Article DOI: https://doi.org/10.37284/eajhs.6.1.1307

East African Journal of Health and Science
eajhs.eanso.org
Volume 6 Issue 1, 2023
Print ISSN: 2707-3912 | Online ISSN: 2707-3920
Title DOI: https://doi.org/10.37284/2707-3920

EAST AFRICAN NATURE & SCIENCE ORGANIZATION

Original Article

Effect of Mass Media Exposure on HIV/AIDS Stigma Among Kenyan Women and Men

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Article DOI: https://doi.org/10.37284/eajhs.6.1.1307

Date Published: *11 July 2023*

Keywords: *HIV/AIDS, Kenya, Mass Media Exposure, Stigma, HIV Testing.*

ABSTRACT

In Kenya, stigma directly or indirectly continues to play a major role in spreading HIV/AIDS. Negative attitudes, perceptions, and discrimination toward people who are HIV positive or have AIDS can adversely affect their willingness to be tested and adhere to antiretroviral therapy. This study examined the effect of mass media exposure on HIV/AIDS stigma among men and women in Kenya. It uses retrospective cross-sectional data from the Kenya Demographic and Health Survey (KDHS) 2008/09, adjusting for weights and strata to account for its complex design. The study sample comprised women aged 15-49 (n = 3,811) and men aged 15-54 (n = 3,095) who agreed to voluntary counselling and testing for HIV. Among them, 8.34% of the women and 4.98% of the men tested positive for HIV. Women who consumed all forms of media (newspapers, magazines, radio, and television) represented 23.05% of the sample, while those who consumed none comprised 6.89% (F[2.77, 1053.35] = 24.3; $p < 0.001$); the results for men were 22.06% vs 1.31% (F[2.89, 1098.72]) = 17.84; $p < 0.001$). Women and men who consumed all media almost every day were 11% (AOR = 0.89; $p < 0.05$) and 25% (AOR = 0.75; $p < 0.01$), respectively, less likely to impute HIV/AIDS stigma than those who never consumed all forms of media. Those who consumed all media forms less than once a week were 48% (AOR = 0.52; $p < 0.05$), and those who consumed them almost every day were 21% (AOR = 0.79), $p < 0.001$) less likely to impute an HIV/AIDS stigma compared to those who never consumed any media sources. All media consumption, particularly reading newspapers/magazines, reduced HIV/AIDS stigma. The study concluded that all forms of media should build on and scale up such efforts to reduce the HIV/AIDS stigma that impedes Kenyans from protecting their health.

APA CITATION

Onsomu, E. O., Moore, D., Kimani, J. K. & Abuya, B. A. (2023). Effect of Mass Media Exposure on HIV/AIDS Stigma Among Kenyan Women and Men *East African Journal of Health and Science*, *6*(1), 232-250. https://doi.org/10.37284/eajhs.6.1.1307.

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Article DOI: https://doi.org/10.37284/eajhs.6.1.1307

CHICAGO CITATION

Onsomu, Elijah O., DaKysha Moore, James K. Kimani and Benta A. Abuya. 2023. "Effect of Mass Media Exposure on HIV/AIDS Stigma Among Kenyan Women and Men". *East African Journal of Health and Science* 6 (1), 232-250. https://doi.org/10.37284/eajhs.6.1.1307.

HARVARD CITATION

Onsomu, E. O., Moore, D., Kimani, J. K. & Abuya, B. A. (2023) "Effect of Mass Media Exposure on HIV/AIDS Stigma Among Kenyan Women and Men", *East African Journal of Health and Science*, 6(1), pp. 232-250. doi: 10.37284/eajhs.6.1.1307.

IEEE CITATION

E. O. Onsomu, D. Moore, J. K. Kimani & B. A. Abuya, "Effect of Mass Media Exposure on HIV/AIDS Stigma Among Kenyan Women and Men", *EAJHS*, vol. 6, no. 1, pp. 232-250, Jul. 2023.

MLA CITATION

Onsomu, Elijah O., DaKysha Moore, James K. Kimani & Benta A. Abuya. "Effect of Mass Media Exposure on HIV/AIDS Stigma Among Kenyan Women and Men". *East African Journal of Health and Science*, Vol. 6, no. 1, Jul. 2023, pp. 232-250, doi:10.37284/eajhs.6.1.1307.

INTRODUCTION

At the end of 2021, an estimated 38.4 million people worldwide were living with HIV, and approximately a third were Africans (WHO, 2022). In Kenya, the HIV/AIDS pandemic spans over thirty years. Despite media campaigns to fight it, prevalence (7%) and risk remain high. Ongoing programs seek to increase media awareness campaigns on the risks of acquiring HIV (Grabbe et al., 2010; Jesmin et al., 2013; Kalichman & Simbayi, 2003; Marum et al., 2008; Vidanapathirana et al., 2005). Across Africa, different types of mass media have been used to create awareness of HIV (Noar et al., 2009). However, different populations obtain information from different sources. Programs geared toward scaling-up HIV/AIDS testing should analyse which media best advance their cause.

Since the 1990s, scholars have attested that mass media are useful in motivating people to behave safely (Liskin, 1990), and evidence associates their messaging with a reduction in HIV-related stigma. Using mass media to spread positive messages and images nurtures positive attitudes toward people living with HIV/AIDS (PLHA) and could change social values. A cross-sectional study found that disseminating HIV/AIDS knowledge via mass media, particularly television and radio, reduced audiences' propensity to stigmatise or act as agents of stigma toward People Living with HIV/AIDS (PLHA) (Asamoah et al., 2017). Similar associations between exposure to mass media and reduced stigma have been reported elsewhere. A study in the Eastern Cape province of South Africa found that exposure to mass media in the presence of informal social networks increased HIV knowledge, reduced stigma, and eventually led to behaviour change (Hutchinson et al., 2007).

In Ghana, the media infuse stories with local culture to deliver preventive messages (Frishkopf et al., 2016; Panford et al., 2001). Again, in Ghana, women who accessed mass media were more likely to support teachers with HIV remaining in the classroom than were women with no exposure (Appiah et al., 2022). In Nigeria, a study demonstrated that exposure to HIV-related communication in the media increased knowledge about HIV, which is a strong predictor of reduced stigma (Babalola et al., 2009). These findings are corroborated by a systematic review and meta-analysis indicating that mass media impact on reducing HIV-related stigma increases over time (Aghaei et al., 2023). Evidence also suggests that exposure to mass media affects sexual behaviour. A study examining the direct relationships among HIV stigma, mass media exposure, and unprotected sex in sub-Saharan Africa found that individual-level mass media exposure reduced the likelihood of unprotected sex (Cort et al., 2023).

Stigmatising and discriminating against PLHA have proven key barriers to accessing and using such services as HIV counselling and testing and

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disclosing HIV status to sexual partners, all of which affect disease containment. A study on the relationship between HIV stigma and the use of Voluntary Counseling and Testing (VCT) services in Nigeria showed that high levels of stigma decreased the use of the services (Odimegwu et al., 2013). Misconceptions and lack of understanding about HIV/AIDS have the same effect (Haroun et al., 2016; Letshwenyo-Maruatona et al., 2019).

Thus, one goal of mass media interventions is to destigmatise HIV/AIDS by increasing awareness, knowledge, and demand for testing services (Asamoah et al., 2017; Bago & Lompo, 2019; Jesmin et al., 2013; Letshwenyo-Maruatona et al., 2019; Li et al., 2009). They can also have the opposite effect; research suggests that the metaphors, photos, and terminologies the media use to frame their coverage of HIV/AIDS can accentuate stigma (Ren et al., 2010). In this context, studies show that education level, along with media access, predicts less bias toward PLHA. A study in Ethiopia found that more highly educated women with greater access to mass media were less likely to stigmatise (Gurmu et al., 2015).

Frequency of exposure to the media is also associated with HIV-related knowledge and stigmatising attitudes. In Ghana, a study found that the frequency of exposure to the media, particularly print media and television, was associated with an increase in HIV-related knowledge. Those with moderate-to-high levels of HIV-related knowledge were less prone to stigmatising attitudes (Boah et al., 2022).

Socioeconomic factors have also been associated with HIV-related stigma. Research conducted in Vietnam to assess stigma and discrimination experienced by PLHA across such social settings as family, community, and healthcare facilities found that unemployed, poor, and middle-class patients reported more stigmatisation and discrimination from the community (Tran et al., 2019). Similarly, evidence from other studies shows stigma and discrimination are experienced at different levels in individual, family, community, healthcare system, and media contexts (Bekalu & Eggermont, 2015; Turan et al., 2017). Research on gender differences in HIV-related stigma in Kenya showed that women were more stigmatising than men (Mugoyaa & Ernst, 2014). Overall, limited research on the types of media and level of exposure on the likelihood of reduced HIV/AIDS-related stigma in Kenya. This study seeks to contribute evidence to better understand to what extent the mass media types and level of exposure affect PLHA.

We realise that different types of media exposure affect PLHA in distinct ways. Our study is designed to answer the following question: Which mass media exposure type has the greatest effect on HIV/AIDS-related stigma among women and men in Kenya?

METHODS

Data

The study is based on cross-sectional data from the Kenya Demographic and Health Surveys, 2008/09. A pair of two survey dataset files were merged, 1) the Individual Recode dataset (women) and HIV Recode dataset; and 2) the Male Recode dataset and HIV Recode dataset. The sample was limited to women 15-49 years (n = 3,811) and men 15-54 years (n = 3,095) who responded to questions about whether they were tested for HIV/AIDS and their media use (frequency of reading a newspaper or magazine, listening to the radio, and/or watching television). It allowed us to estimate the associations between some or all media and HIV/AIDS stigmatising behaviours, such as fear of direct contact with PLHA, opposition to teaching condom use in schools and feeling ashamed of family members with HIV/AIDS. All data were weighted to attain linearised standard errors; hence, the analyses are based on individual-level information (StataCorp, 2021).

Outcome, Exposure, and Control Variables

Stigma: Participants were asked various questions that measured stigma with responses recorded as yes - "1" - for the presence of stigma or no - "0" -

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Article DOI: https://doi.org/10.37284/eajhs.6.1.1307

for the absence of stigma. They were asked: 1) Would you buy fresh vegetables from a shopkeeper or vendor if you knew that this person had the AIDS virus? 2) If a member of your family got infected with the AIDS virus, would you want to keep it a secret or not? 3) If a member of your family became sick with AIDS, would you be willing to take care of her or him in your own household? 4) In your opinion, if a female teacher has the AIDS virus but is not sick, should she be allowed to continue teaching in the school? and 5) Should children aged 12-14 years be taught about using condoms to avoid getting AIDS?

We used common factor analysis to identify patterns in the responses to the five questions. Weights and correlations between each variable (factor loading) were determined at < 0.3 (Torres-Reyna, n.d.; University of California, Los Angeles [UCLA], 2021). The retained factors were renamed for the theme they mostly explained. The retained factors that explained most of the total variance were used to generate dichotomous variables, which were used for the final analyses. Three main themes related to stigma were identified: 1) fear of direct contact with PLHA, 2) teaching condom use in schools, and 3) shame about a family member with AIDS.

Media: The exposure variables - reading a newspaper/magazine, listening to the radio, watching television, and consuming all media - are categorical and seek to measure an individual's primary source of information and frequency of use. Exposure variable responses were "not at all", "less than once a week", "at least once a week", and "almost every day". They were included in separate multivariate logistic regression models.

Control Variables: Confounding and other factors that could explain the outcome were controlled in this study. Stepwise logistic regression analysis was used in determining the covariates used as controls. They included age, education, religion, marital status, ethnicity, wealth, occupation, residential status, circumcision, and VCT (HIV testing).

Data Analysis

The statistical software STATA version 17.0 (StataCorp, 2021) was used for all data analyses, including descriptive, bivariate, univariate, and multivariate. Bivariate analyses were used to estimate the prevalence of various stigmas by the exposures and study control variables. While a stepwise logistic regression analysis was performed to determine which control variables to include in the model, we also used bivariate analyses with chi-square tests for significance to reassess them. Those with a significant p-value were re-included in the final model. Univariate logistic regression analyses were used to identify the association between stigma and the mass media exposure variables. Last, multivariate logistic regression analyses were conducted by including the identified control variables through a forward stepwise regression method. Both unadjusted and adjusted analyses were stratified by gender and reported unadjusted or adjusted odds ratios (ORs) and 95% confidence intervals, with study significance set at $p < 0.05$.

RESULTS

Descriptive Analysis

The study included all participants who agreed to VCT; of them, 8.34% (n = 318) of women and 4.98% (n = 154) of men tested positive for HIV. Among all study participants, 44% (n = 1,617) of women and 33.68% (n = 1,040) of men expressed stigma associated with direct contact with PLHV; 39.35% (n = 1,487) of women and 33.11% (n = 1,022) of men opposed teaching condom- use in schools; 46.89% (n = 1,771) of women and 33.3% (n = 1,028) of men felt shame about PLVH.

Concerning media consumption, 17.5% (n = 653) of women who read newspapers and magazines indicated that they did so at least once a week; only 5.67% (n = 215) read almost every day. For men, the figures are 29.61% (n = 916) and 13.7% (n = 424), respectively. For women who listened to the radio, 15.91% (n = 606) indicated that they did so at least once a week; 58.32% (n = 2221) did so almost every day. For men, the figures are 13.09% (n = 405) and 76.14% (n = 2355),

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Article DOI: https://doi.org/10.37284/eajhs.6.1.1307

respectively. Among women who watched television, 8.98% (n = 342) did so at least once a week, and 25.75% (n = 981) watched almost every day. For men, the figures are 17.49% (n = 541) and 30.64% (n = 948), respectively. For all media (newspapers/magazines, radio, and television), 14.62% (n = 557) of women consulted them at least once a week, and 63.34% (n = 2414) almost every day. For men, the figures are 11.54% (n = 358) and 81.07% (n = 2509), respectively (see *Table 1*).

Table 1: Study descriptive statistics

Variable		Women		Men	
		n	%	n	%
HIV/AIDS Stigma direct contact	Total	3779	100	3088	100
	No	2,162	57.21	2,048	66.32
	Yes	1617	42.79	1,040	33.68
HIV/AIDS Stigma condom use teaching	Total	3779	100	3087	100
	No	2,292	60.65	2,065	66.89
	Yes	1487	39.35	1,022	33.11
HIV/AIDS Stigma shame	Total	3777	100	3087	100
	No	2,006	53.11	2,059	66.7
	Yes	1,771	46.89	1,028	33.3
Read newspaper	Total	3,808	100	3,094	100
	Not at all	2229	58.53	1007	32.55
	Less than once a week	711	18.67	747	24.14
	At least once a week	653	17.15	916	29.61
	Almost every day	215	5.65	424	13.7
Listen to radio	Total	3808	100	3093	100
	Not at all	677	17.78	154	4.98
	Less than once a week	304	7.98	179	5.79
	At least once a week	606	15.91	405	13.09
	Almost every day	2221	58.32	2355	76.14
Watch television	Total	3810	100	3094	100
	Not at all	2088	54.8	1013	32.74
	Less than once a week	399	10.47	592	19.13
	At least once a week	342	8.98	541	17.49
	Almost every day	981	25.75	948	30.64
All Media¥	Total	3811	100	3095	100
	Not at all	569	14.93	79	2.55
	Less than once a week	271	7.11	149	4.81
	At least once a week	557	14.62	358	11.57
	Almost every day	2414	63.34	2509	81.07
HIV/AIDS Status	Total	3811	100	3095	100
	Negative	3493	91.66	2941	95.02
	Positive	318	8.34	154	4.98
Age	Total	3811	100	3095	100
	15-19	798	20.94	704	22.75
	20-24	811	21.28	544	17.58
	25-29	629	16.5	431	13.93
	30-34	516	13.54	428	13.83
	35-39	412	10.81	314	10.15
	40-44	325	8.53	263	8.5
	45-49	320	8.4	223	7.21
	50-54	-	-	188	6.07

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Article DOI: https://doi.org/10.37284/eajhs.6.1.1307

Variable		Women		Men	
		n	%	n	%
Education	Total	3811	100	3095	100
	Less than primary/none	519	13.62	177	5.72
	Primary	2033	53.35	1602	51.79
	Secondary	944	24.77	973	31.44
	Higher/college/graduate	315	8.27	342	11.05
Religion	Total	3808	100	3093	100
	Protestant	2352	61.76	1783	57.65
	Roman catholic	802	21.06	754	24.38
	Muslim	558	14.65	398	12.87
	Other religions	96	2.52	158	5.11
Marital status	Total	3811	100	3095	100
	Never married	1142	29.97	1350	43.62
	Currently married	2285	59.96	1622	52.41
	Formerly married	384	10.08	123	3.97
Ethnicity	Total	3810	100	3095	100
	Kikuyu	669	17.56	502	16.22
	Luhya	584	15.33	521	16.83
	Luo	527	13.83	434	14.02
	Kalenjin	363	9.53	287	9.27
	Kamba	297	7.8	251	8.11
	Kisii	211	5.54	178	5.75
	Meru	174	4.57	149	4.81
	Mijikenda/Swahili	312	8.19	244	7.88
	Somalia	256	6.72	180	5.82
	Other Ethnicities/Tribes	417	10.94	349	11.28
Wealth	Total	3811	100	3095	100
	Poorest/Poorer	1398	36.68	1050	33.93
	Middle	630	16.53	518	16.74
	Richer/Richest	1783	46.79	1527	49.34
Occupation	Total	3800	100	3051	100
	Not Working	1681	44.24	425	13.93
	Teaching/Professional	679	17.87	582	19.08
	Agriculture/Self Employed	758	19.95	1041	34.12
	Sales	209	5.5	199	6.52
	Other Occupations	473	12.45	804	26.35
Residential Status	Total	3811	100	3095	100
	Urban	1093	28.68	943	30.47
	Rural	2718	71.32	2152	69.53
Circumcision	Total	3644	100	3095	100
	No	2529	69.4	498	16.09
	Yes	1115	30.6	2597	83.91
Voluntary Counselling and Testing	Total	3767	100	3087	100
	No	1506	1002	1792	58.05
	Yes	2261	660	1295	41.95

¥All media include a combination of reading newspaper, listening to radio, and watching television.

Bivariate Analysis

Stigma related to having direct contact with PLHA was prevalent among women who indicated that they do not read newspapers and magazines at all, especially compared to those who indicated that they do so almost every day (28.85% vs 1.01%; $F[2.68, 1016.66] = 33.26$; $p <$

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0.001). For television, the figures were 26.88% vs 5.42% (F[2.92, 1108.6] = 29.05; $p < 0.001$) for women who indicated that they do not watch at all compared to those who watch almost every day. The trend was the opposite for those who indicated that they never listen to the radio or consult all media compared to those who listen or use all media almost every day (7.97% vs 21.62%; F[2.79, 1016.25 = 18.75]; $p < 0.001$; and 6.89% vs 23.05%; F[2.77, 1053.35 = 24.3]; $p < 0.001$), respectively (see *Table 2*).

Stigma related to teaching condom use in schools was prevalent among women who indicated that they do not read newspapers and magazines at all compared to those who do so almost every day (23.62% vs 1.81%; F[2.51, 954.03] = 0.95; $p < 0.001$). For television, the proportions are 24.49% vs 7.86% (F[2.78, 1055.27] = 8; $p < 0.001$). For those who indicated that they never listen to radio or use all media compared to those who do one or the other almost every day, the figures are 7.14% vs 22.16% (F[2.76, 1049.12 = 9.33]; $p < 0.001$) and 5.91% vs 24.31% (F[2.72, 1031.7 = 8.09]; $p < 0.001$), respectively. We found no association between shame related to HIV/AIDS stigma and any type of media among women (see *Table 2*).

Among men, similar significant findings were observed for the associations between media and HIV/AIDS stigma related to direct contact (all $p < 0.001$) and teaching condom use (all $p < 0.01$), respectively. However, we did find associations between shame and reading newspapers (9.79% vs 4.89%; F[2.91, 1106.41 = 4.67]; $p < 0.01$) and watching television (8.9% vs 10.35%; F[2.89, 1099.46 = 2.59]; $p < 0.05$) (see *Table 3*).

Univariate Logistic Regression

Associations between the exposure variables and the main outcome measure were statistically significant.

HIV/AIDS Stigma Related to Direct Contact

Women who read newspapers/magazines sometimes, at least once a week, or almost every day were 48% (UOR = 0.52, $p < 0.001$), 46% (UOR = 0.54, $p < 0.001$), or 36% (UOR = 0.64, $p < 0.001$) less likely to stigmatise direct contact with PLHA than those who never read newspapers/magazines. Those who listened to radio at least once a week or almost every day were 32% (UOR =0.68, $p < 0.01$) and 30% (UOR = 0.70, $p < 0.001$) less likely to stigmatise than those who never listened. Those who watch television at least once a week or almost every day were 20% (UOR = 0.80, $p < 0.01$) and 33% (UOR = 0.67, $p < 0.001$) less likely to stigmatise than those who never watch. Those who use all forms of media at least once a week or almost every day were 36% (UOR = 0.64, $p < 0.01$) and 34% (UOR = 0.66, $p < 0.001$) less likely to stigmatise than those who do not (see *Table 4*).

Men who read newspapers/magazines sometimes, at least once a week, or almost every day were 54% (UOR = 0.46, $p < 0.001$), 38% (UOR = 0.62, $p < 0.001$), and 39% (UOR = 0.61, $p < 0.001$) less likely to stigmatise direct contact with PLHA than those who do not read newspapers/magazines at all. Those who listen to radio at least once a week or almost every day were 29% (UOR =0.71, $p < 0.05$) and 32% (UOR = 0.68, $p < 0.001$) less likely to stigmatise than those who never listen. Those who watch television sometimes, at least once a week, or almost every day were 40% (UOR = 0.60, $p < 0.001$), 29% (UOR = 0.71, $p < 0.001$), and 27% (UOR = 0.73, $p < 0.001$) less likely to stigmatise than those who never watch. Those who use all forms of media at least once a week or almost every day were 35% (UOR = 0.65, $p < 0.05$) and 41% (UOR = 0.59, $p < 0.001$) less likely to stigmatise than those who do not (see *Table 7*).

HIV/AIDS Stigma Related to Teaching Condom Use in Schools

Women who listen to radio sometimes, at least once a week, or almost every day were 49% (UOR = 0.51, $p < 0.001$), 18% (UOR = 0.82, $p < 0.01$), and 22% (UOR = 0.78, $p < 0.001$) less likely to oppose such teaching than those who never listen. Those who watch television sometimes or almost every day were 35% (UOR = 0.65, $p < 0.01$) and 16% (UOR = 0.84, $p < 0.001$) less likely to oppose such teaching than those who never watch. Those who use all forms of media sometimes, at least

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once a week, or almost every day were 52% (UOR = 0.48, $p < 0.01$), 22% (UOR = 0.78, $p < 0.01$), and 23% (UOR = 0.77, $p < 0.001$) less likely to oppose such teaching than those who never do (see *Table 5*).

For men, those who read newspapers/magazines at least once a week or almost every day were 14% (UOR = 0.86, $p < 0.05$) and 17% (UOR = 0.83, $p < 0.01$) less likely to oppose HIV-related teaching than those who never do. Those who watch television at least once a week or almost every day were 17% (UOR = 0.83, $p < 0.05$) and 14% (UOR = 0.86, $p < 0.001$) less likely to oppose such teaching than those who never do (see *Table 8*).

HIV/AIDS Stigma Related to Shame about a Family Member with AIDS

Women who read newspapers/magazines sometimes were 26% (UOR = 0.74, $p < 0.05$) less likely to feel shame than those who never do (see *Table 6*). Men who read newspapers/magazines sometimes or almost every day were 28% (UOR = 0.72, $p < 0.05$) less likely and 13% (UOR = 1.13, $p < 0.05$) more likely to feel shame than those who never do (see *Table 9*).

Multivariate Logistic Regression

The adjusted odds ratios associated with media and HIV/AIDS stigma were slightly attenuated after adjusting for study control factors.

HIV/AIDS Stigma Related to Direct Contact

Women who read newspapers/magazines less than once a week or at least once a week were 29% (AOR = 0.71, $p < 0.05$) and 21% (AOR = 0.79, $p <0.01$) less likely to stigmatise than those who never do. Those who watch television almost every day were 19% (AOR = 0.81, $p < 0.001$) less likely to stigmatise than those who never watch. Women who use all forms of media almost every day were 11% (AOR = 0.89, $p < 0.05$) less likely to stigmatise than those who never use all forms of media (see *Table 10*).

Men who read newspapers/magazines less than once a week, at least once a week, or almost every day were 32% (AOR = 0.68, $p < 0.05$), 19% (AOR = 0.81, $p < 0.01$), and 18% (AOR = 0.82, $p < 0.05$) less likely to stigmatise than those who never do. Men who listen to radio almost every day were 24% (AOR = 0.76, $p < 0.01$) less likely to stigmatise than those who never do. Men who watch television less than once a week were 27% (AOR = 0.73, $p < 0.05$) less likely to stigmatise than those who never watch. Last, men who use all forms of media almost every day were 25% (AOR = 0.75, $p < 0.01$) less likely to stigmatise than those who do not use all forms of media (see *Table 11*).

HIV/AIDS Stigma Related to Teaching Condom Use in Schools

Women who listened to the radio less than once a week or almost every day were 45% (AOR = 0.55, $p < 0.01$) and 20% (AOR = 0.80, $p < 0.001$) less likely to oppose such teaching than those who never listened. Women who watch television less than once a week or almost every day were 32% (AOR = 0.68, $p < 0.05$) and 21% (AOR = 0.79, $p < 0.001$) less likely to oppose such teaching than those who never watch television. Women who use all forms of media almost every day were 48% (AOR = 0.52, $p < 0.001$) less likely to oppose such teaching than those who do not use all forms of media (see *Table 10*). Men who listen to radio less than once a week were 80% (AOR = 1.80, $p < 0.05$) more likely to stigmatise such teaching than men who never listen (see *Table 11*).

HIV/AIDS Stigma Related to Shame Over a Family Member with AIDS

Women who read newspapers/magazines less than once a week were 26% (AOR = 0.74, $p < 0.05$) less likely to feel such shame than those who never do (see *Table 10*). Men who read newspapers/magazines less than once a week were 26% (AOR = 0.74, $p < 0.05$) less likely to feel such shame than those who never do (see *Table 11*).

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Article DOI: https://doi.org/10.37284/eajhs.6.1.1307

Table 2: Bivariate analysis, number, and percentage of the association between media and HIV/AIDS stigma among women in Kenya

Variables		Women											
		HIV/AIDS Stigma Direct Contact				HIV/AIDS Stigma Condom Use Teaching				HIV/AIDS Stigma Shame			
		No		Yes		No		Yes		No		Yes	
		n	%	n	%	n	%	n	%	n	%	n	%
Read newspaper	Total	2,161	58.39	1,615	41.61	2290	59.83	1486	40.17	2005	56.01	1769	43.99
	Not at all	1039	27.25	1161	28.85	1253	32.47	947	23.62	1120	29.96	1080	26.16
	Less than once a week	472	13	238	7.2	465	12.49	245	7.71	407	12.29	303	7.92
	At least once a week	487	14.5	164	4.55	427	12.01	224	7.03	355	10.98	294	8.03
	Almost every day	163	3.64	52	1.01	145	2.85	70	1.81	123	2.77	92	1.88
		$F(2.68, 1016.66) = 33.26$***				$F(2.51, 954.03) = 0.95$***				$F(2.65, 1008.46) = 1.97$			
Listen to radio	Total	2162	58.45	1614	41.55	2290	59.84	1486	40.16	2005	56.01	1769	43.99
	Not at all	227	5.13	429	7.97	294	5.97	362	7.14	318	7.25	337	5.85
	Less than once a week	139	4.29	164	4.88	181	5.73	122	3.44	143	5.28	160	3.89
	At least once a week	335	9.64	267	7.08	362	9.3	240	7.42	297	8.63	305	8.09
	Almost every day	1461	39.39	754	21.62	1453	38.85	762	22.16	1247	34.84	967	26.16
		$F(2.79, 1016.25) = 18.71$***				$F(2.76, 1049.12) = 9.33$***				$F(2.56, 974.38) = 0.96$			
Watch television	Total	2162	58.41	1616	41.59	2291	59.84	1487	40.16	2006	55.99	1770	44.01
	Not at all	1005	27.59	1057	26.88	1144	29.98	918	24.49	1082	30.16	978	24.29
	Less than once a week	213	6.25	186	5.75	255	7.83	144	4.18	223	7.26	176	4.75
	At least once a week	208	5.67	132	3.54	218	5.58	122	3.63	160	4.42	180	4.79
	Almost every day	736	18.9	241	5.42	674	16.46	303	7.86	541	14.15	436	10.18
		$F(2.92, 1108.6) = 29.05$***				$F(2.78, 1055.27) = 8$***				$F(2.64, 1004.52) = 1.78$			
All Media[¥]	Total	2162	58.4	1617	41.6	2292	59.84	1487	40.16	2006	55.99	1771	44.01
	Not at all	169	3.67	381	6.89	240	4.65	310	5.91	268	5.94	282	4.62
	Less than once a week	106	2.97	164	4.64	155	4.72	115	2.89	130	4.33	140	3.29
	At least once a week	300	9.09	254	7.02	324	9.07	230	7.04	279	8.56	274	7.55
	Almost every day	1587	42.67	818	23.05	1573	41.41	832	24.31	1329	37.16	1075	28.55
		$F(2.77, 1053.35) = 24.3$***				$F(2.72, 1031.7) = 8.09$***				$F(2.85, 1083.25) = 0.41$			

*$p < .05$; **$p < .01$; ***$p < .001$

[¥]*All media include a combination of reading newspaper, listening to radio, and watching television.*

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Table 3: Bivariate analysis, number, and percentage of the association between media and HIV/AIDS stigma among men in Kenya

Variables		Men											
		HIV/AIDS Stigma Direct Contact				HIV/AIDS Stigma Condom Use Teaching				HIV/AIDS Stigma Shame			
		No		Yes		No		Yes		No		Yes	
		N	%	n	%	n	%	n	%	n	%	n	%
Read newspaper	Total	2,047	69.21	1,040	30.79	2065	70.11	1021	29.89	2059	68.85	1027	31.15
	Not at all	509	16.92	491	14.28	589	20.44	411	10.78	646	21.42	354	9.79
	Less than once a week	515	16.83	232	6.57	523	16.4	224	7.02	549	17.59	198	5.81
	At least once a week	675	25.19	241	8.02	646	23.86	269	9.29	600	22.53	315	10.65
	Almost every day	348	10.28	76	1.92	307	9.41	117	2.8	264	7.31	160	4.89
		$F(2.95, 1120.91) = 25.86$***				$F(2.71, 1030.56) = 3.69$**				$F(2.91, 1106.41) = 4.67$**			
Listen to radio	Total	2047	69.23	1039	30.77	2063	70.07	1022	29.93	2057	68.81	1028	31.19
	Not at all	68	2.18	83	2.62	92	3.1	58	1.61	94	3.38	57	1.41
	Less than once a week	105	3.21	73	2.19	96	2.97	82	2.44	121	4.2	57	1.21
	At least once a week	241	8.78	163	5.36	268	9.73	136	4.43	266	9.33	137	4.77
	Almost every day	1633	55.06	720	20.6	1607	54.27	746	21.46	1576	51.9	777	23.79
		$F(2.91, 1106.48) = 11.21$***				$F(2.75, 1044.48) = 4.01$**				$F(2.87, 1090.49) = 1.37$			
Watch television	Total	2047	69.22	1040	30.78	2064	70.06	1022	29.94	2059	68.84	1027	31.16
	Not at all	553	18.29	454	13.17	598	20.28	408	11.13	681	22.58	326	8.9
	Less than once a week	387	14.14	205	6.11	414	14.15	178	6.12	419	14.6	172	5.61
	At least once a week	376	13.22	164	4.83	394	13.13	146	4.93	340	11.75	200	6.3
	Almost every day	731	23.57	217	6.67	658	22.5	290	7.77	619	19.9	329	10.35
		$F(2.75, 1044.78) = 15.75$***				$F(2.93, 1112.19) = 4.78$**				$F(2.89, 1099.46) = 2.59$*			
All Media[¥]	Total	2048	69.23	1040	30.77	2065	70.07	1022	29.93	2059	68.81	1028	31.19
	Not at all	26	0.74	50	1.31	44	1.23	32	0.82	46	1.49	30	0.56
	Less than once a week	75	2.2	73	2.18	77	2.21	71	2.18	101	3.4	47	0.99
	At least once a week	196	6.99	161	5.22	236	8.18	120	3.94	236	8.65	120	3.51
	Almost every day	1751	59.3	756	22.06	1708	58.46	799	22.98	1676	55.28	831	26.12
		$F(2.89, 1098.72) = 17.84$***				$F(2.57, 977.25) = 5.5$**				$F(2.92, 1109.67) = 1.46$			

**p < .05; **p < .01; ***p < .001*

[¥]All media include a combination of reading newspaper, listening to radio, and watching television.

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Table 4: Unadjusted odds ratios (UORs) and 95% confidence intervals (CIs) of the association between media and HIV/AIDS stigma (direct contact) in a univariate logistic regression model among women in Kenya.

HIV/AIDS Stigma		Women										
		Read Newspaper/Magazine			Listen to Radio			Watch Television			All Media¥		
		UOR	95%	CI	UOR	95%	CI	UOR	95%	CI	UOR	0.95	CI
Media	Not at all	1(Ref)			1(Ref)			1(Ref)			1(Ref)		
	Sometime	0.52***	0.4	0.69	0.72	0.47	1.11	0.94	0.69	1.29	0.83	0.53	1.31
	At least once a week	0.54***	0.47	0.64	0.68***	0.59	0.8	0.8**	0.68	0.95	0.64***	0.53	0.77
	Almost every day	0.64***	0.55	0.75	0.70***	0.64	0.78	0.67***	0.6	0.73	0.66***	0.60	0.73

Table 5: Unadjusted odds ratios (ORs) and 95% confidence intervals (CIs) of the association between media and HIV/AIDS stigma (condom use teaching in schools) in a univariate logistic regression model among women in Kenya.

HIV/AIDS Stigma		Women										
		Read Newspaper/Magazine			Listen to Radio			Watch Television			All Media¥		
		UOR	95%	CI	UOR	95%	CI	UOR	95%	CI	UOR	0.95	CI
Media	Not at all	1(Ref)			1(Ref)			1(Ref)			1(Ref)		
	Sometime	0.85	0.6	1.21	0.51***	0.34	0.74	0.65**	0.48	0.89	0.48**	0.30	0.78
	At least once a week	0.9	0.79	1.02	0.82**	0.7	0.96	0.89	0.74	1.08	0.78**	0.65	0.93
	Almost every day	0.96	0.83	1.1	0.78***	0.71	0.86	0.84***	0.78	0.89	0.77***	0.70	0.85

Table 6: Unadjusted odds ratios (UORs) and 95% confidence intervals (CIs) of the association between media and HIV/AIDS stigma (shame of family member with aids) in a univariate logistic regression model among women in Kenya.

HIV/AIDS Stigma		Women										
		Read Newspaper/Magazine			Listen to Radio			Watch Television			All Media¥		
		UOR	95%	CI	UOR	95%	CI	UOR	95%	CI	UOR	95%	CI
Media	Not at all	1(Ref)			1(Ref)			1(Ref)			1(Ref)		
	Sometime	0.74*	0.55	0.99	0.91	0.56	1.47	0.81	0.56	1.18	0.98	0.63	1.52
	At least once a week	0.91	0.79	1.06	1.07	0.93	1.25	1.16	0.98	1.37	1.06	0.89	1.27
	Almost every day	0.92	0.8	1.06	0.97	0.9	1.06	0.96	0.87	1.06	1.00	0.92	1.08

**p < .05; **p < .01; ***p < .001 | 1(Ref): Reference category*

¥All media include a combination of reading newspaper, listening to radio, and watching television.

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Table 7: Unadjusted odds ratios (UORs) and 95% confidence intervals (CIs) of the association between media and HIV/AIDS stigma (direct contact) in a univariate logistic regression model among men in Kenya.

HIV/AIDS Stigma		Men										
		Read Newspaper/Magazine			Listen to Radio			Watch Television			All Media¥		
		UOR	95%	CI	UOR	95%	CI	UOR	95%	CI	UOR	0.95	CI
Media	Not at all	1(Ref)			1(Ref)			1(Ref)			1(Ref)		
	Sometime	0.46***	0.34	0.63	0.57	0.3	1.07	0.6***	0.46	0.78	0.55	0.25	1.22
	At least once a week	0.62***	0.54	0.71	0.71*	0.54	0.94	0.71***	0.6	0.84	0.65*	0.46	0.91
	Almost every day	0.61***	0.53	0.69	0.68***	0.57	0.81	0.73***	0.66	0.82	0.59***	0.48	0.74

Table 8: Unadjusted odds ratios (UORs) and 95% confidence intervals (CIs) of the association between media and HIV/AIDS stigma (condom use teaching in schools) in a univariate logistic regression model among men in Kenya.

HIV/AIDS Stigma		Men										
		Read Newspaper/Magazine			Listen to Radio			Watch Television			All Media¥		
		UOR	95%	CI	UOR	95%	CI	UOR	95%	CI	UOR	0.95	CI
Media	Not at all	1(Ref)			1(Ref)			1(Ref)			1(Ref)		
	Sometime	0.81	0.62	1.04	1.6	0.93	2.74	0.79	0.6	1.04	1.47	0.78	2.79
	At least once a week	0.86*	0.74	0.99	0.94	0.74	1.2	0.83*	0.71	0.96	0.85	0.62	1.15
	Almost every day	0.83**	0.74	0.92	0.92	0.79	1.06	0.86***	0.79	0.93	0.84	0.70	1.01

Table 9: Unadjusted odds ratios (UORs) and 95% confidence intervals (CIs) of the association between media and HIV/AIDS stigma (shame of family member with aids) in a univariate logistic regression model among men in Kenya.

HIV/AIDS Stigma		Men										
		Read Newspaper/Magazine			Listen to Radio			Watch Television			All Media¥		
		UOR	95%	CI	UOR	95%	CI	UOR	95%	CI	UOR	0.95	CI
Media	Not at all	1(Ref)			1(Ref)			1(Ref)			1(Ref)		
	Sometime	0.72*	0.54	0.96	0.69	0.36	1.33	0.97	0.72	1.31	0.77	0.35	1.70
	At least once a week	1.01	0.89	1.56	1.11	0.85	1.45	1.16	0.99	1.36	1.04	0.72	1.50
	Almost every day	1.13*	1	1.28	1.03	0.89	1.21	1.1	0.99	1.21	1.08	0.86	1.36

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Table 10: Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) of the association between HIV/AIDS stigma and media in a multivariate logistic regression model among women in Kenya.

HIV/AIDS Stigma		Women								
		Direct Contact			Condom Use Teaching in Schools			Shame of Family Member with AIDS		
		AOR	95%	CI	AOR	95%	CI	AOR	95%	CI
Read newspaper	Not at all	1(Ref)			1(Ref)			1(Ref)		
	Less than once a week	0.71*	0.53	0.95	0.92	0.64	1.33	0.74*	0.56	0.98
	At least once a week	0.79**	0.65	0.95	0.93	0.81	1.06	0.91	0.79	1.05
	Almost every day	0.88	0.72	1.08	0.98	0.83	1.15	0.93	0.78	1.11
Listen to radio	Not at all	1(Ref)			1(Ref)			1(Ref)		
	Less than once a week	1.33	0.81	2.18	0.55**	0.35	0.87	1.00	0.63	1.60
	At least once a week	0.89	0.76	1.05	0.87	0.73	1.05	1.13	0.96	1.34
	Almost every day	0.90	0.81	1.01	0.80***	0.71	0.90	1.02	0.92	1.13
Watch television	Not at all	1(Ref)			1(Ref)			1(Ref)		
	Less than once a week	1.12	0.77	1.63	0.68*	0.49	0.95	0.79	0.54	1.15
	At least once a week	0.92	0.78	1.09	0.90	0.74	1.08	1.13	0.94	1.37
	Almost every day	0.81***	0.72	0.90	0.79***	0.73	0.86	0.97	0.88	1.08
All Media[¥]	Not at all	1(Ref)			1(Ref)			1(Ref)		
	Less than once a week	1.60	0.89	2.86	0.52*	0.30	0.91	1.09	0.69	1.70
	At least once a week	0.86	0.71	1.03	0.84	0.67	1.04	1.12	0.92	1.37
	Almost every day	0.89*	0.80	1.00	0.79***	0.69	0.89	1.05	0.94	1.18

**p < .05; **p < .01; ***p < .001 | 1(Ref): Reference category*

[§]Adjusted for: age, education, religion, marital status, ethnicity, wealth, occupation, residential status, circumcision, and voluntary counselling and testing (tested or not)

[¥]All media include a combination of reading newspaper, listening to radio, and watching television.

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Table 11: Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) of the association between HIV/AIDS stigma and media in a multivariate logistic regression model among men in Kenya

HIV/AIDS Stigma		Men								
		Direct Contact			Condom Use Teaching in Schools			Shame of Family Member with AIDS		
		AOR	0.95	CI	AOR	0.95	CI	AOR	0.95	CI
Read newspaper	Not at all	1(Ref)			1(Ref)			1(Ref)		
	Less than once a week	0.68*	0.49	0.94	1.06	0.79	1.41	0.74*	0.55	1.00
	At least once a week	0.81**	0.71	0.93	0.97	0.83	1.14	0.99	0.85	1.16
	Almost every day	0.82*	0.69	0.97	0.90	0.78	1.03	1.08	0.94	1.26
Listen to radio	Not at all	1(Ref)			1(Ref)			1(Ref)		
	Less than once a week	0.55	0.28	1.10	1.80*	1.02	3.19	0.74	0.38	1.42
	At least once a week	0.77	0.58	1.03	0.97	0.77	1.23	1.04	0.80	1.35
	Almost every day	0.76**	0.62	0.92	0.98	0.85	1.13	1.01	0.87	1.17
Watch television	Not at all	1(Ref)			1(Ref)			1(Ref)		
	Less than once a week	0.73*	0.55	0.98	0.97	0.71	1.32	1.04	0.75	1.43
	At least once a week	0.88	0.74	1.03	0.94	0.81	1.10	1.14	0.97	1.34
	Almost every day	0.92	0.81	1.04	0.94	0.85	1.04	1.07	0.96	1.19
All Media[¥]	Not at all	1(Ref)			1(Ref)			1(Ref)		
	Less than once a week	0.67	0.29	1.56	1.83	0.93	3.59	0.80	0.38	1.72
	At least once a week	0.78	0.55	1.11	0.91	0.68	1.23	0.99	0.69	1.40
	Almost every day	0.75**	0.59	0.93	0.93	0.78	1.12	1.04	0.84	1.29

**p < .05; **p < .01; ***p < .001 | 1(Ref): Reference category*

[§]Adjusted for: age, education, religion, marital status, ethnicity, wealth, occupation, residential status, circumcision, and voluntary counselling and testing (tested or not)

[¥]All media include a combination of reading newspaper, listening to radio, and watching television.

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DISCUSSION

We sought to identify the association between mass media messaging and HIV/AIDS stigma among women and men in Kenya who participated in VCT. Overall, we found that all forms of media are crucial to reducing all three expressions of stigma: avoiding direct contact with someone who is HIV positive, opposing condom-use education, and feeling ashamed of a family member with HIV/AIDS. After adjusting for other variables, women who read newspapers and magazines were less likely to stigmatise in all three categories, followed by women who watch television. Listening to the radio only marginally reduced stigmatising behaviour, much less than reading newspapers and magazines and watching television. Similarly, Asamoah et al. (2017) found that television and radio reduced HIV/AIDS stigma among young Ghanaian women.

Women who interacted with media on a continuous basis were less likely to demonstrate HIV/AIDS stigma than those in direct contact with someone with HIV or learning about the disease in school. Media use had no effect on stigma among those who had a family member with HIV/AIDS, indicating that shame is intransigent. However, receiving information about HIV every day from the mass media somehow prepared women to provide care to HIV-positive relatives. Participants might have been more concerned about image - whether others would stigmatise them for having a relative diagnosed with the disease.

Mugoya and Ernst (2014) used the same dataset as this study and found more stigmatising attitudes among women than men. A more recent study in Kenya (Nyaga, 2020) shows negative attitudes toward PLHA are partly based on misunderstandings about how the disease is contracted. Therefore, media messages about HIV in Kenya must be factual and informative.

Our study found that men who used all forms of media tended to stigmatise less in all three categories. However, the form of media had a specific effect on stigmas related to condom-use education and shame about a family member with HIV, which was counterintuitive.

Understanding the media platforms that best disseminate messages that reduce the stigma associated with HIV is critical to reducing disease incidence in Kenya. Stigma can be a barrier to prevention and treatment (Levy et al., 2021). For the past two decades, sub-Saharan countries have used different forms of media to lower HIV stigma. Creel et al. (2011) observed the effects of a radio program in Malawi and found, in some cases, it did help to reduce stigma. Using Demographic Health Survey data (2006-2011) from several sub-Saharan countries, Bekalu et al. (2014) found the media were important in addressing HIV stigma, especially in urban communities. Another study showed media use helped to increase HIV testing and counselling (Onsomu et al., 2013).

Aghaei et al. (2023) stress the importance of understanding the specific media interventions that are effective in reducing HIV stigma. At the same time, health educators and academicians must optimise their messages. We recommend that health educators, academicians, healthcare providers, and health communication professionals in Kenya continue to tailor communication campaigns both culturally and to the specific mass media platform. In the United States, studies show that the more positively mass media images and messages cast living with the disease and scientific advancement, the greater reduction in stigma (He et al., 2022). Addressing stigma among medical providers is also important. Mwarogo (2007) discusses the fear among some Kenyans of differential treatment in a medical setting if they test positive for the disease. Therefore, approaches to remediate HIV-related stigma must be targeted to the setting: family, community, schools, healthcare, and many others.

CONCLUSION, FUTURE DIRECTIONS, AND LIMITATIONS

Overall, we found that media are associated with reduced stigma in Kenya. However, men who

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read newspapers/magazines almost every day or listen to radio less than once a week were more likely to stigmatise such teaching than men who never listen. Media must increase and target their efforts to curb HIV/AIDS stigma in urban and rural areas. Some limitations associated with this study include the nature of the data: the findings are specific to Kenya and cannot be generalised to other sub-Saharan countries. Also, the 2008/09 Kenya Demographic and Health Survey is cross-sectional, so causal relationships between HIV/AIDS stigma and media cannot be determined. The data also did not address the use of emerging media, such as the internet; software applications, including smartphone apps; and social media venues like TikTok, Facebook, or Twitter, all prevalent throughout Kenya.

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