (1.07 percent) followed by high income group (0.52 percent). The lowest prevalence of obesity is found in children belongs to moderate income group (0.39 percent). None of the male children of low income group as well as high income group found suffering from the problem of obesity, whereas none of the female child of moderate income group found suffering from the problem of obesity. Further the study examined the relationship between per-capita income and nutritional status of children under five years in the rural areas of Panipat district for this purpose Pearson product moment correlation is applied with between per-capita income and Z-scores of weight-for-age, height-for-age and weight-for-height result with the help of SPSS. Result of correlation is represented with the help of following table:-

Table 5: Relationship between Per-capita Income and Nutritional Status of Children under Five Years in the Rural Areas of Panipat District

		Per-capita Income	HAZ	WAZ	WHZ
Per-capita Income	Pearson Correlation	1	.046	.137**	.128**
	Sig. (1-tailed)		.126	.000	.001
	N	633	633	633	633
HAZ	Pearson Correlation	.046	1	.605**	-.120**
	Sig. (1-tailed)	.126		.000	.001
	N	633	633	633	633
WAZ	Pearson Correlation	.137**	.605**	1	.703**
	Sig. (1-tailed)	.000	.000		.000
	N	633	633	633	633
WHZ	Pearson Correlation	.128**	-.120**	.703**	1
	Sig. (1-tailed)	.001	.001	.000	
	N	633	633	633	633

**Correlation is found significant at the 0.01 level (1-tailed).

Source: Field Survey

Table 5 represents that per-capita income is found positively correlated with z-scores of, weight-for-age, height-for-age and weight-for-height. However, is found significantly (0.01 level of significance) correlated with weight-for-age as well as weight-for-height in rural areas of Panipat district. It means that if per-capita income increases then z-score value of weight-for-age as well as weight-for-height also increases. As we know that lower the z-score for weight-for-age, height-for-age and weight-for-height indicates poor nutrition status of children less than five years. On the basis of this analysis it can be said that increase in per-capita income improves the status of nutritional of the children under five years in the rural areas of Panipat district. Table 5 also shows that height-for-age z-score is found positively (0.605) and significantly (at 0.01 level of significance) correlated with weight-for-age z-score in rural areas of Panipat district. It means that if a child is found stunted then there are maximum chances that he/she will also be found underweight. However, height-for-age z-score is found significantly (at 0.01 level of significance) and negatively (-0.120) correlated with weight-for-height z-score. Weight-for-height is association of the ratio of weight and height and if a child is stunted (low height for age) then the ratio of height and weight may be seems normal because he/she is shorter than normal height. It is also found that weight-for-age z-score and weight-for-height z-score age found positively (0.703) and significantly (at 0.01 level of significant) correlated with each other.

Conclusion

It is found that that in rural areas of Panipat district, 29.54 percent families have less than 2,000 rupees per-capita income while 30.17 percent families have more than 3,000 rupees per-capita income. Highest percentage share for per-capita income is found in moderate income group. 40.28 percent families have 2,000 rupees to 3,000 rupees per-capita income. It is also found that maximum families engaged in primary occupational structure in rural areas of Panipat district while minimum share of occupational structure is found in tertiary occupational structure. Further it is also found that highest problem of wasted, stunted and underweight is found in those children whose families are engaged in primary occupations and lowest problem of wasted, underweight and stunted is found among those children whose families are engaged in tertiary occupations. The highest prevalence of overweight/obese found in those children whose families are engaged in tertiary occupations

whereas, the lowest prevalence is found in those children whose families are engaged in primary occupations. It is also found in the study that the prevalence of underweight, stunted and wasted is decreased as monthly per-capita income increased. However, the situation is different for the prevalence overweight/obese. The prevalence of overweight/obese is found high in Moderate income group followed by high income group. Lowest prevalence of overweight/obese is found in low income group. The study also revealed that per-capita income is found positively correlated with z-scores of weight-for-age, weight-for-height and height-for-age in the rural areas of Panipat district. It means that if per-capita income increases then z-score value of weight-for-height as well as weight-for-age also increases and higher the z-score for weight-for-age, height-for-age and weight-for-height indicates good nutrition status of children under five years.

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