

Association between intimate partner violence and child nutrition status in Rwanda: Findings from recent Rwanda Demographic and Health Survey 2019/20

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Abstract

Background

Despite significant socio-economic progress and a decade of interventions aimed at improving nutrition, malnutrition remains a significant problem among children under the age of five in Rwanda. While several studies have been conducted to identify important risk factors for malnutrition in Rwanda, none have specifically assessed the association between intimate partner violence (IPV) and child nutritional status. Therefore, this study aimed to examine the association between women's exposure to IPV and the nutritional status of their children in Rwanda.

Methods

The study analyzed secondary data from the Rwanda Demographic and Health Survey 2019–20 (RDHS 2019/20). Data was gathered on women's emotional, physical, and sexual IPV experiences, as well as demographic and socioeconomic characteristics. Furthermore, their children's birth outcomes were included as mediating factors. To determine the association between IPV exposure and child nutrition status, we used a series of binary logistic regression models. A total of 2,965 children, ages 6 to 59 months, born to women between the ages of 15 and 49 were studied.

Results

This study found that approximately 36%, 33.8%, and 14.6% of women in partnerships experienced physical, emotional, and sexual IPV, respectively. The prevalence of stunting among their children was 31.4%, and 7% were underweight. The crude analysis showed that women's experiences of sexual (OR = 1.63, 95%CI = 1.19–2.25) and emotional (OR = 1.29, 95%CI = 1.01–1.65) IPV were associated with an increased likelihood of their children being stunted, while only sexual IPV was associated with underweight (OR = 1.77, 95%CI = 1.05–2.99). Even after controlling for birth outcome variables, the association between sexual IPV, and stunting (OR = 1.55, 95%CI = 1.06–2.28) and underweight (OR = 1.99, 95%CI = 1.13–3.56) remained significant. In the full model, after controlling for sociodemographic factors and birth outcome variables, sexual IPV was found to be associated with an increased risk of child stunting (OR = 1.39, 95%CI = 1.03–2.17) but not significantly associated with underweight.

Conclusion

Women's experience of intimate partner violence is associated with an increased likelihood of their children's malnutrition status. Therefore, prospective interventions should suppress violence against women to reduce the burden of IPV and childhood malnutrition.

Introduction

The World Health Organization (WHO) defines intimate partner violence (IPV) as any behavior by a current or past male intimate partner during marriage, cohabitation, or any other formal or informal

relationship that results in physical, sexual, or psychological harm [1]. IPV is the most prevalent type of violence against women and the third leading cause of mortality for people between the ages of 15 and 44 [2]. Its detrimental effects on women's health are severe enough to be acknowledged as a public health emergency with wide-ranging societal implications [3].

According to global estimates of IPV perpetrated by men against women, 30% of all women in partnership have been the victims of physical or sexual violence by an intimate partner at some point during their lifetime [1]. Research suggests that low-income and more gender-segregated settings may have higher rates of IPV against women [1], [4].

Among low-income nations, Sub-Saharan African countries have some of the highest prevalence of women experiencing IPV in their lifetime [5]. This is because of widespread acceptance of violence in society and individuals have low socioeconomic status [6], with a prevalence rate of 41.3% overall, higher than the global average [7]. The Democratic Republic of the Congo has recorded the highest prevalence of IPV against women among Sub-Saharan African countries (47%), followed by Equatorial Guinea (46%), Uganda (45%), and Liberia (43%) [8].

IPV has both short- and long-term effects on women's physical and mental health and can sometimes affect the children of women who have experienced such violence. As a result, women's history of violence is a risk factor for many diseases and conditions in their children. IPV has major negative consequences for women and children, including alcohol and drug abuse, eating and sleep disorders, physical inactivity, low self-esteem, post-traumatic stress disorder, smoking, self-harm, poor care and dietary practices for children [6], [9]. According to different studies, growing up in a home with violence puts children on the trajectory of either becoming victims or perpetrators of domestic violence [10]. There is also evidence linking women's lifetime IPV exposure to their children's nutritional indicators, though the relationship has been inconsistent and varies depending on the context [11]. In India, maternal exposure to multiple incidences of physical family violence in previous years was linked to all measures of malnutrition, including stunting, wasting, and underweight in children aged 12–35 months [12]. In Bangladesh, women with a lifetime history of physical and sexual IPV were more likely to have a stunted child [13]. Although biomedical and socioeconomic risk factors for malnutrition in Rwanda are well understood [14]–[16], the role of psychosocial factors in child malnutrition is less understood. IPV is a psychosocial factor that needs to be explored more for its detrimental effect on child development, specifically on nutritional indicators such as stunting, underweight, and wasting.

Childhood undernutrition is extremely common in low- and middle-income countries [17]. According to recent estimates, approximately 149 million under-five children are stunted, more than 49 million are wasted, and more than 40 million are overweight globally. Africa and Asia account for the majority of the world's malnutrition, with 94% stunting, 96% wasting, and 71% overweight [17], [18]. Despite substantial socio-economic progress and a decade of interventions aimed at improving children's health status [14], the prevalence of child malnutrition remains high. According to the most recent Rwanda Demographic

and Health Survey (RDHS 2019/2020), 33% of Rwandan children aged 6–59 months are stunted, 1% are wasted, 8% are underweight, and 6% are overweight [19].

Despite the global prevalence of child malnutrition and IPV remaining high, no study has been conducted to investigate the association between the two in Rwanda. As a result, the current study used data from the RDHS 2019/2020 to estimate the prevalence of IPV and its association with children's malnutritional status.

Method And Sampling

In this sample, secondary data from the 2019-20 Rwanda Demographic Health Survey (RDHS 2019-20) was used. RDHS 2019-20 was conducted from November 9, 2019, to July 20, 2020, by the National Institute of Statistics of Rwanda (NISR), using a stratified two-stage cluster design. The first stage involved selecting sample points (clusters) made up of enumeration areas (EAs) delineated for the 2012 Rwanda Population and Housing Census. A total of 500 clusters were selected, with 112 in urban and 388 in rural areas. The second stage involved systematic sampling of households. Each sample point selected 26 households, for a total sample size of 13,000 households. The study only included under-five children born to women simultaneously in a union (married or living with a partner), aged 15–49 years, during the five years preceding to the survey. Following adherence to the inclusion criteria, the study included a total of 2,965 children.

Nutrition Status

The nutritional status of children was determined using anthropometric measurements such as height, weight, and age. Three indices were identified using these measures, including stunting (low height for age), wasting (low weight for height), and underweight (low weight for age). Stunting is a symptom of chronic malnutrition, indicating a failure to receive adequate nutrition over an extended period of time; wasting is a symptom of acute malnutrition and represents a failure to receive adequate nutrition in a short period; and underweight is a composite index that reflects both acute (wasting) and chronic (stunting) malnutrition [20]. Children whose height-for-age, weight-for-height, and weight-for-age Z-scores were below minus two standard deviations (-2 SD) from the median of the reference population were considered stunted, wasted, or underweight respectively. These three variables were then dichotomized into two categories: yes and no.

Intimate Partner Violence

Intimate partner violence was assessed based on a series of binary questions asked to women in partnership, measuring whether they experienced physical, sexual, or emotional violence. Physical violence related questions included: "has your husband/partner ever (1) pushed, shook, or thrown something at you; (2) slapped you; (3) twisted your arm or pulled your hair; (4) punched you with his fist

or with something that could hurt you; (5) kicked, dragged, or beaten you up; (6) tried to choke or burn you on purpose; or (7) threatened or attacked with a knife, gun, or any other weapon?" Sexual violence was assessed using the following questions: "has your husband/partner ever physically forced you to have sexual intercourse with him when you did not want to?; has your husband/partner ever physically forced you to perform any other sexual acts you did not want to? Or force you to perform sexual acts you did not want to with threats or in any other way?" To assess emotional violence, women were also asked if their husband/ partners have ever said or done something to humiliate them in front of others, threaten to hurt or harm them or someone close to them, insult them, or make them feel bad about themselves. Based on this information, three binary variables were developed to assess IPV against women: physical IPV, sexual IPV, and emotional IPV. Women who had previously experienced IPV were coded "1," while those who had never experienced IPV were coded "0."

Social Demographic Characteristics

Several socio-demographic variables, including the number of under-five-year-old children, household size, region, place of residence, wealth index, religion, age, education, and occupation status of both the mother and father/partner, were included as potential confounding variables. This study also included maternity care and birth outcomes (birth size and birth weight) as potential mediating factors. Maternal care service utilization is divided into three categories: antenatal care (ANC), delivery care, and postnatal care (PNC).

Statistical analysis

Data was analyzed descriptively using frequencies and percentages, to better understand the characteristics of child malnutrition indicators, intimate partner violence (IPV), and the social demographics of participants. The prevalence of children's nutritional indicators (stunting, underweight, and wasting) was estimated using a bivariate percentage distribution, and the differences were tested using Pearson's chi-square statistic. Moreover, for each nutritional indicator, a series of binary logistic regression models were used to examine the relationship between IPV experience and children's nutritional status. The crude association between the IPV and each nutritional outcome was estimated in the first model. In the second model, mediating factors were adjusted. Finally, mediating factors and sociodemographic characteristics were adjusted to estimate the effects of IPV on the child's malnutrition status. The estimated odds ratio (OR) with a 95% confidence interval (CI) was used to represent the regression results. For regression analyses, the significance level was set at $p < 0.05$. The Statistical Package for Social Science was used for all analyses (IBM SPSS Statistics 25).

Results

Of the total children included in this study, 51.3% were male and 48.7% were female. Almost half (48.5%) of these children were 24–59 months of age. Only 5.7% of the children had low weight, and 4.9% had a

home delivery. Regarding place of residence, the majority of children resided in rural areas (78.7%). 11.3% and 13% of children's mothers and fathers were illiterate, respectively. As for geographical location, 11.1% of children lived in Kigali city, 16.4% in the Northern Province and the remaining three provinces (East, West, and South) were almost equally distributed (24.5%, 24.2% and 23.8% respectively). Furthermore, the majority of children were from the poorest household wealth quintile (23.6%) (Table 1).

Table 1
Descriptive statistics of children under 5 years

Social demographic characteristics	Percent	%
Sex of child (N = 2295)		
Male	1178	51.3
Female	1117	48.7
Child's age in months (n = 2965)		
< 6 months	368	12.4
6–23 months	1159	39.1
24–59 months	1438	48.5
Number of under 5 children (n = 2965)		
1–2	2779	93.7
3–4	177	6.0
Above 4	9	0.3
Number of household members (n = 2965)		
1–3	527	17.8
4–6	1787	60.3
7 and above	651	22.0
Mother's age (n = 2965)		
15–19	62	2.1
20–29	1072	36.2
30–39	1411	47.6
40–49	420	14.2
Father's age(n = 2411)		
19–29	439	18.2
30–39	1193	49.5
40–49	604	25.1
50 and above	175	7.3
Region(n = 2965)		

Social demographic characteristics	Percent	%
Sex of child (N = 2295)		
Kigali	329	11.1
South	706	23.8
West	718	24.2
North	487	16.4
East	725	24.5
Residence (n = 2965)		
Urban	631	21.3
Rural	2334	78.7
Mother's education(n = 2965)		
No education	334	11.3
Primary	1939	65.4
Secondary	552	18.6
Higher	140	4.7
Father's education (n = 2400)		
No education	313	13.0
Primary	1617	67.4
Secondary	329	13.7
Higher	141	5.9
Religion (n = 2965)		
No religion	39	1.3
Catholic	1047	35.3
Protestant	1406	47.4
Adventist	383	12.9
Muslim	65	2.2
Jehovah witness	18	0.6
Other	7	0.2
Wealth Index(n = 2965)		

Social demographic characteristics	Percent	%
Sex of child (N = 2295)		
Poorest	699	23.6
Poorer	590	19.9
Middle	570	19.2
Richer	560	18.9
Richest	546	18.4
Mother's occupation(n = 2960)		
Not working for the last 12 months	503	17.0
Working in last 12 months	2457	83.0
Father's occupation(n = 2385)		
Not working for the last 12 months	153	6.4
Working in the last 12 months	2232	93.6
number of antenatal visits during pregnancy (2965)		
< 4 visits	1585	53.5
4 visits and above	1379	46.5
baby postnatal check within 2 months(N = 2965)		
No	2429	81.9
Yes	536	18.1
Place of birth(N = 2920)		
Home	144	4.9
Institution	2776	95.1
Size of child at birth(N = 2949)		
Very large	161	5.5
Larger than average	718	24.3
Average	1566	53.1
Smaller than average	441	15.0
Very small	63	2.1
Weight at birth(N = 2823)		

Social demographic characteristics	Percent	%
Sex of child (N = 2295)		
> 2.5	162	5.7
2.5 and above	2661	94.3

Prevalence Of Intimate Partner Violence And Child Malnutrition Diseases

Of the total sample, 31.4% of children were stunted, and 7% were underweight (Fig. 1). With respect to IPV, 36%, 33.8%, and 14.6% of the mothers of the sampled children experienced physical, emotional, and sexual violence from their partner or husband, respectively (Fig. 2).

Child Nutritional Status By Predictors

Table 2 shows that the prevalence of stunting and underweight was higher in children whose mothers experienced sexual or emotional violence than in children whose mothers did not ($p < 0.005$). Children with smaller sizes and lower weights (less than 2.5 kg) at birth were more likely to be stunted or underweight ($p < 0.001$). Similarly, a significantly higher prevalence of stunting was found among children born at home compared to those born at in hospitals. The prevalence of stunting and underweight was found to be decreasing with the increase in both father's and mother's education level. Furthermore, the incidence of being stunted or underweight decreases with the increase in household wealth quintiles. Children residing in rural areas had a higher prevalence of stunting and underweight than those from urban areas. Moreover, the prevalence of stunting was higher among older children than among young children.

Table 2

Socio demographic characteristics and children malnutritional status by children age under 5 years, selected from Rwanda DHS 2019-20

Social demographic characteristics		Stunting		Underweight	
		Not stunted	Stunted	Not underweight	Underweight
Number of under 5 years children	P-value	0.765		0.699	
1–2		1904(68.5)	875(31.5)	2583(93.0)	195(7.0)
3–4		124(70.1)	53(29.9)	163(92.6)	13(7.4)
Above 4		7(77.8)	2(22.2)	9(100.0)	0(0.0)
Number of household members	P-value	0.586		0.028	
1–3		364(69.1)	163(30.9)	492(93.4)	35(6.6)
4–6		1235(69.1)	552(30.9)	1673(93.7)	112(6.3)
7 and above		436(67.0)	215(33.0)	590(90.6)	61(9.4)
Mother's age	P-value	0.066		0.079	
15–19		50(80.6)	12(19.4)	59(95.2)	3(4.8)
20–29		751(70.1)	321(29.9)	1006(93.9)	65(6.1)
30–39		958(67.9)	453(32.1)	1311(93.0)	99(7.0)
40–49		276(65.7)	144(34.3)	379(90.2)	41(9.8)
Father's age	P-value	0.650		0.015	
19–29		301(68.6)	138(31.4)	415(94.5)	24(5.5)
30–39		848(71.1)	345(28.9)	1122(94.1)	70(5.9)
40–49		430(71.2)	174(28.8)	554(91.9)	49(8.1)
50 and above		119(68.0)	56(32.0)	155(88.6)	20(11.4)
Region	P-value	P < 0.001		0.013	
Kigali		269(81.8)	60(18.2)	315(95.7)	14(4.3)
South		489(69.3)	217(30.7)	638(90.5)	67(9.5)
West		455(63.4)	263(36.6)	676(94.3)	41(32.0)

Social demographic characteristics	Stunting		Underweight		
		Not stunted	Stunted	Not underweight	Underweight
Number of under 5 years children	P-value	0.765		0.699	
North		305(62.6)	182(37.4)	455(93.4)	32(6.6)
East		517(71.3)	208(28.7)	671(92.6)	54(7.4)
Residence	P-value	P < 0.001		P < 0.001	
Urban		514(81.5)	117(18.5)	609(96.5)	22(3.5)
Rural		1521(65.2)	813(34.8)	2146(92.0)	186(8.0)
Father's education	P-value	P < 0.001		P < 0.001	
No education		196(62.6)	117(37.4)	276(88.2)	37(11.8)
Primary		1108(68.5)	509(31.5)	1507(93.3)	108(6.7)
Secondary		256(77.8)	73(22.2)	313(95.1)	16(4.9)
Higher		130(92.2)	11(7.8)	139(98.6)	2(1.4)
Religion	P-value	0.020		0.100	
No religion		18(46.2)	21(53.8)	32(82.1)	7(17.9)
Catholic		711(67.9)	336(32.1)	969(92.7)	76(7.3)
Protestant		975(69.3)	431(30.7)	1318(93.7)	88(6.3)
Adventist		261(68.1)	122(31.9)	354(92.4)	29(7.6)
Muslim		48(73.8)	17(26.2)	58(89.2)	7(10.8)
Other		6(85.7)	1(14.3)	7(100.0)	0(0.0)
Jehovah witness		16(88.9)	2(11.1)	17(94.4)	1(5.6)
Wealth index	P-value	P < 0.001		P < 0.001	
Poorest		383(54.8)	316(45.2)	627(89.7)	72(10.3)
Poorer		365(61.9)	225(38.1)	532(90.2)	58(9.8)
Middle		386(67.7)	184(32.3)	534(94.0)	34(6.0)
Richer		411(73.4)	149(26.6)	525(93.8)	35(6.3)

Social demographic characteristics	Stunting		Underweight		
	P-value	Not stunted	Stunted	Not underweight	Underweight
Number of under 5 years children	P-value	0.765		0.699	
Richest		490(89.7)	56(10.3)	537(98.4)	9(1.6)
Mother's occupation	P-value	0.002		0.375	
Not working for the last 12 months		375(74.6)	128(25.4)	463(92.0)	40(8.0)
Working in last 12 months		1656(67.4)	801(32.6)	2287(93.2)	168(6.8)
Father's occupation		0.482		0.127	
Not working for the last 12 months		104(68.0)	49(32.0)	138(90.2)	15(9.8)
Working in last 12 months		1577(70.7)	655(29.3)	2083(93.4)	147(6.6)
Mother's education	P-value	P < 0.001		P < 0.001	
No education		188(56.3)	146(43.7)	302(90.4)	32(9.6)
Primary		1292(66.6)	647(33.4)	1785(92.2)	152(7.8)
Secondary		423(76.6)	129(23.4)	529(95.8)	23(4.2)
Higher		132(94.3)	8(5.7)	139(99.3)	1(0.7)
Person child lives with	P-value	0.926		0.497	
Mother		1378(68.0)	647(32.0)	1879(92.9)	144(7.1)
Someone else		119(68.4)	55(31.6)	164(94.3)	10(5.7)
Father drink alcohol	P-value	0.066		0.619	
No		355(72.3)	136(27.7)	458(93.5)	32(6.5)
Yes		530(67.4)	256(32.6)	728(92.7)	57(7.3)
Sex of child	P-value	0.297		0.973	
Male		786(66.7)	392(33.3)	1092(92.8)	85(7.2)
Female		768(68.8)	349(31.2)	1035(92.7)	81(7.3)

Social demographic characteristics		Stunting		Underweight	
		Not stunted	Stunted	Not underweight	Underweight
Number of under 5 years children	P-value	0.765		0.699	
Experienced any emotional violence partner	P-value	0.044		0.498	
No		602(71.2)	244(28.8)	788(93.4)	56(6.6)
Yes		283(65.7)	148(34.3)	398(92.3)	33(7.7)
Experienced any physical violence by partner	P-value	0.081		0.653	
No		580(71.0)	237(29.0)	761(93.3)	55(6.7)
Yes		305(66.3)	155(33.7)	425(92.6)	34(7.4)
Experienced any sexual violence by partner	P-value	0.003		0.031	
No		773(70.9)	317(29.1)	1019(93.7)	69(6.3)
Yes		112(59.9)	75(40.1)	167(89.3)	20(10.7)
Baby postnatal check within 2 months	P-value	0.767		0.761	
No		1670(68.8)	759(31.2)	2255(92.9)	172(7.1)
Yes		365(68.1)	171(31.9)	500(93.3)	36(6.7)
Place of birth	P-value	P < 0.001		0.316	
Home		77(53.5)	67(46.5)	131(91.0)	13(9.0)
Institution/hospital		1930(69.5)	846(30.5)	2584(93.2)	190(6.8)
Size of child at birth	P-value	P < 0.001		P < 0.001	
Very large		126(78.3)	35(21.7)	155(96.3)	6(3.7)
Larger than average		552(76.9)	166(23.1)	691(96.2)	27(3.8)
Average		1075(68.6)	491(31.4)	1475(94.2)	91(5.8)
Smaller than average		242(54.9)	199(45.1)	373(84.8)	67(15.2)
Very small		29(46.0)	34(54.0)	46(74.2)	16(25.8)

Social demographic characteristics		Stunting		Underweight	
		Not stunted	Stunted	Not underweight	Underweight
Number of under 5 years children	P-value	0.765		0.699	
Weight at birth	P-value	P < 0.001		P < 0.001	
> 2.5		75(46.3)	87(53.7)	124(77.0)	37(23.0)
2.5 and above		1877(70.5)	784(29.5)	2499(93.9)	161(6.1)
Child's age in months		p < 0.001		0.073	
< 6 months		307(83.4)	61(16.6)	349(95.4)	17(4.6)
6–23 months		802(69.2)	357(30.0)	1082(93.4)	77(6.6)
24–59 months		926(64.4)	512(35.6)	1324(92.1)	114(7.9)

Association Between Women's Experiences With Intimate Partner Violence And Stunting Of Their Children

In the first model, the crude analysis reveals that children whose mothers experienced sexual IPV were more likely to be stunted compared to children whose mothers did not (OR = 1.63, 95% CI = 1.19–2.25); similarly, the likelihood of stunting was higher among children whose mothers experienced emotional IPV than those who did not encounter it (OR = 1.29, 95% CI = 1.01–1.65). After variables such as child place of birth, size, and weight at birth were controlled in the second model, sexual IPV remained significantly associated with child stunting (OR = 1.55, 95% CI = 1.06–2.28). Even after including social demographic factors in the full model, this sexual IPV remained significantly associated with child stunting (OR = 1.39, 95% CI = 1.03–2.17) (Table 3).

Table 3
Binary logistic regression analysis for assessing the association between intimate partner violence and stunting of children

Variables	Model 1	Model 2	Model 3
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Experienced Emotional IPV			
No	ref	ref	ref
Yes	1.29(1.01–1.65) *	1.17(0.83–1.66)	1.2(0.81–1.77)
Experienced Sexual IPV			
No	ref	ref	ref
Yes	1.63(1.19–2.25) *	1.55(1.06–2.28) *	1.39(1.03–2.17) *
Place of Birth			
Home		1.0(0.42–2.38)	0.76(0.28–2.03)
Institution		ref	Ref
Size of Child at Birth			
Very Large		0.32(0.11–0.92) *	0.47(0.15–1.50)
Larger Than Average		0.27(0.11–0.68) *	0.36(0.13–0.98) *
Average		0.45(0.21–1.20)	0.59(0.23–1.55)
Smaller Than Average		0.88(0.37–2.08)	0.88(0.35–2.25)
Very Small		ref	ref
Weight at Birth			
> 2.5		2.08(1.16–3.73) *	2.72(1.44–5.13) *
2.5 And above		ref	ref
Mother's Age			
15–19			0.34(0.67–1.76)
20–29			0.67(0.49–1.09)
30–39			0.90(0.58–1.41)
40–49			Ref
Residence			
Urban			0.91(0.57–1.45)

Variables	Model 1	Model 2	Model 3
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Rural			Ref
Father's Education			
No Education			1.80(0.585–5.55)
Primary			1.75(0.609–5.01)
Secondary			1.65(0.55–4.94)
Higher			Ref
Wealth Index			
Poorest			5.01(2.56–9.78) *
Poorer			3.55(1.81–6.96) *
Middle			3.31(1.69–6.46) *
Richer			2.23(1.19–4.19) *
Richest			Ref
Mother's Occupation			
Not Working			Ref
Working			0.93(0.617-1.40)
Father Drinks Alcohol			
No			Ref
Yes			1.41(0.77–1.42)
Region			
Kigali			1.20(0.64–2.26)
South			0.86(0.56–1.31)
West			1.45(0.97–2.18)
North			1.26(0.81–1.99)
East			Ref
Ref.: Reference category			
*p < 0.05			

In this study, other different variables were also found to be significantly associated with child nutritional status. Children born with lower weights (less than 2.5kg) were more likely to be stunted (OR = 2.72, 95% CI = 1.44–5.13), and children from the poorest wealth quintile were all associated with greater odds of stunting (OR = 5.01, 95% CI = 2.56–9.78). Additionally, size and weight at birth remained significant in the full model (Table 3).

Association Between Women's Experiences With Intimate Partner Violence And Underweight Of Their Children

In the first model, children whose mothers experienced sexual intimate partner violence were also more likely to be underweight versus children from mothers who didn't face sexual IPV (OR = 1.77, 95%CI = 1.05–2.99). The association between sexual IPV and underweight remained significant after controlling variables like size of children and weight at birth. In the full model, sexual IPV was not associated with underweight (Table 4).

Table 4
Binary logistic regression analysis for assessing the association between intimate partner violence and underweight of children

Variables	Model 1	Model 2	Model 3
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Experienced sexual IPV			
No	ref	ref	ref
Yes	1.77(1.05–2.99) *	1.99(1.13–3.56) *	1.47(0.68–3.19)
size of child at birth			
very large		0.23(0.56–0.92) *	0.33(0.64–1.71)
larger than average		0.09(0.26–0.30) *	0.16(0.42–0.62) *
average		0.20(0.07–0.57) *	0.32(0.990–1.05)
smaller than average		0.58(0.23–1.48)	0.77(0.26–2.26)
very small		ref	ref
weight at birth			
> 2.5		2.42(1.17–4.99) *	3.75(1.65–8.53) *
2.5 and above		ref	ref
Number of under 5 children			
1–2			0.45(0.15–1.17)
3–4			0.68(0.35–1.35)
Above 4			Ref
Mother's age			
15–19			0.24(0.12–0.35)
20–29			0.38(0.16–0.93) *
30–39			0.75(0.37–1.50)
40–49			Ref
Region			
kigali			1.91(0.65–5.65)
south			1.36(0.65–2.85)
west			1.19(0.57–2.49)

Variables	Model 1	Model 2	Model 3
	OR (95% CI)	OR (95% CI)	OR (95% CI)
north			0.78(0.32–1.90)
east			Ref
Residence			
urban			0.54(0.20–1.44)
rural			Ref
Wealth Index			
poorest			5.57(1.05–29.39) *
poorer			7.30(1.39–38.38) *
middle			4.39(0.83–23.29)
richer			5.74(1.18–27.93) *
richest			Ref
Mother's occupation			
Not working			Ref
Working			0.71(0.32–1.59)
Father drinks alcohol			
No			Ref
Yes			0.92(0.57–1.58)
Ref.: Reference category			

Although most of the variables used were not statistically significant in our model, two variables were significantly associated with lower odds of a child being underweight: children born from mothers aged between 20 and 29 years (OR = 0.38, 95% CI = 0.16–0.93) and children whose birth size was larger than the average (OR = 0.16, 95% CI = 0.04–0.62). On the other hand, children from the poorest households (OR = 5.57, 95% CI = 1.05–29.38) and children born with less than 2.5kg (OR = 3.75, 95% CI = 1.65–8.53) were also associated with increased odds of being underweight (Table 4).

Discussion

This study used data from the 2019/20 Rwanda Demographic and Health Survey (RDHS 2019/20) to investigate the relationship between a mother's exposure to IPV and her child's nutritional outcomes in Rwanda.

According to the current study, the majority of the children's mothers (36%) experienced physical IPV, followed by emotional IPV (33.8%) and sexual IPV (14.6%). In total, nearly half of the women (46%) had at least one form of IPV in their lifetime. Similar findings that corroborate the current study were reported in a recent study conducted in Rwanda [21]. Earlier studies in Rwanda found slightly higher rates of IPV among women. For example, 56% of women experienced at least one form of IPV in 2010 [22]. In the study setting, we believe patriarchy, social and cultural gender norms, power dynamics, and hierarchical constructions of masculinity and womanliness are the driving forces behind IPV [11]. Moreover, the COVID-19 pandemic has played a role in increasing IPV prevalence [23]. Others believe that the increase in IPV among women could have been due to greater empowerment and government policies toward gender equality that made women feel confident enough to report IPV [21], [24], [25]. Such research evidence imposes the necessity of continued effort to assess the predictive effect of IPV exposure in Rwanda on factors like nutritional status that are understudied compared to other parts of the world.

The prevalence of malnutrition among children appears to be high in Rwanda, despite a growing economy. The tendency of families from the lowest wealth quintile to have the highest percentage of households with more than five members may be one contributing factor [16]. The study findings showed that children from families in the poorest wealth quintile were at higher risks of developing malnutrition than children from the richest wealth quintile, which is consistent with the findings of prior studies [16]. Others suppose that the increase in child malnutrition, particularly stunting, among children under 5 years old in Rwanda could be caused in part by inappropriate food supplementation during the weaning stage, when infants switch from exclusive breastfeeding to eating supplementary meals in their diet [15], [26], [27].

We found that women exposed to sexual IPV were more likely to have children with stunting, which is in agreement with previous studies [13], [28]. It is conceivable that IPV may have a detrimental effect on a mother's ability to care for her child in general as well as her mental health and treatment-seeking behaviors when her child is ill or malnourished [28]. Since mothers are typically the ones who look after young children, their physical and mental wellbeing is crucial to the health and happiness of their children. According to McCaw and colleagues (2007), women who experience violence frequently exhibit high levels of controlling behaviors in their marriages as well as poorer levels of autonomy, self-esteem, and functional capacity [29]. Additionally, when a mother's mental and physical health are compromised, she has limited decision-making power and may be less able to provide for the physical and emotional needs of her child [13]. Researchers have indicated a link between parental involvement in harmful and unhelpful parenting activities with their own children and parental experiences of IPV [30], [31].

The study also found that birth outcomes influence children's nutritional status. The findings indicated that children whose birth weight were less than 2.5 kg and had a small birth size were more likely to suffer from malnutrition. This finding is consistent with previous studies conducted in Rwanda [16], India [17], [32], Ethiopia [33], [34] and Bangladesh [32].

In line with several studies [16]–[18], [32], our study reveals that some socio-demographic factors, such as the wealth index and the mother's age, were associated with child nutritional status. Although the majority of the socio-demographic variables were not statistically significant in the multivariable model, a bivariate analysis revealed an association between several socio-demographic variables (including women's education, age, region, place of residence, and occupation) and IPV, which is supported by numerous studies [17], [35]. More research is needed to better understand the link between wealth, education, empowerment, and child malnutrition.

Conclusion

In Rwanda, child malnutrition remains a major public health issue. According to the findings of this study, 31.4 percent of under-five year old children were stunted, while 7 percent were underweight. Our research also found that children whose mothers experienced sexual or emotional violence were more likely to develop malnutrition outcomes. Small birth weight and birth size were also found to increase the risk of malnutrition. Furthermore, both the education and wealth index of mothers in bivariate analysis were found to be associated with child nutritional status; however, in multivariable analysis, the relationship between the mother's education and IPV was no longer significant. The current study recommends focusing on effective interventions to prevent violence against women, which would alleviate the burden of childhood malnutrition. To fight against the incidence of childhood malnutrition, policy initiatives should be put in place to improve women's education and expand their employment opportunities.

Strengths And Limitations

The study's large sample size and use of nationally representative data increase its external validity. However, the limitations of the study also have to be taken into account when interpreting the findings. We cannot infer causal relationships from the observed outcomes due to the methodology of the study. In addition, the factors employed in this analysis were limited to those that could be found in the DHS dataset and were not all-inclusive.

Declarations

Ethics declarations

Ethics approval and consent to participate

The Institutional Review Board of ICF International and the National Ethics Committee of Rwanda examined and gave their approval to this study, which was a secondary analysis of publicly accessible data from the Demographic Health Survey (DHS) (<https://microdata.statistics.gov.rw/index.php/catalog>). We were permitted to utilize this data for this analysis by the National Institute of Statistics of Rwanda (NISR). The procedures used in this study were made in accordance with the principles of ethical standards according to the Declaration of Helsinki.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the study are available from the corresponding author on reasonable request.

Competing interests

There is no conflict of interest, according to the authors' declaration

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Authors' contributions

JI and CB conceived and designed the study; they had full access to the RDHS dataset. JI, JN and CB conducted the data analyses and contributed to the data interpretation. JI, NJ, CB, PM, SSG and PU contributed to the drafting of the manuscript, and provided critical review of the manuscript content. VS provided a full supervision, including study conception, design, manuscript writing and submission. The final manuscript was read and approved by all authors.

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References

1. C. Bahati, J. Izabayo, J. Niyonsenga, V. Sezibera, and L. Mutesa, "Intimate partner violence as a predictor of antenatal care services utilization in Rwanda," *BMC Pregnancy and Childbirth*, vol. 21, no. 1, pp. 1–12, 2021, doi: 10.1186/s12884-021-04230-5.
2. D. E. Antai and J. B. Antai, "Attitudes of women toward intimate partner violence: a study of rural women in Nigeria.," *Rural and remote health*, vol. 8, no. 3, p. 996, 2008, doi: 10.22605/rrh996.
3. L. Bacchus, G. Mezey, and S. Bewley, "Domestic violence: Prevalence in pregnant women and associations with physical and psychological health," *European Journal of Obstetrics and Gynecology and Reproductive Biology*, vol. 113, no. 1, pp. 6–11, 2004, doi: 10.1016/S0301-2115(03)00326-9.
4. L. Okenwa-Emegwa, S. Lawoko, and B. Jansson, "Attitudes Toward Physical Intimate Partner Violence Against Women in Nigeria," *SAGE Open*, vol. 6, no. 4, 2016, doi:

10.1177/2158244016667993.

5. B. O. Ahinkorah, K. S. Dickson, and A. A. Seidu, "Women decision-making capacity and intimate partner violence among women in sub-Saharan Africa," *Archives of Public Health*, vol. 76, no. 1, pp. 1–10, 2018, doi: 10.1186/s13690-018-0253-9.
6. S. A. Kebede, A. B. Weldesenbet, and B. S. Tusa, "Magnitude and determinants of intimate partner violence against women in East Africa: multilevel analysis of recent demographic and health survey," *BMC Women's Health*, pp. 1–8, 2022, doi: 10.1186/s12905-022-01656-7.
7. WHO, "Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence," 2013.
8. World Health Organisation, "Violence against women prevalence estimates, 2018 – WHO European Region," 2018.
9. J. C. Campbell, "Health consequences of intimate partner violence," *Lancet*, vol. 359, no. 9314, pp. 1331–1336, 2002, doi: 10.1016/S0140-6736(02)08336-8.
10. E. S. Owusu Adjah and I. Agbemaflle, "Determinants of domestic violence against women in Ghana," *BMC public health*, vol. 16, p. 368, 2016, doi: 10.1186/s12889-016-3041-x.
11. A.-N. Issah, D. Yeboah, M. R. Kpordoxah, M. Boah, and A. B. Mahama, "Association between exposure to intimate partner violence and the nutritional status of women and children in Nigeria," *Plos One*, vol. 17, no. 5, p. e0268462, 2022, doi: 10.1371/journal.pone.0268462.
12. L. K. Ackerson and S. V. Subramanian, "Domestic violence and chronic malnutrition among women and children in India," *American Journal of Epidemiology*, vol. 167, no. 10, pp. 1188–1196, 2008, doi: 10.1093/aje/kwn049.
13. S. Ziaei, R. T. Naved, and E. C. Ekström, "Women's exposure to intimate partner violence and child malnutrition: Findings from demographic and health surveys in Bangladesh," *Maternal and Child Nutrition*, vol. 10, no. 3, pp. 347–359, 2012, doi: 10.1111/j.1740-8709.2012.00432.x.
14. RNSA, "Rwanda Nutrition Situation Analysis and Policy Implications," *TF0A4965ASARwandaNutritionSituationAnalysisNovember212018FIN*, 2018.
15. A. Nshimiyiryo *et al.*, "Risk factors for stunting among children under five years: A cross-sectional population-based study in Rwanda using the 2015 Demographic and Health Survey," *BMC Public Health*, vol. 19, no. 1, pp. 1–10, 2019, doi: 10.1186/s12889-019-6504-z.
16. A. Binagwaho *et al.*, "Trends in burden and risk factors associated with childhood stunting in Rwanda from 2000 to 2015: Policy and program implications," *BMC Public Health*, vol. 20, no. 1, pp. 1–9, 2020, doi: 10.1186/s12889-020-8164-4.
17. D. Mondal and P. Paul, "Association between intimate partner violence and child nutrition in India: Findings from recent National Family Health Survey," *Children and Youth Services Review*, vol. 119, no. September, p. 105493, 2020, doi: 10.1016/j.chilyouth.2020.105493.
18. D. M. Alice, B. E. Gustave, M. Habtu, H. Alphonse, and R. Erigene, "Prevalence and Factors Associated with Under Nutrition among Children Aged 6 to 59 Months in Ngoma District, Rwanda," vol. 3, no. 4, p. 14, 2021, doi: 10.14302/issn.2641-4538.jphi-21-3859.

19. National Institute of Statistics of Rwanda, *Rwanda Demographic and Health Survey 2019-20 Final Report*. 2021.
20. National Institute of Statistics of Rwanda and Rwanda Ministry of Health, *Rwanda Demographic Health Survey, 2019-20*. 2021.
21. C. Bahati, J. Izabayo, P. Munezero, J. Niyonsenga, and L. Mutesa, "Trends and correlates of intimate partner violence (IPV) victimization in Rwanda: results from the 2015 and 2020 Rwanda Demographic Health Survey (RDHS 2015 and 2020)," *BMC Womens Health*, vol. 22, no. 1, p. 368, 2022, doi: 10.1186/s12905-022-01951-3.
22. D. R. Thomson, A. B. Bah, W. G. Rubanzana, and L. Mutesa, "Correlates of intimate partner violence against women during a time of rapid social transition in Rwanda: Analysis of the 2005 and 2010 demographic and health surveys," *BMC Women's Health*, vol. 15, no. 1, pp. 1–13, 2015, doi: 10.1186/s12905-015-0257-3.
23. K. Joseph, I. Nicole, M. Leon, and S. Vincent, "Impact of COVID-19 on Mental Health in Rwanda," *Public Health Bul*, vol. 2, no. 3, pp. 7–12, 2020.
24. M. P. Atkinson, T. N. Greenstein, and M. M. Lang, "For women, breadwinning can be dangerous: Gendered resource theory and wife abuse," *Journal of Marriage and Family*, vol. 67, no. 5, pp. 1137–1148, 2005, doi: 10.1111/j.1741-3737.2005.00206.x.
25. S. R. Schuler, R. Lenzi, S. H. Badal, and L. M. Bates, "Women's Empowerment as a Protective Factor Against Intimate Partner Violence in Bangladesh: A Qualitative Exploration of the Process and Limitations of Its Influence," *Violence Against Women*, vol. 23, no. 9, pp. 1100–1121, 2017, doi: 10.1177/1077801216654576.
26. N.J. SM. Goudet, PL. Griffiths, and B. BA. Madise, "Nutritional interventions for preventing stunting in children (0 to 5 years) living in urban slums in low and middle-income countries (LMIC) (Protocol)," *Cochrane Library*, no. 5, pp. 1–44, 2015, doi: 10.1002/14651858.CD011695.www.cochranelibrary.com.
27. S. Shamim, F. Naz, S. W. Jamalvi, and S. S. Ali, "Effect of weaning period on nutritional status of children," *Journal of the College of Physicians and Surgeons*, vol. 16, no. 8, pp. 529–31, 2006.
28. E. Rico, B. Fenn, T. Abramsky, and C. Watts, "Associations between maternal experiences of intimate partner violence and child nutrition and mortality: Findings from demographic and health surveys in Egypt, Honduras, Kenya, Malawi and Rwanda," *Journal of Epidemiology and Community Health*, vol. 65, no. 4, pp. 360–367, 2011, doi: 10.1136/jech.2008.081810.
29. B. McCaw, J. Golding, M. Farley, and J. R. Minkoff, "Domestic Violence and Abuse, Health Status, and Social Functioning," *Women and Health*, vol. 45, no. 2, pp. 1–23, 2007, doi: 10.1300/J013v45n02_01.
30. A. A. Levendosky and S. A. Graham-Bermann, "Parenting in battered women: The effects of domestic violence on women and their children," *Journal of Family Violence*, vol. 16, no. 2, pp. 171–192, 2001, doi: 10.1023/A:1011111003373.

31. B. J. Zvara *et al.*, "Intimate Partner Violence, Parenting, and Children's Representations of Caregivers," *Journal of Interpersonal Violence*, vol. 36, no. 21–22, pp. NP11756–NP11779, 2021, doi: 10.1177/0886260519888527.
32. M. S. Rahman, T. Howlader, M. S. Masud, and M. L. Rahman, "Association of low-birth weight with malnutrition in children under five years in Bangladesh: Do mother's education, socio-economic status, and birth interval matter?," *PLoS ONE*, vol. 11, no. 6, pp. 1–16, 2016, doi: 10.1371/journal.pone.0157814.
33. A. Santosa, E. N. Arif, and D. A. Ghoni, "Effect of maternal and child factors on stunting: partial least squares structural equation modeling," *Clinical and Experimental Pediatrics*, vol. 65, no. 2, pp. 90–97, 2022, doi: 10.3345/cep.2021.00094.
34. Z. B. Dessie, M. Fentie, Z. Abebe, T. A. Ayele, and K. F. Muchie, "Maternal characteristics and nutritional status among 6–59 months of children in Ethiopia: further analysis of demographic and health survey," *BMC Pediatrics*, 2019, doi: 10.1186/s12887-019-1459-x.
35. A. Hannan and K. S. Ongechi, "The Association Between Women ' s Empowerment and Child Nutrition in Bangladesh," *Social Sciences*, vol. 5, no. 10, 2016.

Figures

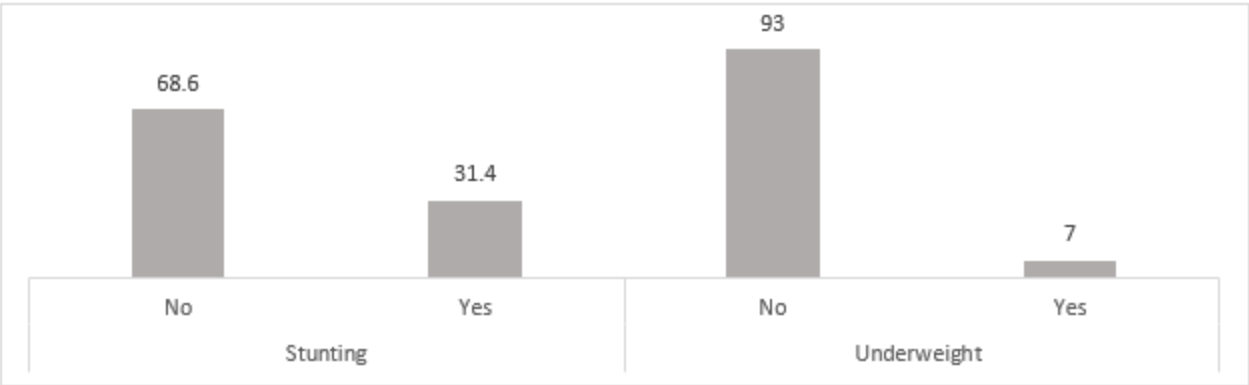


Figure 1

Prevalence of stunting and underweight in children aged under 5 years



Figure 2

Prevalence of different forms of intimate partner violence experienced in the past year among women in partnership.