

Knowledge and Perceptions Towards Cervical Cancer and Screening among HIV-infected Women Attending Public Health Facilities in Kisii County, Kenya

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ABSTRACT

Context: Knowledge of cancer of the cervix and perceptions of the disease and screening are key determinants for the utilization of screening services among HIV-infected women. HIV infection predisposes women to an increased risk of having cancer of the cervix. Utilization of cervical cancer screening services among women is important as it leads to early diagnosis of pre-cancerous lesions and their prompt treatment. Kenya is among those countries in Africa reporting low screening rates for cancer of the cervix among HIV-infected women.

Aim: This study sought to investigate the knowledge and perceptions towards cervical cancer and screening and their association with the uptake of screening services among HIV-infected women in Kisii County, Kenya.

Methods: A cross-sectional survey involving 612 HIV-infected women aged between 15-49 years who were attending HIV care clinics in two sub-county hospitals in Kisii County. The enrolled respondents were recruited through a systematic random sampling method. Data were collected through a structured questionnaire focusing on socio-demographic parameters, knowledge of the disease and screening, perceptions of the disease, and screening practices.

Results: The median age of the respondents was 42 years. Those with a primary level of education were 52.9% (n=324). The respondents who were married were 53.7% (n=329). A large proportion of the respondents were aware of and had heard about the disease and screening, at 86.6% (n=530) and 75.5% (n=462), respectively. Only 10.6% (n=65) of them knew that human papillomavirus caused cancer of the cervix, and 31.5% (n=193) of them knew that HIV was a risk factor for cancer of the cervix. A large proportion of the respondents, 53.1% (n=325), had low levels of total knowledge of cervical cancer and screening scores. A statistically significant association ($p \leq 0.05$) was observed between the uptake of screening and knowledge of cervical cancer screening, as well as perceived benefits and barriers to screening.

Conclusion: The respondents in this study demonstrated low levels of knowledge about cervical cancer and cervical cancer screening. There was a direct relationship between knowledge of cervical cancer and screening, perceived benefits, perceived barriers of screening for cancer of the cervix, and uptake of screening. There is a need to enhance cervical cancer health education in HIV care clinics to improve knowledge and shift perceptions toward cancer of the cervix and screening among HIV-infected women.

Keywords: Cervical cancer, HIV-infected women, knowledge, perceptions, screening

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1. Introduction

Women from developing countries experience a high burden of cancer of the cervix, as it accounts for the second highest deaths and cause of cancer cases in women (Castle *et al.*, 2021). Sub-Saharan Africa (SSA) is one of the regions overwhelmingly burdened by the disease. This burden has been occasioned by the disproportionate burden of human immunodeficiency virus (HIV) infections in the region, estimated at 71% of all global HIV burden in 2019 (Jahagirdar *et al.*, 2021). Cancer of the cervix is linked with

high mortality in the SSA region, accounting for up to 60% of deaths in the world. The high mortality has been made possible due to the decreased utilization of screening services and treatment of the disease (Singh *et al.*, 2023).

Knowledge of cancer of the cervix is a key determinant for screening among HIV-infected women. Those with good knowledge had a higher likelihood of screening than those with poor knowledge (Dessalegn Mekonnen, 2020). Perceptions towards cancer of the cervix and its screening are also known to motivate HIV-infected women to utilize the screening services. The odds of screening for the disease

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among HIV-infected women with a high perception of their susceptibility to develop cervical cancer were higher than those with a low perception (Vigneshwaran et al., 2023). HIV-infected women in rural communities have lower levels of education, and their participation in screening for cancer of the cervix has remained unsatisfactory (Gao et al., 2023).

In any given community, the prevailing sociocultural background can influence their health beliefs regarding cancer of the cervix and screening. This study employed a behavioral theory, the health belief model (HBM), as the framework for understanding the perceptions of HIV-infected women toward cancer of the cervix and screening. The HBM has established that individual perceptions about a disease and the strategies to decrease its occurrence determine health behavior (Orji et al., 2012). The main constructs of the model incorporated into the study included perceived susceptibility to the disease, perceived severity of the disease's consequences, perceived benefits, perceived barriers, and perceived self-efficacy in screening for the disease (Orji et al., 2012).

In 2020, the World Health Organization advanced a global agenda to eliminate cervical cancer by targeting the screening of 70% of women by the age of 35 years and again by the age of 45 years by 2030 (World Health Organization, 2020). However, to successfully increase the utilization of screening services, it requires a deeper understanding of the determinants of screening behavior among HIV-infected women. In Kenya, the determinants that greatly influence participation in screening for the disease include women's perceptions and knowledge of the disease and screening (Gebreegziabher et al., 2024).

2. Significance of the study

Kenya is among the few countries in the sub-Saharan Africa region witnessing a uniform rise in the incidences of cervical cancer disease (Jedy-Agba et al., 2020). Cancer of the cervix is estimated to account for 12% of all new cancer cases diagnosed and 3200 deaths due to cancer witnessed in Kenya in the year 2020 (Sung et al., 2021).

HIV-infected women have a six-fold increased risk of developing cancer of the cervix owing to HIV-related immunodeficiency compared to women not living with HIV (Stelzle et al., 2021). It is estimated that 1,508,405 persons were living with HIV in Kenya in 2019, among whom 890,000 were females (National AIDS Control Council, 2020). The high-risk population of HIV-infected women requires an effective national program for screening of cancer of the cervix to enable early identification of pre-cancerous lesions in the cervix and their treatment.

Kenya remains among those countries with low screening rates for cancer of the cervix among HIV-infected women. In 2020, only 27% of HIV-infected women in Kenya had ever undergone screening for cervical cancer (Yang et al., 2023). Additionally, it was a small proportion, i.e., 19% of HIV-infected women aged between 25 and 49 years, who had undergone screening for cervical cancer in the past three years up to 2020 (Yang et al., 2023).

One of the key recommendations of the national cancer policy in Kenya is the integration of routine screening services for cancer of the cervix into HIV care clinics to

promote screening among women living with HIV (Ministry of Health, 2020). However, despite the availability and integration of screening and HIV care services, uptake of screening remains low. This low uptake has necessitated the need to investigate to have a deeper understanding and clarity on the perceptions and knowledge of the disease and screening among HIV-infected women and how it impacts their screening behavior. This investigation will not only extend the available evidence on the perceptions and knowledge of the disease and screening among HIV-infected women in this community but also inform future health promotion interventions targeting this high-risk population.

3. Aim of the study

This study sought to investigate the knowledge and perceptions towards cervical cancer and screening and their association with the uptake of screening services among HIV-infected women in Kisii County, Kenya.

4. Subjects & Methods

4.1. Research Design

A cross-sectional survey was utilized in investigating the knowledge and perceptions towards the disease and screening among HIV-infected women and their association with the uptake of screening services in Kisii County, Kenya. The design was chosen because the data collection occurred at a single point in time (Wang & Cheng, 2020).

4.2. Study Setting

Kisii County is a region located in the Southwestern part of Kenya. The study was conducted at the HIV care clinics in two sub-county hospitals, Keumbu and Gucha. The sub-county hospitals provide both in-patient and out-patient services. The two hospitals provided both cervical cancer screening and HIV care services at no cost, and these services were integrated.

4.3. Subjects

HIV-infected women enrolled in the study were aged between 15-49 years and attended the HIV care clinics in the two hospitals for health care services.

Inclusion criteria

The criteria for inclusion included those actively on follow-up in the two HIV care clinics, had not undergone treatment for cervical cancer or pre-cancerous lesions, had not been screened, and if they had been screened, not more than six months ago. Those eligible from the daily clinic attendance register were listed in each of the two hospitals.

The first study participant in the two hospitals was randomly selected from the list on the clinic days. Thereafter, every 3rd and 2nd HIV-infected woman on the clinic attendance list at Gucha and Keumbu hospitals, respectively, was recruited until a sample size of 612 for both hospitals was reached. The formula by Casagrande et al. (1978) was used to arrive at the sample size when comparing two independent groups in a prospective quasi-experiment that was ongoing at the time.

$$n = \frac{\{Z_{1-\alpha/2}\sqrt{2P(1-P)} + Z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)}\}^2}{(P_1 - P_2)^2}$$

Where;

α = Type I error (0.05)

β = Type II error (0.10)

At 95% confidence, $Z_{1-\alpha/2} = 1.96$

At 90% power, $Z_{1-\beta} = 1.28$

P_1 = Proportion of the study population screened in the control group was 14%

P_2 = Proportion of the study population to be screened in the intervention group was 30%

$$P = \frac{P_1 + P_2}{2}$$

4.4. Tools and Data Collection

4.4.1. Structured Interview Questionnaire

A structured questionnaire was used to collect data from the respondents. The questionnaire assessed the knowledge and perceptions of cancer of the cervix and screening among HIV-infected women. Since the interviewer administered the questionnaire, the tool was written in the English language. The researcher developed the first section of the structured questionnaire based on reviewed information from the literature, including national screening guidelines (*Ministry of Health, 2018*).

The first section included socio-demographic parameters, e.g., religion, occupation, marital status, age, and level of education. The knowledge of the disease and screening questions comprised 19 items on awareness of cervical cancer and screening, risk factors, symptoms, and signs of cancer of the cervix.

Scoring system

The questions had two answer options: yes or no. Each response to the questions was assigned a score of either 1 or 0 based on whether it was a correct or incorrect response. These scores were then converted into percentages. The total knowledge of cancer of the cervix and screening scores were thus categorized as low ($\leq 50\%$), moderate (51-79%), and high ($\geq 80\%$).

The second section of the questionnaire involved the Health Belief Model (HBM) scale, which was adapted and modified from the Champion HBM scale (*Champion, 1999*). The adaption was made possible with permission being granted by the tool developer. The modification took into consideration the HIV status of the respondents and the required screening behavior based on the national screening guidelines at the time (*Ministry of Health, 2018*).

The 23-item HBM scale was used to collect information on the HIV-infected women's beliefs regarding perceived severity and perceived susceptibility to the disease, perceived barriers, perceived benefits, and perceived self-efficacy to screening.

Scoring system

A 5-point Likert-type scale was used to score questions about perceptions. The scores ranged from 5 (strongly agree) to 1 (strongly disagree), with options 4 (agree), 3 (neutral), and 2 (disagree).

4.5. Procedures

The Kenyatta National Hospital and the University of Nairobi's Ethics and Research Committee provided the necessary ethical clearance. The National Commission for Science, Technology & Innovation provided the required research license. The Department of Health in Kisii County also granted the researcher permission to collect information in the two hospitals.

Validation of the questionnaire: After modifying the questionnaire, it was pre-tested at a different sub-county hospital among a random sample of 47 HIV-infected women, representing 13% of the study subjects. The researcher ensured the study tool's reliability by testing it using Cronbach's alpha. The results for the 19 items measuring knowledge of cervical cancer and screening were 0.76. For the 20 items measuring perceived barriers, perceived benefits, perceived severity, and perceived susceptibility, the result was 0.703. For the three items measuring perceived self-efficacy, the result was 0.835. This finding demonstrated good reliability of the tool in measuring the study variables.

The principal investigator and trained assistants explained the study information, including its purpose, potential risks, and benefits, to the eligible study participants in the two hospitals before obtaining their voluntary informed consent or assent. Following their enrollment in the study, participants were interviewed by the research team in a separate room to maintain confidentiality. Before the questionnaires could be filed, they were carefully reviewed to ensure their completeness and accuracy. The principal investigator thereafter filed and stored the complete questionnaires safely. The data collection period lasted from June to August 2020.

4.6. Limitations of the study

The scope of this study limited the researchers to HIV-infected women in Kisii County who were on follow-up in the HIV care clinics in the two hospitals. This population was mainly from a rural setting. The findings may, therefore, not be generalizable to HIV-infected women from urban settings or those who have not been diagnosed with HIV and do not attend HIV care clinics.

4.7. Data analysis

Analysis of the collected data was performed using the 23rd version of the Statistical Package for the Social Sciences (SPSS). Frequencies, proportions, and means summarized the socio-demographic parameters, knowledge, and perceptions of the disease and screening through the use of descriptive statistics. Binary logistic regression was used to determine the association between the variables, as indicated by adjusted odds ratios with 95% confidence intervals. Statistical significance was considered at a p-value of ≤ 0.05 .

5. Results

Table 1 represents the socio-demographic parameters of the participants. The respondents' ages ranged from 15 to 49 years. The oldest was 49 years, while the youngest was 15 years old, with a median age (interquartile range;

IQR) of 42 (36, 48) years. Slightly more than half of the respondents, 52.9% (n=324) and 53.7% (n=329) had a primary level of education and were married, respectively. Most respondents, 68.6% (n=420) and 74.7% (n=457), were peasant farmers and Protestants, respectively.

Table 2 reveals the knowledge of the HIV-infected women regarding cancer of the cervix and screening. A large proportion of the respondents were aware of and had heard about the disease and screening, at 86.6% (n=530) and 75.5% (n=462), respectively. Only 10.6% (n=65) of the respondents knew that cervical cancer is caused by human papillomavirus. Those who knew that HIV infection increased the risk for the disease were 31.5%.

Table 3 demonstrates the total knowledge of cancer of the cervix and screening among HIV-infected women. A large proportion of the respondents, 53.1% (n=325), had low levels of total knowledge about the disease and its screening methods. Only a small proportion of the respondents, 15.4% (n=94), had high levels of total knowledge about the disease and screening.

Table 4 represents the uptake of screening among HIV-infected women. A large proportion of the respondents (57.7%, n=353) had not been screened, while only 42.3% (n=259) had been screened.

Table 5 clarifies the perceptions of HIV-infected women towards cancer of the cervix, and screening with higher mean scores were observed for perceived benefits (4.09±0.54) and self-efficacy (4.06±0.48) among those who had been screened compared to the unscreened respondents. Lower mean scores were observed for perceived barriers to screening (2.16±0.59), susceptibility (3.24±0.96), and severity (3.54±0.79) among those who had been screened compared to the unscreened respondents.

Table 6 reveals the relationship between uptake of screening and knowledge and perceptions of cervical cancer and screening. A significant association (p<0.05) was observed between the uptake of screening and knowledge of the disease and screening. A significant association (p<0.05) was also observed between perceived benefits, perceived barriers to screening, and uptake of screening.

6. Discussion

HIV-infected women have a higher risk of persistent HPV infections and are more susceptible to developing cervical cancer at a younger age compared to women who are HIV-negative (*World Health Organization, 2020*). The HPV infection makes HIV-infected women more vulnerable to cervical cancer, requiring increased screening coverage for its prevention and treatment. However, their screening coverage in Kenya remained low (*Yang et al., 2023*). The present study sought to investigate the knowledge and perceptions towards cervical cancer and screening and their association with the uptake of screening services among HIV-infected women in Kisii County, Kenya.

The study was conducted in a rural setting, with most of the respondents being peasant farmers. Most of them had a primary level of education. These characteristics had implications for their access to and use of health information to make health decisions, including cervical cancer screening behavior.

A large proportion of the respondents were aware of and had heard about cancer of the cervix and screening. The high level of awareness could be explained by the identified sources of information for the majority of them, which were healthcare providers and the media.

Table (1): Frequency and percentage distribution of socio-demographic parameters among respondents (n=612).

Variables	Screened for cervical cancer		Unscreened for cervical cancer		Total	
	No.	%	No.	%	No.	%
Level of education						
Primary	126	38.9	198	61.1	324	52.9
Secondary	104	45	127	55	231	37.8
Tertiary	21	65.6	11	34.4	32	5.2
Illiterate	8	32	17	68	25	4.1
Occupation						
Business	50	45	61	55	111	18.1
Teacher	15	57.7	11	42.3	26	4.3
Housewife	8	38.1	13	61.9	21	3.4
Casual laborer	6	54.5	5	45.5	11	1.8
None	2	50	2	50	4	0.7
Peasant farmer	169	40.2	251	59.8	420	68.6
Saloonist	5	45.5	6	54.5	11	1.8
Students	4	50	4	50	8	1.3
Marital status						
Single	19	32.8	39	67.2	58	9.5
Divorced	5	38.5	8	61.5	13	2.1
Married	150	45.6	179	54.4	329	53.7
Separated	10	35.7	18	64.3	28	4.6
Widowed	75	40.8	109	59.2	184	30.1
Religion						
Catholic	70	45.2	85	54.8	155	25.3
Protestant	189	41.4	268	58.6	457	74.7

Table (2): Frequency and percentage distribution of respondents' knowledge of cancer of the cervix and screening (n=612).

Variables	Screened		Unscreened		Total	
	No.	%	No.	%	No.	%
Awareness of cancer of the cervix (CC)						
Have you ever heard of CC?						
Yes	236	44.5	294	55.5	530	86.6
No	23	28	59	72	82	13.4
CC is a common type of cancer among women						
Yes	223	45.1	271	54.9	494	80.7
No	36	30.5	82	69.5	118	19.3
CC is transmitted through sexual contact						
Yes	102	61.4	64	38.6	166	27.1
No	157	35.2	289	64.8	446	72.9
CC is mainly caused by human papillomavirus						
Yes	46	70.8	19	29.2	65	10.6
No	213	38.9	334	61.1	547	89.4
Risk factors of CC						
Having a human immunodeficiency virus infection						
Yes	106	54.9	87	45.1	193	31.5
No	153	36.5	266	63.5	419	68.5
Smoking cigarettes						
Yes	147	51.8	137	48.2	284	46.4
No	112	34.1	216	65.9	328	53.6
Weakened immunity						
Yes	141	54	120	46	261	42.6
No	118	33.6	233	66.4	351	57.4
Having a sexually transmitted infection						
Yes	150	54.3	126	45.7	276	45.1
No	109	32.4	227	67.6	336	54.9
Initiation of sexual intercourse at a young age						
Yes	151	57.6	111	42.4	262	42.8
No	108	30.9	242	69.1	350	57.2
Having many children						
Yes	92	53.2	81	46.8	173	28.3
No	167	38	272	62	439	71.7
Having multiple sexual partners						
Yes	179	54.6	149	45.4	328	53.6
No	80	28.2	204	71.8	284	46.4
Signs and symptoms of CC						
Bleeding per vagina after menopause						
Yes	132	53.2	116	46.8	248	40.5
No	127	34.9	237	65.1	364	59.5
Bleeding per vagina after sexual intercourse						
Yes	121	57.3	90	42.7	211	34.5
No	138	34.4	263	65.6	401	65.5
Vaginal discharge, sometimes foul smelling						
Yes	144	53.3	126	46.7	270	44.1
No	115	33.6	227	66.4	342	55.9
Irregular vaginal bleeding						
Yes	149	54	127	46	276	45.1
No	110	32.7	226	67.3	336	54.9
Awareness of CC screening						
Have you ever heard of CC screening						
Yes	239	51.7	223	48.3	462	75.5
No	20	13.3	130	86.7	150	24.5
Examination of the cervix by the nurse can detect Cervical Cancer						
Yes	242	54.3	204	45.7	446	72.9
No	17	10.2	149	89.8	166	27.1
Regular CC screening can prevent CC						
Yes	210	53.3	184	46.7	394	64.4
No	49	22.5	169	77.5	218	35.6
Annual screening for CC is required among HIV-infected women						
Yes	204	54.1	173	45.9	377	61.6
No	55	23.4	180	76.6	235	38.4

*CC: Cancer of the cervix

Table (3): Frequency and percentage distribution of total knowledge levels of cancer of the cervix and screening scores among the respondents (n=612).

Level of Knowledge Scores	No.	%
Low	325	53.1
Moderate	193	31.5
High	94	15.4

Table (4): Frequency and percentage distribution of uptake of screening among the respondents (n=612).

Uptake of screening	No.	%
Screened	259	42.3
Unscreened	353	57.7

Table (5): Mean scores of perceptions of cancer of the cervix and screening among the respondents (n=612).

Variables	Number of Scale Items	Screened (n=259)	Unscreened (n=353)
		Mean±SD	Mean±SD
Perceived susceptibility	2	3.24±0.96	3.40±0.88
Perceived severity	3	3.54±0.79	3.75±0.73
Perceived benefits of screening	5	4.09±0.54	4.06±0.61
Perceived barriers to screening	10	2.16±0.59	2.55±0.57
Perceived self-efficacy of screening	3	4.06±0.48	3.87±0.59

Table (6): Association between knowledge and perceptions of cancer of the cervix and screening, and uptake of screening among the respondents.

Uptake of Screening	AOR	95%CI	P-value
Perceived susceptibility			
Unscreened	Ref.	-	-
Screened	1.044	0.815-1.337	0.733
Perceived severity			
Unscreened	Ref.	-	-
Screened	0.873	0.641-1.188	0.388
Perceived benefits of screening			
Unscreened	Ref.	-	-
Screened	0.565	0.370-0.862	0.008
Perceived barriers to screening			
Unscreened	Ref.	-	-
Screened	0.330	0.2240-0.485	<0.001
Perceived self-efficacy of screening			
Unscreened	Ref.	-	-
Screened	1.589	0.962-2.624	0.070
Knowledge of cancer of the cervix and screening			
Unscreened	Ref.	-	-
Screened	0.067	0.032-0.142	<0.001

*Binary logistic regression of variables while adjusting for age and level of education.

This finding suggests that health education on cervical cancer prevention was being conducted by health care providers in the HIV care clinics from which the respondents benefited whenever they attended their routine care. It also highlights the integral role of advocacy and mass media campaigns in raising awareness about the disease. The high level of awareness and knowledge about this type of cancer and its screening was observed in similar previous studies conducted in Kenya among HIV-infected women (Kangethe et al., 2022; Kemper et al., 2022; Lukorito et al., 2017).

Interestingly, the observed high level of awareness did not translate to better knowledge of cervical cancer. Only a very small proportion of the respondents identified human papillomavirus as the primary cause of the disease. Most respondents exhibited low levels of knowledge, including factors that increase their risk, signs, symptoms, and

screening for the disease. The limited understanding and clarity of information about cancer of the cervix and screening may be a potential obstacle to screening among HIV-infected women. The low levels of knowledge about the cause, risk factors, signs, and symptoms reported in this study were supported by previous observations in the region (Kimondo et al., 2021; Mesfin et al., 2023).

There was less likelihood for HIV-infected women in the present study to undertake screening owing to the low levels of knowledge exhibited about the disease and screening. This finding suggests that it is important for HIV-infected women to be empowered with adequate information on cancer of the cervix and the available methods of screening. The acquired knowledge will inform their decision-making and motivate them to seek and undertake screening. The integration of screening for cancer of the

cervix into HIV care services allowed nurses and other members of the health team to increase the screening rates through the empowerment of HIV-infected women with relevant knowledge of the disease. Other studies in the East African region have supported a direct relationship between the uptake of screening and knowledge of cervical cancer and screening (Gebreegziabher et al., 2024; Vigneshwaran et al., 2023).

HIV-infected women in the present study were less likely to be screened, given their perceived benefits of screening. Having adequate knowledge of the value and efficacy of the methods used for screening in detecting pre-cancerous cervical lesions can help change HIV-infected women's perception of the benefits of screening. Early identification of the pre-cancerous cervical lesions through screening can also lead to their timely treatment. Similar findings of a direct relationship between uptake of screening and perceived benefits of screening have been documented in other studies conducted in the region (Vigneshwaran et al., 2023; Solomon et al., 2019).

HIV-infected women in the study were also less likely to be screened for cervical cancer owing to their perceived barriers to screening. This observation was aligned with findings reported in a study undertaken in Uganda among HIV-infected women (Vigneshwaran et al., 2023). This finding suggests the need for intensified health education for HIV-infected women to shift their health beliefs on identified barriers to screening for the disease. A previous study conducted in Kenya identified, among others, fear of pain, interference with future fertility, and gender of the health care provider as the perceived barriers to screening among HIV-infected women (Kangethe et al., 2022).

7. Conclusion

Low levels of knowledge on cancer of the cervix and screening were exhibited by the HIV-infected women in the study. There was a direct relationship between knowledge of cervical cancer and screening, perceived benefits, perceived barriers of screening for cancer of the cervix, and uptake of screening among HIV-infected women.

8. Recommendations

The study recommends that:

- The health department in the County government needs to establish a comprehensive health education program in the health facilities to sensitize and increase awareness of cancer of the cervix and screening consistently, especially in the HIV clinics, to empower HIV-infected women.
- Nurses and other health care providers need to monitor and make recommendations for cervical cancer screening to HIV-infected women as they attend their routine HIV care to enhance screening.
- The management of health facilities in the counties needs to ensure uninterrupted services regarding cervical cancer screening by providing all the required resources.

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