

Socioeconomic Factors Associated with Double Burden of Malnutrition in Mother-Child Pairs in Burkina Faso

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Abstract

Burkina Faso has historically been characterized by high rates of child stunting and recent DHS data showed a steady increase in overweight/obesity among adult women, particularly in urban areas. This dual shift creates a setting where the double burden of malnutrition (DBM) in mother-child pairs is likely to emerge. This study aimed to determine the prevalence of mother-child double burden of malnutrition (DBM) and the socio-economic associated factors in Burkina Faso. This cross-sectional study used nationally representative data from the Burkina Faso Demographic and Health Survey (BFDHS-V). The DBM in mother-child pairs was defined as maternal overweight combined with child stunting, wasting, or underweight. Among 5,232 pairs, multivariable logistic regression was used to identify socioeconomic factors associated with DBM. The prevalence of DBM in mother-child pairs was 3.2%, 1.7% and 2.1% for OM/SC, OM/WC and OM/UC respectively. In adjusted analyses, the richest wealth quintile was associated with higher odds of OM/WC (aOR = 2.68, $p = 0.041$). Rural residence was protective against OM/WC (aOR = 0.43, $p = 0.012$). Older maternal age was associated with higher odds of both outcomes: OM/WC (aOR = 2.54 for 35 - 49 years; $p = 0.005$) and OM/SC (aOR = 3.08 for 25 - 34 years; $p = 0.001$). Compared to infants (<6 months), children aged 24 - 59 months had lower odds of OM/WC (aOR = 0.31, $p = 0.002$) but higher odds of OM/SC (aOR = 2.64, $p = 0.017$). The double burden of malnutrition in Burkina Faso is less common than would be expected, with type-specific socioeconomic and demographic determinants. Wealth increases risk for stunting-related DBM, while rural residence protects against wasting-related DBM. Older maternal age is a risk factor for both, and child age shows

opposite effects. Interventions should be tailored to the specific DBM sub-type.

Keywords

Double Burden of Malnutrition, Overweight, Stunted, Wasted, Pairs, Burkina Faso

1. Introduction

The double burden of malnutrition (DBM) is the coexistence of contrasting forms of malnutrition whether within the same individuals, households or communities. At the household level, it is described as the co-occurrence of undernutrition and overnutrition within the same household in at least 2 people. Although there is no single operational definition or indicator of this type of DBM, the most common association using anthropometric criteria, is an underweight child and an overweight/obese mother [1]. Studies examining the phenomenon in pairs composed of an overweight mother and an underweight child reported prevalence estimates ranging from 5% to 56% countries or regions [2] [3]. However, the heterogeneity in the definition of DBM and the cut-off points of anthropometric measures likely contributes to this wide range of prevalence estimates of DBM across the world [1].

Stunted children are substantially more likely to develop adult overweight, obesity, and costly chronic diseases such as type 2 diabetes and cardiovascular disease, thereby perpetuating a vicious cycle of malnutrition across the life course [4]. Simultaneously, mothers have elevated health risks associated with overweight and obesity, including substantial burdens of diabetes and hypertension that increase maternal morbidity and healthcare needs [5]. In addition, obesity leads to impaired economic productivity and increased expenditure on health care [6]. DBM can reinforce intergenerational cycles of malnutrition, where maternal life-course nutrition and physical characteristics shape child outcomes and perpetuate population patterns of disease.

The commonly described driving mechanism of DBM relates to the nutrition transition and related changes in household dietary and lifestyle patterns - a socio-economically patterned phenomenon [7]. For instance, household wealth showed paradoxical associations with DBM across settings: in sub-Saharan Africa, higher wealth consistently predicts elevated DBM risk, with maternal overweight substantially more common among the wealthiest quintile [8] [9]. Conversely, in Latin America and the Caribbean, lower household wealth and rural residence are associated with the specific pairing of overweight mothers with stunted children, illustrating persistent poverty-related DBM pockets even among growing economies [10]. Understanding the determinants of DBM is critical for designing context-appropriate interventions that can simultaneously address maternal over-

weight and child undernutrition to improve the health and well-being of both mothers and children and to achieve the second target of SDG-2.

Burkina Faso is among the Sub-Saharan African countries where the nutrition transition is accelerating, marked by a rising prevalence of overweight and obesity, particularly among urban women [11], along with a shift in dietary patterns and an increase in cardiometabolic risk factors [12] [13]. Although various sectors have made progress in reducing child wasting, underweight and stunting among children persist, while overweight and obesity are increasingly common among women and children, especially in urban households. In this study we aimed to examine the socioeconomic and demographic determinants of household-level DBM in this population and to identify factors that can inform integrated, double-duty nutrition policies capable of effectively addressing both forms of malnutrition within the same household.

2. Material and Methods

2.1. Data Source and Survey Design

The present study is based on an analysis of secondary data from the Burkina Faso Demographic and Health Survey Round-V (BFDHS-V). BFDHS-V was a nationally representative cross-sectional survey conducted in 2021, by the national bureau of statistics of Burkina Faso and the DHS Program ICF Rockville, Maryland, USA. It was a two-stage area stratified sample survey, which sample size was calculated to provide representative results at the national, the capital city (Ouagadougou), the urban areas other than Ouagadougou, and the rural level. During the survey, 13,251 households were selected with a response rate of 98%. A total of 17,659 women of reproductive age (15 - 49 years) were interviewed including the full household questionnaires and anthropometric measurements of < 5 years old children and women. For this analysis, we considered a weighted subsample of 5232 mother-child pairs with complete anthropometric data, excluding mothers who were pregnant.

2.2. Outcome Variables

2.2.1. Definitions

The outcome variable was the presence of DBM (at the household level), defined as a mother-child pair in which both the mother and her child (under 5 years) simultaneously had at least one form of malnutrition. Maternal malnutrition was defined as overweight or obesity (body mass index ≥ 25 kg/m²), and we refer to this collectively as “maternal overweight” throughout the manuscript. Child malnutrition was defined as the presence of stunting (height-for-age z-score, HAZ < -2), wasting (weight-for-height z-score, WHZ < -2), or underweight (weight-for-age z-score, WAZ < -2).

DBM was therefore classified into three non-mutually exclusive subtypes: overweight mother + stunted child (OM/SC), overweight mother + wasted child (OM/WC), and overweight mother + underweight child (OM/UC). Because a

child could meet more than one undernutrition criterion (e.g., be both stunted and wasted), a single mother-child pair could be counted in more than one DBM subtype. To avoid double-counting when estimating the overall prevalence of DBM, we considered a household as positive for DBM if it met any of the three subtype definitions.

2.2.2. Anthropometric Measurements and Nutritional Status

For the BFDHS-V, weight measurements were taken using digital scales. Height/length measurements were taken using a height board. Children under 24 months of age were measured in the supine position, while older children and adults were measured in the standing position. Child nutritional status was determined using the 2006 WHO growth standard to calculate HAZ, WHZ and WAZ. Children were considered as undernourished when they were stunted, wasted or underweight, defined as height-for-age, weight-for-age and weight-for-height/length z-scores below -2 standard deviations (SD), respectively. Maternal nutritional status was defined as: BMI < 18.5 kg/m², underweight; $18.5 \leq$ BMI < 25.0 kg/m², normal weight; BMI ≥ 25.0 kg/m², overweight

2.3. Explanatory Variables

The explanatory variables were identified from previous literature [7] [14] and included: household wealth index (poorest to richest), place of residence (urban/rural), maternal age (15 - 24, 25 - 34, 35 - 49 years), number of children under five years in the household (1 - 2, 3 - 4, ≥ 5), child sex and age (< 6 , 6 - 23, 24 - 59 months), maternal education (none, primary, secondary/higher), number of antenatal care visits (none, 1 - 3, ≥ 4), work status (not working/currently working), and dietary diversity (based on the Minimum Dietary Diversity-Women score, dichotomized 'Met/Not met'). The wealth index is a composite score which was calculated using principal components analysis and already available in the BFDHS-V dataset. The index is based on the household's ownership of selected assets, materials used for housing construction, types of water access and sanitation facilities etc.

2.4. Statistical Analysis

For descriptive statistics, we reported the weighted frequency distribution to summarize the categorical variables and means (standard errors) to summarize the continuous variables. Prior to regression modeling, we assessed whether the observed co-occurrence of maternal overweight and child undernutrition represented meaningful patterning rather than random association. After calculating the expected prevalence of each DBM subtype under the assumption of statistical independence between maternal overweight and child undernutrition, we compared these expected values to the observed prevalence using design-adjusted chi-square tests. The association between the outcomes (household-level DBM and its subtypes) and selected household, parental, and child characteristics was assessed using survey-weighted logistic regression to account for the complex survey de-

sign. All analyses were performed using the “*svyglm*” function in the survey package of R [15]. The survey design was defined using the primary sampling unit (PSU), the sampling strata, and the final sampling weights provided in the dataset. A separate multivariable logistic regression model was fitted for each DBM subtype. All covariates were entered simultaneously into the model based on a priori knowledge from the literature (full model). No stepwise selection was used; instead, the full model is presented to control for potential confounding. Model fit was assessed using the Rao-Scott adjusted likelihood ratio test and multicollinearity between the independent variables was tested using the variance inflation factor with a cutoff point of mean VIF = 5, ensuring that the independent variables were not highly correlated. Associations were expressed as adjusted odds ratios (aOR) with 95% confidence intervals. Statistical significance was set at $p < 0.05$.

3. Results

3.1. Characteristics of the Study Sample

Overall, 5232 mother-child pairs were analyzed. **Table 1** describes the household and sociodemographic characteristics of the participants. The mean age (SD) of mothers was 29.6 (7.0) years, and 71.7% of them resided in rural areas. Mothers with no formal education represented 69.9% of the participants and only 17.3% had at least secondary education. The mean BMI of mothers was 22.7 (4.1) kg/m². The prevalence of overweight and obesity among mothers was 16.3% and 5.4 %, respectively. 21.2% of children were stunted, 10.1% were wasted and 16.2% were underweight (**Table 1**).

Table 1. Characteristics of the study participants.

Characteristic	Mean (SD) or n (%) ^a
Maternal age (years)	29.6 (7.0)
Maternal age category	
15 - 24	1,406 (26.8%)
25 - 34	2,433 (46.5%)
35 - 49	1,393 (26.6%)
Maternal BMI (kg/m ²)	22.7 (4.1)
Maternal overweight/obesity	
Normal/Underweight	4,099 (78.3%)
Overweight/Obese	1,133 (21.7%)
Number of children under 5	
1 - 2	1,584 (30.3%)
3 - 4	2,911 (55.6%)
≥5	737 (14.1%)
Maternal work status	
Don't work	1,941 (37.1%)

Continued

Currently working	3,291 (62.9%)
Child age (months)	28.5 (17.3)
Child age category	
0 - 5 months	572 (11.0%)
6 - 23 months	1,697 (32.7%)
24 - 59 months	2,927 (56.3%)
Child sex	
Male	2,659 (50.8%)
Female	2,573 (49.2%)
Wealth quintile	
Poorest	990 (18.9%)
Poor	1,028 (19.7%)
Middle	1,206 (23.1%)
Rich	1,120 (21.4%)
Richest	888 (16.9%)
Maternal education	
None	3,655 (69.9%)
Primary	673 (12.8%)
Secondary and Higher	904 (17.3%)
Residence	
Urban	1,494 (28.6%)
Rural	3,738 (71.4%)
Household size	8.6 (4.6)

^aValues are weighted percentages (n) and means (SD) accounting for the survey design.

3.2. Prevalence of Double Burden of Malnutrition

The prevalence of the different types of DBM is presented in **Figure 1**.

The highest prevalence (95% CI) was observed for OM/SC DBM subtype: 3.2% (2.5 - 3.6). Lower prevalence estimates were found for OM/WC (1.7% [1.4 - 2.3]) and OM/UC (2.1% [1.6 - 2.6]). The observed prevalence of all DBM types differs significantly from what would be expected under the assumption of statistical independence. The percentage difference between observed and expected prevalence ranged from 23% for OM/WC to 40% for OM/UC; all $p < 0.01$ (**Table 2**).

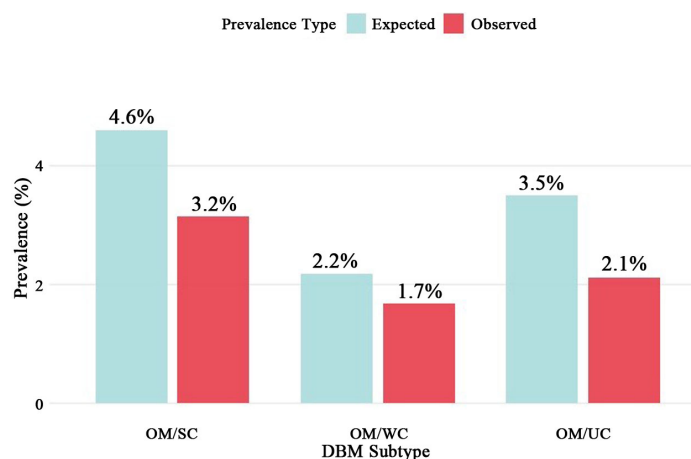


Figure 1. Prevalence of mother-child pairs' double burden of malnutrition.

Table 2. Observed vs expected prevalence of double burden of malnutrition.

DBM Subtype	Expected DBM (%)	Observed DBM (%)	Prevalence Ratio (%)	Chi-Square P-Value
OM/SC	4.6	3.2	0.7	<0.001
OM/WC	2.2	1.7	0.8	0.004
OM/UC	3.5	2.1	0.6	<0.001

DBM, Double Burden of Malnutrition. OM/SC, maternal overweight + child stunting. OM/WC, maternal overweight + child wasting. OM/UC, maternal overweight + child underweight.

3.3. Factors Associated with the Double Burden of Malnutrition

The bivariate analysis showed that mother-child pairs in the richest wealth quintile had significantly higher odds of all DBM subtypes, while those residing in rural residence had significantly lower odds. Maternal education showed differential associations: compared to no formal education, primary education was associated with increased odds of OM/WC and secondary/high education with increased odds of OM/UC. Compared to younger mothers (<25 years), mothers aged 25 to 34 years had higher odds of OM/SC and those aged 35 to 49 years had higher odds of OM/WC. Achieving minimum dietary diversity was associated with increased odds of OM/WC and OM/UC (**Table 3**).

In multivariable analysis, mother-child pairs in the richest wealth quintile had significantly higher odds of OM/WC only (aOR = 2.68; $p = 0.041$), and those residing in rural residence had lower odds for OM/SC only (aOR = 0.43; $p = 0.012$). The associations between older maternal age and OM/WC and OM/SC remained significant: mothers aged 25 - 34 years had significantly higher odds of OM/SC (aOR = 3.08; $p = 0.001$), and mothers aged 35 - 49 years had significantly higher odds of OM/WC (aOR = 2.54; $p = 0.005$), compared with mothers under 25 years. The association with children's age varied depending on the subtype of DBM: compared to infants (<6 months), children aged 24 to 59 months had higher odds

of OM/SWC (aOR = 2.64; $p = 0.017$) but, conversely, lower odds of OM/SC (aOR = 0.31; $p = 0.002$) (**Table 3**).

Table 3. Multivariable regression of factors associated with double burden of malnutrition (DBM) among mother-child pairs in Burkina Faso.

Variable	OM/SC			OM/WC			OM/UC		
	OR (95% CI)	aOR (95% CI)	<i>P</i>	OR (95% CI)	aOR (95% CI)	<i>P</i>	OR (95% CI)	aOR (95% CI)	<i>P</i>
Wealth index									
Poorest	Ref.	Ref.		Ref.	Ref.		Ref.	Ref.	
Poor	0.59 (0.20 - 1.72)	0.66 (0.21 - 2.04)	0.470	0.86 (0.43 - 1.72)	1.19 (0.54 - 2.63)	0.665	0.35 (0.13 - 0.93)	0.41 (0.14 - 1.20)	0.102
Middle	1.01 (0.47 - 2.19)	0.92 (0.37 - 2.25)	0.848	1.11 (0.56 - 2.19)	1.43 (0.65 - 3.15)	0.369	1.22 (0.58 - 2.55)	1.20 (0.50 - 2.85)	0.687
Rich	1.81 (0.87 - 3.75)	1.46 (0.63 - 3.36)	0.377	1.34 (0.73 - 2.46)	1.21 (0.51 - 2.83)	0.666	1.67 (0.82 - 3.39)	1.44 (0.63 - 3.27)	0.383
Richest	3.63 (1.87 - 7.07)	2.22 (0.92 - 5.33)	0.074	2.48 (1.32 - 4.63)	2.68 (1.04 - 6.91)	0.041	2.69 (1.38 - 5.25)	1.22 (0.43 - 3.41)	0.709
Residence									
Urban	Ref.	Ref.							
Rural	0.26 (0.16 - 0.42)	0.43 (0.22 - 0.83)	0.012	0.64 (0.42 - 0.99)	1.11 (0.57 - 2.15)	0.754	0.37 (0.23 - 0.58)	0.62 (0.33 - 1.20)	0.156
Children <5 y									
1 - 2	Ref.	Ref.		Ref.	Ref.		Ref.	Ref.	
3 - 4	0.59 (0.35 - 1.01)	0.65 (0.33 - 1.28)	0.218	0.73 (0.49 - 1.08)	0.80 (0.48 - 1.36)	0.415	0.67 (0.42 - 1.07)	0.75 (0.39 - 1.45)	0.394
≥5	0.57 (0.28 - 1.14)	0.99 (0.44 - 2.23)	0.974	0.55 (0.28 - 1.10)	0.53 (0.23 - 1.19)	0.122	0.57 (0.29 - 1.15)	0.77 (0.34 - 1.71)	0.516
Education									
No education	Ref.	Ref.		Ref.	Ref.		Ref.	Ref.	
Primary	2.08 (1.05 - 4.12)	1.57 (0.73 - 3.38)	0.248	0.69 (0.36 - 1.30)	0.62 (0.29 - 1.34)	0.225	1.73 (0.93 - 3.25)	1.79 (0.85 - 3.78)	0.128
Secondary	1.54 (0.87 - 2.74)	0.82 (0.42 - 1.63)	0.575	1.54 (1.00 - 2.37)	1.39 (0.66 - 2.92)	0.379	2.45 (1.46 - 4.11)	1.96 (0.88 - 4.39)	0.101
Maternal age (y)									
15 - 24	Ref.	Ref.		Ref.	Ref.		Ref.	Ref.	
25 - 34	2.40 (1.25 - 4.62)	3.08 (1.58 - 6.04)	0.001	1.41 (0.81 - 2.47)	1.62 (0.83 - 3.17)	0.159	1.20 (0.64 - 2.24)	1.50 (0.76 - 2.96)	0.244
35 - 49	1.93 (0.96 - 3.88)	2.60 (1.12 - 6.03)	0.026	2.12 (1.20 - 3.73)	2.54 (1.33 - 4.85)	0.005	1.33 (0.70 - 2.53)	1.66 (0.74 - 3.72)	0.223
Maternal work									
Not working	Ref.	Ref.		Ref.	Ref.		Ref.	Ref.	

Continued

Working	1.20 (0.72 - 1.99)	1.16 (0.66 - 2.04)	0.597	1.18 (0.81 - 1.71)	1.07 (0.67 - 1.71)	0.767	1.22 (0.74 - 1.99)	1.23 (0.68 - 2.23)	0.488
Antenatal visits									
No ANV	Ref.	Ref.		Ref.	Ref.		Ref.	Ref.	
1 - 3 ANV	1.18 (0.15 - 9.42)	1.41 (0.16 - 12.79)	0.757	0.62 (0.13 - 3.11)	0.81 (0.14 - 4.70)	0.813	0.29 (0.08 - 1.06)	0.32 (0.07 - 1.42)	0.134
>4 ANV	1.29 (0.17 - 9.83)	1.22 (0.14 - 10.68)	0.856	0.57 (0.12 - 2.72)	0.64 (0.12 - 3.38)	0.595	0.28 (0.08 - 0.94)	0.27 (0.07 - 1.08)	0.064
Dietary Diversity									
Not met	Ref.	Ref.		Ref.	Ref.		Ref.	Ref.	
Met	1.45 (0.84 - 2.49)	1.33 (0.72 - 2.47)	0.364	2.04 (1.35 - 3.07)	1.55 (0.92 - 2.62)	0.100	1.75 (1.09 - 2.81)	1.59 (0.92 - 2.77)	0.099
Child age (m)									
0 - 5	Ref.	Ref.		Ref.	Ref.		Ref.	Ref.	
6 - 23	0.93 (0.50 - 1.75)	0.97 (0.51 - 1.86)	0.934	2.12 (0.91 - 4.94)	2.10 (0.90 - 4.90)	0.087	1.21 (0.49 - 2.99)	1.21 (0.49 - 3.00)	0.683
24 - 59	0.29 (0.15 - 0.56)	0.31 (0.14 - 0.65)	0.002	3.38 (1.57 - 7.27)	2.64 (1.19 - 5.85)	0.017	1.20 (0.53 - 2.71)	1.02 (0.42 - 2.47)	0.959
Child sex									
Male	Ref.	Ref.		Ref.	Ref.		Ref.	Ref.	
Female	0.62 (0.38 - 1.01)	0.63 (0.37 - 1.08)	0.094	0.67 (0.48 - 0.95)	0.73 (0.48 - 1.12)	0.146	0.75 (0.48 - 1.16)	0.76 (0.46 - 1.26)	0.287
Mean VIF	1.99			1.42			2.16		
Rao-Scott LRT	37.9		0.01	72.9		<0.001	35.1		0.02

DBM, Double Burden of Malnutrition. OM/SC, maternal overweight + child stunting. OM/WC, maternal overweight + child wasting. OM/UC, maternal overweight + child underweight. OR, Odds ratio. aOR, adjusted odds ratio. LRT, Likelihood ratio test.

4. Discussion

The results of our preliminary analysis indicated that all DBM subtypes occurred significantly less frequently than it would be expected, as suggested by the large differences between observed and expected figures (up to 40% or OM/UC). This finding implies that factors driving the co-occurrence of maternal overweight and child undernutrition may either protect against one another or operate through different mechanisms in this population. For example, households living in extreme poverty may face a high risk of child undernutrition but have limited access to the energy-dense foods that lead to maternal overweight. In contrast, more affluent households may achieve better child nutrition outcomes, even if mothers have a higher BMI. Thus, the factors associated with household DBM are not simply correlates of each condition separately, but they may rather reflect a specific convergence of risks that allows both forms of malnutrition to co-occur within a distinct subset of households.

We assessed three distinct subtypes of household-level dual burden of malnutrition, with prevalences of 3.2%, 1.7%, and 2.1%, for pairs of an overweight mother with a stunted, wasted, or underweight child, respectively. Studies in resource-limited settings reported prevalences ranging from 2% to 6% in most Sub-Saharan African countries, with the exception of Ghana, where the prevalence peaked at 12% [16]. Higher prevalence has been reported in other settings; 7.0% in India [17], 12.3% in Ethiopia [18], 13.5% in Bangladesh [19] and 12.0% in Southeast Asia [20]. The variations across countries and world regions could be attributed to the economic development of the populations and the ongoing process of nutrition transition in these settings. In recent decades, poor economy countries have experienced socio-economic changes and epidemiological transition leading to shifts in dietary habits and consumption of energy-dense foods, along with less physical activity, resulting in a rise in overweight and obesity among adults including women of reproductive age [21] [22]. Additionally, this dietary profile, combined with inadequate water, sanitation, and hygiene conditions, contributes to suboptimal nutrition outcomes in children [23].

We identified several socioeconomic factors associated with an increased likelihood of household-DBM. The richest wealth quintile was associated with higher odds of OM/SC. Our result is consistent with previous research in most sub-Saharan, and South and South-east countries [20] [24] reporting that mother-child pairs who were in the richest wealth category had higher odds of DBM compared with the poorest categories. Two systematic reviews reported mixed findings [7] [22], while, a negative association was found in studies in Peru [25] and in Latin America and Caribbean countries (LAC) [10]. In the latter study, poorest households also appeared at risk for specific child outcomes within an overweight-mother pairs; children of overweight mothers in the richest households were 57% lower probability of being OM/SC compared with the richest [10]. It is worth noting however, that most LAC countries are higher-income LMICs; a characteristic that could have affected their results. Further, data from 55 DHS in Low- and Middle-Income countries suggests that DBM is not uniformly distributed across wealth quintiles: it is more likely to occur in the wealthiest households lower-income LMICs and in the poorest households of higher-income LMICs [26]. The association wealth index and OM/SC may be explained by the fact that households in the richest wealth index category may experience a dietary transition [27], characterized by an increased consumption of energy-dense foods that lack critical nutrients, and low levels of physical activity, all factors contributing to a higher risk of overweight and obesity among individuals in these households [17] [28]. For stunting specifically, other factors (e.g., poor complementary feeding, high consumption of processed foods) could override the wealth advantage of food availability. For example, an analysis of DHS data from thirteen West African countries showed that minimum acceptable diet mediated 35.9% to 44.5% of the association between low wealth and stunting, indicating that complementary feeding quality is a key pathway even within non poor households when feeding prac-

tices are suboptimal [29].

The association between urban residence and DBM in our study is consistent with research findings in SSA, where the odds of an overweight mother and a stunted child in the same household was found to be higher in urban and peri-urban areas than in rural areas [30]. Moreover, data from 42 developing countries showed that OM/SC was associated with urban residency in Latin America but with rural residency in Africa and Asia [31], suggesting that associations between OM/SC and the place of residency differ across countries according to country income level [26]. Urban environments may facilitate the nutrition transition through greater exposure to energy-dense processed foods, reduced physical activity, and higher maternal obesity risk, while child undernutrition persists due to inadequate feeding practices and food insecurity in urban poor settings [32]. The effect of rural versus urban residence is hypothesized to be largely explained by covariates such as higher poverty rates, lower levels of education and poorer access to services [33].

We found that increasing age of mothers was associated with a higher odd of the pairs experiencing OM/SC and OM/WC subtype of DBM. Similar findings were reported in several studies and suggest that the prevalence of DBM was higher in older age than in younger age groups of mothers [18] [20] [24]. The higher risk of overweight and obesity among older women in our context [34] and in SSA [35] [36] has been demonstrated, and is one of the possible drivers of the higher likelihood of DBM. The primary mechanism could be the additive effect of physiological changes across the female reproductive lifespan, specifically, the weight gained during each pregnancy that is often not fully lost in the inter-pregnancy period [33]. Also, older maternal age is often correlated with higher parity; it can be hypothesized that older mothers may face higher nutritional demands of multiple children, putting them at risk of insufficient food intake specially if they have less control over resources.

Child age showed divergent associations depending on the type of child undernutrition in the DBM. This finding underscores that the direction of the child age association is opposite for stunting versus wasting. Direct comparisons with prior studies are limited by the fact that most research does not disaggregate or did not report child age associations by DBM types [7] [16] [20] [22] [37]. The negative association between older child age and OM/WC aligns with evidence from Ethiopia where children aged 13 to 35 months had significantly lower overall DBM unadjusted odds compared to infants aged 6 - 12 months [19]. In contrast, a study in Kenya reported higher odds of overweight/obese mother-stunted child pairs among children aged 13 - 59 months compared to children less than 6 months old, with however no significant association between child age and OM/WC pairs [38]. Another study in Peru reported no significant age differences after adjustment [2]. Stunting is a chronic, cumulative process of linear growth faltering driven by repeated infections and sustained dietary inadequacy. This growth faltering accumulates progressively from the complementary feeding window on-

ward, when children are introduced to external foods and face higher exposure to pathogens, inadequate nutrient intake, and reduced breastfeeding protection. As a result, stunting prevalence increases with age, reflecting the long-term, linear growth deficits that manifest more prominently in older children. On the other hand, wasting is an acute condition reflecting recent, severe food deficit or acute illness, and is more prevalent in infants who have the highest nutritional demands and who are most vulnerable to acute infections after losing breastfeeding protection upon weaning.

Several limitations should be acknowledged. The cross-sectional design precludes causal inference, and the BFDHS-V was not designed to study DBM, so selection and categorization of certain variables were restricted to standard DHS content, which may limit comparability with other DBM research. Residual confounding by unmeasured factors (dietary quality, physical activity etc.) cannot be ruled out. Nonetheless, the study has key strengths: it is a national-scale investigation of DBM in mother-child pairs in Burkina Faso, using a large, nationally representative sample with a high response rate, which enhances generalizability and statistical power.

5. Conclusion

This study showed that DBM occurs less frequently than expected among mother-child pairs in Burkina Faso. Socioeconomic determinants are not uniformly associated with all DBM subtypes. Higher wealth is a risk factor for OM/SC, while residence and education lose significance after adjustment. Child age further differentiates the two forms: wasting-related DBM decreases with age, while stunting-related DBM increases. This suggests that the double burden is shaped by more complex, type-specific pathways that go beyond traditional socioeconomic indicators. Future research should investigate mediating behaviors to explain these patterns.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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