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LEVELS, DIFFERENTIALS AND CORRELATES OF NUTRITIONAL STATUS OF CHILDREN UNDER-FIVE YEARS IN HARYANA

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Abstract

This study investigates the nutritional status of children under the age of five years in the state of Haryana. Based on data obtained from the National Family and Health Survey (NFHS), the nutritional status among children in terms of three anthropometric measures: stunting, wasting, and underweight has been investigated. The study is based on simple statistical tools, including rates, proportions, and bivariate analyses. It has been found that, despite having a sound economic and health infrastructure, the nutritional status of children in the state of Haryana still remains a significant concern. The prevalence of stunting and underweight among children is 27.46 per cent and 21.39 per cent, respectively. It varies considerably across districts, between rural and urban areas and across socio-demographic backgrounds of the children. These results are significantly associated with children's age, maternal body mass index (BMI), maternal education, household wealth status, and dietary practices. Spatially, the district of Mewat, located in the southern part of Haryana has higher levels of undernutrition among children.

Keywords: Nutrition, Health, Children, Stunting, Underweight, Haryana.

Introduction

For demographers, among all characteristics of the human population, age has been the most important variable in both basic and advanced demographic analyses (Poston and Bouvier, 2010). For people in the society, however, age functions not only as a marker of personal identity but also as a determinant of social status, since individuals' roles and responsibilities are largely shaped by their age (Weeks, 2021). There are some societies that give more social status to individual based on their age (Davis, 1949). Demographically, along with older persons aged 60 years and above, children below 14 years are considered as non-working population, whereas adults aged 15-59 years form the working-age population. Conventionally, the non-working population (children and old persons) is categorized as dependent (Bloom at el., 2007; United Nations, 2020).

Children under-five years of age are totally dependent on their parents and other family members for their holistic development, including nutrition and health. They are also considered vulnerable due to their age and are at risk of exploitation, abuse, violence and neglect (Rajeshwari, 2019). Poor nutritional status among children constitutes to be a major global public health challenge. Inadequate

nutrition during early childhood is associated with profound and long-term health, social, and economic consequences across the life course (Fenske et al., 2013). Childhood malnutrition is a complex and multidimensional issue resulting from the interaction of determinants at multiple levels, including individual biological and behavioural factors, as well as household socio-economic conditions and food security (Ulahannan et al., 2022; Kumar, 2002; UNICEF, 2013). Epidemiological evidence indicates that malnutrition constitutes to be a major underlying cause of approximately one in every two deaths among children under five years of age (Poel et al., 2008). Empirical studies demonstrate that child mortality and malnutrition are unevenly distributed globally, with a disproportionate concentration among socioeconomically disadvantaged populations, particularly in regions of Sub-Saharan Africa and Asia (Onis et al., 2003; Kumar and Paswan, 2021). Notably, more than half of the world's wasted children reside in countries within South Asia (UNICEF, 2021). According to estimates by the World Bank, India ranks among the countries with the highest number of children affected by malnutrition globally (Das et al., 2020). Nearly half of the population in India, particularly children and women, are experiencing multiple forms of malnutrition, which in turn adversely affects human development outcomes (Tantri et al., 2022). The magnitude of malnutrition in India exhibits substantial inter-state and rural-urban disparities (Kanjilal et al., 2010). States such as Bihar, Madhya Pradesh, and Uttar Pradesh bear a disproportionately high burden of malnourished children. Furthermore, malnutrition accounts for approximately 68 per cent of total under-five mortality in the country (Swaminathan et al., 2019). Therefore, addressing childhood malnutrition is imperative to promote optimal cognitive growth and overall developmental outcomes (Black et al., 2008). In this context, the present study seeks to assess the nutritional status of children under five years of age in the state of Haryana.

Objectives of Study

Major objectives of the study are:

- to assess the nutritional status of children and,
- to examine the associated determinants of nutritional status among children in Haryana.

Study Area

Geographically, the state of Haryana is situated in the north-western part of India, extending from 27°39′N to 30°55′N latitudes and 74°27′E to 77°36′E longitudes, covering a geographical area of 44,212 km² (Fig. 1). According to the Census of India 2011, Haryana had a total population of 25,351,462 persons. The population of children under five years of age has been estimated at 2.37 million, accounting for approximately 9 per cent of the total population of the state. Economically, Haryana is among the advanced states of India. Over the decades, it has undergone a structural transformation from a predominantly agrarian economy to one driven by industry and services.

Database and Methodology

The study is based on secondary data obtained from latest fifth round of the National Family and Health Survey (NFHS) conducted in 2019-21. The nutritional status of the children aged under-five years has been measured in terms of three anthropometric

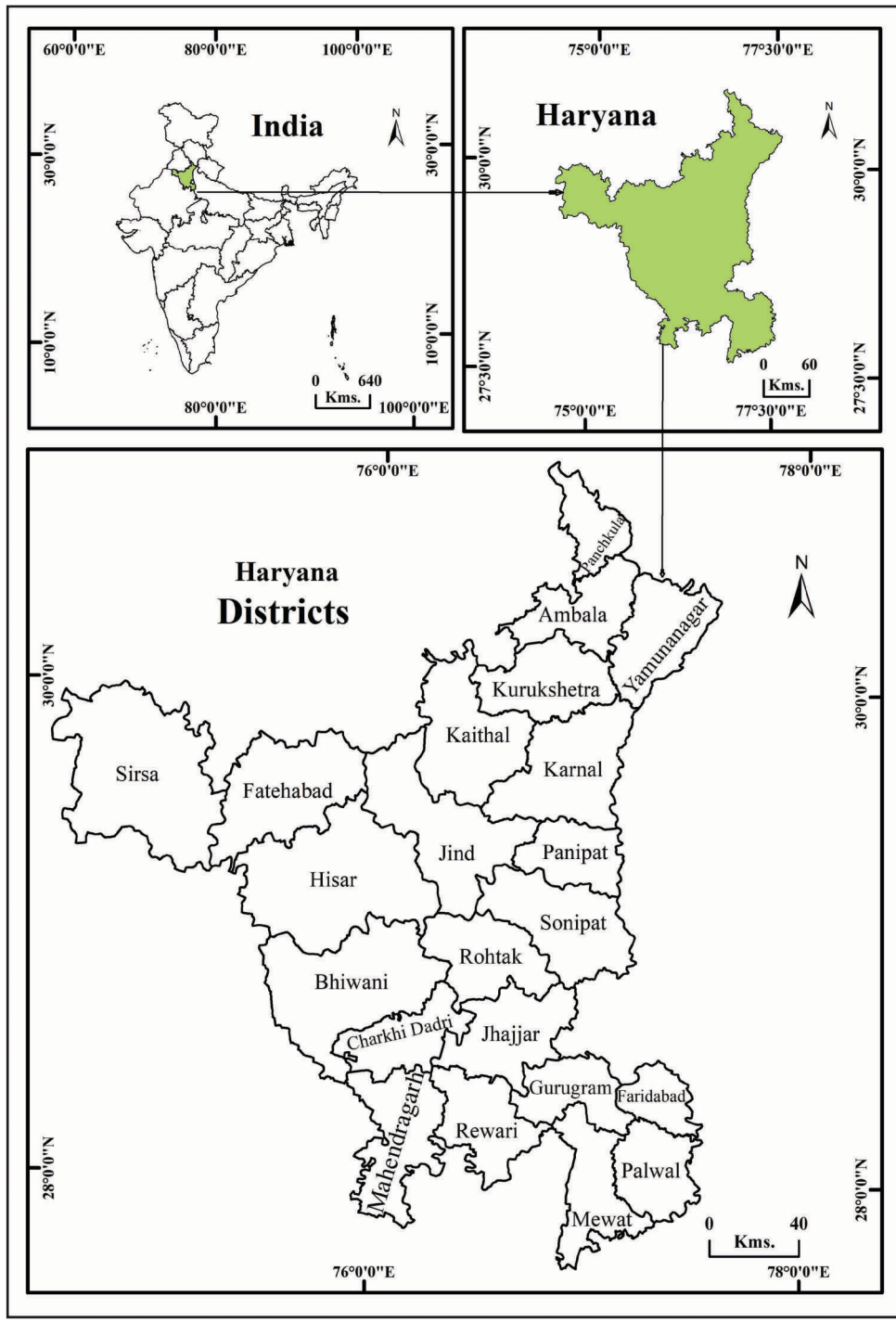

India
Haryana
Haryana
Districts
Panchkula
Ambala
Yamunanagar
Kurukshetra
Kaithal
Karnal
Sirsa
Fatehabad
Jind
Panipat
Hisar
Sonipat
Rohtak
Bhiwani
Charkhi Dadri
Jhajjar
Gurugram
Faridabad
Mahendragarh
Rewari
Palwal
Mewat
Kms.
N

Fig. 1

measures: (i) stunting; (ii) wasting and; (iii) underweight. Children are stunted when their height is low for their age, wasted when their weight is low for their height, and underweight when their weight is low for their age. Statistically, children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age (stunted). Similarly, the children whose Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered thin (wasted). Likewise, the children whose weight-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are classified as underweight (IIPS and ICF, 2021).

The nutritional level of the children has also been assessed in relation to the socio-economic, and demographic characteristics of the children and their mothers. These socio-economic and demographic characteristics are; children's age, sex, size at birth, birth order, social groups, religious groups, place of residence, households' wealth status, mother's education, birth interval and dietary patterns. Previous studies have also considered these socio-economic and demographic characteristics of children, their mothers, and households to examine the differentials and correlates of child malnutrition (Kumar and Paswan, 2021; Meitei, 2020; Kanjilal et al., 2010; Kalhan at el., 2021; Das et al., 2020)). Bivariate analyses have been performed subsequently to understand the relationship between the predictors and outcome variables. The adjusted impact of socioeconomic and demographic determinants of stunting, wasting and, underweight have been investigated by using binary logistic regression. After checking the multicollinearity using the Variance Inflation Factor (VIF) approach, the variables included in the regression analysis have been finalized. Maps and tables have been prepared to interpret the results.

Results and Discussion

Levels of Stunting among Children

In Haryana, the prevalence of stunted children has declined substantially from 45.70 per cent in 2005-06 to 34 per cent in 2015-16 and further to 27.46 per cent in 2019-21 (Fig. 2). A similar declining trend has been observed in the case of severely stunted children, which decreased from 19.40 per cent in 2005-06 to 14.80 per cent in 2015-16 and further to 10.60 per cent in 2019-21. At the national level, the prevalence of stunting among children has also declined from 48 per cent in 2005-06 to 38.40 per cent in 2015-16 and further to 35.48 per cent in 2019-21. Likewise, the proportion of severely stunted children in India has also declined from 23.70 per cent in 2005-06 to 16.30 per cent in 2015-16 and slightly further to 15.10 per cent in 2019-21. Thus, Haryana has experienced a relatively faster decline in the prevalence of child stunting as compared to India as a whole. Between 2005-06 and 2019-21, the prevalence of stunting among children in Haryana has declined by 18.24 percentage points, whereas at the national level the decline has been 12.52 percentage points.

Spatially, the prevalence of stunting among children has shown a considerable variation across districts in Haryana. A very high level of prevalence of stunting among children has been observed only in Mewat district (44.38 per cent) (Fig. 3). Existing literature indicates that in the district of Mewat, the factors such as poverty, poor maternal nutrition, low educational attainment and, limited access to health and sanitation facilities

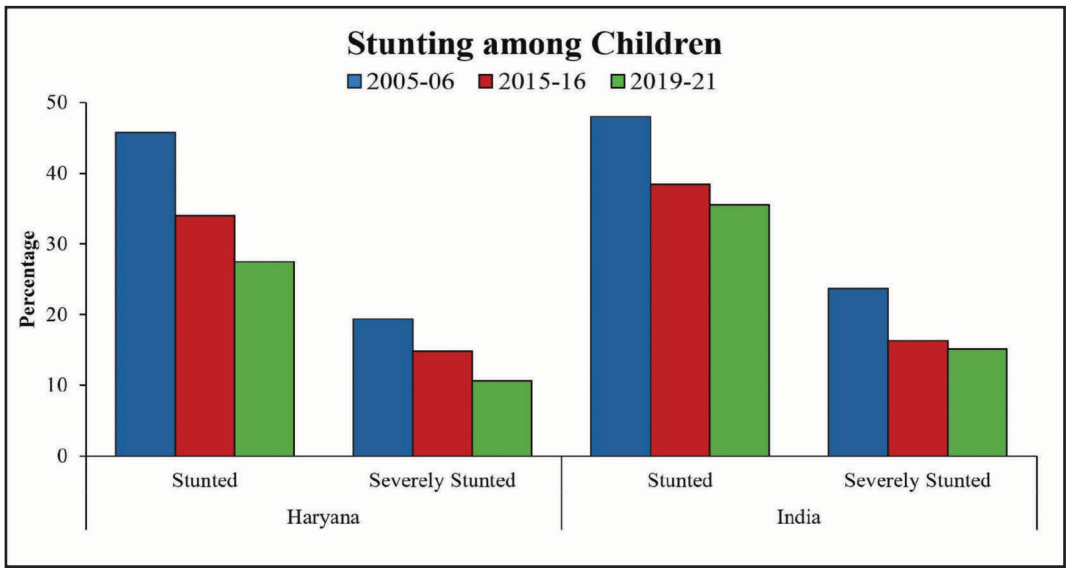


Fig. 2

have been associated with higher levels of stunting (Rahi et al., 2024). A moderate level of prevalence of stunting (27.12 to 32.86 per cent) among children has been found in eight districts, namely Palwal (30.95 per cent), Kaithal (29.89 per cent), Karnal (29.16 per cent), Bhiwani (29.00 per cent), Faridabad and Rohtak (28.86 per cent), Hisar (27.79 per cent), and Yamuna Nagar (27.73 per cent). In contrast, the lowest level of prevalence of stunting among children has been recorded in the district of Jhajjar (15.59 per cent).

Differentials of Stunting among Children

Prevalence of stunting among children in Haryana has shown substantial variations by the socio-economic and demographic characteristics of children, their mothers, households, and place of residence. At the individual level, stunting has been marginally higher among male children (27.89 per cent) than among the female children (27.06 per cent) (Table 1). Children with very small size at birth (39 per cent) and those whose mothers have a low body mass index (32.77 per cent) have exhibited a higher prevalence of stunting than children with average or larger size at birth (26.78 per cent) and those whose mothers have a higher body mass index (20.17 per cent) (Table 1). Dietary patterns have also shown variations in stunting, as children who never or occasionally consume vegetarian food (42.37 per cent) and green leafy vegetables (35.77 per cent) have recorded a higher prevalence of stunting as compared with those who consume these foods daily or weekly. Similarly, maternal education has shown a clear gradient, as children whose mothers have no formal education have exhibited a substantially higher prevalence of stunting (39.31 per cent) than those whose mothers have ten or more years of schooling (20.11 per cent). On account of socio-economic and residential differences, stunting has been more prevalent among children residing in rural areas (28.10 per cent) as compared with those living in urban areas (26.16 per cent). Further, children from the poorest households have shown a markedly

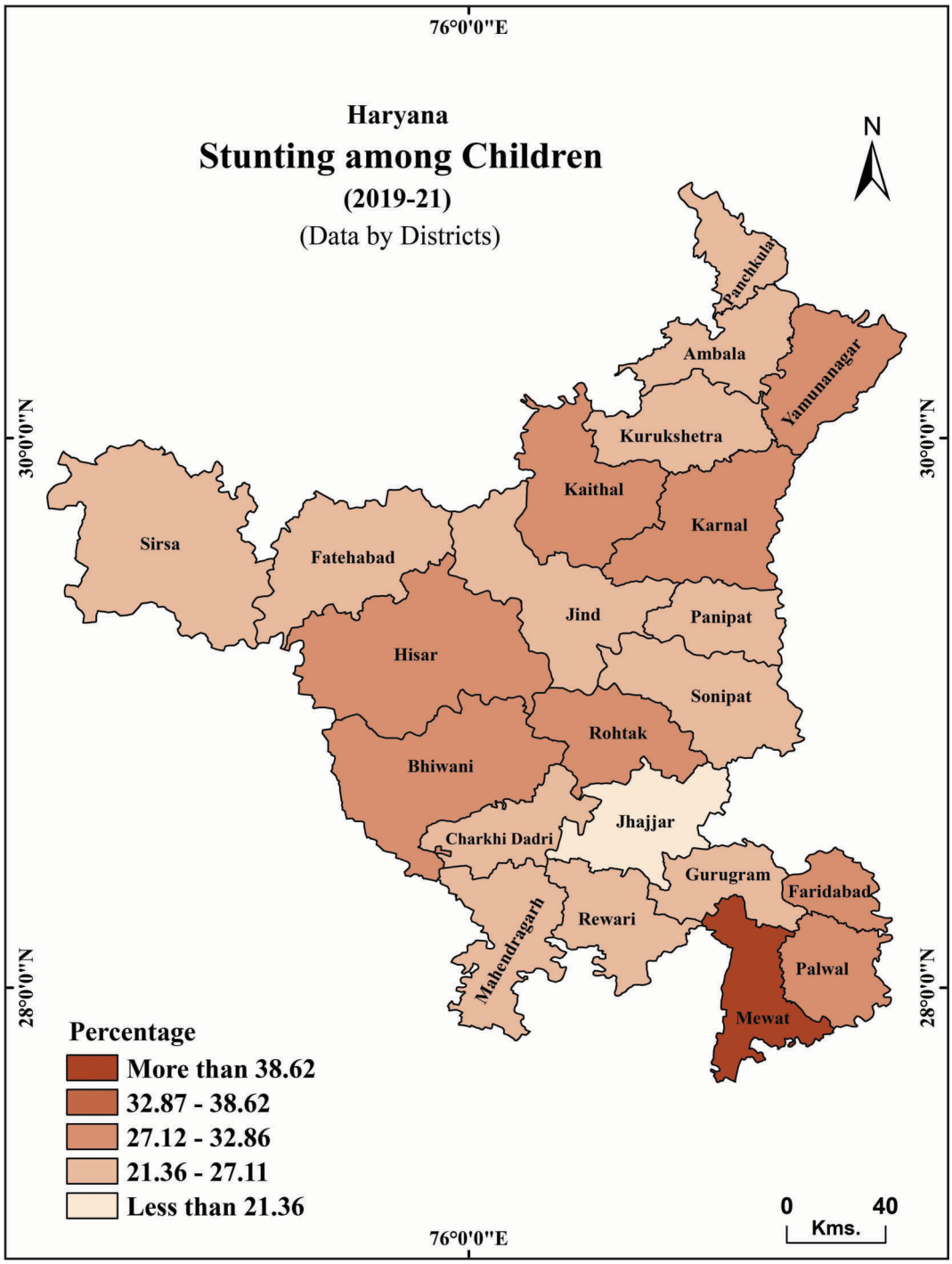

76°0'0"E
Haryana
Stunting among Children
(2019-21)
(Data by Districts)
N
30°0'0"N
28°0'0"N
Panchkula
Ambala
Yamunanagar
Kurukshetra
Kaithal
Karnal
Sirsa
Fatehabad
Jind
Panipat
Hisar
Sonipat
Rohtak
Bhiwani
Jhajjar
Charkhi Dadri
Gurugram
Faridabad
Rewari
Mahendragarh
Palwal
Mewat
Percentage
More than 38.62
32.87 - 38.62
27.12 - 32.86
21.36 - 27.11
Less than 21.36
0 40
Kms.

Fig. 3

Table 1

Haryana: Stunting among Children by their Socio-Economic Characteristics, 2021

Variable	Parameter	Stunting (per cent)
Age of Child (months)	Less than 6	17.50
	06-08	17.20
	09-11	21.30
	12-17	28.50
	18-23	34.70
	24-35	32.60
	36-47	30.80
	48-59	24.40
Sex	Male	27.89
	Female	27.06
Place of Residence	Urban	26.16
	Rural	28.10
Social Groups	SC	33.89
	OBC	29.11
	General	19.56
	Others	34.13
Child's Size at Birth	Very small	39.00
	Small	34.56
	Average/larger	26.78
	Don't know	22.12
Maternal Body Mass Index	Below 18.50	32.77
	18.50 - 24.90	30.14
	Above 25	20.17
Religious Groups	Hindu	26.12
	Muslim	41.57
	Sikh	17.51
	Others	34.62
Birth Order	One	23.61
	Two-Three	28.39
	Four-Five	38.67
	Six and more	43.28
Mother's Years of Schooling	No education	39.31
	Below 10 years	34.22
	Ten or more years	20.11
Wealth Status	Poorest	56.11
	Poorer	39.12
	Middle	36.78
	Richer	28.21
	Richest	19.56
Birth Interval	First birth	23.57
	Below 24 months	34.16
	24 to 35 months	32.41
	Above 35 months	25.32
Non-Vegetarian Food	Never/occasionally	26.41
	Daily/weekly	33.23
Vegetarian Food	Never/occasionally	42.37
	Daily/weekly	27.36
Vegetarian Protein Intake	Never/occasionally	41.41
	Daily/weekly	27.32
Vegetarian (Green Leafy)	Never/occasionally	35.77
	Daily/weekly	27.21
State Average		**27.46**
National Average		**35.48**

Source: Compiled by Authors.

higher prevalence of stunting (56.11 per cent) as compared with those from the richest households (19.56 per cent). Similarly, stunting has been more common among children belonging to scheduled castes (33.89 per cent) than among those from other backward classes (29.11 per cent) and the general category (19.56 per cent).

Correlates of Stunting among Children

A clear age gradient has been observed, with the odds of stunting increasing substantially as children grow older. Children aged 12-17 months have 1.92 times higher odds of being stunted as compared with children under six months, and the odds increase further to 2.45 times among children aged 18-23 months (Table 2). Birth size and maternal characteristics also play an important role in determining stunting. The children born with larger birth size have 0.62 times the odds of being stunted as compared with those born with very small birth size. Maternal education has also shown a protective effect, as children whose mothers have ten or more years of schooling have 0.75 times the odds of stunting as compared with children whose mothers have no formal education. Among social groups, children belonging to other backward classes and the general category have exhibited lower odds of stunting 0.79 times and 0.63 times, respectively than scheduled caste children. Place of residence also matters as rural children have recorded lower odds of being stunted (0.85 times) as compared with their urban counterparts. This association between stunting and place of residence may appear counter-intuitive because urban areas are often assumed to have better access to healthcare and services. However, several studies from Haryana suggest that urban poor populations, particularly those living in slums, experience higher levels of child malnutrition, which is the indication of higher level of stunting (Pooja et al., 2019; Rahi et al., 2024). Household wealth status has also shown a strong gradient, with children from richer and richest households having substantially lower odds of stunting, 0.42 times and 0.34 times, respectively, than the children from poorer households.

Levels of Wasting among Children

In Haryana, the prevalence of wasted children has increased from 19.11 per cent in 2005-06 to 21.20 per cent in 2015-16; however, it has declined considerably to 11.46 per cent in 2019-21 (Fig. 4). A similar fluctuating but overall declining trend has been observed in case of severely wasted children. The prevalence of severely wasted children increased from 5.00 per cent in 2005-06 to 9.00 per cent in 2015-16, but subsequently declined to 4.40 per cent in 2019-21. At the national level, the prevalence of wasting among children remained relatively high during the same period, declining marginally from 19.80 per cent in 2005-06 to 19.32 per cent in 2019-21. However, the proportion of severely wasted children in India increased from 6.40 per cent in 2005-06 to 7.42 per cent in 2015-16 and further to 7.72 per cent in 2019-21 (Fig. 4). Thus, Haryana has experienced a relatively faster decline in the prevalence of wasting among children as compared to India as a whole. Between 2005-06 and 2019-21, the prevalence of wasting in Haryana declined by 7.65 percentage points, whereas at the national level the decline has been only 0.48 percentage points.

Spatially, the prevalence of wasting among children in 2019-21 in Haryana has shown variations across districts. A very high level of prevalence of wasting among children

Table 2

Haryana: Binary Logistic Regression for Stunted Children

Variable	Parameter	Stunting (AOR 95 per cent CI)
Age of Child (months)	Less than 6 (RC)	-
	06-08	0.92 (0.62-1.36)
	09-11	1.31 (0.90-1.89)
	12-17	1.92 (1.45-2.53) ***
	18-23	2.45 (1.84-3.26) ***
	24-35	2.28 (1.78-2.92) ***
	36-47	2.16 (1.69-2.77) ***
	48-59	1.51 (1.17-1.94) **
Sex	Male (RC)	-
	Female	0.95 (0.85-1.08)
Place of Residence	Urban (RC)	-
	Rural	0.85* (0.74-0.97)
Social Groups	SC (RC)	-
	OBC	0.79 (0.68-0.93) **
	General	0.63 (0.54-0.74) ***
	Others	0.87 (0.58-1.30)
Child's Size at Birth	Very small (RC)	-
	Small	0.89 (0.55-1.46)
	Average/larger	0.62 (0.39-0.96) *
	Don't know	0.30 (0.12-0.77) *
Maternal Body Mass Index	Below 18.50 (RC)	-
	18.50 - 24.90	0.98 (0.83-1.17)
	Above 25	0.68 (0.56-0.84) ***
Religious Groups	Hindu (RC)	-
	Muslim	1.33 (1.04-1.69) *
	Sikh	0.57 (0.37-0.88) *
	Others	0.90 (0.19-4.27)
Birth Order	One (RC)	-
	Two-Three	0.95 (0.80-1.12)
	Four-Five	1.07 (0.84-1.37)
	Six and more	1.19 (0.78-1.80)
Mother's Years of Schooling	No education (RC)	-
	Below 10 years	1.06 (0.87-1.28)
	Ten or more years	0.75 (0.60-0.93) **
Wealth Status	Poorest (RC)	-
	Poorer	0.52 (0.35-0.77) ***
	Middle	0.53 (0.37-0.78) ***
	Richer	0.42 (0.29-0.61) ***
	Richest	0.34 (0.23-0.50) ***
Birth Interval	First birth (RC)	-
	Below 24 months	1.31 (1.10-1.58) **
	24 to 35 months	1.19 (0.98-1.43)
	Above 35 months	1.00 (1.00-1.00)
Non-Vegetarian Food	Never/occasionally (RC)	-
	Daily/weekly	0.94 (0.79-1.12)
Vegetarian Food	Never/occasionally (RC)	-
	Daily/weekly	1.12 (0.46-2.74)
Vegetarian Protein Intake	Never/occasionally (RC)	-
	Daily/weekly	0.72 (0.39-1.33)
Vegetarian (Green Leafy)	Never/occasionally (RC)	-
	Daily/weekly	1.07 (0.76-1.52)

Source: Compiled by Authors, RC: Reference Category; AOR: Adjusted Odd Ratio; CI: Class Interval; *Significant at <0.05; **Significant at <0.01; ***Significant at <0.001

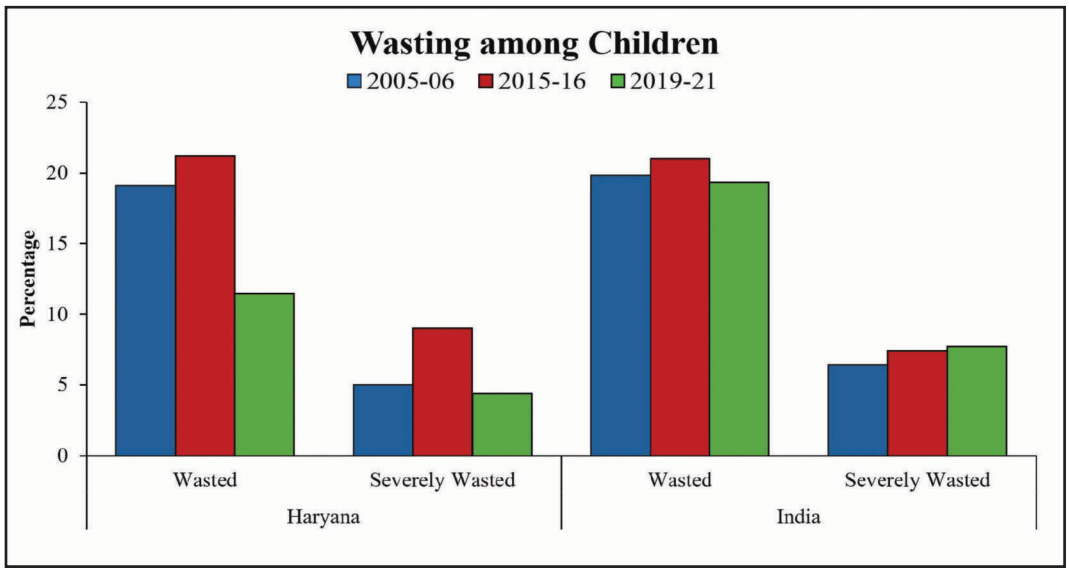


Fig. 4

has been observed only in Kaithal district (20.76 per cent) (Fig. 5). A moderate level of prevalence of wasting among children ranging between 12.03 to 14.93 per cent has been found in six districts, namely Mewat (14.21 per cent), Kurukshetra (12.87 per cent), Sirsa (12.65 per cent), Rohtak (12.51 per cent), Yamuna Nagar (12.11 per cent) and Panchkula (12.10 per cent). In contrast, the lowest level of prevalence of wasting among children has been recorded in the districts of Bhiwani (6.20 per cent) followed by Jhajjar (8.10 per cent), Faridabad (8.20 per cent), Mahendragarh (8.41 per cent) and Jind (8.80 per cent) (Fig. 5). Thus, Kaithal district has recorded highest level of wasting, while Bhiwani district has witnessed lowest level of wasting among children in Haryana.

Differentials of Wasting among Children

Prevalence of wasting among children in Haryana has shown variations by the socio-economic and demographic characteristics of children. At the residential level, prevalence of wasting has been slightly higher among children residing in rural areas (11.73 per cent) than among those living in urban areas (10.71 per cent) (Table 3). On account of social group differentials, the prevalence of wasting has been higher among children belonging to scheduled castes (14.14 per cent) as compared with those from other social groups (12.71 per cent), other backward classes (11.52 per cent) and the general category (8.73 per cent). Household economic status further reflects variations in the prevalence of wasting, as children from the poorest households have exhibited a higher prevalence of wasting (14.67 per cent) as compared with those from the richest households (10.32 per cent) (Table 3). Dietary patterns have also shown variations in wasting, as children who consume non-vegetarian food on a daily or weekly basis have recorded a slightly higher prevalence of wasting (12.56 per cent), as compared with those who consume such foods never or occasionally (11.23 per cent). Similarly, children who consume vegetarian foods on a daily or weekly basis have shown a higher

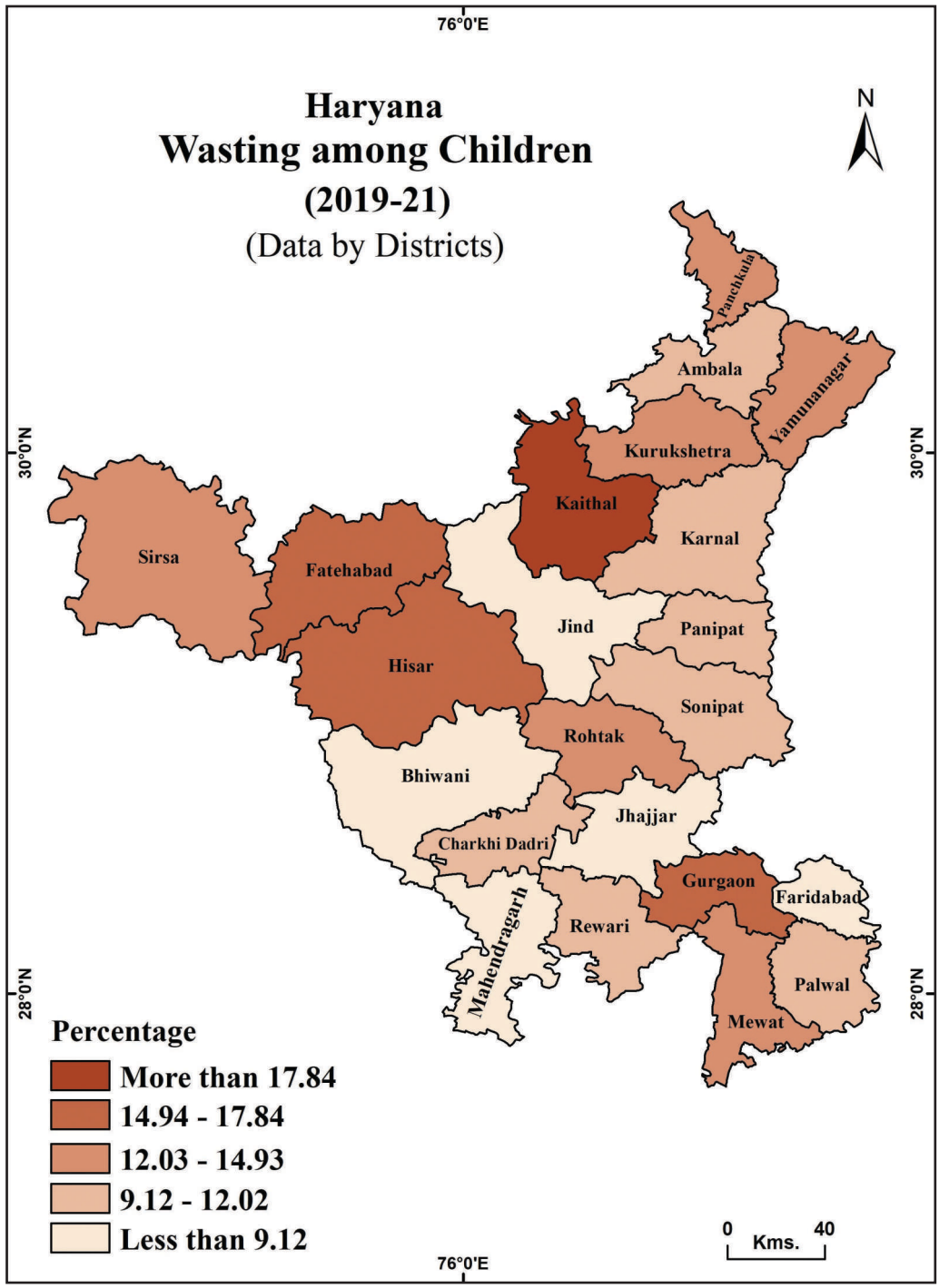

Haryana
Wasting among Children
(2019-21)
(Data by Districts)
N
76°0'E
30°0'N
28°0'N
Panchkula
Ambala
Yamunanagar
Kurukshetra
Kaithal
Karnal
Sirsa
Fatehabad
Jind
Panipat
Hisar
Sonipat
Rohtak
Bhiwani
Jhajjar
Charkhi Dadri
Gurgaon
Faridabad
Rewari
Mahendragarh
Palwal
Mewat
Percentage
More than 17.84
14.94 - 17.84
12.03 - 14.93
9.12 - 12.02
Less than 9.12
0 Kms. 40

Fig. 5

Table 3

Haryana: Wasting among Children by their Socio-Economic Characteristics, 2021

Variable	Parameter	Stunting (per cent)
Age of Child (months)	Less than 6	24.20
	06-08	15.10
	09-11	12.80
	12-17	13.10
	18-23	11.50
	24-35	8.00
	36-47	9.70
	48-59	8.0
Sex	Male	11.81
	Female	11.00
Place of Residence	Urban	10.71
	Rural	11.73
Social Groups	SC	14.14
	OBC	11.52
	General	8.73
	Others	12.71
Child's Size at Birth	Very small	13.13
	Small	13.62
	Average/larger	11.21
	Don't know	18.00
Maternal Body Mass Index	Below 18.50	15.54
	18.50 - 24.90	12.63
	Above 25	7.21
Religious Groups	Hindu	11.11
	Muslim	13.63
	Sikh	14.91
	Others	10.01
Birth Order	One	11.32
	Two-Three	11.31
	Four-Five	12.52
	Six and more	10.11
Mother's Years of Schooling	No education	13.66
	Below 10 years	13.25
	Ten or more years	20.11
Wealth Status	Poorest	14.67
	Poorer	12.05
	Middle	14.14
	Richer	11.13
	Richest	10.32
Birth Interval	First birth	11.37
	Below 24 months	12.95
	24 to 35 months	10.83
	Above 35 months	10.81
Non-Vegetarian Food	Never/occasionally	11.23
	Daily/weekly	12.56
Vegetarian Food	Never/occasionally	3.61
	Daily/weekly	11.53
Vegetarian Protein Intake	Never/occasionally	9.63
	Daily/weekly	11.46
Vegetarian (Green Leafy)	Never/occasionally	8.91
	Daily/weekly	11.57
State Average		**11.46**
National Average		**19.32**

Source: Compiled by Authors.

prevalence of wasting (11.53 per cent) as compared with those who never or occasionally consume such food (3.61 per cent).

Correlates of Wasting among Children

A clear age pattern has been observed, with the odds of wasting declining as children grow older. `Children aged 6-8 months have 0.56 times lower odds of being wasted as compared with infants below six months, and the odds decline further to 0.44 times among children aged 9-11 months, 0.39 times among children aged 18-23 months and 0.27 times among children aged 24-35 months (Table 4). Maternal body mass index level also plays an important role in determining wasting, as children whose mothers have an average body mass index (18.50-24.90) have shown 0.80 times the odds of being wasted as compared with those whose mothers have a body mass index of less than 18.50. However, this association has not been found to be statistically significant. In contrast, children born to mothers with a body mass index of above 25 have substantially lower and statistically significant odds of wasting (0.48 times). Maternal education has also shown a protective effect, as children whose mothers have ten or more years of schooling have 0.70 times the odds of wasting as compared with children whose mothers have no formal education. Among social groups, children belonging to other backward classes and the general category have exhibited lower odds of wasting (0.78 times and 0.66 times, respectively) as compared with scheduled caste children.

Levels of Underweight among Children

The study reveals that the prevalence of underweight among children in Haryana has declined from 39.61 per cent in 2005-06 to 21.39 per cent in 2019-21 (Fig. 6). While, at the national level, underweight prevalence has decreased from 42.53 per cent to 32.11 per cent during the same period. Likewise, the prevalence of severely underweight children in the state has declined from 14.20 per cent to 5.89 per cent over the same period, reflecting significant improvements in child nutritional status. In contrast, prevalence of underweight children at the national level has declined from 15.80 per cent in 2005-06 to 10.60 per cent in 2019-21. Thus, Haryana has recorded a sharper decline of 18.22 percentage points in underweight prevalence as compared to 10.42 percentage point decline recorded at the national level.

Spatially speaking, the prevalence of underweight children in 2019-21 in Haryana has shown considerable variations across districts (Fig. 7). A very high level of prevalence of underweight children has been observed only in Mewat district (37.31 per cent). A moderate level of prevalence of underweight children (20.73 to 26.25 per cent) has been observed in eight districts, namely Sirsa (23.44 per cent), Yamuna Nagar (23.08 per cent), Jind (22.86 per cent), Kurukshetra (22.50 per cent), Gurugram (22.23 per cent), Rohtak (22.06 per cent), Hisar (21.44 per cent) and Palwal (21.02 per cent). In contrast, the lowest level of prevalence of underweight children has been found in Ambala (13.73 per cent), Sonipat (12.68 per cent) and Jhajjar (9.67 per cent) districts. Thus, Mewat district has recorded the highest level of underweight children, while Jhajjar district has witnessed the lowest prevalence of underweight children in Haryana.

Differentials of Underweight Children

Prevalence of underweight children in

Table 4
Haryana: Binary Logistic Regression for Wasted Children

Variable	Parameter	Stunting (AOR 95 per cent CI)
Age of Child (months)	Less than 6 (RC)	-
	06-08	0.56 (0.38-0.83) **
	09-11	0.44 (0.29-0.66) ***
	12-17	0.46 (0.34-0.62) ***
	18-23	0.39 (0.28-0.55) ***
	24-35	0.27 (0.20-0.36) ***
	36-47	0.34 (0.26-0.44) ***
	48-59	0.27 (0.20-0.36) ***
Sex	Male (RC)	-
	Female	0.94 (0.80-1.11)
Place of Residence	Urban (RC)	-
	Rural	1.01 (0.83-1.23)
Social Groups	SC (RC)	-
	OBC	0.78 (0.63-0.97) *
	General	0.66 (0.53-0.83) ***
	Others	0.74 (0.42-1.31)
Child's Size at Birth	Very small (RC)	-
	Small	0.85 (0.42-1.71)
	Average/larger	0.75 (0.39-1.42)
	Don't know	1.25 (0.39-3.98)
Maternal Body Mass Index	Below 18.50 (RC)	-
	18.50 - 24.90	0.80 (0.64-1.01)
	Above 25	0.48 (0.36-0.63) ***
Religious Groups	Hindu (RC)	-
	Muslim	1.27 (0.90-1.78)
	Sikh	1.38 (0.87-2.19)
	Others	0.86 (0.08-9.08)
Birth Order	One (RC)	-
	Two-Three	0.97 (0.78-1.22)
	Four-Five	0.94 (0.66-1.33)
	Six and more	0.70 (0.36-1.38)
Mother's Years of Schooling	No education (RC)	-
	Below 10 years	0.92 (0.70-1.20)
	Ten or more years	0.70 (0.51-0.95) *
Wealth Status	Poorest (RC)	-
	Poorer	0.81 (0.46-1.41)
	Middle	1.10 (0.64-1.88)
	Richer	0.89 (0.52-1.52)
	Richest	1.08 (0.62-1.86)
Birth Interval	First birth (RC)	-
	Below 24 months	1.15 (0.89-1.48)
	24 to 35 months	0.92 (0.70-1.20)
	Above 35 months	1.00 (1.00-1.00)
Non-Vegetarian Food	Never/occasionally (RC)	-
	Daily/weekly	0.93 (0.73-1.19)
Vegetarian Food	Never/occasionally (RC)	-
	Daily/weekly	4.14 (0.74-23.19)
Vegetarian Protein Intake	Never/occasionally (RC)	-
	Daily/weekly	0.82 (0.35-1.90)
Vegetarian (Green Leafy)	Never/occasionally (RC)	-
	Daily/weekly	1.22 (0.73-2.06)

Source: Compiled by Authors, RC: Reference Category; AOR: Adjusted Odd Ratio; CI: Class Interval; *Significant at <0.05; **Significant at <0.01; ***Significant at <0.001

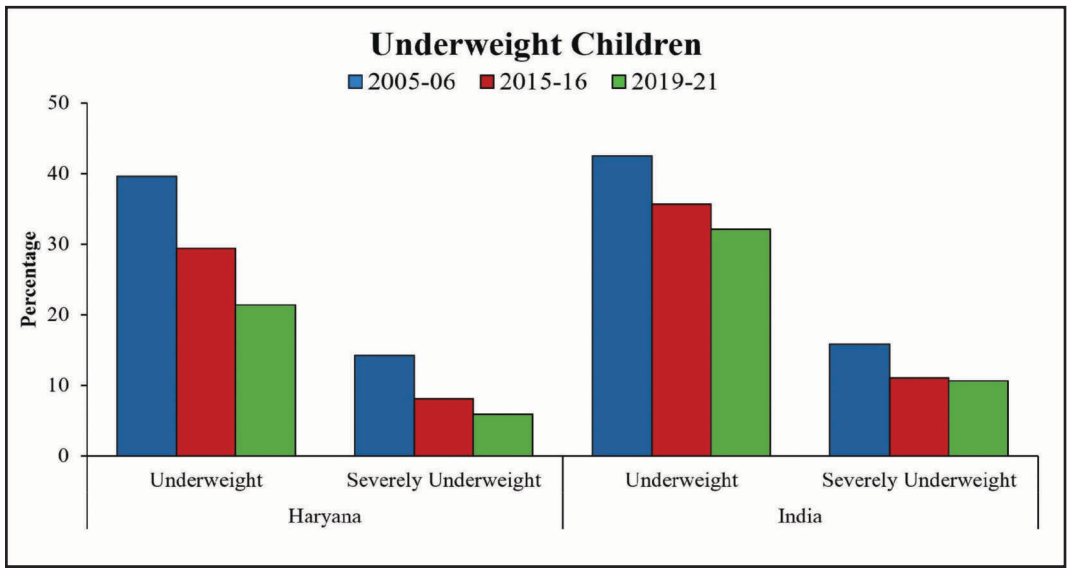


Fig. 6

Haryana varies widely by household wealth, social groups, maternal education, and maternal body mass index. Prevalence of underweight children has been marginally higher among female children (21.67 per cent) than among the male children (21.23 per cent) (Table 5). Further, children from the poorest households have shown a markedly higher prevalence of underweight (48.18 per cent) as compared with those from the richest households (14.22 per cent). Similarly, prevalence of underweight has been higher among children belonging to scheduled castes (27.26 per cent) than among those from general category (13.52 per cent). Underweight has been more common among children whose mothers have no formal education (35.37 per cent) as compared with those whose mothers have ten or more years of schooling (20.11 per cent). In addition, children whose mothers have a lower body mass index have exhibited a higher prevalence of underweight children (29.93 per cent) as compared with those children whose mothers have a higher body mass index (14.41 per cent).

Correlates of Underweight Children

The study reveals that children aged 36-47 months have 1.35 times higher odds of being underweight than children below six months of age (Table 6). Children born with an average or larger birth size have shown 0.45 times the odds of being underweight as compared with those born with very small birth size. Maternal body mass index levels also play an important role in determining underweight, as children whose mothers have an average body mass index of (18.50-24.90) and higher body mass index (more than 25.00) have shown 0.76 times and 0.51 times lower odds of being underweight, respectively, as compared with children whose mothers have lower body mass index (below 18.50). Maternal education has also shown a protective effect, as children whose mothers have ten or more years of schooling have shown 0.52 times lower odds of underweight as compared with children whose mothers have no formal education. Social and economic factors are also important in determining the underweight prevalence

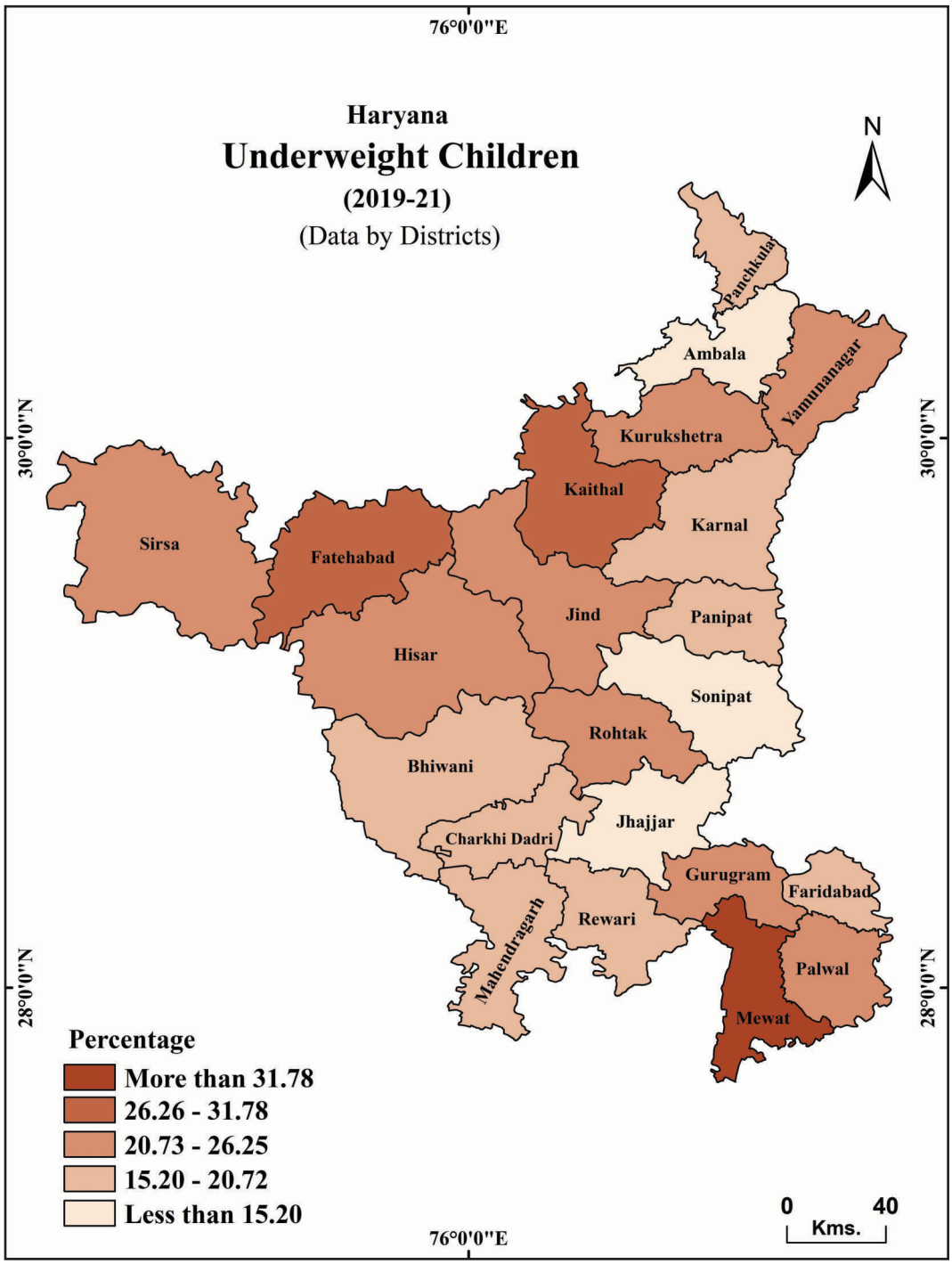

76°0'0"E
Haryana
Underweight Children
(2019-21)
(Data by Districts)
N
30°0'0"N
28°0'0"N
Panchkula
Ambala
Yamunanagar
Kurukshetra
Kaithal
Karnal
Sirsa
Fatehabad
Jind
Panipat
Hisar
Sonipat
Rohtak
Bhiwani
Jhajjar
Charkhi Dadri
Gurugram
Faridabad
Rewari
Mahendragarh
Palwal
Mewat
Percentage
More than 31.78
26.26 - 31.78
20.73 - 26.25
15.20 - 20.72
Less than 15.20
0 40
Kms.

Fig. 7

Table 5

Haryana: Underweight Children by their Socio-Economic Characteristics, 2021

Variable	Parameter	Stunting (per cent)
Age of Child (months)	Less than 6 (RC)	19.80
	06-08	17.20
	09-11	17.00
	12-17	17.70
	18-23	23.90
	24-35	21.90
	36-47	24.70
	48-59	21.30
Sex	Male (RC)	21.23
	Female	21.67
Place of Residence	Urban (RC)	20.51
	Rural	21.74
Social Groups	SC (RC)	27.26
	OBC	23.75
	General	13.52
	Others	26.11
Child's Size at Birth	Very small (RC)	37.29
	Small	28.84
	Average/larger	20.42
	Don't know	33.41
Maternal Body Mass Index	Below 18.50 (RC)	29.93
	18.50 - 24.90	23.00
	Above 25	14.41
Religious Groups	Hindu (RC)	19.66
	Muslim	36.48
	Sikh	20.92
	Others	33.11
Birth Order	One (RC)	18.51
	Two-Three	21.73
	Four-Five	29.86
	Six and more	33.67
Mother's Years of Schooling	No education (RC)	35.37
	Below 10 years	27.53
	Ten or more years	20.11
Wealth Status	Poorest (RC)	48.18
	Poorer	30.16
	Middle	30.34
	Richer	22.32
	Richest	14.22
Birth Interval	First birth (RC)	18.51
	Below 24 months	26.00
	24 to 35 months	25.21
	Above 35 months	19.92
Non-Vegetarian Food	Never/occasionally (RC)	20.11
	Daily/weekly	28.15
Vegetarian Food	Never/occasionally (RC)	33.26
	Daily/weekly	21.32
Vegetarian Protein Intake	Never/occasionally (RC)	37.2
	Daily/weekly	21.1
Vegetarian (Green Leafy)	Never/occasionally (RC)	25.77
	Daily/weekly	21.14
State Average		**21.39**
National Average		**32.11**

Source: Compiled by Authors.

Table 6

Haryana: Binary Logistic Regression for Underweight Children

Variable	Parameter	Stunting (AOR 95 per cent CI)
Age of Child (months)	Less than 6 (RC)	-
	06-08	0.8 (0.54-1.18)
	09-11	0.83 (0.56-1.23)
	12-17	0.84 (0.62-1.12)
	18-23	1.21 (0.90-1.62)
	24-35	1.10 (0.85-1.41)
	36-47	1.35* (1.05-1.73)
	48-59	1.08 (0.84-1.40)
Sex	Male (RC)	-
	Female	1.04 (0.91-1.19)
Place of Residence	Urban (RC)	-
	Rural	0.82 (0.70-0.95) **
Social Groups	SC (RC)	-
	OBC	0.79 (0.67-0.94) **
	General	0.57 (0.47-0.68) ***
	Others	0.69 (0.45-1.07)
Child's Size at Birth	Very small (RC)	-
	Small	0.70 (0.42-1.16)
	Average/larger	0.45 (0.28-0.70) ***
	Don't know	0.51 (0.21-1.22)
Maternal Body Mass Index	Below 18.50 (RC)	
	18.50 - 24.90	0.76 (0.64-0.92) **
	Above 25	0.51 (0.41-0.64) ***
Religious Groups	Hindu (RC)	-
	Muslim	1.53 (1.19-1.96) ***
	Sikh	1.00 (0.67-1.51)
	Others	1.22 (0.25-5.86)
Birth Order	One (RC)	-
	Two-Three	0.94 (0.79-1.13)
	Four-Five	0.93 (0.72-1.22)
	Six and more	0.86 (0.55-1.35)
Mother's Years of Schooling	No education (RC)	-
	Below 10 years	0.86 (0.71-1.06)
	Ten or more years	0.52*** (0.42-0.66)
Wealth Status	Poorest (RC)	-
	Poorer	0.53 (0.36-0.78) **
	Middle	0.65 (0.44-0.94) *
	Richer	0.52 (0.35-0.75) ***
	Richest	0.43 (0.29-0.63) ***
Birth Interval	First birth (RC)	-
	Below 24 months	1.2 (0.99-1.47)
	24 to 35 months	1.1 (0.90-1.35)
	Above 35 months	1.00 (1.00-1.00)
Non-Vegetarian Food	Never/occasionally (RC)	-
	Daily/weekly	0.98 (0.81-1.18)
Vegetarian Food	Never/occasionally (RC)	-
	Daily/weekly	1.47 (0.58-3.70)
Vegetarian Protein Intake	Never/occasionally (RC)	-
	Daily/weekly	0.53 (0.29-0.98) *
Vegetarian (Green Leafy)	Never/occasionally (RC)	-
	Daily/weekly	1.22 (0.73-2.06)

Source: Compiled by Authors, RC: Reference Category; AOR: Adjusted Odd Ratio; CI: Class Interval; *Significant at <0.05; **Significant at <0.01; ***Significant at <0.001

among children. As compared to children belonging to scheduled castes, children from other backward classes and the general category have shown 0.79 times and 0.57 times lower odds of being underweight, respectively. Children residing in rural areas have shown 0.82 times lower odds of being underweight as compared to children living in urban areas. With regards to household's wealth status, it has been found that children who are from richest households have 0.43 times lower odds of being underweight as compared to children who are from the poorest households. Children who regularly consume vegetarian diet have shown 0.53 times lower odds of being underweight than those who consumed such foods never or occasionally.

Conclusions

This study examines the levels, differentials, and correlates of stunting, wasting, and underweight among children aged under five years in Haryana. The findings reveal that there has been a substantial decline in the prevalence of stunting, wasting, and underweight among children in Haryana during the period from 2005-06 to 2019-21. However, the prevalence of all three indicators of nutritional status has shown considerable spatial variation across districts in Haryana. The prevalence of stunting and underweight has been found to be highest in Mewat district, while Jhajjar district has recorded the lowest prevalence of stunting and underweight. The highest prevalence of wasting has been recorded in Kaithal district as compared to the lowest prevalence of wasting in Bhiwani district.

Socio-economic and demographic characteristics of the children have a profound effect on the prevalence of stunting, wasting, and underweight in the state. Stunting and wasting have been recorded higher among male children as compared to female children, whereas the prevalence of underweight has been found to be higher among female children than those of male children. Higher prevalence of stunting, wasting, and underweight has been recorded among children belonging to scheduled castes, rural areas and the poorest households. In contrast, children who belong to the general category, urban areas and richest households have recorded the lowest prevalence of stunting, wasting, and underweight. Maternal characteristics have been found to contribute to variations in the prevalence of stunting and underweight, as children belonging to mothers having an education of ten or more years and high body mass index (above 25) have the lowest prevalence of these indicators of nutritional status as compared to those children who belong to mothers having no education and low body mass index.

The study further reveals that stunting, wasting, and underweight among children are significantly associated with the age of the child, maternal characteristics, social group and household economic status. A distinct pattern has been observed in the age-related association, where the odds of stunting and underweight increase with age, while the odds of wasting decline as children grow older. Thus, it has been observed that the levels of child stunting, wasting, and underweight have improved in Haryana over time. However, there still exist substantial socio-economic and spatial inequalities across districts and social groups. It requires focused policy interventions towards vulnerable and disadvantaged population groups in the state.

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