The association between intimate partner violence and cervical cancer screening among women of childbearing age in South Africa

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Background. Cervical cancer is a major global public health concern, particularly in South Africa (SA), where it is the second most prevalent cancer among women. This prevalence can be attributed to several factors including poor screening rates and the prevalence of HIV.
Objective. To examine the association between intimate partner violence (IPV) and cervical cancer screening (CCS) in SA, while considering the influence of other sociodemographic factors.
Methods. The study used cross-sectional data from the 2016 South Africa Demographic and Health Survey, focusing on women of childbearing age who underwent CCS. Bivariate analysis was conducted to investigate the relationship between CCS and each independent variable. A binary regression model was used to determine the association between intimate partner violence and CCS while controlling for other variables.
Results. The study found that 32% of women aged 15 to 49 years in SA had undergone CCS at least once in their lifetime. No significant association was established between IPV and CCS uptake (unadjusted odds ratio (uOR) 1.05, 95% CI 0.84 - 1.31; $p>0.05$ and adjusted odds ratio (aOR) 1.16, 95% CI 0.89 - 1.51; $p>0.05$). However, sociodemographic factors, including area of residence, age, education level, wealth, race and health insurance status, were significant predictors of CCS. Older women, those with higher education, wealthier individuals and those with health insurance were more likely to undergo screening.
Conclusion. In the present study, IPV was not a significant factor directly influencing CCS uptake. Instead, a complex interplay of sociodemographic factors was identified as predictors of CCS rates. These findings highlight the need for interventions that address the barriers to CCS, particularly in rural areas and among underprivileged and minority populations. Improving education, healthcare coverage and accessibility can potentially enhance screening rates and reduce the burden of cervical cancer in SA.

Keywords. cervical cancer screening; intimate partner violence; human papillomavirus, South Africa.

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Cervical cancer poses a significant health challenge in SA, being the second most common cancer among women, with a mortality rate marked by 5 406 deaths in 2015.[1,2] The prevalence of the disease is particularly alarming owing to the high incidence of HIV in the country, a predictor of cervical cancer.[3] Studies have revealed that the human papillomavirus (HPV), particularly types 16 and 18, is a leading cause of cervical cancer.[4,5] The national incidence rate of cervical cancer in SA ranges from 22.8 to 27 per 100 000 women, which is 42% higher than the global average of 15.8 per 100 000 women.[6] Additionally, an estimated 19 million females aged 15 and older are at risk of developing cervical cancer in SA.[7]

In parallel, intimate partner violence (IPV) constitutes a grave issue within the country, affecting 21% of women in intimate relationships.[8] Statistics indicate that 14% of married women in SA experienced physical abuse, and 4% have suffered sexual violence at the hands of their partners, though the actual numbers are presumed to be higher owing to underreporting. While these rates are lower than the sub-Saharan Africa (SSA) prevalence rate of 44% and 29.29% in southern Africa, they remain a significant concern in SA.[9,10] The reluctance of some women to report incidents of IPV for fear of victimisation amidst the sensitive nature of the issue, further complicates the situation. The intersection of IPV and health-seeking behaviour, particularly regarding cervical cancer screening (CCS), is especially concerning as IPV survivors may avoid medical services out of fear of further violence or abandonment. This avoidance can increase their risk of HPV infection and subsequently cervical cancer.[11,12] In light of the above, the present study aims to investigate the relationship

between IPV and CCS in SA, considering IPV as a potential factor influencing CCS rates. The study objectives include (1) ascertaining the levels of CCS in SA, (2) examining the association between IPV and CCS using bivariate statistics and (3) examining the relationship between IPV and CCS while controlling for other variables in an adjusted binary regression model.

Methods

Study design and setting

The study used cross-sectional data from the 2016 South Africa Demographic and Health Survey (SADHS), for which data access was approved. SA was selected as the setting of analysis because of its high rates of IPV and cervical cancer, which may indicate low CCS rates.

Study population and sample

The study population comprised 1 980 women aged 15 - 49 years who responded to a question about CCS. After excluding participants who responded 'I don't know', the final sample size was 1 975 women. The study applied weighting to the data to ensure national representativeness and address any imbalances in sample profiles after data collection.

Study variables

The outcome variable of the study is CCS, derived from responses of women aged 15 - 49 years who were asked if they had ever undergone CCS through a Pap smear exam. The survey collected these data using answers to the question, 'Have you ever had a Pap smear exam?'.

Table 1 shows the original variable name presented in the Demography and Health Survey (DHS) dataset, the original variable categorisation, definition and new categorisation used in the present study.

Independent variables

Several variables were used in this study. The mediating variable of the study is IPV, defined as women who have experienced severe physical violence, less severe physical violence, sexual violence or emotional violence by their husband or partner. It is categorised with the binary responses 'yes' or 'no'. Herein, the yes refers to women who have experienced one or more IPV types. The other variables included age, levels of education, province, area of residence, race, frequency of smoking cigarettes, HIV status, number of sexual partners over the last 12 months, wealth index, health insurance, marital status, current contraceptive use and sex of the household head.

Data analysis

First, descriptive statistics were performed to determine the levels of CCS in SA while also obtaining the distribution of the study sample concerning women's background characteristics. Second, an unadjusted binary regression model was employed to examine the CCS's association with IPV and other independent variables. This was done to identify the statistical relationship of interest without adjusting for other independent variables. Third, an adjusted binary regression model was employed to examine the association between IPV and CCS while adjusting for covariates. All analyses were conducted in Stata 14 (Stata Corp., USA). All 'I don't know' responses were excluded from the analysis. The IPV variable was developed by combining emotional, severe, less severe and sexual violence, categorising women who experienced any form of IPV under this variable.

Ethical considerations

The DHS programme granted permission to use the SADHS dataset. Ethical clearance was waived since the study used secondary data that had been anonymised. All ethical protocols were adhered to by the DHS before conducting fieldwork in SA.[13]

Results

Sample characteristics

Table 2 presents the characteristics of the study participants, which included 1 975 women. The majority of women (77%) reported not experiencing IPV, while 23% of women reported experiencing IPV from their husbands or partners. Regarding the area of residence, women from urban areas constituted the largest percentage of the sample at 57% (*n*=1124), while women from rural areas made up 43% (*n*=851). Women aged between 15 and 24 years constituted the largest group (33%, *n*=651), followed by those aged 25 - 34 (32%, *n*=633), then those aged 35 - 44 (24%, *n*=470) and women aged 45 - 49 (11%, *n*=221). Regarding the level of education, women without education and those who did not complete their education constituted the greatest percentage of participants at 62% (*n*=1215), followed by those with secondary education (26%, *n*=512). Women with tertiary education constituted 10% (*n*=189) of the sample, while women who reported having a primary education constituted the least at 3% (*n*=59).

Levels of CCS in SA

The study found that 32% of women aged between 15 and 49 years had undergone (CCS), while 68% did not screen for cervical cancer (Fig. 1). At the provincial level, only the Western Cape had over

Table 1. Definition and categorisation of dependent (outcome) variable

Variables	Original variable categories	Definition	Categorisation
Dependent (outcome) variable			
CCS	Yes	Screened for cervical cancer	Yes
s1407	No		No
	I don't know		

CCS = cervical cancer screening.

Table 2. Participant characteristics

Independent variables	*n* (%)
Mediating variable	
IPV	
Yes	448 (22.68)
No	1 527 (77.32)
Sociodemographic variables	
Area of residence	
Urban	1 124 (56.91)
Rural	851 (43.09)
Age	
15 - 24	651 (32.96)
25 - 34	633 (32.05)
35 - 44	470 (23.80)
45 - 49	221 (11.19)
Level of education	
No and incomplete education	1 215 (61.52)
Complete primary	59 (2.99)
Complete secondary	512 (25.92)
Tertiary	189 (9.57)
Wealth index	
Poorer and poorest	801 (40.56)
Middle	438 (22.18)
Richer and richest	736 (37.27)
Province	
Western Cape	131 (6.63)
Eastern Cape	218 (11.04)
Northern Cape	189 (9.57)
Free State	194 (9.82)
KwaZulu-Natal	331 (16.76)
North West	179 (9.06)
Gauteng	217 (10.99)
Mpumalanga	231 (11.70)
Limpopo	285 (14.43)
Racial group	
Black	1 725 (87.34)
Coloured	182 (9.22)
Other (White, Indian/Asian and other groups)	68 (3.44)
Sex of household head	
Male	804 (40.71)
Female	1 171 (59.29)
Health/risk factors	
HIV status	
Negative	1 615 (81.77)
Positive	360 (18.23)
Number of sexual partners in the last 12 months (incl. spouse)	
0	227 (11.49)
1	1 657 (83.90)
≥2	91 (4.61)
Frequency of cigarette smoking	
Non-smoker	1 824 (92.35)
Every day	115 (5.82)
Some days	36 (1.82)
Current contraceptive use	
Not using	925 (46.84)
Other modern methods	541 (27.39)
Injections	509 (25.77)
Health insurance	
Has health insurance	245 (12.41)
Does not have health insurance	1 730 (87.59)
Marriage	

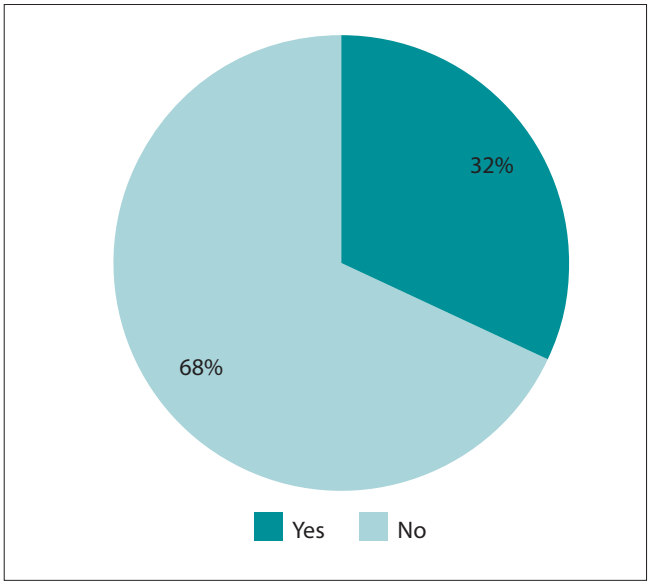

Fig. 1. National cervical cancer screening levels in SA.

50% of its female population in the study sample undergo CCS, with 59% of the study sample in that province being screened, as illustrated in Fig. 2. The other provinces had CCS levels of less than 36%, with the North West recording 35% and the Free State at 34% and KwaZulu-Natal showing the lowest level of CCS at 26% among women aged between 15 and 49 years.

Association between IPV and CCS

The results of the analysis examining the association between IPV and CCS among women aged between 15 and 49 years are shown in Table 3. Model 1 shows the outputs of the unadjusted binary regression, while Model 2 displays the outputs of the adjusted binary regression model. In both models, no statistically significant association was found between IPV and CCS among women in this age group in SA (unadjusted odds ratio (uOR) 1.05, 95% confidence interval (CI) 0.84 - 1.3; $p>0.05$ and adjusted odds ratio (aOR) 1.16, 95% CI 0.89 - 1.51; $p>0.05$). By area of residence, both models found that women who resided in rural areas were significantly less likely to undergo CCS compared with women from urban areas (uOR 0.56, 95% CI 0.46 - 0.69; $p<0.05$ and aOR 0.64; 95% CI 0.49 - 0.85; $p<0.05$).

Table 3. Bivariate and multivariate associations between predictor variables and CCS in South Africa

		Model 1			Model 2	
CCS	**uOR**	***p*-value**	**95% CI**	**aOR**	***p*-value**	**95% CI**
Mediating variable						
IPV						
No (RC)						
Yes	1.05	0.68	0.84 - 1.31	1.16	0.26	0.89 - 1.51
Sociodemographic variable						
Area of residence						
Urban (RC)						
Rural	0.56	0.00**	0.46 - 0.69	0.64	0.00**	0.49 - 0.85
Age						
15 - 24 (RC)						
25 - 34	5.93	0.00**	4.23 - 8.32	5.47	0.00**	3.83 - 7.80
35 - 44	14.28	0.00**	10.11 - 20.16	13.47	0.00**	9.31 - 19.48
45 - 49	16.98	0.00**	11.41 - 25.24	15.08	0.00**	9.86 - 23.06
Level of education						
None and incomplete education (RC)						
Primary	0.99	0.98	0.55 - 1.79	0.99	0.97	0.51 - 1.90
Secondary	1.46	0.00**	1.17 - 1.82	1.28	0.06	0.99 - 1.67
Tertiary	3.00	0.00**	2.20 - 4.10	2.32	0.00**	1.57 - 3.43
Wealth Index						
Poorer and poorest (RC)						
Middle	1.15	0.28	0.89 - 1.49	1.04	0.78	0.77 - 1.40
Richer and richest	1.62	0.00**	1.31 - 2.01	1.16	0.31	0.87 - 1.54
Province						
Western Cape (RC)						
Eastern Cape	0.32	0.00**	0.20 - 0.50	0.31	0.00**	0.17 - 0.56
Northern Cape	0.33	0.00**	0.21 - 0.52	0.31	0.00**	0.18 - 0.53
Free State	0.35	0.00**	0.22 - 0.56	0.34	0.00**	0.19 - 0.62
KwaZulu-Natal	0.24	0.00**	0.16 - 0.37	0.31	0.00**	0.17 - 0.55
North West	0.37	0.00**	0.23 - 0.59	0.44	0.01*	0.24 - 0.82
Gauteng	0.28	0.00**	0.18 - 0.44	0.23	0.00**	0.13 - 0.42
Mpumalanga	0.32	0.00**	0.21 - 0.51	0.39	0.00**	0.22 - 0.71
Limpopo	0.26	0.00**	0.16 - 0.39	0.35	0.00**	0.19 - 0.64
Racial group						
Black/African (RC)						
Coloured	1.85	0.00**	1.35 - 2.52	1.00	1.00	0.60 - 1.67
Other (White, Indian/Asian and other groups)	2.36	0.00**	1.45 - 3.83	1.01	0.97	0.55 - 1.87
Sex of household head						
Male (RC)						
Female	0.97	0.74	0.80 - 1.17	1.11	0.40	0.87 - 1.41
Health/risk factors						
HIV status						
Negative (RC)						
Positive	0.93	0.58	0.73 - 1.19	1.00	1.00	0.75 - 1.33
Sexual partners in the last 12 months (including spouse)						
0 (R.C)						
1	1.12	0.45	0.83 - 1.52	1.10	0.58	0.78 - 1.57
≥2	1.23	0.43	0.73 - 2.07	1.01	0.98	0.56 - 1.83
Frequency of cigarette smoking						
Non-smoker (RC)						
Every day	1.52	0.03*	1.04 - 2.24	0.96	0.87	0.59 - 1.57
Some days	1.10	0.78	0.55 - 2.22	1.18	0.68	0.54 - 2.59

(continued)

Table 3. (continued) Bivariate and multivariate associations between predictor variables and CCS in South Africa

	Model 1			Model 2		
CCS	uOR	*p*-value	95% CI	aOR	*p*-value	95% CI
Current contraceptive use						
Not using (RC)						
Pills	1.11	0.37	0.89 - 1.39	1.07	0.64	0.82 - 1.39
Injections	0.97	0.78	0.77 - 1.22	0.95	0.72	0.73 - 1.25
Health insurance						
Does not have health insurance (RC)						
Has health insurance	2.64	0.00**	2.01 - 3.46	1.39	0.06	0.98 - 1.98
Marriage						
Not married (RC)						
Married	2.80	0.00**	2.24 - 3.51	1.35	0.03*	1.03 - 1.79

*$p<0.05$
**$p<0.01$
CCS = cervical cancer screening; CI = confidence interval; RC = reference category; aOR = adjusted odds regression; uOR = unadjusted odds regression.

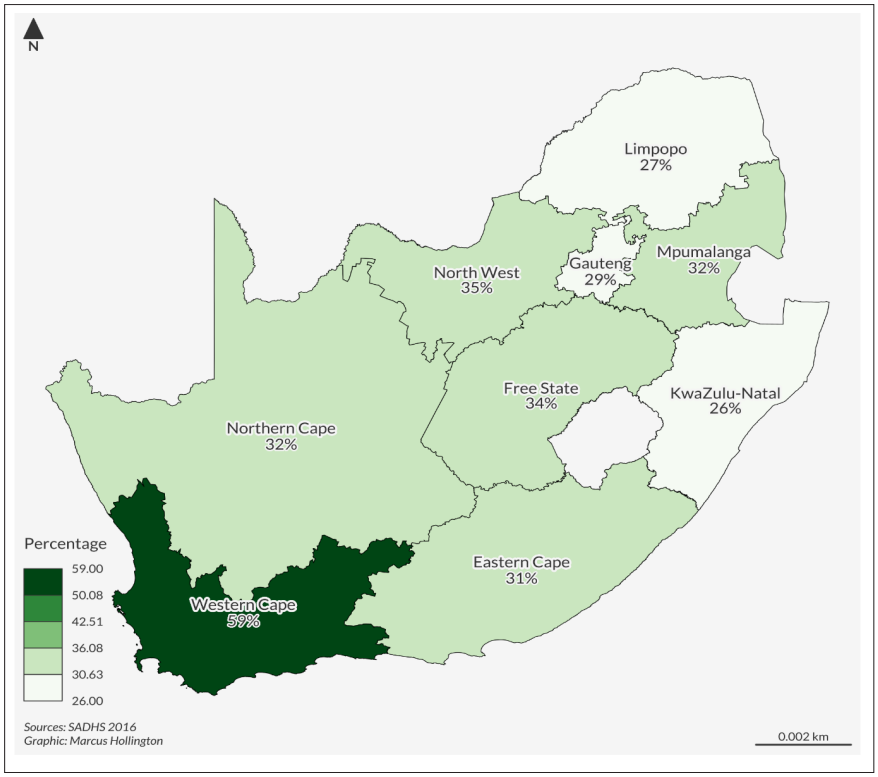

Fig. 2. Levels of cervical cancer screening by province among women aged 15 - 49 years in South Africa.

For age, both models found that women aged between 25 and 34 years were significantly more likely to undergo CCS compared with women aged 15 - 24 years (uOR 5.93; 95% CI 4.23 - 8.32; $p<0.05$ and aOR 5.47, 95% CI 3.83 - 7.80; $p<0.05$). Similarly, women aged between 35 and 44 years old were significantly more likely to undergo CCS compared with women aged 15 - 24 years (uOR 14.28, 95% CI 10.11 - 20.16; $p<0.05$ and aOR 13.47, 95% CI 9.31 - 19.48; $p<0.05$). Additionally, women aged between 45 and 49 years were significantly more likely to undergo CCS compared with women aged 15 - 24 years (uOR 16.98, 95% CI 11.41 - 25.24; $p<0.05$ and aOR 15.08, 95% CI 9.86 - 23.06; $p<0.05$).

By level of education, Model 1 found that women with secondary education were significantly more likely to undergo CCS compared with those with no formal education or incomplete education (uOR 1.46, 95% CI 1.17 - 1.82; $p<0.05$). Women with tertiary education were significantly more likely to undergo CCS compared with those without or with incomplete education (uOR 3.00, 95% CI 2.20 - 4.10; $p<0.05$ and aOR 2.32, 95% CI 1.57 - 3.43; $p<0.05$).

In terms of wealth index, Model 1 found that women who fell in the richer and richest wealth quantile were significantly more likely to undergo CCS compared with those who fell in the poorer and poorest quantile (uOR: 1.62, 95% CI 1.31 - 2.01; $p<0.05$). Regarding provinces, both models found that women from all provinces were less likely to undergo CCS compared with women from the Western Cape.

The race of participants was significantly associated with CCS in Model 1. Coloured women were significantly more likely to undergo CCS compared with black women (uOR 1.85, 95% CI 1.35 - 2.52; $p<0.05$). Additionally, women from other racial groups (white, Indian/Asian and other) were significantly more likely to undergo CCS compared with black women (uOR 2.36, 95% CI 1.45 - 3.83; $p<0.05$). In terms of the frequency of smoking cigarettes, Model 1 found that women who smoke cigarettes every day were significantly more likely to undergo CCS compared with non-smokers (uOR 1.52, 95% CI 1.04 - 2.24; $p<0.05$).

Regarding health insurance, Model 1 found that women with health insurance were significantly more likely to undergo CCS compared with women without

health insurance (uOR 2.64, 95% CI 2.01 - 3.46; $p<0.05$). Finally, by marital status, married women were more likely to undergo CCS compared with unmarried women in both models (uOR 2.80, 95% CI 2.24 - 3.51; $p<0.05$ and aOR 1.35, 95% CI 1.03 - 1.79; $p<0.05$).

Discussion

The results suggest that IPV does not act as a barrier or facilitator of CCS. This could suggest that IPV's impact on health-seeking behaviour may not be direct or is overshadowed by more pressing needs or fears related to the abusive relationship. Findings from a study by Gordon[10] show that female victims of IPV were less likely to seek medical assistance in fear of further violence by their partners or abandonment, which negatively impacts health-seeking behaviour. Another possibility is that healthcare providers may not be trained to recognise and address the specific needs of women experiencing IPV, resulting in missed opportunities to encourage CCS.

Additionally, the stigma associated with such experiences in this study setting may prevent women from seeking medical care after abuse, as such experiences are often viewed as shameful and humiliating.[11,14,15] Victims may feel dehumanised, helpless and at the mercy of their perpetrators. This could diminish their will to seek medical assistance to ensure that they are not at risk of contracting STIs and cervical cancer.

The study also found that several sociodemographic variables were associated with the outcome. One key factor was the area of residence. Women from rural areas were less likely to undergo CCS compared with their urban counterparts, a finding consistent with previous research.[16,17] This disparity could be driven by the limited availability of healthcare facilities in rural areas, making access to CCS more challenging. The present study also found that the likelihood of CCS increased with age in both the unadjusted and adjusted models.

In terms of education, study results showed an increasing likelihood of undergoing CCS with increasing education levels. This may be because better-educated women often have higher health literacy, enabling them to understand the importance of preventive healthcare and to better navigate the healthcare system. This finding corresponds with findings from a study[18] conducted in Addis Ababa that showed that women with degrees had higher odds of undergoing CCS than those without degrees. Similarly, in the present study, women with tertiary education had the greatest odds of undergoing CCS than those with no or incomplete education.

In terms of wealth, the study found that the likelihood of women undergoing CCS increased with wealth (Model 1). This was consistent with the findings of other studies;[19-21] thus, highlighting the impact that wealth status has on the ability of women to undergo CCS. The study also found that race was significantly associated with CCS. Black women were less likely to undergo CCS than coloured women as well as women from other ethnic groups (Model 1). This corroborates findings from a study that shows that racial/ethnic disparities in CCS persist globally, especially among minority groups in both high-income and low-resource countries.[22] SA's inequality explains these racial disparities, especially among black women, many of whom have poor access to health services,[23] leading to their underrepresentation in CCS.

Analysis of health/risk factors revealed that cigarette smoking frequency was associated with CCS. Herein, the study found that women who smoked cigarettes every day were more likely to undergo CCS compared with non-smokers. This is consistent with findings from other studies.[24-26] This association can be attributed to the debilitating effects of cigarette smoking, which compromises the immune system, making women susceptible to cervical cancer, hence their need to undergo CCS. In terms of health insurance, women with health insurance had greater odds of undergoing CCS compared with women without health insurance (Model 1). This was consistent with the findings of other studies.[2733] This is because women with health insurance have better access to healthcare, which entails CCS when needed should the health insurance cover such medical tests.

Conclusion

The present study revealed that IPV neither hinders nor promotes CCS. This may be attributed to the likelihood that the influence of IPV on health-seeking actions is indirect or that it is eclipsed by more immediate concerns or anxieties associated with the abusive relationship. However, factors such as age, area of residence, education, wealth, race, province, health insurance and cigarette smoking have been identified as significant. This suggests the need for targeted health-promoting interventions to facilitate the early diagnosis or treatment of cervical cancer among women, with a particular focus on these identified demographic and socioeconomic factors. Tailoring approaches to address the unique barriers faced by different groups could improve CCS uptake and ultimately enhance outcomes for women's health in the context of IPV.

Declaration. This study was performed in fulfilment of the requirements for a Master's degree for MH at the University of the Witwatersrand.

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Data availability statement. The datasets generated and analysed during the current study are available from the corresponding author upon reasonable request.

Conflicts of interest. None.

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