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Stunting among children aged 6-59 months born to teenage mothers in Kabarole District, Tooro region, Uganda. A cross-sectional study.

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ABSTRACT

Background

The purpose of the study is to investigate stunting among children aged 6-59 months born to teenage mothers in Kabarole District, Tooro Region, Uganda, so as to find out the causes and risk factors associated with stunting.

Methods

A cross-sectional descriptive study was conducted in one of the sub-counties in the Rwenzori sub-region, Western Uganda. The study adopted a cross-sectional study design with quantitative data collection and analysis methods. A sample of 135 respondents was selected using Fisher's method of sample size determination.

Results

Majority of the respondents 80(59.3%) were aged 36-59, 40(29.6%) were below 35 months, 10(07.4%) were below 18 months, 5(3.7%) were under 9 months. The prevalence of stunting at 36.3% among children under 5 months. We found that marital status, those who were separated (aOR = 0.23, CI = 0.08 - 0.62, p = 0.004), mothers not practicing exclusive breast feeding (aOR = 2.28; 95% CI: 0.10-0.76, p = 0.012), age at which mothers start complimentary feeding (aOR: 1.13; 95% CI: 0.49- 1.27, p=0.002) and mothers who were practicing formula feeding aOR: 1.13; 95% CI: 0.49- 1.27, p=0.002) were associated with stunting. Lack of maternal education was 1.08 times more likely to cause a child under 5 years compared to the others (uOR: 1.08; 95% CI: 0.54-2.17; p=0.025).

Conclusions

The prevalence of stunting among children 6 - 59 months of age was high, underscoring the critical role of nutrition, maternal health, and the influence of dietary factors in determining children's growth outcomes.

Recommendations

There is a need for comprehensive interventions addressing the factors to prevent stunting through integrating nutrition counselling and supplementation programs, implementing poverty reduction strategies, and supporting maternal education services.

Keywords: Prevalence of stunting, Children aged 6-59 months, Teenage mothers, Kabarole district.
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Background.

Stunning is the failure of children to achieve their linear growth potential because of suboptimal health conditions and inadequate nutrition and care; they also suffer from severe, irreversible physical and cognitive damage (De Onis and Branca, 2016). In Africa, the prevalence of stunting

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among children in the same age category is 30 per cent, which is significantly higher than the global estimate of 22.3 per cent (FAO, 2023). The prevalence of stunting is highest in Africa at 61.4 million and in Uganda at a prevalence of 27.9% as of 2020 (Organisation, 2021). Findings from a study conducted in Kabale, a district in western Uganda gives a reflection, at a prevalence of 41.1% which was reported to be close to the regional average of 41.7% from the UDHS 2011 data(Kasajja et al., 2022), there has been a decrease in prevalence of stunting among children under 5 in Uganda to 28.9% in 2016. These findings show a slow progression in the reduction of cases and correlate with a study in Nigeria that reported a prevalence of 37% by 2018 from 42% in 2003 (Adeyemi et al., 2022).

In Uganda, the government has also implemented programs such as the Uganda Nutrition Action Plan (UNAP) to improve maternal and child nutrition through interventions like promoting breastfeeding, dietary diversification, and vitamin A supplementation (Uganda Nutrition Action Plan 2018-2025). And also, initiatives like the Integrated Management of Acute Malnutrition (IMAM) program to provide comprehensive treatment for malnourished children, including therapeutic feeding and nutritional counselling. (Uganda Nutrition Action Plan 2018-2025). The global estimate for stunting is 144 million children under the age of 5 in 2019. This represents around 21.3% of all children under 5 worldwide (Vaivada et al., 2020). The study aims to identify the influence of maternal factors associated with stunting among children aged 6-59 months born to teenage mothers in Kabarole district.

Methodology

Research Design

The study design was a descriptive cross-sectional study that employed both quantitative and qualitative methods in data collection. The quantitative methods were used to collect data that can be numerically presented, while the qualitative method was used to collect non-numeric data.

This study design was selected because data were collected at a single point in time, given the fact that cross-sectional studies are relatively cheap and less time-consuming than other types of research.

Target population

The study was carried out at Fort Portal Regional Referral Hospital in Kabarole district, located approximately 290 Km west of Kampala, the city of Uganda, Western Uganda. The population is composed of different tribes, with the Batooro as the most common. The economic activities done are retail shops, small-scale mini supermarkets, and marketing and small-scale farming; however, there are other activities like trade in addition to agriculture (plantation, animal husbandry, and fishing). Kabarole was selected because the local people have a variety of foodstuffs, but there has been a consistent level of malnutrition among children under five years in the area, and therefore, there is a need to identify factors contributing to this problem, leading to high prevalence rates of stunting among children.

Sampling and Sampling techniques.

Sample size determination

The sample size was determined using Fisher's et al. The formula given by the method below,

$$n = \frac{Z^2 * p(1-p)}{d^2}$$

n= minimum sample size

d= margin of error

Z= standard normal deviation corresponding to 1.96 P= prevalence (6%) q=1-p d=4%

$$n = \frac{1.96^2 X 0.06 X 0.94}{0.04^2}$$

=135

Therefore, a sample size of 135 respondents shall be considered during the study.

Sampling Procedure.

The study used simple random sampling to select teenage mothers attending Fort Portal Regional Referral Hospital. This method was used because it avoids bias and allows all participants a chance to be involved. Purposive sampling was used to select nurses since they are key informants, mainly the head of the nutritional department and nurses.

Inclusion Criteria

The study included only teenage pregnant women with stunted children attending Fort Portal regional referral Hospital to attain ANC, immunizations, and who were available at the time of the study.

Exclusion Criteria

The study did not consider pregnant mothers who were not attending antenatal care services.

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Study variables

The independent variables was; prevalence, maternal factors and dietary factors related factors while dependent variable is stunted children between 6-59 years.

Data collection instrument

Questionnaires were administered to the respondents by the study to mainly collect quantitative data. This tool contained both closed-ended (structured) and open-ended (semi-structured) questions guided by the specific objective.

Administration of Instruments.

An introduction was made to the teenage mothers, and the objective of the study was well explained. Teenage Mothers who consented to take part in the study were required to read and sign a consent form before being recruited. Teenage mothers were recruited once on a given day. The study gathered the teenage mothers at Fort Portal Regional Referral Hospital and asked for their cards and issued them with questionnaires. One was interviewed at a time for the teen mothers who could not read or write. Those who were able to read and write English were issued questionnaires, but filled them individually, not in the group, to avoid information manipulation. Teenage mothers were urged to ask where they did not understand. The procedure went on until the sample size was reached.

Quality Control

The study got a letter of introduction from Uganda Christian University that introduced the study to the institution review board of Fort Portal Regional Referral Hospital. Permission to conduct the study was granted.

Quality control was ensured by pretesting the questionnaire on 5% of the sample size, and adjustments were made where necessary. Data collectors were supervised throughout the data collection period by the principal investigator, who checked for accuracy, consistency, and completeness. Any anomalies identified were corrected appropriately by either revisiting the respondents or contacting them by telephone. The numbering and coding of the questionnaires were done properly.

Training of the data collection team.

The data collection team comprised 12 research assistants who were mostly university graduates. The study team was recruited based on their experience they had in conducting similar research. A one-day training was conducted by the principal investigator. The training focused on the administration of questionnaires, interviewing techniques, and translation of the questions into the local language.

Pre-testing of questionnaires

Pre-testing of questionnaires was conducted over a period of one day in each district. The research tool was pretested in a pilot study, which was carried out at Virika hospital because the environmental setting is the same, no payments were required, and the status of the patients was almost similar. This helped to make necessary adjustments before the study was carried out in Fort Portal Regional Referral Hospital. Redundant questions that did not add any value to the study were deleted.

Data analysis procedure

Quantitative data obtained using the questionnaire were entered into a computer using Excel software by double entry, followed by data cleaning and validation. The data were collected and analysed with the use of the Statistical Package for the Social Sciences (SPSS) Version 22.0. Descriptive statistics were used to analyse socio-demographic characteristics, prevalence, and factors of stunting. Content analysis was used to analyse qualitative data on stunting and KIIs. The data were summarised into themes.

The data was entered into SPSS version 22.0 for cleaning and coding, and was also double-entered to minimise entry errors. Thereafter, it

30 was exported to SPSS 22.0 for analysis, ready for interpretation, presentation, and discussions.

Quantitative data were analysed using SPSS version 22.0 and then were presented as frequency tables and cross-tabulations. Adjusted odds ratios, 95% confidence intervals, and p-value set at 0.05 were used to determine the statistical significance of the associations between independent variables and EBF.

Qualitative data were analysed using content thematic analysis. Transcripts from each participant were initially analysed one by one by the study coordinator. Interviews were transcribed in English in order to be used for identifying individual bits of data. The transcripts were read and re-read in full to annotate any thoughts in the margin. This involved examining the text closely, line by line, and this has facilitated a microanalysis of the data. Codes were assigned according to content and themes. These were

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grouped, and thematic categories were constructed according to content for a deeper understanding of the factors associated with stunting among teenage mothers. Quotes from research participants were used to enrich the data.

Ethical considerations

The study was carried out in accordance with rigorous ethical and moral principles. The study participants provided their explicit consent to participate in the research, and all data and instruments were gathered with their authorisation. The utilisation of voluntary consent as a methodology was implemented to guarantee that the subjects possess the autonomy to make an informed decision regarding their participation in the research.

The study was reviewed by the Institutional Research and Ethics Committee of Uganda Christian.
University, and after the ethics clearance, permission was sought from the respective District Health Offices before undertaking the research. Ethical approval was sought from various sources to ensure that the study adheres to acceptable ethical guidelines.
In addition, Informed consent was obtained from each study participant. Each respondent was informed about the purpose of the study, that the findings of the study would inform policymakers and other concerned bodies. Any inclusion in the study was after their verbal and written consent. The right to freedom from harm and discomfort was maintained, as participants were not subjected to any risk of harm or injury.

RESULTS

Demographic data of the respondents

Table 1: showing the demographic data of the respondents (n=135).

Variable	Frequency (n=135)	Percentage (%)
Children's age groups		
Under 9	5	03.7
Under 18 months	10	07.4
Under 36 months	40	29.6
36-59	80	59.3
Sex of children		
Male	80	59.3%
Sex	55	40.7%
Marital status of parents		
Single	15	11.1%
Married	100	74.1%
Separated/widowed	20	14.8%
Occupation of fathers		
Students	25	18.5%
Self employed	75	55.6%
Peasant	35	25.9%
TOTAL	**135**	**100**

Source: primary data from the field.

Table 1 shows more than a half 80(59.3%) were aged 36-59, 40(29.6%) were below 35 months, while 10(07.4%) were below 18 months and 5(3.7%) were aged under 9 months. Additionally, majority 100(74.1%) of the parents were married while 20(14.8%) were separated/ widowed and 15(11.1%) were single. In this study, slightly more than half, 75(55.6%) of the fathers were self-employed, while a significant number, 35(25.9%) were peasants, and 25(18.5%) were students.

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Association between demographic characteristics of the respondents and stunting

Table 2: Bivariate analysis between demographic characteristics and stunting

Variable	Diagnosed with stunting		Total	cOR	95% C.I		p-value
	Yes (%)	No (%)			Lower	Upper	
Children's age groups Under 9	02(4.08%)	03(3.49%)	5	1			
Under 18 months	04(8.16%)	06(6.98%)	10	0.65	0.27	1.61	0.354
Under 36 months	22(44.90%)	18(20.93%)	40	0.55	0.19	1.66	0.290
36-59 Months	21(42.86%)	59(68.60)	80	0.88	0.33	2.40	0.907
Total	**49 (100)**	**86(100)**	**135**				
Sex of children Male	38(77.55%)	42(48.84%)	80	1			
Female	11(22.45%)	44(51.16%)	55	1.65	0.76	3.59	0.207
Total	**49 (100)**	**86(100)**	**135**				
Marital status of parents Single	05(10.20%)	10(11.63%)	15	1			
Married	29(59.18%)	71(82.56%)	100	1.85	0.77	4.45	0.170
Separated/Divorced	15(30.61%)	05(5.83%)	20	2.43	1.09	5.42	**0.030***
Total	**49 (100)**	**86(100)**	**135**				
Occupation of fathers Students	15(30.61%)	10(11.63%)	25	1			
Self employed	26(53.06%)	49(56.98%)	75	0.082	0.007	1.009	0.139
Peasant	08(16.33%)	27(31.40%)	35	1.067	0.159	7.145	0.012
Total	**49 (100)**	**86(100)**	**135**				

******Significant association at P-value <0.05;***

Table 2, findings indicate that only the marital status of parents has a statistical correlation with the level of stunting of children. Parents who were separated/divorced were 2.43 times more likely to have their children stunted (uOR=2.43, 95%CI: 1.09-5.42, p=0.030). The rest were not statistically significant.

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Prevalence of stunting among children 6-59 months.

Table 3: showing the prevalence of stunting among children (n=135)

Variable	Frequency	Percentage
Has your child ever been diagnosed with stunting?		
Yes	49	36.3%
No	86	63.7%
Total	**135**	**100**

Source: primary data from the field.

Table 3, a significant number 49(36.3%) reported that their children had ever been diagnosed with stunting, while the majority 86(63.7%) reported not having ever been diagnosed with stunting.

Influence of maternal health on stunting.

Table 4: showing the influence of maternal health on stunting

Variable	**Frequency**	**Percentage**
What could be the leading cause of stunting among the under 5?		
Lack of maternal education.	86	63.7
Low maternal BMI	05	3.7
Poor household wealth	30	22.2
Lack of a balanced diet	14	10.4
Does maternal nutrition and health affect a child's stunting?		
Yes	120	88.9
No	15	11.5
How does maternal nutrition and health during pregnancy contribute to stunting in children?		
IUFR (intra-uterine fetal retardation)	20	14.8
Lack of breast milk	100	74.1
Low nutrients in breast milk	10	7.4
All the above	5	3.7
Total	**135**	**100**

Source: primary data from the field.

Table 4 shows that the majority, eighty-five (62.9%), reported stunting among children under 5 months, 16(19.3%) reported under 4 months, while 15(11.1%) reported that it was among children under 3 months, and an insignificant number, 09(6.7%) reported that it was among the children under 2 months. Findings also revealed that the majority 86(63.7%) of the respondents indicated that stunting is caused by lack of maternal education, while 30(22.2%) indicated that it was by while 14(10.4%) reported that it was due to lack of a balanced diet and 05(3.7%) reported that it was due to a low maternal BMI. Study findings also revealed that the majority, 120(88.9%) of the respondents reported that maternal nutrient affects a child's stunting, while 15(11.5%) reported that maternal nutrition

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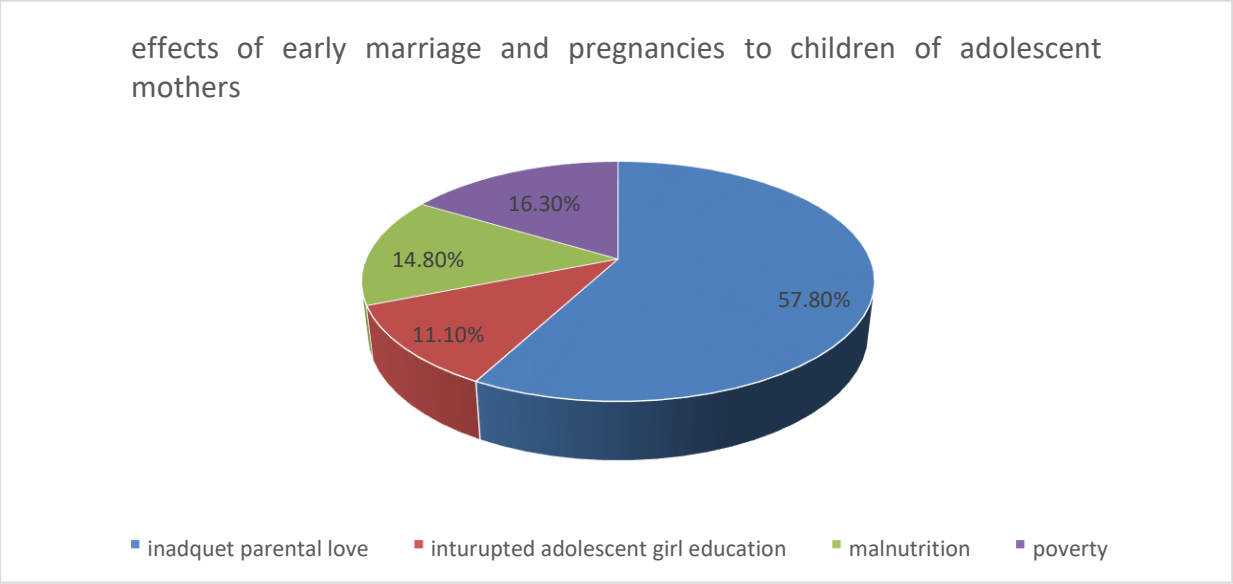
does not affect a child's stunting. Additionally, the study also revealed that majority 100(74.1%) of the respondents reported that lack of breast milk while 20(14.8%) reported IUFR, 10(7.4%) reported low nutrients in breast milk and only 5(3.7%) reported that it all the above (IUFR, Lack of breast milk. Low nutrients in breast milk) contribute to stunting in children.

Figure 1: showing the effects of early marriage and pregnancies on children of adolescent mothers (n=135)



Source: primary data from the field.

Fig 1, findings revealed that majority 78(57.8%) reported inadequate parental love, 22(16.3%) reported poverty while 20(14.8%) reported malnutrition and 15(11.1%) respondents reported interrupted adolescent girl child education.

Table 5: Bivariate analysis between maternal nutrition and health factors and stunting among children under 5

Variable	Diagnosed with stunting		Total	uOR	95% C. I		p-value
	Yes (%)	No (%)			Lower	Upper	
What could be the leading cause of stunting among the under 5? Lack of a balanced diet	6(12.24%)	08(9.30%)	**14**	1			
Lack of maternal education.	27(55.10%)	59(68.60%)	**85**	1.08	0.54	2.17	**0.025***
Low maternal BMI	1(2.04%)	04(4.65%)	**5**	0.32	0.12	0.87	0.824
Poor household wealth	15(30.61%)	15(17.44%)	**30**	0.44	0.14	1.31	0.14

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Total	**49 (100)**	**86(100)**	**135**				
Does maternal nutrition and health Does it affect a child's stunting? Yes	42(85.71)	78(90.70%)	**120**	1			
No	07(4.29%)	08(9.30%)	**15**	1.53	0.67	3.48	0.314
Total	**49 (100)**	**86(100)**	**135**				
How maternal nutrition and health during pregnancy contribute to stunting in children IUFR (intra-uterine fetal retardation)	07(14.29%)	13(15.12%)	**20**	1			
Lack of breast milk	34(69.39%)	66(76.74%)	**100**	2.43	0.09	0.7	**0.008***
Low nutrients in breast milk	05(10.20%)	05(5.81%)	**10**	0.703	0.366	1.351	0.290
All the Above	03(16.33%)	02(2.33%)	**5**	4.2	0.54	33	0.172
Total	**49 (100%)**	**86(100%)**	**135**				
Effects of early marriage and pregnancies on the children of adolescent mothers Inadequate Parental Love	28(57.14%)	50(58.14%)	**78**	1			
Interrupted Adolescent girl education	07(14.29%)	08(9.30%)	**15**	1.75	0.26	11.77	0.564
Malnutrition	10(20.41%)	10(11.63%)	**20**	0.9	0.17	4.8	0.899
Poverty	04(8.16%)	18(20.93%)	**22**	2.5	0.25	24.72	0.433
Total	**49 (100%)**	**86(100%)**	**135**				

**Significant association at P-value <0.05;*

From table 5, Mothers who believed that the leading cause of stunting among the under 5 was due to Lack of maternal education were 1.08 times more likely to have under 5 stunting compared to the others(uOR: 1.08; 95% CI: 0.54-2.17; p=0.025). There was a statistically significant association between the belief that Lack of maternal education and stunting (p=0.025).

Table 5 above shows the odds of how maternal nutrition and health during pregnancy contribute to stunting in children. Mothers with a Lack of breast milk to stunting were 2.43 times more likely (uOR: 2.43; 95% CI: 0.09-0.7; p=0.008) compared to those with IUFR (intra-uterine fetal retardation) and Low nutrients in breast milk, and no significant association was established (p=0.290).

According to the table above, other maternal and health factors reported by the respondents do not statistically influence stunting in children under 5.

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Table 6, the majority, 117(86.6%), reported lack of breast milk, 9(6.7%) lack of knowledge on breastfeeding, while 5(3.7%) reported use of formula feeding, and 4(3.0%) reported inadequate support as the reasons why adolescent mothers do not breastfeed exclusively.

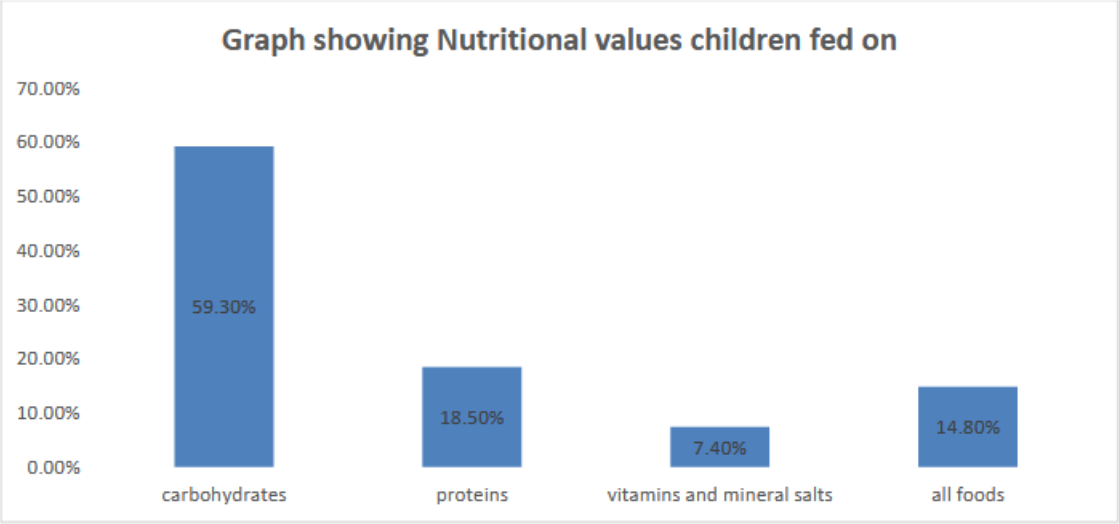
Additionally, findings also revealed that the majority of the respondents initiated complementary feeding at 4 months, less than half, 35(25.9%), at 6 months, while 30(22.2%) initiated it at 6 months, and 06(4.4%) of the respondents reported that they initiated complementary feeding below 3 months.

Study findings also revealed that the majority, 90(77.7%), had a food store, while less them half of the respondents, 45(33.3%), reported that they did not have a food store.

Findings also revealed more than a half 80(59.3%) reported poverty, 20(14.8%) reported lack of education on food security, 20(14.8%) reported location while 10(07.4%) reported lack of transport to storehouses were some of the challenges faced when trying to store food.

It was also revealed that the majority of the respondents, 85(63.0%), did not practice formula feeding, while less than half, 50(37.0%), reported that they were practicing formula feeding.

Figure 3: showing responses to the nutritional values that children feed on



Source: primary data from the field.

Figure 3 shows that more than half 80, 59.3%) feed their children on carbohydrates, 25(18.5% on proteins, while 20(14.8%) reported all food values, and 10(7.4%) reported feeding their children on vitamins and mineral salts.

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Table 7a: Bivariate analysis between dietary factors and stunting

Variable	Diagnosed with stunting		Total	uOR	95% C. I		p-value
	Yes (%)	No (%)			Lower	Upper	
Mothers practicing exclusive breastfeeding Yes	37(75.51%)	68(79.07%)	**105**	1			
No	12(24.49%)	18(20.93%)	**30**	1.3	0.11	0.82	**0.019***
Total	**49 (100%)**	**86(100%)**					
not practice EBF? Lack of knowledge	04(8.16%)	05(5.81%)	**9**	1			
Inadequate support	01(2.04%)	03(3.49%)	**4**	0.082	0.007	1.009	0.139
Lack of breast milk	41(83.67%)	76(88.37%)	**117**	1.067	0.159	7.145	**0.051***
Use of formula feeding	03(6.12%)	02(2.33%)	**5**	0.909	0.146	5.659	0.947
Total	**49 (100%)**	**86(100%)**	**135**				
At what age do mothers start complementary feeding? below 3 months	02(4.08%)	04(4.65%)	**6**	1			
4 months	31(63.27%)	48(55.81%)	**79**	0.124	21	0.715	**0.020***
6 months	15(30.61%)	20(23.26%)	**35**	0.302	55	1.653	0.168
8 months	01(2.04%)	14(16.28%)	**15**	0.467	65	3.344	0.448
Total	**49 (100%)**	**86(100%)**	**135**				
Do you have a food store? Yes	36(73.47%)	54(62.79%)	**90**	1			
No	13(26.53%)	32(37.21%)	**45**	0.423	0.007	26.913	0.685
Total	**49 (100%)**	**86(100%)**	**135**				
What challenges do you face when trying to store food? Poverty	28(57.14%)	52(60.47%)	**80**	1			
Lack of education on food security	09(18.37%)	11(1279%)	**20**	2.087	3.16	7.154	**0.031***
Food desert	01(2.04%)	04(4.65%)	**5**	0.667	0.073	6.111	0.72
Location	07(14.29%)	13(15.12%)	**20**	1.212	0.153	9.594	0.855
Lack of transport	04(8.16%)	06(6.98%)	**10**	0.333	0.027	4.186	0.395
Total	**49 (100%)**	**86(100%)**	**135**				

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Do mothers in your practice formula feed? No	26(53.06%)	24(27.91%)	**50**	1			
Yes	23(46.94%)	62(72.09%)	**85**	0.183	0.033	1.013	**0.052***
Total	**49 (100%)**	**86(`00%)**	**135**				
The nutritional values that children feed on							
Carbohydrates	26(53.06%)	54(62.79%)	**80**	1			
Proteins	12(24.49%)	13(15.12)	**25**	1.1	0.146	8.267	0.926
Vitamins & Minerals	08(16.33%)	12(13.95%)	**20**	0	0	0	0.999
All foods	03(6.12%)	07(8.14%)	**10**	0.458	0.207	1.014	0.084
Total	**49 (100%)**	**86(100%)**	**135**				

**Significant association at P-value <0.05;*

On influences of dietary factors, the result shows that Mothers who were not practicing exclusive breastfeeding were 1.3 times more likely to have stunted children as compared to those who practiced EBF(uOR: 1.3; 95% CI: 0.11-0.82, p=0.019). *Key to* note is that mothers who do not practice EBF due to lack of breast milk were 1.067 times more likely to have stunting children (uAOR: 1.067: 95% CI: 0.159-7.145; p=0.051), those start complimentary feeding at 4 months were 0.124 times less likely to have stunted children (uOR: 0.124; 95% CI: 0.21- 0.715 p= 0.020). In terms of at what age mothers start complementary feeding, the result shows that the odds of those who introduced complementary feeding at 4 months to stunting among under 5 were 0.124 less compared to those who introduced at below 3 months, 6 months, and 8 months, with statistically significant associations (p=0.020). Similarly, another dietary factor that influences stunting is the challenges faced when trying to store food. Those who lack education on food security were 2.087 times more likely to have children with stunting (uOR: 2.087; 95% CI: 3.16-7.154; p=0.031). In terms of whether mothers practice formula feeding, those who practice formula feeding were 0.1830 times less likely to have stunted children (uOR: 0.1830; 95%CI: 033-1.013; p=0.052). The rest of the variables were not statistically significant.

MULTIVARIATE ANALYSIS

Multivariable logistic regression analysis between predictor variables and Stunting

Both demographic, dietary, and maternal nutrition and health factors that met a statistical requirement of a P-value of 0.2 were analyzed at the multivariate level to determine those that are statistically significant with a P-value of 0.5. The table below shows results from the multivariate analysis. In a multivariate Logistic regression model adjusted for all the covariates, the observed association between the various factors and stunting among children under 5 was attenuated.

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Table 8a: Final model on the association between Stunting among children under 5 and predictor variables

Variables	Diagnosed with stunting Yes (%)	No (%)	Total	unadjusted Odd Ratio(95% C.I)	adjusted Odd Ratio(95% C.I)	p-value
Marital status of parents Single	05(10.20%)	10(11.63%)	15	1	1	
Married	29(59.18%)	71(82.56%)	100	1.85(0.77-4.45)	0.33(0.04-2.56)	0.45
Separated/Divorced	15(30.61%)	05(5.83%)	20	2.43(1.09-5.52)	1.34(0.10-18.75)	**0.012***
Total	**49 (100)**	**86(100)**	**135**			
What could be the leading cause of stunting among the under 5? Lack of a balanced diet	6(12.24%)	08(9.30%)	14	1	1	
Lack of maternal education.	27(55.10%)	59(68.60%)	85	1.08(0.54-2.17)	0.56(0.06-5.49)	0.621
Low maternal BMI	1(2.04%)	04(4.65%)	5	0.32(0.12-0.87)	1.03(0.19-5.65)	0.969
Poor household wealth	15(30.61%)	15(17.44%)	30	0.44(0.14-1.31)	3.26(0.46-23.21)	0.238
Total	**49 (100)**	**86(100)**	**135**			
How maternal nutrition and health during pregnancy contribute to stunting in children, IUFR (intra-uterine fetal retardation)	07(14.29%)	13(15.12%)	20	1	1	
Lack of breast milk	34(69.39%)	66(76.74%)	100	2.43(0.09-0.70)	0.25(0.07-0.94)	0.361
Low nutrients in breast milk	05(10.20%)	05(5.81%)	10	0.703(0.36-0.70)	0.83(0.19-3.75)	0.285
All the Above	03(16.33%)	02(2.33%)	5	4.20 (0.54-0.33)	0.39(0.11-1.36)	0.828
Total	**49 (100%)**	**86(100%)**	**135**			
others practicing exclusive breastfeeding feeding Yes	37(75.51%)	68(79.07%)	105	**1**	**1**	
No	12(24.49%)	18(20.93%)	30	1.3(0.11-0.820)	2.28(0.10-0.76)	**0.012***
Total	**49 (100%)**	**86(100%)**				

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Why do mothers not practice EBF? Lack of knowledge	04(8.16%)	05(5.81%)	9	1	1	
Inadequate support	01(2.04%)	03(3.49%)	4	0.082(0.007-1.009)	1.89(0.37-9.22)	0.453
Lack of breast milk	41(83.67%)	76(88.37%)	117	1.067(0.159-7.145)	0.51(0.18-1.39)	0.187
Use of formula feeding	03(6.12%)	02(2.33%)	5	0.909(0.146-5.659)	0.87(0.22-3.39)	0.835
Total	**49 (100%)**	**86(100%)**	**135**			
At what age do mothers start complementary feeding? below 3 months	02(4.08%)	04(4.65%)	6	1	1	
4 months	31(63.27%)	48(55.81%)	79	0.124(0.21-0.715)	1.08(0.54-2.17)	**0.020***
6 months	15(30.61%)	20(23.26%)	35	0.302(0.55-1.653)	0.32(0.12-0.87)	0.168
8 months	01(2.04%)	14(16.28%)	30	0.467(0.65-3.344)	0.44(0.14-1.31)	0.448
Total	**49 (100%)**	**86(100%)**	**135**			

Table 8: Multivariable logistic regression analysis between predictor variables and stunting in children under 5

	Lack of transport	04(8.16%)	06(6.98%)	10	0.333(0.027-
4.186)	8.12(3.120-4.87)	0.273			
	Total	**49 (100%)**	**86(100%)**	**135**	
Do mothers in your practice formula feeding?					
	No	26(53.06%)	24(27.91%)	50	1
	1				
	Yes	23(46.94%)	62(72.09%)	85	0.183(0.033-
1.013)	1.13(0.49- 1.27)	**0.002***			
	Total	**49 (100%)**	**86(`00%)**	**135**	

∗Significant association at P-value <0.05; ∗∗ strong association with Adjusted Odds Ratio ≥3.

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After adjusting for confounding, the variables that remained significantly associated with stunting among children under 5 years old included: marital status, mothers practicing exclusive breastfeeding, age at which mothers start complementary feeding, and mothers practicing formula feeding. Other variables: what could be the leading cause of stunting among the under 5, how maternal nutrition and health during pregnancy contribute to stunting in children, and what challenges are faced when trying to store food, were not statistically significant but were confounders, and they were dropped at different steps in the regression.

Discussion

Prevalence of stunting among children 6-59 months born to teenage mothers

According to the study findings, 36.3% reported that their children were diagnosed with stunting. This was due to inadequate dietary intake, especially a lack of essential nutrients like iron, zinc, and vitamin A. This is in line with Yaya et al. (2020), who revealed that almost 40% of the under-five children were stunted, and Ekholuenetale et al. (2020), who revealed a prevalence just below 30%.

Influence of maternal factors on stunting among children aged 6-59 months born to teenage mothers

In this study, findings revealed that the majority of the respondents, 74.1% reported that the lack of breast milk is highly associated with children's stunting. Poor maternal health, stress during pregnancy and lactation period have been cited as major causes of Lack of breast milk in mothers. Due to a lack of adequate and nutritious breast milk, a child is denied all he basic nutrients that are essential for the child's growth and development, hence leading to stunting. This is in agreement with Saleh et al. (2021), who revealed that any impact on maternal nutrition and health has a greater impact on the proper development of the child. The study also found that the majority of the respondents, 63.7% reported that lack of maternal education was cited as a contributing factor to stunting among children under 5. Adolescents with low levels of education may lack knowledge about proper nutrition and child care practices, leading to suboptimal health outcomes for their children. This correlates with findings by Laksono et al. (2022), who revealed that mothers' education may affect the nutritional status and health of children and is highly associated with stunting among children below 2 years.

Influence of dietary factors associated with stunting among children aged 6-59 months born to teenage mothers

In this study, it was revealed that a significant number of the mothers 22.2% did not practice exclusive breastfeeding. This denies children a chance to get the nutrients they deserve in the first 6 months of life, which are essential in their growth, as they may fail to start and sustain breastfeeding, and this puts them at risk of stunting. This is in line with Dede and Bras (2020), who revealed that breastfeeding rates are lower among young mothers. Additionally, in this study, it was revealed that more than half of the mothers 58.5% started complementary feeding at 4 months. This was due to a lack of knowledge about recommended feeding guidelines, pressure from friends and families to start solid foods. This practice alone puts these children at risk of stunting as they may end up missing the nutrients in their mother's breastmilk. This is in line with Dhami et al. (2019), who revealed that inadequate complementary feeding practices, including late initiation and poor dietary diversity, contribute to stunting among children born to teenage mothers. On the other hand, the study also revealed that a significant number, 33.3% of the respondents, did not have food stores, which leads to food insecurity. This was due to poverty and financial struggles to purchase food. Food insecurity leads to inadequate breastfeeding, inappropriate complementary feeding, and poor dietary diversity; a combination of all these or one of them can lead to stunting among the children. This is in line with M'Kaibi et al. (2017), who revealed that food insecurity is a pervasive issue affecting dietary diversity and nutrient intake among households, and it has a significant influence on the incidence of stunting. The study also found that only 14.8% of the mothers feed their children on all food values. This was due to limited access to healthy food options, lack of nutritional knowledge, and the picky eating habits of their children. Inadequate nutrition hinders growth and development, which leads to malnutrition and stunted growth. This is in agreement with Ssentongo et al. (2020), who revealed that in Uganda, reported vitamin A deficiency (VAD) was associated with higher odds of stunting, as teenage mothers would lack access to micronutrient-rich

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foods and supplements, increasing the risk of stunting in their children.

Conclusion.

Stunting was more prevalent among children below 5 years old.
Maternal factors on stunting among children included lack of breast milk and maternal education.
Factors associated with stunting among children included: Lack of exclusive breastfeeding, starting complementary feeding at 4 months, lack of food stores, and not feeding children on a balanced diet.

Recommendations.

The Ministry of Health and district health officers should implement and support programs that are aimed at teaching mothers about children's nutrition.
The participants were asked if they had advice; their answers are summarised in these recommendations. The most important aspect of the recommendations is that they are preventative measures. The participants were clear that the issues of teenage pregnancies and stunting should be addressed by their causes, and prevention is valued higher than treatment.

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List of Abbreviations

SBCC Social and Behavior Change Communication
SNNPR Southern Nations, Nationalities and Peoples Region
SSA Sub-Saharan Africa
UDHS: Uganda Demographic and Health Survey
UNICEF United Nations International Children's Emergency Fund
WHO World Health Organization

Source of funding

The study was not funded

Conflict of interest

The author did not declare any conflict of interest

Data availability

Data is available upon request

Author contributions

John Bosco Oryem collected data and drafted the manuscript of the study
Gordon Kibirige supervised the study

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John Bosco Oryem is a student of a Bachelor of Human Nutrition and Clinical Dietetics at Uganda Christian University.
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