




## Relationship Between Single Motherhood Status and Stunting Among Children Under 5 in Kgatleng, Botswana

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### Abstract

Undernutrition affects sub-Saharan African countries with increased stunting among children under 5 years old. The short- and long-term effects of this stunting include the potential for slow growth in early life, impaired health, and educational and economic disadvantages in adolescent and adult years. In this quantitative cross-sectional study, we analyzed the relationship between single-mother families and the occurrence of stunting among children under 5 years old in the Kgatleng District of Botswana. We collected primary data from 196 mothers and their children who visited selected clinics in Kgatleng. The results of the binary logistic regression analysis were significant:  $\chi^2(1, N = 196) = 4.119, p = .046$ , indicating the model was able to distinguish between those respondents who reported stunting and those who did not report stunting. The implications for positive social change include the potential to increase awareness among health professionals to continually check the linear growth of children under 5 to help curb the deleterious effects and the social inequalities caused by stunting.

**Keywords:** *single mothers, single motherhood, nutrition status, poor diet, poor nutrition, undernutrition, stunting, Africa, and Botswana*

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### Introduction

Stunting is defined as the proportion of children whose height is less than minus two standard deviations ( $-2$  SDs) below the median for the same age and sex as set by the World Health Organization (WHO) Child

Growth Standards (de Onis & Branca, 2016; Leroy & Frongillo, 2019). Children are categorized as severely stunted if their length and/or height is less than minus three standard deviations ( $-3$  SDs) below the median for the same age and sex as set by the WHO Child Growth Standards (de Onis & Branca, 2016). Worldwide, it is estimated that about one-quarter (26%) of children are stunted (Fentahun et al., 2016). The prevalence of stunting in Botswana is estimated at 31.4% among children under 5 years old (United Nations in Botswana, 2021), an apparent increase from the 2009 estimates of approximately 25.9% prevalence of stunting among children under 5 (United Nations in Botswana, 2021).

Long-term consequences related to childhood stunting syndrome are varied and of massive severity. These consequences include increased morbidity and mortality, reduced physical and neurodevelopmental capacity, elevated metabolic disease risk into adulthood, and reduced economic capacity (de Onis & Branca, 2016). Specific to these consequences, researchers reported an association of poor school attendance among stunted children and a high risk of mortality and susceptibility to infections (Tariku et al., 2017). An association also exists between shorter adult stature and labor-market outcomes, such as lower earnings and poorer productivity (de Onis & Branca, 2016). Also, household composition potentially impacts children's health outcomes. Ntshebe et al. (2019) conducted a study in Botswana and reported that stunting was higher among children living with unrelated household members than those living with both parents. Similarly, children in households with only a mother and a grandparent present had a higher level of stunting than those living with both parents (Ntshebe et al., 2019). Of concern is the change in the Botswanan family structure. Botswanan women are increasingly burdened with raising their children alone as marriages or cohabiting decline (Dintwat, 2010). The traditional nuclear family, which consists of the children, their mother, and their spouse or extended family (other spouses, relatives, or nonrelatives; Akinyemi et al., 2016), has been replaced by a single-headed household family.

To help understand this issue, we examined the relationship between single motherhood and the occurrence of stunting among children under 5 years old in Kgatleng District, Botswana. To this purpose, Bronfenbrenner's ecological systems theory was applied, and the microsystem comprising the child's family environment was examined for efficacy in predicting child stunting among children under 5; the child's mother's marital status—married or single—represented the mesosystem.

## Method

### Research Design and Questions

Our study was an observational, quantitative, cross-sectional study conducted in two waves, during March and September 2020, due to the COVID-19 restrictions in Kgatleng District. We collected data using a paper questionnaire administered to the mothers and/or caretakers who agreed to participate in the study. The research question was: What is the relationship between single motherhood status and stunting among children under 5 years old in Kgatleng, Botswana? The predictor variable was family structure, with two levels: mother-only families and two-parent (mother and father) families. Single mothers of interest were mothers whose current marital status was never married, widowed, divorced, or separated during the survey periods. Married mothers included women engaged in union (heterosexual union only) or women living together with their male partner in Kgatleng District. The dependent variable was stunting, with two levels, stunting and normal. Ethics approval was obtained from both the Walden University Institutional Review Board (IRB; approval number: 01-30-20-0504573) and the Botswana Ministry of Health IRB (approval number: HPDME 13/18/1) to access local clinics and participants.

## Population

Our study was conducted in the Kgatleng District, a region situated in the southern part of Botswana. Kgatleng District is located between latitude 23.88°S–24.51°S and longitude 25.89°E–26.82°E and covers an area estimated at 7,960 km<sup>2</sup> (Tshireletso et al., 2018). In 2011, the Kgatleng District had a population of 91,660 individuals (44,565 males; 47,095 females), with an average literacy rate of 86.5% (83% for males, 89.7% for females; Statistics Botswana, 2015). Within the population, infants (0–1 year old) made up 4.9%, whereas children under 5 (0–4 years old) made up 11.9% (Statistics Botswana, 2015). The population is highly concentrated in Mochudi, the Kgatleng District capital, at 51.3% (Statistics Botswana, 2015). Mochudi is the location for the five welfare clinics used in this study.

## Procedure

A systematic, randomly selected sample (every 3rd mother who entered the clinic) yielded 196 mothers and/or guardians and their children under 5 living in the Kgatleng District of Botswana. Participants were deidentified and encoded alphabetically to protect their anonymity.

Inclusion criteria were mothers aged 15–49 years with children aged 6–59 months. One periurban village and one remote village in the geographical area were randomly selected due to their proximity and the fluidity of means of transport during lockdown periods. These include Mochudi, a periurban village, where five welfare clinics were randomly selected and one clinic in Artesia village. The Kgatleng District is served by 14 clinics, 13 health posts, and one referral hospital. All clinics in the district help children under 5 years old indiscriminately.

## Measures

To assess sociodemographic participant information, we created and administered a paper questionnaire to the mothers and/or caretakers enrolled in the study. The sociodemographic and household profile sections of the questionnaire were used to assess mother's age at the birth of the child, maternal marital status, mother's educational attainment, and mother's nutritional knowledge; childbirth order, parents' employment status, and mother's health-seeking behavior; and occupation of household members, household size, and marital status of the household heads. The questionnaire was first written in English and then translated into Setswana, the local language, and then translated back into English to maintain uniformity of the questionnaire. The questionnaire was piloted with public health peers outside the study area and pretested to check its readability, functionality, and completeness prior to its administration.

Stunting was employed as an index of growth retardation to categorize the nutritional status of the children under 5 years old. To ascertain a child's demographics, we used an under-5 card (a child clinic card), which is a crucial tool to assist health workers in providing integrated care to an individual child. It contains a chart needed to record and assess a child's growth from birth up to 5 years of age (Banda et al., 2020).

To assess child anthropometric measures of height and weight, we employed standard methods as described in the WHO Growth Standards training manual (Yadav et al., 2016). For the weight measurement, the children were placed in the center of the calibrated weighing device, and the investigator measured the reading to the adjacent 0.1 kg (Fentahun et al., 2016). Children under 5 years old were weighed with light clothing and no shoes; instrument calibration was done before weighing each child. Furthermore, the investigator checked the weighing scale daily against the standard weight for accuracy. The height of the children was measured using a calibrated gauging board. Height measurement for any child more than 24 months old was done in a stand-up position against a calibrated height-gauging board, and the measurement was taken to the nearest 0.1 cm (Badake et al., 2014). For children who could not stand erect, a recumbent position was used to measure their height (Fentahun et al., 2016). As described by Zeray et al. (2019), the

assessment of the height for the children was done using a length-measuring device with a fixed headboard and a moveable footboard perpendicular to the surface on which the child was lying. A fixed measuring tape marked in millimeters was attached to the surface with zero marking the edge of the headboard. During the measurement, children were placed and maintained in a straight position by holding their heads with a crown against the headboard.

## Results

### Household Characteristics

The categorization of the family structure revealed whether the child lived with only a mother, two parents (mother and father), or other parent substitutes (grandparents, uncle, aunt, other relative, not related member). Most mothers (69.4%,  $n = 136$ ) who participated in the study were never married; 15.8% ( $n = 31$ ) were married, and 14.8% ( $n = 29$ ) were cohabiting. Single-mother families constituted the leading family structure (comprising single-mother families and two-parent families). Two-thirds of the mothers (76.0%,  $n = 149$ ) reported secondary school attainment without necessarily graduating, whereas 17.9% ( $n = 35$ ) of the mothers completed college (see Table 1). The children under 5 were evenly divided based on gender with 50% ( $n = 98$ ) male and 50% ( $n = 98$ ) female. Descriptive statistics are presented in Table 1.

**Table 1.** Descriptive Statistics

Variable	<i>n</i>	%
Mother's marital status		
Single	136	69.4
Married	60	30.6
Child gender		
Male	98	50.0
Female	98	50.0
Mother's education level		
Secondary	149	76.0
Higher	35	17.9
No education/primary	12	6.1
Mother's employment status		
Unemployed	128	65.3
Employed	68	34.7

### Logistic Regression Analysis

We conducted a binary logistic regression to examine the relationship between single motherhood and the occurrence of stunting among children under 5 in Kgatleng District, Botswana. The results of the analysis were significant,  $\chi^2(1, N = 196) = 4.119, p = .046$ , indicating the model was able to distinguish between those respondents who reported stunting and those who did not report stunting. The model explained between 2.1% (Cox and Snell  $R^2$ ) and 2.8% (Nagelkerke  $R^2$ ) and correctly classified 57.7% of the cases. Respondents who reported as married households were .521 times less likely to report stunting. Table 2 depicts the regression summary.

**Table 2.** Logistic Regression Summary Table

Predictor variable	B	SE	Wald	Sig.	OR	95% C.I.	
						Lower	Upper
Motherhood status	-.651	.326	3.982	.046	.521	.275	.998
Constant	-.118	.172	.470	.493	.889		

## Discussion

The relationship between single motherhood and stunting in children under 5 was examined using primary data collected in Kgatleng District, Botswana. In our study, the association between single-mother families and stunting was statistically significant. This finding resonates with other studies conducted in Botswana and other Southern African countries. Researchers noted rapid changes in family structure with evident absence and noninvolvement of fathers in raising children (Dintwat, 2010; Letamo et al., 2014). Authors of previous studies demonstrated how the family structure could play a buffer role in alleviating the severity of child health outcomes (Ntshebe et al., 2019). Kesebonye and Amone-P'Olak (2020) found that father involvement, particularly the domains of availability and responsibility and having a father figure (biological fathers, stepfathers, uncles, and grandfathers) during childhood, were linked with better emotional well-being in offspring. Mbulayi and Kang'ethe (2020) found that the absence of fathers in the family affected child outcomes such as education, social relationships, and behavioral and emotional well-being. Authors of similar studies conducted in Ethiopia showed an increased likelihood of stunting for children under 5 in single mothers' homes (Dewana et al., 2017). They reported increased odds of stunting, approximately four times higher for children under 5 living with single mothers or mothers who are not currently living with their partners (Dewana et al., 2017). Evidence from Finlay et al. (2016) also showed a negative effect of single mothers on stunting. In addition, studies conducted in Rwanda showed an increased likelihood of stunting for children under 5 in single mothers' homes. Contrarily, evidence from studies conducted in Burundi and Nigeria showed that children from single mothers' homes were less likely to be stunted (Vandeginste, 2014). The mixed findings could explain that various risk factors lead to stunting and that single motherhood may not be the sole pathway. The effect of single mothers on stunting could then be influenced by factors such as the mother's age at the birth of her first child, household wealth, childbirth order, maternal education level, and child gender.

Findings from our study showed that single motherhood with its health effects and economic consequences has the potential to hinder improvements in health, growth, and development of children under 5 because stunted children suffer impaired cognitive development (de Romaña et al., 2021). In turn, these health consequences have the potential to make the global nutrition target to eliminate hunger and all forms of malnutrition not attainable by 2030 (Carducci et al., 2021).

## Conclusion

Stunting remains a public health issue of great concern in sub-Saharan Africa and a significant threat to the development of children under 5 years old. Botswana still experiences a high prevalence of stunting among children under 5, and further analyses are required to help depict various routes that lead to undernutrition. Our findings showed that single motherhood increases the likelihood of stunting in children under 5. These results add knowledge on stunting and will be valuable to inform and develop concerted efforts toward reduction and prevention of stunting in children under 5. Continued efforts by local government and public

health officials in collaboration with other nongovernmental organizations are recommended to curb the prevalence of stunting.

### **Study Limitations**

Our study generated a significant determinant factor for stunting in children under 5 in Kgatleng District, Botswana. However, causality could not be established due to the cross-sectional nature of the data. Response inaccuracy might have been introduced because the children's mothers or caretakers self-reported information. Our analysis did not include parents' and/or children's current and past health illnesses, such as HIV, diarrhea, or malaria. Other covariates, such as maternal income level, mother's educational attainment, employment status, marital status, and breastfeeding practices, could influence the outcomes of interest. Also, our study did not measure the height of caretakers or assess mothers' nutritional status. These measures could influence and determine correlates of stunting in children under 5 in Botswana.

### **Recommendations for Future Research**

Future studies should expand the socioecological model to include tenets of the other four systems. Other covariates, such as maternal income level, mother's educational attainment, employment status, marital status, and breastfeeding practices, should be studied and analyzed. Finally, hierarchical binary logistic regression should be conducted to control for variables consistently identified in extant literature as being related to stunting while examining other variables' predictability.

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