

Original Research Article

Influence of socio-demographic and socio-economic factors on the uptake of cervical cancer screening among HIV-positive women receiving care at the Mama Lucy Kibaki Hospital

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ABSTRACT

Background: Cervical cancer is one of the leading causes of morbidity and mortality among women worldwide caused by the persistent infection with carcinogenic HPV, transmitted via sexual contact. Globally, cervical cancer is the fourth most common malignancy among women in the reproductive age. The impact of cervical cancer is exacerbated among women living with HIV, as they face an elevated risk compared to women who are HIV negative. Given the ramification of late diagnosis and the advantages of early detection via screening for HIV positive women, this study aimed at evaluating the Socio-demographic and socio-economic determinants of cervical cancer screening uptake among women living with HIV.

Methods: Utilizing a cross-sectional design, the study collected primary quantitative data from 218 HIV positive women aged 18 to 49 years, systematically sampled from the comprehensive care center at Mama Lucy Kibaki Hospital. Data was analyzed using the R statistical environment to elucidate patterns of screening behavior.

Results: The results showed that women aged ≥ 30 years and above were more likely to undergo cervical cancer screening compared to those under 30 years of age. The adjusted odds ratio (AOR) was 6.77 (95% CI 2.20-22.4), with a p-value of 0.0010, indicating a strong, statistical association between age and uptake.

Conclusion: This study suggests that age plays a pivotal role in the uptake of cervical cancer screening, with older women being more likely to participate in screening than younger women emphasizing the need for targeted interventions to increase awareness and participation among younger women.

Keywords: Cervical cancer, Screening, Uptake, Reproductive age

INTRODUCTION

Cervical cancer is primarily caused by the persistent infection with carcinogenic human papillomavirus (HPV) types 16 and 18 that lead to either precancerous or cancerous lesions in the cervix, transmitted via sexual contact.¹ Globally, in 2022 the incidence of cervical cancer was estimated to be 660,000 with close to 53% mortality rate (348,874 deaths) in the same period. The global burden of the disease is expected to increase by 14.8% in 2030 if urgent and coordinated interventions are

not implemented especially in low middle countries where 90% of cervical cancer mortalities occur.² The disease is noted to be the second most prevalent cancer following breast cancer in Kenya with estimates indicating that nearly 4802 women were diagnosed with the disease in 2018 with close to 51% succumbing to death, while in contrast only 3.2% of women within the reproductive age were screened for cervical cancer (CC) in the same period.³ When screening is not available early, treatment is delayed, it becomes more complex and costlier to the health system, the individual and the

community they live in especially in resource limited settings. In the context of HIV, the impact of cervical cancer is exacerbated, as women living with HIV face an elevated risk compared to women who are HIV negative. It is estimated that 6% of women living with HIV are afflicted with cervical cancer in the world. The disease also stands as the most common diagnosed cancer among women who are HIV-positive and is categorized as an AIDS-defining disease.⁴ As per the cervical cancer screening guidelines developed by the Kenya Ministry of Health, women living with HIV should begin screening at the point of diagnosis with HIV or at 25 years, whichever comes earlier, and should then continue to be screened throughout their lifetime once every two years.⁵ Routine screening is a key strategy for early detection of cervical cancer indicators, preventing the ramifications of late diagnosis, support early treatment, and prevent invasive cervical cancer. Cervical cancer screening can be done through cytological testing (pap smear), HPV DNA testing for high-risk strains, and visual inspection of the cervix using acetic acid (VIA), either with or without magnification. Despite recent discoveries on cervical cancer screening and prevention strategies, developing countries are still experiencing increased cervical cancer-related morbidity and mortality with studies reporting inconsistent findings on factors influencing the increase. In this regard, the study sought to examine socio-demographic and socio-economic factors associated with uptake of cervical cancer screening among women living with HIV receiving care at Nairobi's Mama Lucy Kibaki Hospital comprehensive care center

METHODS

The study adopted an institution-based cross-sectional study design, the target population for this study was women of reproductive age (18-49 years) living with HIV/AIDS and seeking care at Mama Lucy Kibaki Hospital's (MLKH) CCC department which is a government county referral hospital serving the residents of Nairobi's populous Eastland. The hospital runs two outpatient gynecology clinics per week; the department of reproductive health provides Cervical cancer screening services through its family planning clinic. Since the study was on HIV positive women, data collection was conducted in the CCC between April and May of 2024 for a period of one month.

The sampling frame was based on the ART register at the CCC, the average accessible population was 2080 patients every month. The sample size was calculated using Cochran formula (Cochran, 1977); Confidence interval =95%, Margin of error of 5%, Population Proportion=50% (Assuming that 50% of eligible women would be interested in the CCS services offered at the facility), targeted sample size was 323. Systematic random sampling method was used during data collection to select study participants; the sampling interval was calculated by dividing the total population size by the desired sample size $2080/323=6$, therefore every sixth

women was interviewed based on their arrival time once the clinic was opened. At the end of each day, research assistants recorded the registration number of each participant on the ART register to prevent re-interviewing the same person during a follow-up visit. They also noted the total number of interviews conducted each day to use as a starting point for the next day's interviews.

Ethical approval was sought from the Amref Ethical Research and Scientific Committee (ESRC). A research license was also obtained from the National Commission for Science, Technology and Innovation (NACOSTI) (Research License No. 126480). Additionally, approval for the study was sought from Nairobi County government department of health and the Mama Lucy Kibaki Hospital Chief executive office and participants voluntarily signed the consent form and they were assured anonymity and confidentiality.

The outcome variable was uptake of cervical cancer screening uptake among HIV positive women and the independent variables were socio-demographic variables associated with the outcome variable. In this study the primary outcome was self-reported uptake of cervical cancer screening among HIV-positive women. Independent variables included socio-demographic factors such as age (categorized as ≤ 30 years and ≥ 30 years), parity (nulliparous, multiparous (≤ 3 births), and grand parous (≥ 3 births)), education level (primary education or less versus higher), marital status, partner support, health decision-making autonomy, years enrolled in care, occupation, main sources of income, religion, religious restrictions, and family history of cancer.

Reliability of the data collection tools was assessed using the Spearman-Brown prophecy formula. A systematic random sampling technique was employed to enhance internal validity. Eligible participants were consenting HIV-positive women aged 15-49 years receiving care at Mama Lucy Kibaki Hospital's Comprehensive Care Center over a three-month period. Exclusions applied to women outside the specified age range, those with known mental health conditions, and those who did not consent.

Data was collected using an interviewer administered questionnaire that was pretested in a similar setting before being administered to participants. Data was analyzed using quantitative techniques R, descriptive statistics such as means, medians, frequencies and percentages to summarize characteristics of the participants. Statistical tests such as Chi-square test were conducted to assess the association between categorical variable at 95% confidence interval and p value of ≤ 0.05 as well as significant association of variables were determined using crude and adjusted Odds ratios. Bivariate regression was done to determine the strength and direction (positive or negative) of the relationship between the dependent and independent variable as well as multivariate regression to measure the contribution of several variable to the outcome of interest.

RESULTS

A total of 218 women aged between 15-49 years took part in the study, due to inconsistent patient flow, and unforeseen scheduling conflicts there was a lower-than-expected participant count, therefore the study achieved a response rate of 218 (67.7%) with a majority 199 (91%) reporting to have taken part in cervical cancer screening as shown on the Figure 1.

Those who took part in screening were 199 (91%), a majority 175 (88%), tested negative; 13 (6.5%) tested positive for cervical cancer, 5 self-reported to have recovered and 3 were still undergoing treatment as of the time of the study, 11(5.5%) did not receive their results after screening, as shown in Figure 3. Reasons for non-screening of cervical cancer among HIV-positive women on antiretroviral treatment are as shown in Figure 4.

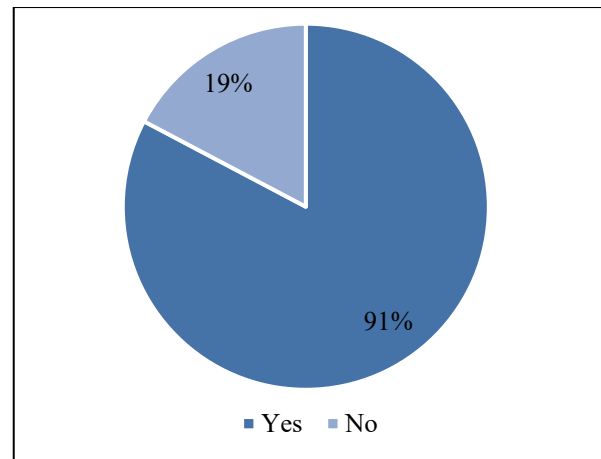


Figure 1: Proportion of uptake of cervical cancer screening.

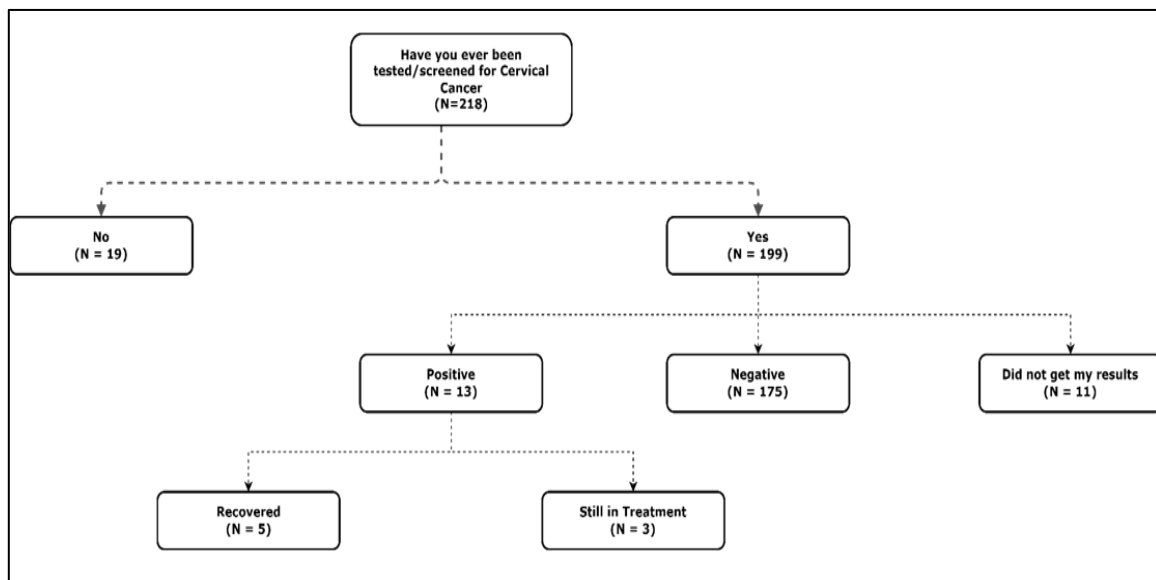


Figure 2: Study results flow chart.

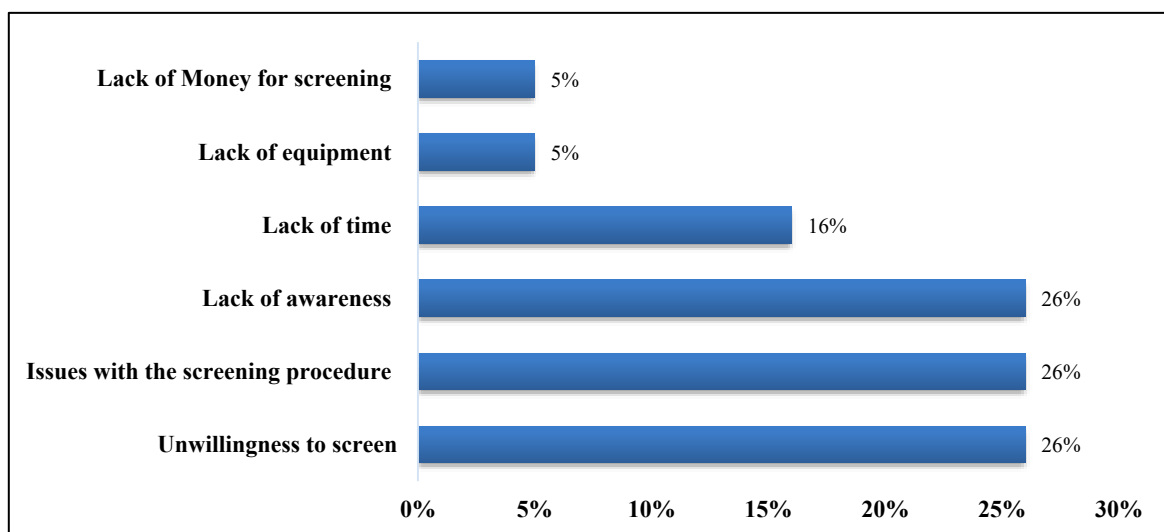


Figure 3: Reasons given by study participants as to why they were not screened for HPV.

Majority, 169 (78%) of the participants were aged ≥ 30 years old. The participants had a mean age of 36.37 ± 8.23 years, with a median age of 35 years (IQR: 30-42.75), ranging from 18 to 49 years. Most of the participants 146 (67%) had more than primary education, with most of the participants having been enrolled on care for than one year 180 (83%) meaning they were stable on routine care. Parity was one of the variables being assessed and majority of the women were multi-parous 172 (78.9%). The mean parity was 1.92 ± 1.26 , with a median of 2 (IQR:1-3), ranging from 0 to 6 children. The majority of the participants were married 84 (38.5%), a significant proportion of those who were married reported no partner support 134 (61.47%) and made their own health decisions 160 (73.39%).

Uptake of cervical cancer screening among HIV-positive women showed significant associations with age and health decision-making variables. Women aged 30 years and above had a significantly higher screening uptake 160 (80.40%) ($\chi^2=9.049$, $df=1$, $p=0.0021$) indicating that older women aged ≥ 30 years old had a significantly higher odds of screening compared to those <30 years (cOR= 4.56. 95% CI: 1.73-12.2). The adjusted odds ratio (AOR)

is 6.77 (95%CI 2.20-22.4), with a p value of 0.0010, indicated a strong, statistical association between age and CCS uptake.

Multiparous women were significantly more likely to undergo screening compared to grand parous women (AOR) 4.70 (95% CI: 1.10-18.6), with a p value of 0.0276, showing a statistically significant relationship. Nulliparous women also showed higher odds of screening compared to grand parous women (AOR= 4.83, 95% CI: 0.69-41.8), but this is not statistically significant as the p value was greater than 0.05 ($p=0.1241$). In regards to socio-economic factors most of the participants reported to be business owners 94 (43%) with their main source of being income from business ventures 104 (47.71%). Most of the participants also identified as Christians 213 (97.71%), with nearly all reporting no particular religious prohibitions against cervical cancer screening 216 (99.08%). Out of the 218 participants who took part in the study only 10 (4.95%) report family history of cervical cancer. In this study factors such as marital status ($p=0.1526$), occupation ($p=0.5787$), level of education ($p=0.8679$) and religion did not show statistically significant associations with screening uptake.

Table 1: Socio-demographic characteristics.

Characteristic	Frequency (N)	%
Age group (years)		
<30	49	22.48
≥ 30	169	77.52
Parity		
Grand parous	23	10.55
Multiparous	172	78.9
Nulliparous	23	10.55
Education		
More than primary	146	66.97
Primary or less	72	33.03
Marital status		
Divorced/separated	37	16.97
Married	84	38.53
Single	69	31.65
Widowed	28	12.84
Partner support		
Not supportive	61	27.98
Supportive	134	61.47
N/A	23	10.55
Health decision maker		
Parents	3	1.37
Partner	55	25.23
Self	160	73.39
Years enrolled		
>1 year in care	180	82.57
≤ 1 year in care	38	17.43
Occupation		
Business woman	94	43.12
Casual labourer	48	22.02
Formal employment	42	19.27

Continued.

Characteristic	Frequency (N)	%
Housewife	23	10.55
Unemployed	11	5.05
Main source of income		
Business venture	104	47.71
Casual work	61	27.98
Formal employment	53	24.31
Religion		
Christian	213	97.71
Muslim	5	2.29
Religious prohibition		
Yes	2	0.92
No	216	99.08
Cervical cancer family history		
Yes	10	4.59
No	208	95.41

Table 2: Bivariate analysis of uptake of cervical cancer screening and study variables.

Characteristic	Uptake of cervical cancer screening		Crude OR (CI)	P value
	Yes, N (%)	No, N (%)		
Age group (in years)				
<30	39 (19.60)	10 (52.63)	4.56 (1.73–12.2)	0.0021
>=30	160 (80.40)	9 (47.37)		
Parity				
Grand parous	19 (9.55)	4 (21.05)	2.81 (0.73–9.02)	0.0993
Multiparous	160 (80.40)	12 (63.16)		
Nulliparous	20 (10.05)	3 (15.79)		
Education				
More than primary	132 (66.33)	14 (73.68)	1.42 (0.52–4.55)	0.5170
Primary or less	67 (33.67)	5 (26.32)		
Marital status				
Divorced/separated	32 (16.08)	5 (26.32)	3.13 (0.78–13.3)	0.1049
Married	80 (40.20)	4 (21.05)		
Single	60 (30.15)	9 (47.37)		
Widowed	27 (13.57)	1 (5.26)		
Partner support				
Not supportive	21 (26.25)	2 (50.00)	2.81 (0.32–24.6)	0.3167
Supportive	59 (73.75)	2 (50.00)		
Health decision maker				
Parents	2 (1.01)	1 (5.27)	13.3 (0.50–225)	0.069
Partner	53 (26.63)	2 (10.53)		
Self	144 (72.36)	16 (84.21)		
Years enrolled				
>1 year in care	167 (83.92)	13 (68.42)	0.42 (0.15–1.25)	0.0971
1 year in care	32 (16.08)	6 (32.58)		
Occupation				
Businesswoman	88 (44.22)	6 (31.58)	0.48 (0.14–1.61)	0.2234
Casual laborer	42 (21.11)	6 (31.58)		
Formal employment	39 (19.60)	3 (15.79)		
Housewife	21 (10.55)	2 (10.53)		
Unemployed	9 (4.52)	2 (10.53)		
Main source of income				
Business venture	97 (48.74)	7 (36.84)	0.48 (0.16–1.40)	0.1763
Casual work	53 (26.63)	8 (42.11)		

Continued.

Characteristic	Uptake of cervical cancer screening		Crude OR (CI)	P value
	Yes, N (%)	No, N (%)		
Formal employment	49 (24.62)	4 (21.05)	0.88 (0.25–3.51)	0.8502
Religion				
Christian	194 (97.49)	19 (100)	N/A	>0.9
Muslim	5 (2.51)	0 (0)		>0.9
Religious prohibition				
Yes	2 (1.01)	0 (0)	N/A	>0.9
No	197 (98.99)	19 (100)		
Cervical cancer family history				
Yes	8 (4.02)	2 (10.53)	0.36 (0.08–2.48)	0.2130
No	191 (95.98)	17 (89.47)		

Table 3: Multivariate analysis of the sociodemographic and socio-economic factors.

Variable name	Uptake of cervical cancer screening		Adjusted OR (95% CI)	P value
	Yes, N (%)	No, N (%)		
Age group (in years)				
<30	39(19.60)	10 (52.63)	Ref	0.0010
≥30	160 (80.40)	9 (47.37)	6.77 (2.20–22.4)	
Parity				
Grand parous	19 (9.55)	4 (21.05)	Ref	0.0276
Multiparous	160 (80.40)	12 (63.16)	4.70 (1.10–18.6)	
Nulliparous	20 (10.05)	3 (15.79)	4.83 (0.69–41.8)	
Health decision maker				
Parents	2 (1.01)	1 (5.27)	Ref	0.0947
Partner	53 (26.63)	2 (10.53)	15.0 (0.42–355)	
Self	144 (72.36)	16 (84.21)	3.42 (0.11–55.1)	
Years enrolled				
>1 year in care	167 (83.92)	13 (68.42)	Ref	0.2368
≤1 year in care	32 (16.08)	6 (32.58)	0.49 (0.15–1.72)	

DISCUSSION

The study aimed at assessing the influence of socio-demographic and socio-economic factors on the uptake of cervical cancer screening among HIV-positive women. The study sought to assess the influence of age, parity, education and marital status, spousal support, healthcare decision maker, duration of care, source of income and household income on the uptake of CCS among HIV positive women. The results of the study demonstrated that, the mean age of the participants was approximately thirty-seven years, less than half were married, close to eighty percent were multiparous; that is, they had more than three children, and nearly seventy percent had more than primary education, additionally more than forty percent were business owners with almost all the participants identifying as Christians, close to five percent had a family history of cervical cancer.

More than ninety percent of the participants had gone through CCS, with an uptake above the targets sent by WHO under the 90-70-90 targets as a global strategy to eliminate cervical cancer. The WHO targets entail; 90% HPV vaccination in girls by age 15, 70% screening of women at ages 25-45 years and treatment for 90% of

those diagnosed.³ The uptake of screening services reported in this study is an indicator that integration of cervical cancer screening within HIV/AIDS is a successful collaboration in addressing these two co-morbidities. It is also an indication that cervical cancer preventive services are acceptable among the participants, however, it would be important to compare this uptake between women in key populations and those in the general population for more diverse interventions.

A small fraction of the participants about nineteen percent said they had not gone through cervical cancer screening, some of the reasons cited for non-screening include unwillingness to screen, issues with the screening procedure and lack of awareness about the availability of service. Other studies reported a much higher non-participation rate (40%) some of reason mentioned were lack of knowledge, fear of results and negligence by the health care workers as reasons for non-screening among HIV-infected women.⁶ This implies that approaches towards addressing non-participation in cervical cancer screening services among HIV positive women require multifaceted interventions that address personal fears and misconceptions to improve prevention and treatment outcomes. It would be important to collect qualitative data on this fraction of participants to gain an in depth

understanding of some of the barriers to non-screening. This study found a significant relationship between age and CCS uptake; women aged above 30 years had higher participation compared to those under 30 years. Further analysis, confirmed age as strong predictor of screening, with an adjusted odds ratio (a OR) of 6.77, these results are similar to those reported by studies.⁶⁻⁸ Therefore, more efforts should be geared towards reaching younger women especially those below 30 years to take part in CCS programs.

The study also examined the link between parity and cervical cancer screening among HIV positive women. While previous research suggests that nulliparous women are less likely to be screened, findings from this study showed no significant association between nulliparity and uptake of cervical cancer screening.^{9,10} On the other hand, multiparous women (those with 3 births and above) had a significant association with uptake of cervical cancer screening, possibly due to increased interactions with healthcare services such as maternal and child health services. Although parity alone was not a strong predictor, the trend suggests that with a larger population, parity maybe a significant predictor of cervical cancer screening uptake.

In this study factors such as marital status, occupation, level of education and religion did not show statistically significant associations with screening uptake, in contrast, a study by Vigneshwaran conducted in 2023 among rural women in Uganda showed that educated HIV-positive women (secondary, tertiary, and university) were positively associated with cervical cancer screening practices compared to uneducated women.¹¹ In addition, in this study women enrolled in care for less than one year had lower odds of screening, indicating potential barriers for newer patients. Other socioeconomic factors, such as business ownership and Christian affiliation, showed no prohibitions against screening. Family history of cervical cancer also showed no association with uptake of CCS. This study being a cross-sectional study design, data was collected at a single point in time, therefore, establishing a causal relationship, assessing change overtime or the effect of a given intervention was not possible. The study was also done in an urban setting where there is greater access to advanced healthcare infrastructure and specialized treatment even in government facilities which may not be reflective of the experiences of populations in rural, remote and marginalized communities where socio-demographic and socio-economic factors may differ, further studies should therefore focus on such populations where the uptake of cervical cancer screening services may be different.

The study's limitations included a constrained timeline and scope, which restricted the ability to capture long-term screening behaviors and achieve broader geographic representation. Additionally, methodological constraints, such as reliance on self-reported data, may have introduced response bias that affected the

comprehensiveness of insights into socio-demographic determinants.

CONCLUSION

This study underscores the imperative of integrating HIV and cervical cancer screening to effectively prevent and manage these interrelated conditions, particularly in resource-constrained settings where cervical cancer remains a predominant cause of morbidity among women living with HIV/AIDS. It emphasizes the urgent need to overcome social and economic barriers such as age, financial dependence and limited spousal support that hinder screening uptake. Aligning with existing literature, the study identifies key socio-demographic factors including age, marital status, spousal involvement, occupation, and parity as critical determinants of screening participation. These insights not only deepen the understanding of factors influencing cervical cancer screening among HIV-positive women but also inform actionable recommendations to enhance screening programs and policy frameworks within Kenya and comparable contexts. Ultimately, this research advances efforts toward early detection and integrated care models essential for reducing cervical cancer-related morbidity and mortality in challenging healthcare environments.

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