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Geographical Analysis of Child Stunting in Jhajjar District, Haryana

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ABSTRACT

Undernutrition means lack of adequate nutrition by not having good food or not eating proper food containing macro and micro nutrient which necessary for proper growth and health. The child may be still undernourished even if he consumed more food to requirement of energy. It is not necessary that more amount of food is rich in micro and macro nutrients.Undernutrition leads to children being underweight, too short in height and less weight according to their age.The study aim to understand the problem of child undernutrition in a food secure and peripheral NCR region district of Haryana namely Jhajjar in geographical point of view. The present study will also reveal the spatial pattern of child stunting and finding of the study provide useful inputs to policy makers for formulating area and problem specific government policies.In the present study, Data have been collected both from secondary sources. Child stunting has been analysed in district at community development block.At block level, the spatial patterns of child stunting has been explored by using the data of department of Child & Women Development of the Ministry of Women and Child Development, Jhajjar for the year 2023-24. Child undernutrition has been calculated on the basis of proportion of stunting children among the total active children enrolled in the Aanganwadi centres.

Keywords: Undernutrition, Stunting, Nutrients, Child, Food Security

INTRODUCTION

The problem of undernutrition is worldwide. But in developing countries, it is widely prevalent and very common due to food insecurity in many part of these countries. In order to deal with this problem and improve the food security level in these countries, the role of Green Revolution Programme was played significant role. In India is also a major problem of hunger and undernutrition among each age group of population. As a result of implementation and adaptation of new technology, agricultural production at national and state level increased rapidly and Haryana started producing surplus foodgrains.

Although the Green Revolution technologies was extended to other part of the country as well Haryana became the biggest beneficiary of this revolution. In this background, Haryana as well as its regions are generally assumed to be very low prevalence of undernutrition with food secure state. However, the reports of 4th round of NFHS reveals very shocking scene of child undernutrition under five years of age in the state. According the survey report of 2016-16, 21.4% of under five children are underweight, 34% are stunted and 21.2% are wasted. These percentage of different indicators of child undernutrition is less than the national average, but it is very serious in food secure state. This present study analysis the problem of child undernutrition under five age group for Jhajjar district of Haryana state. The figure of NFHS (4), 2015-16 reveals that there is 21% children are underweight, 22.3% are stunted and 15.5% are wasted. This district is lies in food surplus state of India and located in peripheral belt of NCR. The problem of undernutrition of children in this district is concerned. The latest data of NFHS 5th round of 2019-20, there is 9.7% children are underweight, 15.6% are stunted and only 8.8% are wasted. The percentage of underweight and wasting children has dropped 50% form 4th round of NFHS but the problem of stunted children is same.

Research Problem

The study aim to understand the problem of child stunting in a food secure and peripheral NCR region district of Haryana namely Jhajjar in geographical point of view. The present study will also reveal the spatial pattern of child undernutrition problem in form of stunting and finding of the study provide useful inputs to policy makers for formulating area and problem specific government policies. By the results of the present study, Government pursue the food related programmes to solve the problem of the child undernutrition in Jhajjar district and other region of Haryana as well as India.

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Objective of Study
The main objective of this study is to analysis the spatial patterns of undernutrition in form of stunting among child population under five in Jhajjar district of Haryana and also check out the correlation between food security and child stunting in different blocks of Jhajjar district.

Hypothesis
The problem of stunting among the children is more prevalent in less food secure blocks of Jhajjar district.

METHODOLOGY

This study also analyzed the spatial pattern of child stunting of 0-5 age group at block level of Jhajjar district. For block level analysis, data have been taken from the department of Women and Child Welfare of Jhajjar district. This department collected and compiled data from Aanganwadi centers. The department provide data for 7 circles of Jhajjar district. But there are 5 blocks in Jhajjar district. So firstly data categorized from circles to block wise. The data provided in terms of total no. of child in 0-5 years age group, number and percentage of stunted children. The data report from the department is for 2023-2024.Spatial pattern at block level has been showed through the choropleth map prepared by using ARC GIS 10.4 software.

Study Area
The present study has taken district Jhajjar of Haryana as study area. Jhajjar district is one out of the 22 districts of Haryana state in Northern India. It carved out of Rohtak district on 15 July 1997 and with its headquarter in Jhajjar city. It far away only 29 kilometers from Delhi. It is peripheral region of National capital of Indiaand developed into an important industrial Centre. Other towns in the district are Bahadurgarh, Badli and Beri. Geographically, it spread in 1834 sq. kilometers. It lies in 29º21'30" to 29º51'30" North latitude and 76º16'30" to 76º58'30" East longitude. It surrounded by Rohtak and Sonepat in north; Rewari and Gurugram in south; national capital Delhi in the east and Bhiwani in west. It has 3 tehsils, 1 sub-tehsil, 5 blocks and 247 inhabited villages.

RESULTS AND DISCUSSION

The child undernutrition data of all block is collected on three parameters like stunting (low height for age). The department of Women and Child Welfare has been provided data in total number of children who actively participated in Aanganwadi centers, total number and percentage of children affected by stunting, wasting, underweighting and overweighting. The overweighting is form of overnutrition. So it does not be carried in present study.

Stunting (Low Height for Age)
Stunting define as chronic undernutrition in critical period of development and growth in early stage of life of anyone. It is denoted in the percentage of children under the five years age, whose height of length for age is below -2 standard deviations (moderate) and -3 standard deviations (severe) from median child growth standards of the World Health Organization. Data of stunting is categorized in to two category-SAM and MAM. SAM is stand for severely acute malnutrition and MAM is for moderate acute malnutrition. The data is carried out up to month 2023-2024.

Stunting –SAM (Severe Acute Malnutrition)
It is denoted in the percentage or number of children under the five years age, whose height or length for their age is below -3 standard deviations (severe) from median child growth standards of the World Health Organization. Severe stunting is irreversible or a child cannot recover height in the same way that they can regain weight.

Table 1: ***CD Block-wise Stunting- SAM in Jhajjar District, 2023-2024***

Block	Total Child[1] (0-5)	SAM	
		Number	%
Bahadurgarh	20908	1171	5.6
Beri	7596	496	6.53
Jhajjar	12196	1231	10.09
Matainhel	6846	357	5.21
Salhawas	5340	404	7.57
Total	52286	3659	7

[1] = total active children measured (height & weight)
Source: Department of Women & Child Welfare, Jhajjar

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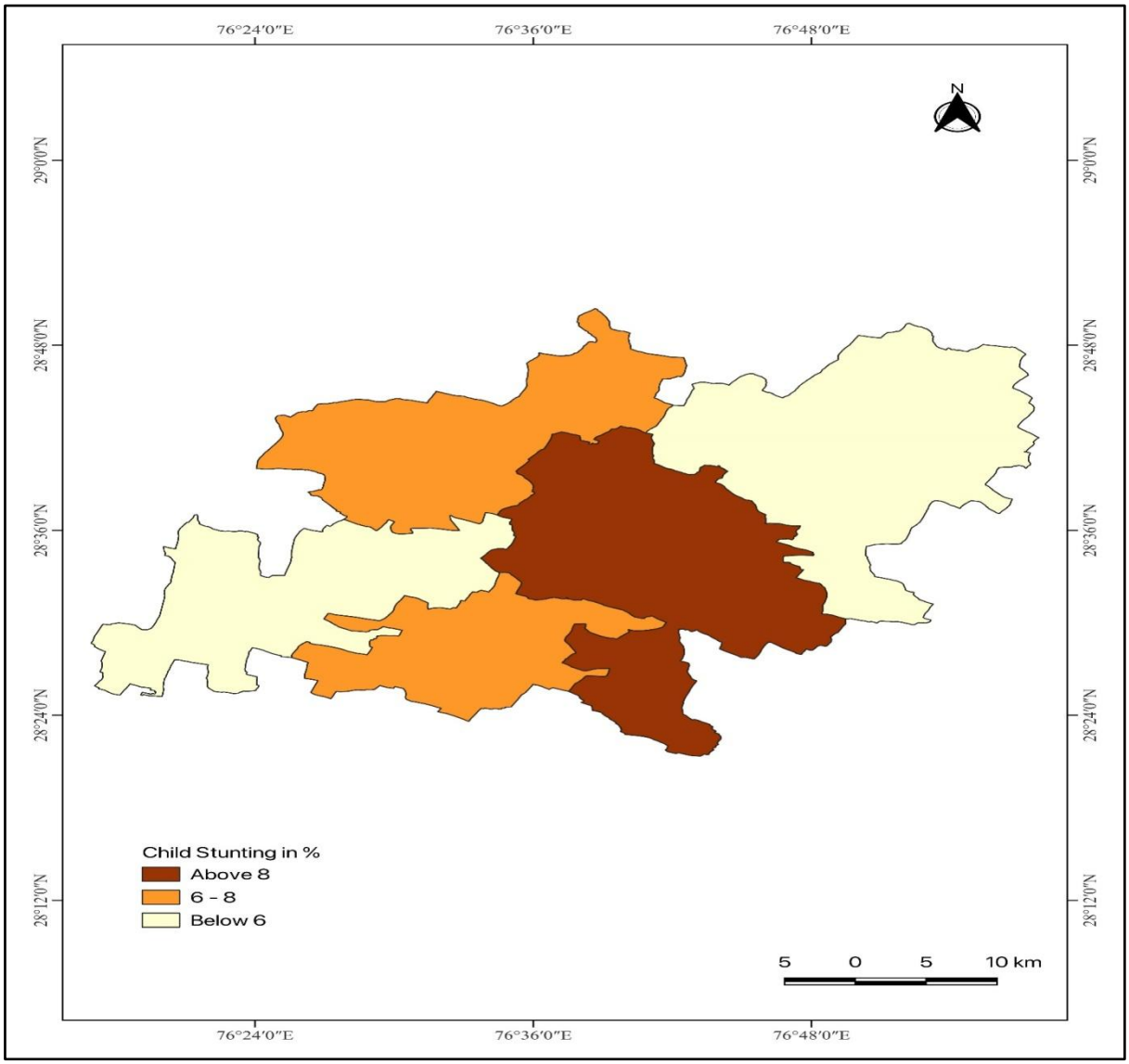
Table 1 shows the numbers of severely stunted children and their percentage out of total active children under the age of five years. The data has been taken from department of Women and Child welfare at Jhajjar city. The data is according to community development block of Jhajjar district. The highest number of severely acute malnutrition of stunting is in Jhajjar block and the lowest in Matainhel block. The percentage of severe stunted children is also the highest in Jhajjar block with 10.09 % and the lowest in Matainhel block with 5.21%. It means, in Jhajjar block every 10^{th} child is stunted and in Matainhel block every 20^{th} child is short for his/ her age. The number of stunted children in Bahadurgarh block is near to Jhajjar block, but percentage is comparatively low. This score (5.6 %) is second lowest in the Jhajjar district. Here the reason of lower percentage of severely stunting is economic development of this block due to locate in peripheral in National Capital Delhi. The level of urbanization, industrialization and employment is higher than other blocks of this district.

Map 1: ***CD Block-wise Child Stunting-SAM in Jhajjar District, 2023-2024***



Source: Based on Table 1

Beri and Salhawas is also not recorded very high prevalence in severe stunting. Beri block recorded lower (6.53%) than the district average (7%) but Salhawas block recorded higher (7.57%) than district average.

Map 1 shows the spatial pattern of percentage of severely stunted (SAM) children under the age of five years. The map shows the prevalent area into three categories. It shows the area of high, moderate and low prevalence of severe stunting in Jhajjar district.

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i. **The Area of High Prevalence of Severe Stunting (above 8%) -** The area of high stunting are prevalent in Jhajjar block. This block has 10.09 percent severely stunted children. This block is main and important because there is headquarter city of this district. This is rural as well as urban block but it is not well developed urban center. It is only day active city. Here is no major industrialization so, it does not provide job or generate income. Surrounding rural areas are also not very rich or produce access agricultural production.

ii. **The Area of Moderate Prevalence of Severe Stunting (6-8%) -** In this category, there are two blocks, name Beri and Salhawas block of this district. Salhawas block recorded 7.57 % and Beri recorded 6.53 % severely stunted children. Salhawas is totally rural block but Beri is rural as well as urban. The reason of less number of severe stunted children in Beri block is urban facility and employment.

iii. **The Area of Low Prevalence of Severe Stunting (below 6%) –** Bahadurgarh and Matainhel block have low prevalence of severe stunting. Bahadurgarh has 5.6% severe stunted and Matainhel has 5.21% severe stunted children. In Jhajjar district, Matainhel recorded the lowest proportion of severe stunted children. Here the reason of low stunted children in Bahadurgarh is high level of urbanization, literacy rate and employment rate etc. On the other hand, in Matainhel block, the reason is not so clear.

Stunting –MAM (Moderate Acute Malnutrition)
It is denoted in the percentage and number of children under the five years age, whose height of length for age is below -2 standard deviations (moderate) from median child growth standards of the World Health Organization.

Table 2 shows block-wise total number of children of 0-5 years, and number of moderately stunted and their percentage children in Jhajjar district. The highest number of moderately stunted children is in Bahadurgarh block. In this block, total 2615 children are stunted. Second highest are recorded in Jhajjar block with 1765 children. The lowest number of stunted children are in Salhawas block. The percentage of stunted children in Jhajjar district are 13.2 %. There is two block, which are above the district average. First block Jhajjar recorded the highest percentage with 14.47% and another block is Salhawas block with 14.33%. The interesting thing is, Salhawas recorded the lowest number but have second highest percentage of stunted children. The lowest proportion of moderately stunted children is recorded in Beri block.

Table 2*: CD Block-wise Stunting- MAM in Jhajjar District, 2023-24*

Block	Total Child[1] (0-5)	MAM	
		Number	%
Bahadurgarh	20908	1171	5.6
Beri	7596	496	6.53
Jhajjar	12196	1231	10.09
Matainhel	6846	357	5.21
Salhawas	5340	404	7.57
Total	52286	2615	13.2

[1] = total active children measured (height & weight) for the month 2023-2024.
Source: Department of Women & Child Welfare, Jhajjar, 2023-2024

Here only 12.09% children are moderately stunted. Block Bahadurgarh is median block in term of moderately stunted children with 12.50%.

Map 2 shows the spatial pattern of percentage of moderately stunted children under the age of five years. The map shows the prevalent area into three categories. It shows the area of high, moderate and low prevalence of severe stunting in Jhajjar district.

The Area of High Prevalence of Moderately Stunting (above 14.40%) - The area of stunting are prevalent in Jhajjar block. this block has 14.47 percent moderately stunted children. This block is main and important because this headquarter city of this district. This is rural as well as urban block. But it is not well developed urban center. It is only

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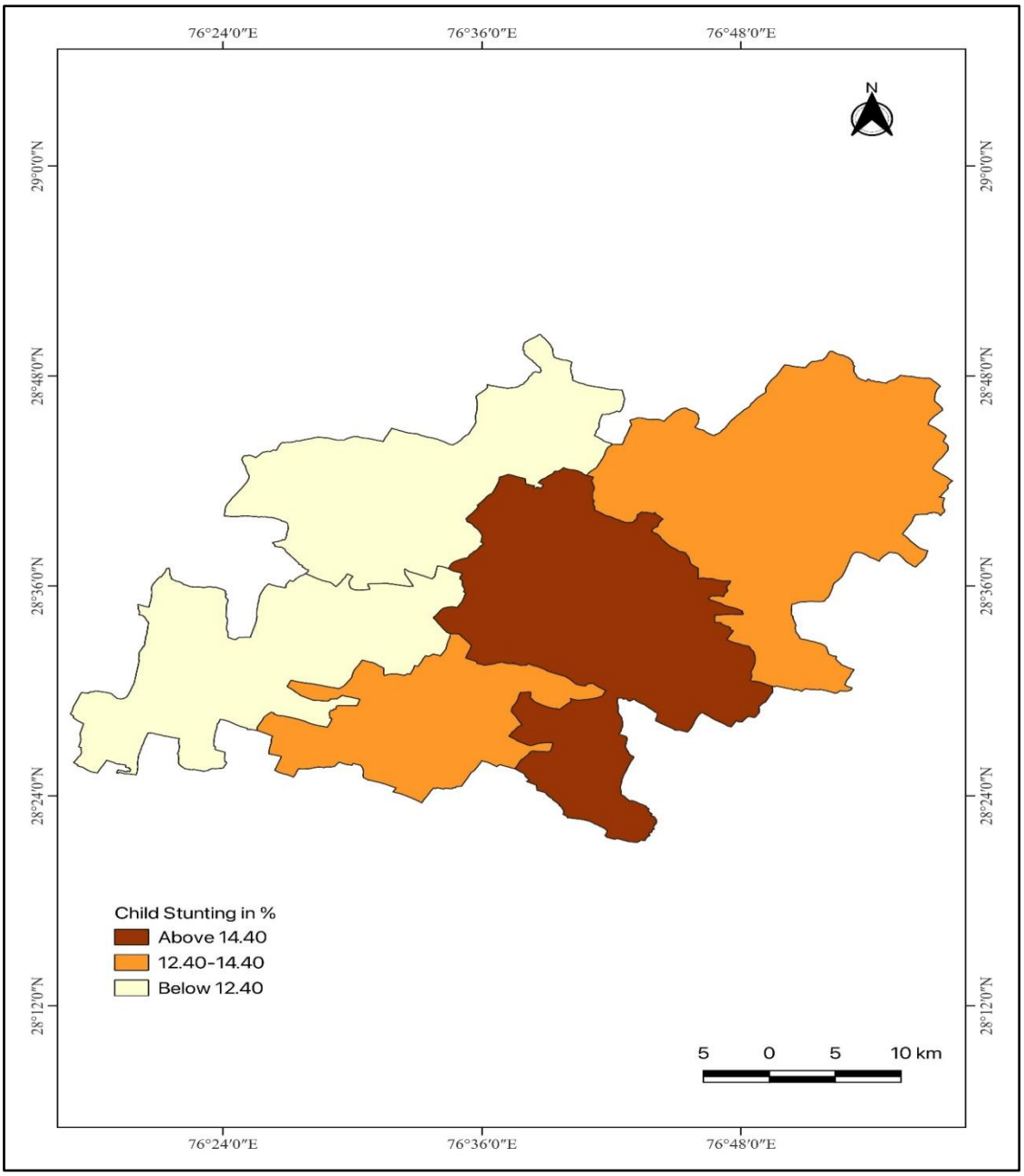
day active city. Here is no major industrialization so, it does not provide job or generate income. Surrounding rural areas are also not very rich or produce access agricultural production.

The Area of Moderate Prevalence of Moderately Stunting (12.40-14.40 %) - In this category, there are two blocks, name Bahadurgarh and Salhawas block of this district.

Map 2: ***CD Block-wise Child Stunting- MAM in Jhajjar District, 2023-2024***



Source: Based on table 2

Salhawas block recorded 14.33 % and Bahadurgarh recorded 12.50 % moderately.

Salhawas block recorded 14.33 % and Bahadurgarh recorded 12.50 % moderately stunted children. Salhawas is totally rural block but Bahadurgarh is rural as well as urban. The reason of less number of severe stunted children in Bahadurgarh block is urban facility and employment. Here the reason of low stunted children in Bahadurgarh is high level of urbanization, literacy rate and employment rate etc. On the other hand, in Salhawas block, the reason is not so clear.

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The Area of Low Prevalence of Moderately Stunting (below 12.40 %) – Beri and Matainhel block have low prevalence of severe stunting. Beri has 12.09 % moderately stunted and Matainhel has 12.23 % stunted children. In Jhajjar district, Beri recorded the lowest proportion of moderately stunted children. Here the reason of the lowest stunted children in Beri is high level of urbanization, literacy rate and employment rate than Matainhel block. On the other hand, in Matainhel block, the reason is not so clear

Stunting- Total (SAM+MAM)
Here the total denoted the severe and moderate together. In Jhajjar, total 20.2 percent children under the age of five years are stunted. In term of stunting, Jhajjar got 4th rank on national level. It is very attentive problem for food secure state of Haryana. According to NFHS-5 survey, there is only 15.6 % children are stunted but from data of Aanganwadi that compiled by the department of Women and Child Development, Jhajjar has 20.2 percent stunted children under the age of five years. The problem of stunting does not reversible like other form of undernutrition like wasting and underweight.

Table 3: ***CD Block-wise Child Stunting-Total (SAM+MAM) in Jhajjar District, 2023-24***

Block	Total Child[1] (0-5)	Total (SAM+MAM)	
		Number	%
Bahadurgarh	20908	3786	18.10
Beri	7596	1414	18.62
Jhajjar	12196	2996	25.37
Matainhel	6846	1194	17.44
Salhawas	5340	1169	21.9
Total	52286	10559	20.2

[1] = total active children measured (height & weight)
Source: Department of Women & Child Welfare, Jhajjar, 2023-2024

In Jhajjar, seven and thirteen percent of children under age of five years are severely and moderately stunted as per complied data of block level according the department of Women and child welfare at Jhajjar. The total 20.2 percent children are stunted in Jhajjar district. Table 3 revealed that, there is highest percentage of stunted children in Jhajjar block. Salhawas got second position in Jhajjar district in stunting percent. But the lowest number of stunted child is in block Matainhel. In term of total number of stunted children, the highest recorded by Bahadurgarh but its percentage share the second lowest in the district. Block Matainhel scored the lowest share of stunting. There are two blocks (Jhajjar and Salhawas) scored above the average of the district. Block Bahadurgarh, Beri and Matainhel recorded below the average of the district. The reason of high prevalence in Jhajjar block is no major industrialization so, it does not provide job or generate income. Surrounding rural areas are also not very rich or produce access agricultural production.

Map 3 shows the spatial pattern of percentage of total (SAM+MAM) stunted children under the age of five years. The map shows the prevalent area into three categories. It shows the area of high, moderate and low prevalence of total stunting in Jhajjar district.

i. **The Area of High Prevalence of Total stunted children (above 25%)** The problem of stunting is highly prevalentin the block. Jhajjar of this district in Jhajjar block number of percentage of prevalent children is highest in severely and moderately stunted child. In this block about 25% children are chronic under nutrition during their critical period of growth and development in early life. There is 25.37% children are failed to achieves expected height as compare to the healthy and well-nourished children of the same age.
ii. **The Area of Moderate Prevalence of Total stunted children (20- 25%)**-Moderate level of stunting (20-25%) are prevalent in Salhawas block. This block has 21.9% of children under the age of five years are stunted. This percentage is second highest among the Jhajjar block. In this block total number of stunted children under the age of five years are the lowest (1169) among all blocks. This block is rural, there is no urban population. It may be a factor high percentage of prevalent children. Literacy rate is also lower than other blocks.

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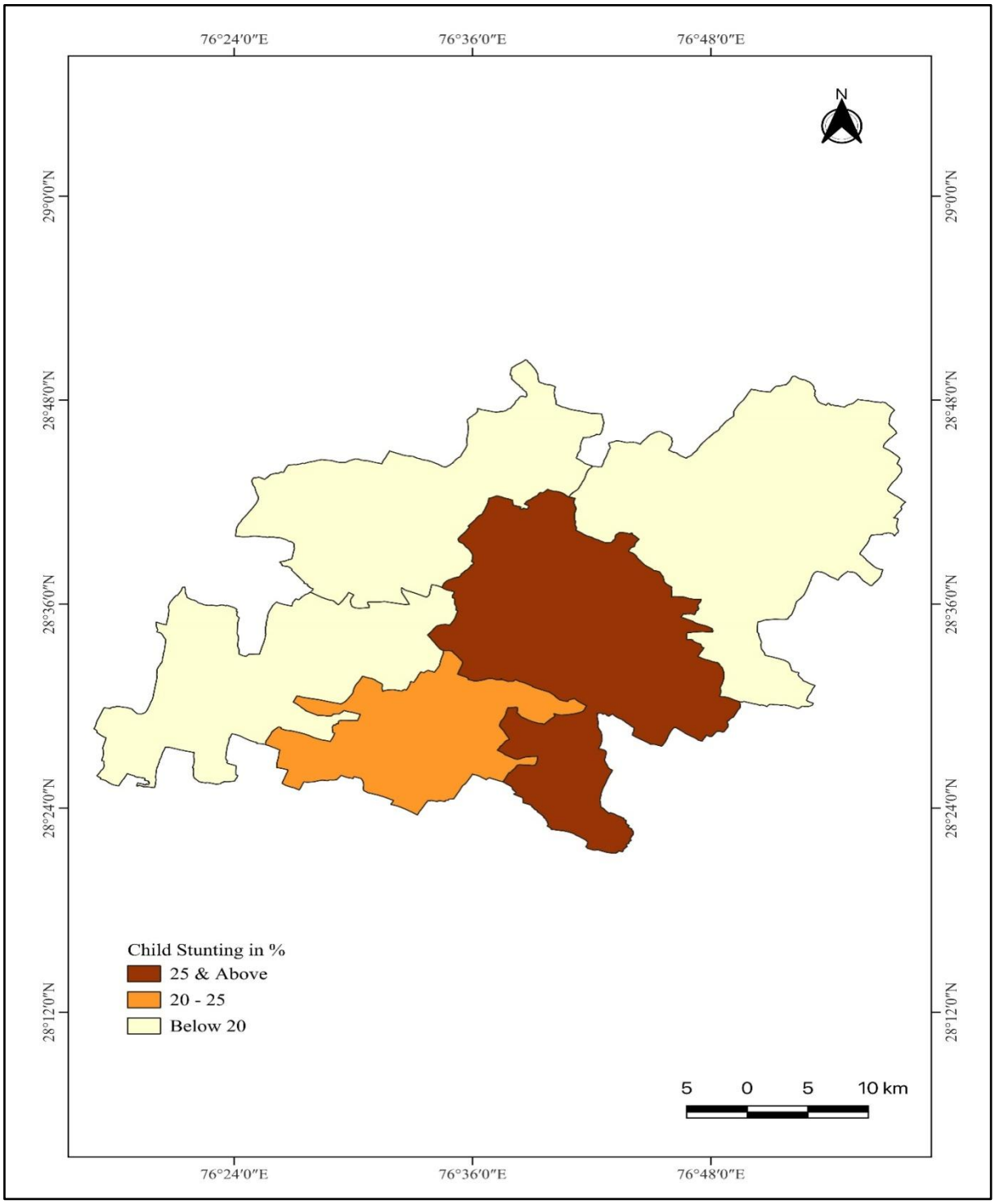
iii. **The Area of Low Prevalence of Total stunted children (above 20%)**-The areas having low percentage of stunted children (below 20%) are spread in 3 blocks of the districts. These blocks are very Bahadurgarh and Matainhel.

Map 3: ***CD Block-wise Child Stunting-Total (SAM+MAM) in Jhajjar District, 2023-2024***



Source: Based on Table 3

Among these blocks, Beri recorded 18.62% stunted children, Bahadurgarh 18.60% and last and least percentage of stunted children are in Matainhel block with 17.44%.Among these three block Bahadurgarh has highest population of children under the age of five years, Bahadurgarh block is highly developed and economically advanced block.It again

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peripheral advantage of national capital territory of Delhi that's why in this block, urbanisation, high literacy rate, better drinking water facility, toilet facility and high per capita income are main factor to reduce the number and percentage of stunted children.

Food Security Indexand Stunting

The definition of food security seems to be an unending process and is also undergoing steady change, depending upon the circumstances under which that definition is required to be viewed (Sud 2006).Food availability is a function of production of food grains through advancement in agriculture with in the country or through import. Food security exists when all people at all times have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (WHO, 2012). Food security is therefore a prerequisite for nutrition security but is not sufficient to guarantee optimal nutritional status. In to achieve nutrition security, one needs to have access to appropriate care giving practices and to hygienic environment and adequate health care services, in addition to a diet that meets nutritional needs for a healthy and active life (FAO, 2014).). The concept of food security stands basically on three pillars of availability, accessibility and utility.

Table 4: ***CD Block-wise Food Security Index and Child Stunting in Jhajjar District, 2023-24***

Block	FSI	Child Stunting (%)
Bahadurgarh	0.9828	18.10
Beri	0.8093	18.62
Jhajjar	0.766	25.37
Matainhel	0.6134	17.44
Salhawas	0.9724	21.9

Source: Calculated by Research Scholar

Food Availability is a function of production of foodgrains through advancement in agriculture with in the country or through import. The Food Security Index vary between 1 and 0. It means the blocks having index value near to 1 is performing better in food security while the blocks having index values near 0 are having poor status of food security.Finally the hypothesis thatchild undernutrition is more prevalent in less food secure areas of the state has been tested by calculation of correlation between food security index and proportion of stunting of children. The value of correlation between child undernutrition and Food Security Index in Jhajjar district is 0.153.Finally the hypothesis thatthe problem of stunting among the children is more prevalent in less food secure areas of the state has been tested by calculation of correlation between food security index and proportion of stunting children.

There is very week positive correlation between stunting and food security in Jhajjar district. It means highly food safe region are facing more problem of low height for age (stunting). But this prove our research hypothesis that there is inverse relation between food security and child stunting in Jhajjar district. This low value means food security is not even main factor of child stunting. There is other factor at household and institutional level are also very important to examine to tackle the problem of undernutrition among children under the age of five years.

CONCLUSION

The problem of child undernutrition is a major problem in developing countries like India. There is many form of child undernutrition. Among these stunting is taken to analysis in this present study. Stunting means child is too short or has less height according to age. The problem of stunting is also categorized into two category. One denote by SAM and another by MAM. SAM is stand for severely acute malnourished and MAM is for moderately acute malnourished. The data has been analyzed at block level.

Among the SAM stunted children, the highest proportion of severely stunted children are recorded in Jhajjar block and the lowest in Bahadurgarh block. On the other hand, moderately stunted children, the highest also found inJhajjar block and lowest in Bahadurgarh block. if we see the pattern of total stunted children in Jhajjar district, there is the highest (25.37%) recorded in Jhajjar block and the lowest (17.44%) in Matainhel block. The hypothesis suggesting that child undernutrition is more common in areas with lower food security within the district has been examined through the calculation of the correlation between the food security index and the rate of stunting among children. In the Jhajjar district, the correlation value between child undernutrition and the Food Security Index is found to be 0.153. This analysis confirms the hypothesis that stunting in children is indeed more prevalent in regions characterized by inadequate food security.

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