

# Intimate Partner Violence as a Predictor of Antenatal Care Services Utilization in Rwanda

Claire Bahati (✉ [cbahati12@gmail.com](mailto:cbahati12@gmail.com))

University of Rwanda

Josias Izabayo

University of Rwanda

Japhet Niyonsenga

University of Rwanda

Vincent Sezibera

University of Rwanda

Léon Mutesa

University of Rwanda

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## Research Article

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# Abstract

**Background:** Although compelling evidence shows that the experience of intimate partner violence (IPV) during pregnancy is detrimental to both physical and mental health of the victims and their offspring, studies on negative impact of IPV on antenatal care (ANC) services utilization are scarce.

**Methods:** The aim of the current study was to determine the impact of IPV exposure on ANC services utilization indicators such as (i) initiation of care within the first three months of pregnancy, (ii) receipt of at least four ANC visits and (iii) receipt of care from skilled providers among reproductive age women in Rwanda. This study used the data from the 2014-15 Rwanda Demographic and Health Survey. Multiple logistic regression was used to estimate the effects of physical and sexual IPV on the antenatal care (ANC) services utilization indicators.

**Results:** Among married women living with their partners with at least one child aged 5 years or under (N=5116), 17% of them reported physical violence, 22.8% reported psychological violence and 9.2% reported sexual violence. We found that there was a significant negative relationship between physical IPV and both early ANC and sufficient ANC. Women who had experienced physical violence by their partners during the preceding 12 months were less likely to receive more than four ANC visits, (O.R) = 0.6151 confidence interval (CI) [0.417-0.908] and they were less likely to attend the first ANC visits within the first three months (O.R) = 0.656 confidence interval (CI) = [0.445-0.967].

**Conclusion:** In this study, the prevalence of IPV is still high and there is evidence that it does have significant impact on ANC. Therefore, the results provide support for continued efforts to reduce intimate partner violence, through the improvement of screening for IPV during ANC visits.

## Background

Intimate partner violence (IPV) refers to behavior within an intimate relationship that causes physical, psychological or sexual harm to those in relationship [1], directed mainly at women because of their perceived subordinate status in the society [2]. Intimate partner violence is a global public health issue that affects about one third of women globally [3]. Global estimates of intimate partner violence perpetuated by men against women indicate that 30% of every partnered women worldwide have experienced physical and/or sexual violence by an intimate partner at some point in their lifetime [4]. The evidence shows that the overall prevalence rate of IPV during pregnancy in developed countries ranges between 10% and 20% [5]. African countries have some of the highest rates of IPV during pregnancy; Gambia with 61%, 34% for Zimbabwe, and 25% for Ethiopia [5] while in Kenya, it is estimated that 38% women suffer from IPV in their lifetime [4]. In Rwanda, a survey conducted in 2010 revealed that more than 50% of female respondents reported having experienced IPV, while 38% of male respondents had perpetrated IPV [6, 7].

Violence against women was a central concern in this regard, and early studies on the relationship between violence against women and reproductive health in developing countries led to a greater

understanding of the problem and its related adverse health outcomes [6]. Outcomes of IPV for pregnant women include miscarriage, HIV infection, stress, depression, pre-term delivery, abortion, stillbirth and their babies are more likely to experience low birth weight, illness, malnutrition and mortality [4, 9].

Women who experience IPV have myriad needs of services from different sectors, including antenatal care service which is one of the best approaches of preventing poor pregnancy outcomes [1]. It was found that optimal ANC includes initiating care within the first three months of pregnancy, receiving at least four ANC visits and receiving care from skilled providers [7]. ANC provides an opportunity to inform and educate pregnant women on important health issues including health promotion activities, screening and diagnosis [8]. It is also an important platform to communicate with support women, families and communities at a critical time in women's life [9]. Thus, ANC is an essential component of birth preparedness complications readiness matrix. There has been an increase in the use of ANC services among pregnant women in low- and middle-income countries (LMICs) since 2002, but the evidence suggest that there is still a need to improve the quality of care that is given in ANC clinics and delivery [8].

According to the Demographic and Health Survey (DHS, 2014–2015) report, overall, four in ten women aged from 15 to 49 years reported exposure to “emotional, physical or sexual violence” from people in intimate relationship. Sexual violence committed by husband or partner was very common standing at thirty four percent and 20% of women aged 15–49 reported having exposed to sexual violence in their entire life. Evidence shows that women with at least 5 offspring are more likely to be exposed to physical violence (46%) than women with no children (23%) [10]. Mothers normally receive ANC services from health centers and district hospitals. Although severe cases are referred to the national referral hospitals, district hospitals have equipment and capacity to provide services related to ANC. [9]. Authors have indicated that ninety nine percent of Rwandan women received ANC from skillful health care providers (doctor, nurse, medical assistant, and midwife) [13], but the frequency of visits was lower than the standard set by World Health Organization (WHO) and the Rwandan Ministry of Health. In fact, only forty four percent of mothers had at least 4 ANC visits. This proportion represents an increase from thirteen percent in 2005 and thirty five percent in 2010. Fifty six percent of women went to their first ANC visit during the 1st trimester of pregnancy, as recommended by WHO [10].

Previous studies have documented the prevalence and correlates of IPV in large parts of the world based on population, prevalence, and association of IPV with reproductive health issues [2]. IPV studies in developing countries mainly relied on data from their nationally representative Demographic and Health Surveys (DHS) [11]. Despite a pool of literature on the association of IPV exposure with low ANC services utilization in high income countries [7] and few countries in developing [2] [12] [16], there is a dearth of studies on the specific IPV exposure associated with reduced ANC services utilization especially in post-genocide countries. Furthermore, some authors have shown an interesting contrast in terms of ANC services utilization, in which Egyptian women who had experienced IPV were found to be more likely receiving at least four ANC visits [7]. Therefore, the primary goal of the current study was to analyze the impacts of three specific IPV: physical IPV, emotional and sexual IPV over ANC services utilization in Rwanda as post-genocide countries. We hypothesized associations of exposure to emotional, physical

and/or sexual IPV with ANC visits initiation within the first three months of pregnancy, reception of at least four ANC visits, and reception of care from skilled providers.

## **Materials And Methods**

### **Data source and sampling**

Secondary data from the 2014-15 Rwanda Demographic Health Survey (RDHS 2014-15) were used. The survey was conducted by the National Institute of Statistics of Rwanda (NISR) from November 9, 2014 to April 8, 2015, using a stratified two stage cluster design. The first stage involved selecting sample point (clusters) consisting of enumeration areas (EAs) delineated for the 2012 Rwanda Population and Housing Census. A total of 492 clusters were selected, 113 and 379 in urban and rural areas respectively. At the second stage, a sample of households was drawn in each EA using a systematic sampling. Within each sample point 26 households were selected, for a total sample of 12,792 households. A 13,564 women age 15-49 years were eligible to complete the questionnaire. Of 13,497 women aged 15-49 years who had completed the questionnaire during the survey, only 5,116 women met the inclusion criteria for this study giving a response rate of 37.71%. The participants were eligible if they were married, living together with her husband/partner and had at least one child aged 0-5 years.

## **Measures**

### **Antenatal care service utilization**

ANC service utilization was measured using three indicators: early ANC, sufficient ANC and skilled ANC providers. The early ANC is dichotomized into receiving early ANC services and delaying ANC services where ANC is considered to be early if a woman receives ANC visits within the first three months of pregnancy. Sufficient ANC is also evaluated as a dichotomized variable: receiving a sufficient ANC and receiving insufficient ANC where ANC is considered to be sufficient if a woman attended at least four ANC visits. Moreover, ANC providers were dichotomized into unskilled ANC providers (community health workers) and skilled providers (i.e. doctor, nurse, medical assistant and midwife).

### **Intimate Partner Violence**

IPV was measured as exposure to physical, sexual or emotional violence. In the 2014 -15 DHS, data on IPV was created by providing binary choices, “yes” or “no”. In this study, physical violence was assessed by the following 7 questions: 1.did your husband/partner ever kick you, beat you, drag you?, 2. Did your husband/partner ever slap you? 3. Did your husband/partner ever twist your arm or pull your hair?, 4. Did your husband/partner ever push you, or throw something at you?, 5. Did your husband/partner ever punch

you with his fist or with something that could hurt you? 6. Did your husband/partner ever threaten or attack you with knife, gun or another weapon? and 7. did your husband/partner ever try to choke you or burn you intentionally?

On the other hand, sexual violence was assessed by the following 4 questions 1. Did your husband/partner ever physically forced you into unwanted sex? 2. Did your husband/partner ever force you into other unwanted sexual acts? 3. and 4. did your husband/partner ever physically force you to perform sexual acts when you didn't want to? While the emotional violence was assessed by the following 2 questions: 1. Have you ever been insulted or made to feel bad by our partner/husband? 2. Have you ever been humiliated by your partner/husband or have you ever been threatened with harm by your partner/husband?

## Sociodemographic questionnaire

This questionnaire assessed both husband's and women's age and education level, women's literacy (illiterate versus literate), types of residence, religion and women's occupation status. We also asked about mass media exposure, sterilization and wealth index.

## Statistical analysis

Data were analyzed quantitatively using frequencies and percentages to describe the characteristics of ANC indicators, IPV and socio demographic factors (e.g., education, residence, religion, occupation status, mass media exposure, province, age, parity and household size). For bivariate analysis, chi-square test was utilized to examine the association in ANC services utilization indicators and forms of IPV via socio-demographic factors. In multivariate analysis, multiple logistic regression was used to examine whether emotional, physical or sexual IPV were associated with early ANC initiation, sufficient ANC and skilled ANC providers, after controlling for covariate factors. All measures were presented as odd ratios (ORs) with their 95% confidence intervals. All analyses were performed using the Statistical Package of Social Science (IBM SPSS statistics 25).

## Results

The majority of sampled women were in rural areas (78.4%) and had a primary education level (70.9%) comparable to their husband's primary educational level (70.4%). The sample was comprised largely of literate women (77.1%) and nearly all (99.5%) had a religion. Most of the sampled women were exposed to at least one type of mass media (86.4%) [Table 1]. About Residences, 24.4% of participants come from East, 24.1% in West, 23.8% in South whereas, 15.8% come from North and the remaining 11.9% come from Kigali City. The mean parity was 4.46, with an average age of 31.59 years old [Table 1]. In the view of the IPV exposure, the majority experienced emotional (22.8%), 18.7% of all participants experienced

physical violence while 8% reported experiencing sexual violence. The mean number of household size was 5.15 [Figure 1: Forms of intimate partner violence (%)].

**Table 1: Distribution of variables considered in the analysis of relationship between IPV and ANC service utilization.**

<b>Variables</b>	<b>Frequency</b>	<b>Percent</b>
<b>Women's education</b>		
No education	785	15.4
Primary	3628	70.9
Secondary	542	10.6
Higher	161	3.1
<b>Husband's education</b>		
No education	830	16.3
Primary	3597	70.4
Secondary	467	9.1
Higher	212	4.1
<b>Women's literacy</b>		
Not able to read at all	1168	22.9
Able to read a part/whole sentence	3938	77.1
<b>Type of place of residence</b>		
Urban	1105	21.6
Rural	4011	78.4
<b>Women's religion</b>		
No religion or other	24	0.5
Has a religion	5085	99.5
<b>Women's occupation</b>		
Not working/ don't work	305	6
Working	4811	94
<b>Exposure to mass media</b>		
No type of mass media	698	13.6
One type of mass media	2179	42.6
Two types of mass media	1432	28
Three types of mass media	780	15.2
<b>Province</b>		

Kigali city	608	11.9
South	1218	23.8
West	1232	24.1
North	810	15.8
East	1248	24.4
Women's age (Mean)	31.59	
Husband's age (Mean)	36	
Wealth index (mean)	2.96	
Parity (Mean)	4.45	
Household's size (Mean)	5.15	
<b>N=5116</b>		

In the current sample, the majority received ANC from skilled providers (97.01%), 58.7% received early ANC and less than a half received at least four ANC visits during their most recent pregnancy (45.8%) [Figure 2: Antenatal care service utilization indicators (%)].

In model adjusting, we found a significant relationship between physical IPV and early ANC utilization and sufficient number of ANC visits. There was no significant relationship between skilled ANC providers and IPV. While sexual IPV were not significant in all the three models, women who had experienced physical violence by their partners during the preceding 12 months were less likely to receive more than four ANC visits, (O.R) = 0.6151 confidence interval (CI) [0.417–0.908] and they were less likely to attend the initial ANC visits within the first three months (O.R) = 0.656 confidence interval (CI)=[ 0.445–0.967] [Table 2].

**Table 2: Adjusted odds ratios (aOR) and 95% confidence intervals (CIs) for associations between intimate partner violence (IPV) and antenatal care (ANC) among married women living together with partners with at least one child aged 5 years or younger, selected from Rwanda DHS 2014-15.**

Variables	Early ANC	Sufficient ANC	Skilled ANC providers
	OR(95% CI)	OR(95% CI)	OR(95% CI)
<b>Ever experienced emotional violence</b>	0.921(0.639-1.326)	0.970(0.678-1.393)	1.087(0.337-3.503)
<b>ever experienced sexual violence</b>	1.059(0.646-1.736)	0.910(0.567-1.526)	3.741(0.440-31.820))
<b>ever experienced physical violence</b>	0.656(0.445-0.967)*	0.6151(0.417-0.908)*	0.392(0.120-1.283)
<b>Women's educational level</b>			
no education	0.336(0.078-1.458)	0.335(0.091-1.230)	na
Primary	0.364(0.092-1.458)	0.351(0.105-1.169)	na
Secondary	0.565(0.149-2.150)	0.369(0.116-1.173)	na
Higher	Na	na	na
<b>partner's education level</b>			
no education	0.517(0.174-1.539)	0.789(0.296-2.099)	1.515(0.095-24.043)
Primary	0.611(0.215-1.734)	0.904(0.359-2.278)	1.0576(0.088-12.656)
Secondary	0.997(0.341-2.915)	0.839(0.327-2.150)	1.104(0.085-14.322)
Higher	Na	na	na
<b>women's literacy</b>	0.915(0.593-1.413)	0.958(0.626-1.464)	0.223(0.020-2.497)
<b>urban residence</b>	0.921(0.626-1.1357)	0.912(0.628-1.324)	0.652(0.229-1.854)
<b>women's occupation</b>	0.991(0.567-1.731)	1.391(0.809-2.392)	0.763(0.158-3.683)
<b>Province</b>			
Kigali city	0.486(0.291-0.810)*	1.262(0.769-2.073)	1.330(0.211-8.385)
South	1.207(0.834-1.746)	2.354(1.639-3.382)*	1.0459(0.249)
West	0.903(0.632-	1.475(1.039-	0.151(0.048-

	1.290)	2.094)*	0.479)*
North	1.077(0.721-1.610)	1.626(1.101-2.400)*	2.570(0.277-23.872)
East	Na	na	na
<b>mass media exposure</b>			
no type	1.562(0.931-2.620)	1.145(0.695-1.888)	na
one type	1.036(0.682-1.571)	1.107(0.739-1.660)	0.904(0.267-3.066)
two types	1.184(0.769-1.822)	1.123(0.741-1.702)	1.348(0.372-4.887)
three types	Na	na	na
<b>Parity</b>	Na	na	na
<b>Religion</b>	Na	na	na
<b>women's age</b>	1.002(0.971-1.035)	1.001(0.971-1.034)	0.910(0.820-1.009)
<b>Partner's age</b>	0.981(0.962-1.002)	0.984(0.964-1.004)	1.022(0.949-1.101)
<b>wealth index</b>	1.055(0.938-1.187)	1.033(0.920-1.159)	0.756(0.523-1.092)
<b>household size</b>	0.869(0.789-0.960)*	0.935(0.849-1.029)	1.498(1.064-2.105)*

**Source:** Table prepared by the author based on the analyses.

Models were adjusted for women's age, husband's age, women's education, husband's education, women's literacy, area of residence, religion, women's occupation, wealth index, household size, parity, women's mass media exposure and province.

\* Pvalue < 0.05 na: not available

Although, most of the covariates used are not statistically significant in our model [Table 2], according to our bivariate analysis [Table 3], covariates like: women's and husband's educational level, wealth index, mass media exposure and types of residence were significantly associated with IPV [Table4].

**Table 3: Socio demographic characteristics and antenatal care service utilization by married women living with partner and had at least one aged 5years or under, selected from Rwanda DHS 2014-15.**

	Early ANC		Sufficient ANC		Skilled ANC providers	
	Yes	No	Yes	No	Yes	No
Characteristics	n (%)	n (%)	n (%)	n (%)	n(%)	n(%)
<b>women's education</b>						
No education	324(12.2)	329(17.2)	256(12.10)	406(16.3)	644(14.4)	8(7.8)
primary	1875(70.5)	1411(73.6)	1500(71.1)	1803(72.2)	3196(71.5)	83(81.4)
secondary	346(13)	152(7.9)	246(11.7)	254(10.2)	488(10.9)	10(9.8)
higher	116(4.4)	26(1.4)	109(5.2)	34(1.4)	140(3.1)	1(1.0)
P value	<b>0.00*</b>		<b>0.00*</b>		<b>0.113</b>	
<b>husband's education</b>						
No education	362(13.6)	350(18.3)	293(13.9)	423(17)	13(12.7)	699(15.7)
primary	1874(70.6)	1378(72.0)	1489(70.7)	1786(71.6)	76(74.5)	3168(71.1)
secondary	267(10.1)	147(7.7)	201(9.5)	214(8.6)	10(9.8)	403(9.0)
higher	152(5.7)	39(2.0)	122(5.8)	70(2.8)	3(2.9)	188(4.2)
P value	<b>0.00*</b>		<b>0.00*</b>		<b>0.848</b>	
<b>Women's literacy</b>						
Not able to read at all	548(20.6)	454(23.8)	435(20.7)	579(23.2)	983(21)	16(15.7)
Able to read	2110(79.4)	1457(76.2)	1671(79.3)	1913(76.8)	86(84.3)	86(84.3)
P value	<b>0.011*</b>		<b>0.036*</b>		<b>0.124</b>	
<b>Type of place of residence</b>						
urban	596(22.4)	382(19.9)	468(22.2)	518(20.7)	955(21.4)	21(20.6)
rural	2065(77.6)	1536(80.1)	1643(77.8)	1979(79.3)	3513(78.6)	81(79.4)
P value	<b>0.043*</b>		<b>0.24</b>		<b>0.848</b>	
<b>Women's religion</b>						
no religion	8(0.3)	8(0.4)	13(0.5)	5(0.2)	16(0.4)	0(0.0)
Has religion	2651(99.7)	1907(99.5)	2481(99.5)	2104(99.8)	4447(99.6)	102(100)
P	<b>0.782</b>		<b>0.304</b>		<b>0.813</b>	

value						
<b>Women's occupation</b>						
not working/ don't work	126(6.6)	161(6.1)	120(5.7)	168(6.7)	5(4.9)	282(6.3)
working	1792(93.4)	2500(93.9)	1991(94.3)	2329(93.3)	97(95.1)	4186(93.7)
value	P	<b>0.475</b>	<b>0.145</b>	<b>0.562</b>		
<b>Province</b>						
Kigali city	279(10.5)	257(13.4)	223(10.6)	317(12.7)	526(11.8)	8(7.8)
South	677(25.4)	403(21)	572(27.1)	515(20.6)	1070(23.9)	9(8.8)
West	624(23.4)	495(25.8)	526(24.9)	604(24.2)	1049(23.5)	68(66.7)
North	445(16.7)	274(14.3)	351(16.6)	370(14.8)	711(15.9)	5(4.9)
East	636(23.9)	489(25.5)	439(20.8)	691(27.7)	1112(24.9)	12(11.8)
value	P	<b>0.00*</b>	<b>0.00*</b>	<b>0.00*</b>		
<b>Exposed to mass media</b>						
no type	350(13.2)	279(14.6)	271(12.9)	365(14.7)	616(13.9)	12(11.9)
one type	1139(43)	825(43.3)	899(42.7)	1078(43.5)	1911(43.0)	51(50.5)
two types	745(28.1)	524(27.5)	582(27.7)	690(27.8)	1237(27.8)	27(26.7)
three types	414(15.6)	279(14.6)	351(16.7)	348(14.0)	681(15.3)	11(10.9)
value	P	<b>0.471</b>	<b>0.043*</b>	<b>0.41</b>		
<b>women's age (Mean)</b>	30.29	31.79	30.59	31.2	30.92	30.8
value	P	<b>0.00*</b>	<b>0.199</b>	<b>0.885</b>		
<b>husband's age(Mean)</b>	34.48	36.32	34.78	35.67	35.27	34.17
value	P	<b>0.00*</b>	<b>0.063</b>	<b>0.971</b>		
<b>wealth index (mean)</b>	2.99	2.88	2.99	2.91	2.95	2.89
P value		<b>0.04*</b>	<b>0.437</b>	<b>0.183</b>		

<b>Parity</b> (Mean)	4.24	4.65	4.32	4.52	4.41	5
P value	<b>0.375</b>		<b>0.133</b>		<b>0.862</b>	
<b>Household's size</b> (Mean)	4.86	5.35	4.91	5.2	5.06	5.07
P value	<b>0.00*</b>		<b>0.00*</b>		<b>0.904</b>	
<b>Source:</b> Table prepared by the authors based on their analyses. * <b>P-value &lt; 0.05</b>						

**Table 4: Socio demographic characteristics and Intimate Partner Violence by married women living with partner and had at least one aged 5years or under, selected from Rwanda DHS 2014-15.**

	Any physical IPV		Any sexual IPV		Any emotional IPV	
	Yes	No	Yes	No	Yes	No
Characteristics	n (%)	n (%)	n (%)	n (%)	n(%)	n(%)
<b>women's education</b>						
No education	31(13.7)	147(14.9)	17(17.3)	161(14.3)	42(15.1)	135(14.3)
Primary	184(81.1)	714(72.2)	71(72.4)	833(74.1)	221(79.2)	685(72.5)
Secondary	10(4.4)	108(10.9)	8(8.2)	110(9.8)	14(5.0)	105(11.1)
Higher	2(0.9)	20(2.0)	2(2.0)	20(1.8)	2(0.7)	20(2.1)
P value	<b>0.009*</b>		<b>0.83</b>		<b>0.007*</b>	
<b>husband's education</b>						
No education	47(20.8)	147(14.9)	15(15.3)	180(16.1)	65(23.4)	130(13.8)
primary	167(73.9)	716(72.6)	75(76.5)	813(72.6)	195(70.1)	694(73.7)
Secondary	10(4.4)	88(8.9)	7(7.1)	92(8.2)	18(6.5)	81(8.6)
Higher	2(0.9)	35(3.5)	1(1.0)	35(3.1)	0(0.0)	37(3.9)
P value	<b>0.005*</b>		<b>0.741</b>		<b>0.00*</b>	
<b>Women's literacy</b>						
Not able to read at all	54(23.9)	225(22.8)	23(23.5)	256(22.9)	65(23.3)	214(22.7)
Able to read	172(76.1)	761(77.2)	75(76.5)	864(77.1)	214(76.7)	727(77.3)
P value	<b>0.729</b>		<b>0.89</b>		<b>0.846</b>	
<b>Type of place of residence</b>						
Urban	30(13.2)	201(20.3)	18(18.4)	215(19.1)	45(16.1)	189(20.0)
Rural	197(86.8)	788(79.7)	80(81.6)	909(80.9)	234(83.9)	756(80.0)
P value	<b>0.014*</b>		<b>0.854</b>		<b>0.149</b>	
<b>Women's religion</b>						
no religion	0(0.0)	2(0.2)	0(0)	2(0.2)	1(0.4)	1(0.1)
Has religion	227(100.0)	986(99.8)	98(100)	1121(99.8)	278(99.6)	943(99.9)

value	P	<b>0.708</b>		<b>0.877</b>		<b>0.566</b>
<b>Women's occupation</b>						
not working/ don't work		7(3.4)	68(6.7)	6(6.1)	68(6.0)	14(5.0) 61(6.5)
Working		200(96.6)	946(93.6)	92(93.9)	1056(92.0)	265(95.0) 884(93.5)
value	P	<b>0.24</b>		<b>0.977</b>		<b>0.397</b>
<b>Exposed to mass media</b>						
no type		45(19.9)	131(13.3)	19(19.6)	158(14.1)	49(17.7) 27(13.5)
one type		100(44.2)	442(45.0)	41(42.3)	502(44.9)	120(43.3) 425(45.2)
two types		53(23.5)	266(27.1)	26(26.8)	295(26.4)	75(27.1) 247(26.3)
three types		28(12.4)	144(14.6)	11(11.3)	163(14.6)	33(11.9) 41(15.0)
value	P	<b>0.007*</b>		<b>0.454</b>		<b>0.237</b>
women's age (Mean)		1.07		31.46	30.77	31.75 30.54
value	P	<b>0.961</b>		<b>0.709</b>		<b>0.004*</b>
husband's age(Mean)		35.01	35.04	35.57	34.99	36.66 34.56
value	P	<b>0.356</b>		<b>0.575</b>		<b>0.007*</b>
wealth index (mean)		2.55	3.01	2.76	2.94	2.68 2.99
value	P	<b>0.00*</b>		<b>0.465</b>		<b>0.022*</b>
Parity(Mean)		4.5	4.22	5	4.88	4.38 4.2
value	P	<b>0.786</b>		<b>0.103</b>		<b>0.146</b>
Household's size (Mean)		4.83	4.91	5.02	5.15	5.05 4.84
value	P	<b>0.802</b>		<b>0.819</b>		<b>0.712</b>
<b>Source:</b> Table prepared by the author based on their analyses. * Pvalue < 0.05						

## Discussion

To the best of our knowledge, this is the first study to investigate the relationship between IPV and ANC services utilization in Rwanda. As predicted, we found that there was a significant negative association of physical IPV with both early ANC and sufficient ANC. Regarding the ANC services utilization, the study found that 97.7% received ANC from skilled providers. Forty six percent received at least four ANC visits during pregnancy time and 58.1% received early ANC. The prevalence of attending at least four or more ANC visits appears to be lower in Rwanda than in some other East African countries. For example, a multicounty analysis of demographic and health surveys study has reported that 75.7% of women attending at least four or more ANC visits in Zimbabwe, approximately 60% were reported in Uganda, 57.6% in Kenya and nearly 56% in Zambia [13]

Reported exposures to emotional IPV (22.8%), to Physical IPV (18.7%) and to sexual IPV (8%) in this study appear to be lower than in similar studies. Several authors have found that physical IPV has been reported by 37% women in Kenya [14], in Uganda 41% reported physical IPV [15], 38% of Egyptian women [7], nearly 48% of women in Bangladeshi and 48.8% in Zambia [7]. A study in sub-Saharan Africa using DHS data reported women exposed to emotional IPV ranging from a low of 7% in Comoros and to a high of 40.1% in Cameroon. Similarly, ever-married women exposure to emotional IPV in Kenya reported 30% [14], while 40% and 23% of married women respectively reported emotional violence and sexual violence in Uganda [15]. Similarly, an analysis of ten countries using DHS data reports exposure to sexual IPV was ranging from 3 % in Moldova to 26 % in Bangladesh [7].

In bivariate analysis most of the socio-demographic characteristics were significant associated with early ANC or sufficient ANC. In consistent to our findings, Tufa et al. has showed that age of women and type of residence are associated with early antenatal care. In contrast, authors have found that there is no significant association between early ANC and women's education [16, 17]. Haddad have found an association between women's education and having a higher frequency (4+) of ANC visits. Although a study by Ahinkorah et al. did not use the recommended number of visits (at least four ANC visits), their findings showed that husband's education associate with the number of ANC visits received in line with this present study. Further study should consider other additional socio-demographic factors including women's knowledge and distance between home and health facility and Pregnancy planned and age at first visit.

Regarding bivariate analysis of the socio-demographic characteristics and types Intimate Partner Violence (IPV), most of the demographic factors were associated with physical IPV including women and husband's education, type of place of residence, exposure to mass media and wealth index. In congruence to our findings, several studies have found that woman and husband's education are associated with physical IPV [18, 19]. A study by Kuhlmann et al. also has shown that the type of place of residence and mass media exposure are associated with physical IPV [7]. Unexpectedly, all socio-demographic characteristics of women and their partners were not significantly associated with sexual IPV. Women and husband's education were significantly linked to emotional IPV. Inconsistently, age and

wealth index were significantly associated with emotional IPV[22] [20, 21]. Further analysis should also use additional socio-demographic factors like alcohol consumption, employment status of husband, greater food insecurity, husband having more than one wife. Concurrent with the present study, Hindin et al. found that physical IPV was significantly related to sufficient ANC and early ANC [23]. Also a study conducted by Leight and Wilson using Demographic and Health Survey data from 36 countries has found that physical IPV was significantly associated with the utilization of four or more ANC services [24]. Koski et al. also has indicated that women experienced physical intimate partner violence are less likely to initiate early ANC and less likely to receive four or more than four ANC visits consistent to our present study [25, 18].

Even though several studies have found a significant relationship between physical IPV and receiving skilled ANC providers [23, 18], our model that was adjusted for covariates failed to find a significant association between the two (physical IPV and receiving skilled ANC providers)

## **Limitations**

Although the DHS dataset is well documented, well known and tested for researchers, during the analysis, we found that some of the attributes were not there, we can say for example: the employment status of respondents which were also most of the important covariates. We were also limited to similar studies on IPV violence and ANC services utilization in Rwanda which has an effect on revealing the gap that exist in the literature review. Furthermore, most of the attributes had many missing values which can have a significant effect on the conclusion that can be drawn and can lead to biased results.

## **Conclusion**

The findings of the present study indicate a significant association between physical IPV and antenatal care services utilization indicators of early ANC and sufficient ANC. Emotional and sexual IPV were not significant after controlling for several socio-demographic characteristics (Women's educational level, partner's education level, women's literacy, residence, mass media exposure, religion, age, household size, wealth index and province), though most them were not statistically significant as well. Therefore, this analysis provides support for continue efforts to reduce intimate partner violence, through the improvement of screening for IPV.

## **Declarations**

### **Ethics approval and consent to participate**

The DHS data that were used in the analysis were secured, free and publicly accessible for the researchers. Procedures used and the standard DHS survey used for were reviewed and approved by the Rwanda National Ethics Committee, and the Institutional Review Board of ICF International. The Institutional Review Board of ICF ensures that the survey complies with the U.S Department of Health and

Human Services regulations for the protection of human subjects while the Host country IRB ensures that the survey complies with laws and norms of nation.

### **Consent for publication**

Not applicable

### **Availability of data and materials**

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

### **Competing interests**

The authors declare that there is no conflict of interest.

### **Funding**

Not applicable.

### **Authors' contributions**

CB, VS and LM conceived and designed the study. CB, JI, JN, VS and LM analyzed and interpreted the data. JI and JN wrote the manuscript, with critical input and comments from all other authors. VS and LM supervised the study. All authors read and approved the final version of the manuscript for submission.

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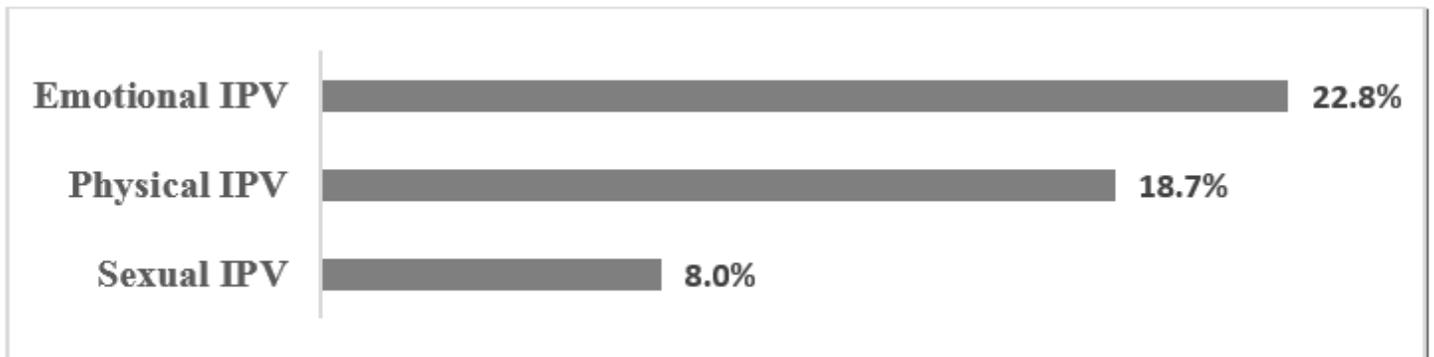
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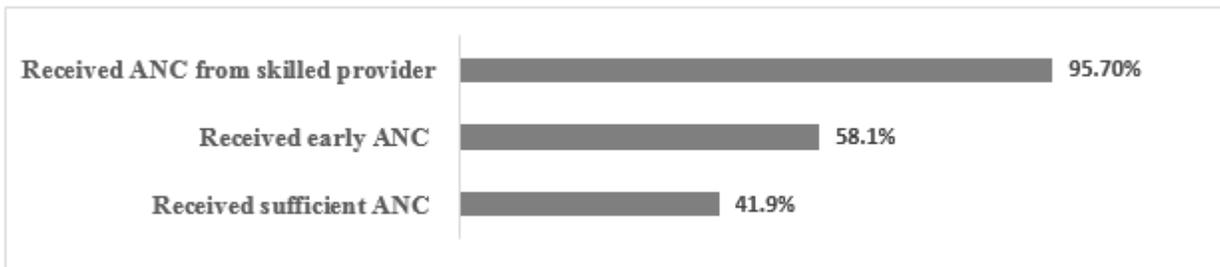
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## Figures



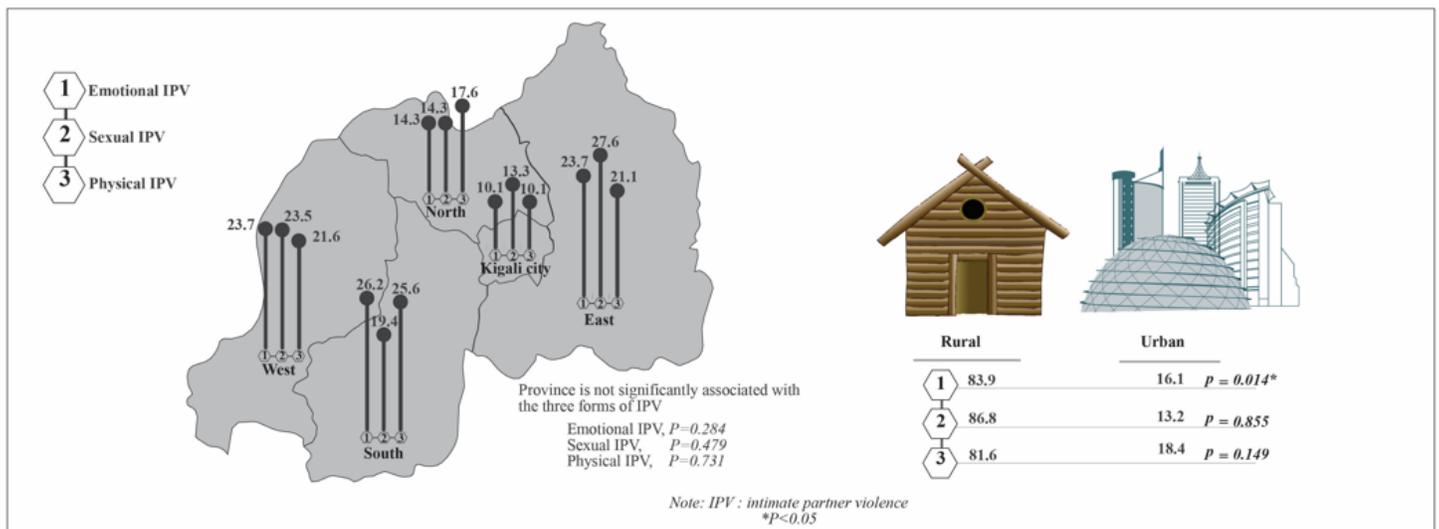
**Figure 1**

Forms of intimate partner violence (%)



**Figure 2**

Antenatal care service utilization indicators (%).



**Figure 3**

Intimate partner violence by province and area of residence (%). Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.