Original Article

Relationship of Maternal Characteristics and Stunting among Children

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Abstract

Background: Stunting is the common form of child undernutrition. The objective of the present study is to know the relationship of maternal characteristics and stunting in children below five years.

Methods: A descriptive study was conducted among 233 children who were 6-59 months of age. Data was collected by structured interview schedule and length/height was measured and analysed length/ height for age to identify status of stunting and maternal characteristics was analysed to identify the relationship with stunting status.

Results: The study result shows that among 233 participants, 29(12.4%) were found to be stunted. Children being stunted or normal in height was associated with maternal height, frequency of meals per day in the family, inadequate iron supplementation during pregnancy, adequacy of antenatal check up during pregnancy. Maternal height below 145cm (OR: 0.009; p=<0.001), frequency of meal (OR: 0.005; p=0.001), inadequate iron supplementation

(OR: <0.001;p=<0.001) increase the likelihood of a child being stunted.

Conclusion: There was correlation between maternal characteristics and stunting of children. There is needed to improve the nutritional status by improving adherence of iron supplementation during pregnancy and improving antenatal visit.

Keywords: Stunting, Maternal characteristics, Children

Introduction

The UN General Assembly adopted a resolution declaring a United Nations Decade of Action on Nutrition from the year 2016-2025.[1] There are four forms of undernutrition: wasting, stunting, underweight, and deficiencies in vitamins and minerals.[2] Child stunting refers to a child who is too short for his age, the result of chronic or recurrent malnutrition.[3]

Globally, 149 million children under five years are stunted, [4] and affected 22.3% of children below five years of age.[5] Stunting is associated with an

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underdeveloped brain, which may lead to long-lasting harmful consequences, including diminished mental ability and learning capacity, poor school performance in childhood, and increased risks of nutrition-related chronic diseases in the future.[6]

In India, 36 percent of children below five years are stunted, nineteen percent are wasted, and thirty-two percent are underweight.[7] Among the Northeast states, Meghalaya, Mizoram, Nagaland, and Tripura saw an increase in stunting, four states that saw an increase in stunting performed poorly on women's well-being indications.[8]

In Mizoram, twenty-nine percent of children under five years are stunted. Children of stunting increased from 28 percent to 29 percent since NFHS-4.[9] Therefore, increasing stunting under five years of age children continues to be a significant problem in Mizoram. Aizawl district is the highest-burden district of stunted children.[10] Among all the age groups, the prevalence rate was highest among children between 6-8 months through 6-23 months. [10]The Poshan Abhiyan was launched in 2018 to improve nutrition among children, pregnant, and lactating woman, and to achieve reduction in stunting and wasting in children.[11]

The present study aim to identify the prevalence of stunting and the relationship between maternal characteristics and stunting of children.

Materials and Methods

A Cross-sectional study conducted from February - June 2023 among 233 participants in the area of Aizawl East District, Mizoram. Children registered in the Integrated Child Development Service Centre(ICDS), and their mothers willing to participate included in the study after obtaining consent. Children who were suffering from chronic illness or congenital anomalies and who were uncooperative and their mothers not willing to participate were exclude. Structured interview schedule was use to collect data on demographic characteristics of the participants, height was measure by standard method. The height measurement was interpreted by the WHO z-score classification system. The chi-square test was use in the bivariate analyses. All variables with association ($p<0.05$) in the Chi-square were calculated in multivariable logistic regression to know their independent effect.

Results

Data in Table No. 1 shows that 233 children participated.91% of the samples have birth weight within normal range, 3. 9% have birth weight more than the normal range, 5.2% have low birth weight.96.1% of the samples were full-term, whereas only 3.9% were premature birth.

Table No. 1: Demographic characteristics of the participants (N=233)

Variables		Frequency	Percentage
Age (in months)	6-11	31	13.3
	12-23	58	24.9
	24-35	47	20.2
	36-47	62	26.6
	48-59	35	15.0
Birth weight	<2500	12	5.2
	2501-4000	212	91.0
	>4001	9	3.9
Status of maturity at birth	Preterm	9	3.9
	Full-term	224	96.1

The prevalence of stunting was 29 (12.4%).17(58.6%) of the participants were male, 12(41.4%) participants were female. The prevalence of stunting was higher (72.4%) between the age group of 24-59 months, only 1 (3.44%) among the age group of 6-11 months.(Table 2)

Table No.2: Distribution of stunting among study participants (N=29)

Variables		Frequency	Percentage
Height for age	Normal	204	87.6
	Stunting	29	12.4
Gender	Male	17	58.62
	Female	12	41.38
Age of the participants (in months)	6-11	1	3.44
	12-23	7	24.14
	24-35	7	24.14
	36-47	8	27.59
	48-59	6	20.69

Maternal characteristics is present in Table 3.Among the mothers, 83.7% were in the age group

of 19-34 years at the time of the birth of their childen. 71.7% of the mothers have a height of more than 145 cm where 27.9% have a height of less than 145 cm. Most mother attended formal education, and only 0.4% did not have formal education. The majority of the mothers 65.2% belong to the nuclear family where 30.9% were from joint families.61.4% of the mothers have family members five or more than five , 38.6 % have family members less than five members. 92.3% of mothers belonged to the lower socioeconomic class, 7.7% belong to the upper class. 79.8% of the mothers received adequate iron supplementation, 20.2% received inadequate iron supplementation during pregnancy.93.6% of the mothers did sufficient antenatal checkups, 6.4% did not do sufficient antenatal checkups during pregnancy.

Table No. 3: Demographic characteristics of mothers (N=233)

Variables		**Frequency**	**Percentage**
Maternal age at birth	≤18 years	7	3.0
	19-34	195	83.7
	≥35 years	31	13.3
Maternal height below 145cms	Yes	66	28.3
	No	167	71.7
Education of mother	No formal education	1	0.4
	Primary	10	4.3
	Middle	29	12.4
	Secondary	126	54.1
	Higher Secondary	29	12.4
	Graduate and above	38	16.3
Type of family	Nuclear	152	65.2
	Joint	72	30.9
	Single parent	9	3.9
Number of family members	<5	90	38.6
	≥5	143	61.4
Frequency of meals per day in the family	Twice	224	96.1
	Thrice	9	3.9
Socioeconomic status of the family	Upper	3	1.3
	Upper middle	15	6.4
	Lower middle	48	20.6
	Upper lower	163	70.0
	Lower	4	1.7
Inadequate iron supplementation during pregnancy	Yes	47	20.2
	No	186	79.8
Number of antenatal visits	3 or less	15	6.4
	4 or more	218	93.6

Data in Table 4 illustrates that stunting was significantly associated with maternal height, frequency of meals in the family, inadequate iron supplementation, and number of antenatal visits.

Table No. 4: Association between stunting status and maternal characteristics (N=233)

Variables		Stunting (n=29)	Normal (n=204)	P-value*
Maternal age at birth	≤18 years	0	7 (100.0)	0.599
	19-34	25 (12.8)	170 (87.2)	
	≥35 years	4 (12.9)	27 (87.1)	
Maternal height below 145cms	Yes	18 (27.7)	47 (72.3)	<0.001
	No	11 (6.5)	157 (93.5)	
Education of mother	No formal education	0	1 (100.0)	0.273
	Primary	3 (30.0)	7 (70.0)	
	Middle	6 (20.7)	23 (79.3)	
	Secondary	15 (11.9)	111 (88.1)	
	Higher Secondary	2 (6.9)	27 (93.1)	
	Graduate and above	3 (7.9)	35 (92.1)	
Type of family	Nuclear	18 (11.8)	134 (88.2)	0.657
	Joint	9 (12.5)	63 (87.5)	
	Single parent	2 (22.2)	7 (77.8)	
Number of family members	<5	13 (14.4)	77 (85.6)	0.464
	≥5	16 (11.2)	127 (88.8)	
Frequency of meals per day in the family	Twice	25 (11.2)	199 (88.8)	0.001
	Thrice	4 (50.0)	4 (50.0)	
Socioeconomic status	Upper	0	3 (100.0)	0.874
	Upper middle	2 (13.3)	13 (86.7)	
	Lower middle	5 (10.4)	43 (89.6)	
	Upper lower	21 (12.9)	142 (87.1)	
	Lower	1 (25.0)	3 (75.0)	
Inadequate iron supplementation during pregnancy	Yes	21 (44.7)	26 (55.3)	<0.001
	No	8 (4.3)	178 (95.7)	
Number of antenatal visits	3 or less	8 (53.3)	7 (46.7)	<0.001
	4 or more	21 (9.6)	197 (90.4)	
Hygienic practice of the mother	Adequate	18 (13.1)	119 (86.9)	0.702
	Inadequate	11 (11.5)	85 (88.5)	
Breastfeeding done	Yes	29 (12.7)	199 (87.3)	0.394
	No	0	5 (100.0)	
Bottle fed	Yes	4 (18.2)	18 (81.8)	0.392
	No	25 (11.8)	186 (88.2)	

*Chi-square test; P≤0.05

The multiple binary logistic regression model shows that maternal height below 145 cm has a 4.3 times higher risk of having stunted growth, compared to other children, when adjusted for other variables of frequency of meals in the family, iron supplementation, and number of antenatal visits during pregnancy. The meal frequency of twice a day has a significantly reduced likelihood of stunting with an odds ratio of .53(0.007, 0.419) at P-0.005.

The odds of stunting were 18.721 higher among children whose mothers did not receive adequate iron supplementation during pregnancy. (Table 5)

Table No. 5: Multivariable binary logistic regression for predictors of stunting

Variables	AOR (95% CI)	P value
Maternal height below 145 cm		
Yes	4.370 (1.435, 13.307)	0.009
No	ref	
Frequency of meals per day in the family		
Twice	0.053 (0.007, 0.419)	0.005
Thrice	ref	
Inadequate iron supplementation during pregnancy		
Yes	18.721 (5.772, 60.718)	<0.001
No	ref	
Number of antenatal visits		
Three or less	4.105 (0.873, 19.294)	0.074
Four or more	ref	

Discussion

Maternal characteristics have an impact on the children. Although a great deal of literature identified several factors associated with stunting, the number of studies in Mizoram is limited. The present study revealed that several maternal factors affect the stunting status of children-low maternal height, frequency of meals per day in the family, inadequate iron supplementation during pregnancy, and number of antenatal visits.

In the previous research study, children of adolescent mothers were more likely to be stunted than mature mothers.[12] However, in the present study findings, maternal age did not have an association with stunting of their children.

The previous study shows that mothers whose height was below 150cm were 2.5 more likely to have stunted children when compared with mothers above 160cm.[13] The short height of mothers (< 145cm) is significantly associated with stunting in children, they have a 4.3 times higher risk of having stunted growth.

Previous study shows that a mother's education influences the nutritional status of the children. No education or incomplete primary school of a mother was associated with stunting [14].In contrast to this, the present study shows that there was no association between the educational level of the mothers and stunting. Proper nutritional guidance and awareness of the mother regarding age-appropriate diet for their children is essential in achieving optimal nutrition.

The odds ratio of being stunted was 2.35 times higher among children living with large family size (≥5) households than those living in small family size (<5).[15] In the present study, family size do not have association with stunting.

Families from low socioeconomic levels have more risk of having stunted children than high socioeconomic status.[16] However, based on the present study findings, socioeconomic status was not significant in determining stunting of children. The economic status of the family was estimated based on income, education level, and occupation of the head of family that may not influence the children's nutritional status.

The government of India recommends IFA supplementation during pregnancy.[17] Previous research findings showed that mothers who did not take adequate iron tablets during pregnancy were at risk of having children with stunting.[18]The present study also identified that there was a correlation between inadequate iron supplementation and the occurrence of stunting.

WHO specifies the number of antenatal visits during pregnancy.[19] The literature identified that children whose mothers received antenatal care are less likely to be stunted.[20] The present findings show that the frequency of antenatal visits during pregnancy was significant in determining stunting in children. Mother who visit the antenatal clinic at least three times or less than three times during pregnancy have more chance of having stunting of children than mothers who visit the antenatal clinic at least four times during pregnancy.

Conclusion

The findings of the current study revealed that stunting still exists among the participants, prevalence is more in male children than female children. The study results indicate that stunting could be associated with maternal characteristics like low maternal height, frequency of meals per day in the family, inadequate iron supplementation, and number of antenatal visits during pregnancy. The Government of India has numerous health and nutrition programs focussing on maintenance of maternal and child health. It is required to create awareness among the people through different social media for the better utilization of the antenatal care provided by the government and the importance of recommended antenatal visits and adequate iron supplementation in maintaining optimum health during pregnancy and long-term benefit in maintaining the nutritional status of the children. It also needs to explore the reasons for noncompliance with iron supplementation for pregnant mothers and the necessary action taken to improve adherence to iron supplementation and strengthen the quality of the services provided for the mothers.

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