DEBATES

Media use and HIV/AIDS knowledge: a knowledge gap perspective

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SUMMARY
Despite the widespread utilization of the mass media in HIV/AIDS prevention, little is known about the knowledge gap that results from disparities in mass media use. This study examined the relationship between HIV/AIDS-related mass media use and HIV/AIDS-related knowledge among urban and rural residents of northwestern Ethiopia. A hierarchical regression analysis indicated that HIV/AIDS-related mass media use has both sequestering and mainstreaming effects in certain segments of the study population, although it was not a significant predictor of HIV/AIDS-related knowledge in the total population. The knowledge gaps between individuals with high and low education and between individuals who experience high and low levels of interpersonal communication about HIV/AIDS narrowed as HIV/AIDS-related media use increased, but the gap between urban and rural residents widened. The widening gap could be explained by differences in perceptions of information salience and several theoretical assumptions. Current mass media information campaigns, which are often prepared and broadcast from urban centers, may not only fail to improve the HIV/AIDS knowledge of the rural populace but also put rural populations at a disadvantage relative to their urban counterparts. Communication interventions informed by socioecological models might be helpful to redress and/or narrow the widening knowledge gap between urban and rural residents.

Key words: HIV/AIDS knowledge; mass media; socioecological approaches; Ethiopia

INTRODUCTION
HIV/AIDS knowledge is a necessary prerequisite for various behavioral changes aimed at preventing HIV/AIDS in populations at risk. The link between knowledge and behavior has not always been direct and strong (Ajzen et al., 2011), leading several investigators to conclude that knowledge is a necessary but not sufficient condition for behavioral change (Baldwin et al., 1990). However, research suggests that people who are well informed about HIV/AIDS are more likely to accurately assess the threat posed by the virus and engage in preventive behaviors (Anderson et al., 1990). Accordingly, theories such as the Information-Motivation-Behavioral Skills Model (IMB) posit that, ‘information that is directly relevant to HIV transmission and prevention and easy to apply in an individual’s social setting is an initial prerequisite of HIV preventive behavior’ (Fisher et al., 2002: 178). Informing the public and enabling them to gain the knowledge that is necessary for action have therefore remained a major prevention goal in various areas of sub-Saharan Africa where the HIV prevalence has long been the highest.

Given their enormous potential reach and cost-effectiveness (Hutton et al., 2003; Hogan et al., 2005), the mass media have been one of the main tools utilized to inform and/or educate populations at risk about the dangers of the pandemic. Since the early days of the pandemic, the mass media (ranging from conventional print and broadcast media such as radio and television
to new online media) have disseminated prevention information in various places across the globe (Noar, 2009). Although the overall evidence on the impact of mass media interventions on HIV/AIDS-related outcomes is inconsistent, a systematic review by Bertrand et al. (Bertrand et al., 2006) indicated that the mass media could have a considerable impact on at least two HIV/AIDS-related outcomes in the developing world; one is HIV/AIDS-related knowledge.

Despite the widespread utilization of the mass media in HIV/AIDS prevention in sub-Saharan Africa (Agha, 2003; Benefo, 2004; Bertrand et al., 2006; Kuhlmann et al., 2008), little is known about the differential impacts of using the mass media to disseminate information. While a considerable number of studies have shown that levels of HIV/AIDS knowledge vary by age, gender, education, residence and other factors (Li et al., 2004; Pallikkadavath et al., 2005; Ugboma et al., 2011), there is a dearth of research about the factors that are most likely to bring about, contribute to and/or change these variations. The present study attempts to fill this gap by assessing the relationship between HIV/AIDS-related mass media use and HIV/AIDS-related knowledge among a sample of urban and rural residents of northwestern Ethiopia. More specifically, it examines whether HIV/AIDS-related mass media use can predict knowledge about the pandemic and whether mass media use is more likely to increase or decrease the knowledge gaps between segments of the study population. The assessment is informed by two established mass communication theories—the knowledge gap hypothesis (Tichenor et al., 1970, 1980) and cultivation theory (Gerbner and Gross, 1976).

According to the knowledge gap hypothesis, ‘as the infusion of mass media information into a social system increases, segments of the population with higher socioeconomic status tend to acquire this information at a faster rate than lower status segments, so that the gap in knowledge between these segments tends to increase rather than decrease’ [(Tichenor et al., 1970), pp. 159–160]. Several early studies on which the knowledge gap hypothesis was based provided empirical support for this hypothesis (Star and Hughes, 1950; Budd et al., 1966; Tichenor et al., 1970). On the contrary, several other investigations indicated that infusing information into a social system through the mass media did not always create gaps between segments of the population with higher and lower socioeconomic status (SES), often indicated by educational level; some of these interventions even closed the gap (Douglas et al., 1970; Galloway, 1974; Shingi and Mody, 1976). The inconsistency among the studies that originally formulated the knowledge gap hypothesis has apparently led to the exploration of other variables responsible for the differential impacts of mass media information campaigns.

Since the original formulation of the knowledge gap hypothesis, a number of studies have identified various motivational factors, such as concern, attention, salience and participation, which may be responsible for the knowledge gap phenomenon (Genova and Greenberg, 1979; Ettema et al., 1983; Viswanath and Finnegan, 1996; Weenig and Midden, 1997; Kwak, 1999). The findings of these studies suggest that motivation can overpowers education in predicting knowledge gaps, but other investigators have maintained that the knowledge gap is better predicted by a combination of factors (including group membership, perceived information functionality, motivation and education) rather than by motivation alone (Viswanath et al., 1993).

Overall, although empirical support for the knowledge gap hypothesis has been mixed since the early days of the theory, as Ettema et al. (Ettema et al., 1983) remarked, the implications of the hypothesis for health information campaigns have been much clearer. Over the years, the hypothesis has remained a powerful conceptual tool for many investigators who have studied the differential impacts of mass media health communication campaigns among different segments of a social system (Niederdeppe, 2008; Slater et al., 2009).

In a somewhat different and television-focused line of media effects theory, Gerbner’s cultivation theory posits the concept of mainstreaming (Gerbner et al., 1980). In cultivation theory, mainstreaming refers to the power of the media (television, in Gerbner’s original propositions) to have similar effects on individuals with high media consumption, regardless of differences in demographic variables. In other words, people from different demographic groups are more likely to have similar belief systems if their media consumption habits are similar. Hence, seemingly contrary to the original propositions of the knowledge gap hypothesis, this theory implies that as long as individuals have similar levels of media consumption, the gap in their
knowledge is more likely to decrease rather than increase, regardless of differences in education or other SES indicators. The present study utilizes these two theoretical frameworks to assess the possible differential impacts of mass media messages on HIV/AIDS-related knowledge.

Research questions

The present investigation seeks to assess the differential impacts of HIV/AIDS-related mass media use on HIV/AIDS-related knowledge among urban and rural residents of northwestern Ethiopia. As indicated above, previous research within the general framework of the knowledge gap hypothesis has shown that education, perceived salience of the information and interpersonal communication moderate the effects of mass media information campaigns on knowledge. Thus, the present study examines whether HIV/AIDS-related mass media use is more likely to open and widen or narrow and close knowledge gaps between individuals with high and low levels of education, perceived salience of HIV/AIDS-related information and interpersonal communication on HIV/AIDS.

Moreover, the present study seeks to move beyond these individual-level factors and address the moderating role of urban versus rural residence. The place of residence is important in HIV/AIDS information interventions in sub-Saharan Africa for two main reasons—epidemiological and socioecological. Epidemiologically, in sub-Saharan Africa, HIV/AIDS has long been an urban problem. Where household surveys have been conducted, the HIV prevalence has been higher in rural areas only in Senegal. In the remaining countries, the prevalence rates have generally been higher in urban areas than in rural areas, with Ethiopia displaying the most pronounced difference: urban residents are eight times more likely to be HIV-infected than rural residents (UNAIDS, 2009). Consequently, prevention interventions have focused more on urban settings than rural settings (Voeten et al., 2004). It is, therefore, conceivable that the difference in prevalence, which could create different levels of direct experience with HIV/AIDS and knowledge about the pandemic, coupled with intervention imbalances may cause urban–rural disparities in HIV/AIDS-related knowledge. From a socioecological perspective, the urban–rural divide also represents differences in cultural norms, social networks, health facilities and infrastructure (Muturi, 2005; van Donk, 2006; Wilson et al., 2006; Muturi and Mwangi, 2011), which may also lead to variations in HIV/AIDS-related knowledge. Although the urban–rural gap in HIV/AIDS knowledge has been widely studied and well documented by previous studies, including national demographic and health surveys (ECSA, 2005), whether the gap is more likely to narrow or widen as a result of HIV/AIDS-related media use remains largely unknown.

The present study aims to provide answers to the following two questions:

**Research Question 1.** Does media use predict variations in HIV/AIDS-related knowledge after controlling for education, interpersonal communication on HIV/AIDS, perceived salience of HIV/AIDS-related information, and urban versus rural residence?

**Research Question 2.** Does media use open and widen or narrow and close gaps in HIV/AIDS-related knowledge between urban and rural residents, as well as between individuals with high and low levels of education, interpersonal communication on HIV/AIDS and the perceived salience of HIV/AIDS-related information?

**METHODS**

Sample and procedure

A household survey was conducted between March and June 2011 in two urban towns (Bahir Dar and Debre Markos, both zonal cities) and two rural villages (Jajirab and Kurfa) that are located in northwestern Ethiopia. The data were collected from 995 (497 urban and 498 rural) respondents between the ages of 15–34 (urban: \( M = 25.5, SD = 6.0 \); rural: \( M = 25.4, SD = 6.3 \)). In sub-Saharan Africa, HIV is primarily transmitted via heterosexual intercourse (Berkley, 1991; Morison, 2001), and therefore, sexually active young people are the most vulnerable group in the society. Thus, it was appropriate to sample the 15–34 age groups. Of the participants, 46.7 and 53.3% of the urban residents were male and female, respectively, and 46.2 and 53.8% of the rural residents were male and female, respectively. Regarding education, 25.2, 33.2, 25.4 and 16.3% of the urban residents had no education, primary, secondary and tertiary education, respectively, whereas 68.5, 30.3 and 1.2% of the rural residents had no education,
primary and secondary education, respectively, \( \chi^2 (3, N = 995) = 2.90, p = 0.000 \).

Households were randomly selected in the four study areas. In the first urban sample (Bahir Dar), the nine smallest administrative units (locally called kebele) were placed in three clusters based on population characteristics (profession, living conditions and other SES indicators). A kebele was then selected from each cluster on a lottery basis. As most households do not have identification numbers, every other household in a row or in a small cluster was randomly selected. The same procedure was followed in Debre Markos. The seven kebeles were grouped into three clusters, and a kebele was chosen from each group in a lottery. The clustering of the kebeles in both urban samples was performed in consultation with local experts. The rural samples were comprised of very small communities, and every other household in a row or in a small cluster was chosen. The randomly selected households were visited, and the individuals who were available during the visit participated if they were age-eligible, willing to participate and the same gender as the interviewer. Interviewers who had a college-level education (i.e. read aloud questionnaires) the participants to accommodate the majority of the rural respondents who were illiterate and to ensure high response and return rates from those who were literate. By selecting interviewers who were not known locally but were familiar with the local dialect and customs, and by using same-gender interviewer–respondent pairs (Gregson et al., 2002), an attempt was made to minimize social desirability bias. The study proposal with its working protocol was submitted to Bahir Dar University, the academic institution closest to the region where the fieldwork took place, and ethical clearance was obtained.

Measures

A questionnaire was prepared based on a review of relevant literature. It was then translated into Amharic, the native language of the study participants, and administered to small samples of urban \( n = 55 \) and rural \( n = 50 \) residents similar to the study participants to check for clarity and validity. An attempt was made to prevent potential language and cultural differences between urban and rural residents by using the mainstream dialect that the media and various social and administrative institutions currently use to address both groups. The use of a read-questionnaire-aloud method helped to achieve high (almost 100%) return and response rates.

**Dependent variable**

**HIV/AIDS-related knowledge**

A detailed measure of HIV/AIDS knowledge was prepared based on previous measures (Koopman et al., 1990; Zimet, 1992; Carey and Schroder, 2002). The measure comprised 40 items covering seven content areas: awareness of HIV/AIDS \( (\alpha = 0.70) \), modes of transmission \( (\alpha = 0.94) \), prevention of transmission \( (\alpha = 0.87) \), high-risk behaviors \( (\alpha = 0.87) \), appearance of people living with HIV/AIDS (PLWHA) \( (\alpha = 0.80) \), existence of a cure \( (\alpha = 0.81) \) and mortality \( (\alpha = 0.87) \). The items were presented with three response options: yes, no and don’t know. The most prominent problem in measuring knowledge is the confounding of knowledge with belief (Zimet, 1992; Ajzen et al., 2011). There are often situations in which individuals might ‘know’ facts according to experts but do not believe them. One way to measure knowledge per se without confounding it with belief, Zimet (Zimet, 1992) suggests, is to begin knowledge measurement items with the phrase ‘Do most experts say…’ Accordingly, all 40 items used to measure HIV/AIDS-related knowledge in the present study began with ‘Do most experts say…’

**Independent variables**

**HIV/AIDS-related media use**

This variable refers to individuals’ deliberate or non-deliberate use of the mass media (print, radio and television) for HIV/AIDS-related information in the previous month. Three items with seven-point response categories were used: (1) in the last month, how often, on average, did you read HIV/AIDS-related articles/stories in newspapers, pamphlets or brochures? (2) How often did you listen to HIV/AIDS-related messages on the radio? (3) How often did you watch HIV/AIDS-related messages on television? The response categories were 1 = not at all; 2 = once a week; 3 = 2–3 times a week; 4 = 4–5 times a week; 5 = 6–7 times a week; 6 = 8–9 times a week; and 7 = 10 or more times a week. Moreover, for background information, media
availability and overall media use were measured. Media availability was measured by asking respondents to indicate the media sources (radio and television) that were available in working condition in their homes and the specific print products (booklets, newspapers, magazines, pamphlets) that they had access to. Overall media use was measured using items and response categories similar to the variable HIV/AIDS-related media use.

HIV/AIDS-related interpersonal communication
This variable was measured by using a two-item scale with five-point response categories: (1) how often do you participate in HIV/AIDS-related conversations and/or awareness-raising discussions? (2) How often do you talk about HIV/AIDS-related issues with other people? The response categories were as follows: 1 = never, 2 = rarely, 3 = sometimes, 4 = often and 5 = very often. The scale was created by averaging the two items (Cronbach’s $\alpha = 0.85$, $M = 1.64$, $SD = 0.95$).

Urban versus rural residence
This variable was measured with other demographic variables. The participants were asked to identify themselves as either urban or rural. Prior to data collection, the study areas were designated as urban and rural. The designation was made based on relevant literature (Tacoli, 1998; Hart et al., 2005) and the criteria used by the Ethiopian central statistical agency (ECSA, 2005). Accordingly, the urban samples had (1) a population of more than 1000 people who were primarily engaged in non-agricultural activities and (2) a considerable number of commercial and manufacturing establishments and public places, such as hotels, bars and shops. The rural samples had (1) a population of less than 1000 people who were primarily engaged in agricultural activities and (2) no or very few commercial and manufacturing establishments and public places. Urban residence was coded as 1 and rural residence as 0 (urban = 49.9; rural = 50.1%).

Education
Education was measured as one of the demographic variables. It was coded as 1 = no education (46.8%), 2 = primary education (31.8%), 3 = secondary education (13.3%) and 4 = tertiary education (8.1%).

Perceived salience of HIV/AIDS-related information
This variable was assessed with three items. The three items that comprised the measure were based on relevant literature (Griffin et al., 1999): (1) I feel that the HIV/AIDS-related information being disseminated via different channels is relevant for me; (2) I feel that the HIV/AIDS-related information being disseminated via different channels is relevant for residents of my community; (3) I feel that the HIV/AIDS-related information being disseminated via different channels is applicable in my current situation. Response categories ranged from 1 (strongly disagree) to 5 (strongly agree) with a score of 3 corresponding to neutral. The scale had good internal consistency (Cronbach’s $\alpha = 0.9$, $M = 3.12$, $SD = 1.04$).

DATA ANALYSIS
Using SPSS 17, a hierarchical regression analysis was performed to determine whether HIV/AIDS-related media use predicts HIV/AIDS-related knowledge in the total sample. An analysis of interaction terms was performed to determine whether HIV/AIDS-related media use is capable of opening and widening or narrowing and closing knowledge gaps between segments of the study population. Based on our theoretical assumptions and the study objectives, the variables were entered into the regression model in the following order: first, the age and gender of the participants were entered as a control block into Block 1; education, interpersonal communication and the perceived salience of HIV/AIDS-related information were entered into Block 2; urban versus rural residence was entered into Block 3; HIV/AIDS-related media use was entered into Block 4; the four interaction terms (media use × education, media use × urban versus rural residence, media use × interpersonal communication and media use × perceived salience of HIV/AIDS-related information) were entered into Block 5. To reduce potential problems of multicollinearity, all of the independent variables were centered by subtracting the means from each score before forming the interaction terms.
Table 1 summarizes the results obtained from the hierarchical regression analysis in which the respondents’ HIV/AIDS knowledge scores were regressed on education, the perceived salience of HIV/AIDS-related information, interpersonal communication, urban versus rural residence, media use and the interaction terms between media use and the four predictors. Block 1—the control block—accounted for 6.8% of the total variance of the outcome variable \( (p < 0.0001) \), with age making a slightly higher contribution \( (\beta = -0.19, p < 0.0001) \) than gender \( (\beta = -0.18, p < 0.0001) \). Controlling for age and gender, the three predictors included in the second block (education, perceived salience of HIV/AIDS-related information and interpersonal communication) explained 48.5% of the variance \( (p < 0.0001) \), with education making the highest contribution \( (\beta = 0.47, p < 0.0001) \). Consistent with our expectation, urban versus rural residence emerged as a significant predictor, explaining 5.6% of the variance \( (\beta = 0.37, p < 0.0001) \) after controlling for education, perceived salience of HIV/AIDS-related information and interpersonal communication. Contrary to our expectations, HIV/AIDS-related media use was not found to be a significant predictor of HIV/AIDS knowledge after controlling for education, perceived salience of HIV/AIDS-related information, interpersonal communication and urban versus rural residence (Table 1).

Table 1: Summary of results from the hierarchical regression analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>t value</th>
<th>( \Delta R^2 (%) )</th>
<th>F change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Block 1</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Age</td>
<td>-0.19***</td>
<td>-6.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender (female: high)</td>
<td>-0.18***</td>
<td>-5.90</td>
<td>6.80***</td>
<td>35.93</td>
</tr>
<tr>
<td><strong>Block 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>0.47***</td>
<td>18.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived salience of info.</td>
<td>0.38***</td>
<td>15.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal com.</td>
<td>0.13***</td>
<td>6.00</td>
<td>48.50***</td>
<td>357.00</td>
</tr>
<tr>
<td><strong>Block 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urbanity versus rurality</td>
<td>0.37***</td>
<td>11.87</td>
<td>5.60***</td>
<td>140.93</td>
</tr>
<tr>
<td><strong>Block 4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media use</td>
<td>0.04</td>
<td>1.58</td>
<td>0.10</td>
<td>2.50</td>
</tr>
<tr>
<td><strong>Block 5</strong></td>
<td></td>
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<tr>
<td>Media use ( \times ) education</td>
<td>-0.12***</td>
<td>-4.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media use ( \times ) interpersonal com.</td>
<td>-0.08**</td>
<td>-3.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media use ( \times ) urbanity versus rurality</td>
<td>0.09*</td>
<td>2.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media use ( \times ) perceived salience of info.</td>
<td>-0.04</td>
<td>-1.60</td>
<td>1.80***</td>
<td>11.83</td>
</tr>
</tbody>
</table>

* \( p < 0.05 \); ** \( p < 0.001 \); *** \( p < 0.0001 \).

RESULTS

Table 1 summarizes the results obtained from the hierarchical regression analysis in which the respondents’ HIV/AIDS knowledge scores were regressed on education, the perceived salience of HIV/AIDS-related information, interpersonal communication, urban versus rural residence, media use and the interaction terms between media use and the four predictors. Block 1—the control block—accounted for 6.8% of the total variance of the outcome variable \( (p < 0.0001) \), with age making a slightly higher contribution \( (\beta = -0.19, p < 0.0001) \) than gender \( (\beta = -0.18, p < 0.0001) \). Controlling for age and gender, the three predictors included in the second block (education, perceived salience of HIV/AIDS-related information and interpersonal communication) explained 48.5% of the variance \( (p < 0.0001) \), with education making the highest contribution \( (\beta = 0.47, p < 0.0001) \). Consistent with our expectation, urban versus rural residence emerged as a significant predictor, explaining 5.6% of the variance \( (\beta = 0.37, p < 0.0001) \) after controlling for education, perceived salience of HIV/AIDS-related information and interpersonal communication. Contrary to our expectations, HIV/AIDS-related media use was not found to be a significant predictor of HIV/AIDS knowledge after controlling for education, perceived salience of HIV/AIDS-related information, interpersonal communication and urban versus rural residence (Table 1).

However, the interaction terms showed that there is a significant interaction between media use and three of the four predictors: education, interpersonal communication and urban versus rural residence. As Figure 1 shows, media use narrows but does not close the knowledge gap between individuals with a high education level and individuals with a low education level. In other words, the knowledge gap between individuals with high and low education is likely to be wide when media use is low, but as media use increases, the gap narrows. In a similar vein, the knowledge gap between individuals who experience high and low levels of interpersonal communication about HIV/AIDS narrowed but did...
not close as media use increased ($\beta = -0.08$, $p < 0.001$).

The interaction of media use with urban versus rural residence was different, however. Instead of narrowing the gap, media use was more likely to widen the knowledge gap between urban residents and rural residents. As Figure 2 shows, the knowledge gap between urban residents and rural residents tends to widen as media use increases. However, the gap already existed, and it was not likely to be opened by media use.

**DISCUSSION**

In this study, it was discerned that although HIV/AIDS-related mass media use did not have a significant effect on HIV/AIDS-related knowledge in the total population (after controlling for education and other important predictors of knowledge), it had a significant effect on certain segments of the study population. Like other domains of human knowledge, HIV/AIDS knowledge was higher among individuals with high education levels. However, as media use increased, the knowledge gap between those with high and low education was more likely to decrease. In a similar vein, the knowledge gap between individuals who experienced high and low levels of HIV/AIDS-related interpersonal communication narrowed as media use increased.

These findings appear to be contrary to the original propositions of the knowledge gap hypothesis. Instead, they align with other subsequent studies that have provided evidence that the mass media function as a ‘knowledge leveler’ between people with high education and people with low education (or socio-economic status more generally) (Douglas et al., 1970; Galloway, 1974; Shingi and Mody, 1976; Ackerson et al., 2011). Although the degree of media exposure for people with high education levels could generally be higher compared with those with low education levels, to the extent that individuals’ utilization of the media for HIV/AIDS-related information increases, their knowledge about the pandemic is likely to increase. Indeed, the present study has revealed the mainstreaming role of the mass media (Gerbner et al., 1980). In other words, segments of the population with high levels of HIV/AIDS-related mass media use were more likely to have similar levels of HIV/AIDS knowledge, regardless of differences in educational background and levels of interpersonal communication about the pandemic.

On the contrary, however, a sequestering function of mass media use was also detected. The gap in HIV/AIDS knowledge between urban and rural residents was more likely to increase than to decrease as HIV/AIDS-related media use increased. This finding appears to be in line with the body of evidence on which the original formulation of the knowledge gap hypothesis was based, although the mechanisms leading to the phenomenon might be different. As media use indeed narrowed the gap in knowledge between individuals with high and low education in our sample, the widening gap that was noted may not be explained by differences in information processing capacity. Based on our findings, we argue that the widening knowledge gap between urban and rural residents that results from HIV/AIDS-related media use might be attributable to differences in the perceptions of the information’s salience. Indeed, previous studies addressing mass communication differences between urban, suburban and rural areas of developing countries indicated that media availability and relevant content can overcome the barriers of illiteracy (see Bostian, 1974 for a review).

In this study, the perceived salience of HIV/AIDS-related information was found to be a significant predictor of HIV/AIDS-related knowledge. This significant predictor, although it did not interact significantly with urban versus rural residence, also had a high positive correlation
with urban residence (Table 2). This suggests that rural residents’ low levels of perceived salience of HIV/AIDS-related information may have led to reduced levels of HIV/AIDS-related media use, even in situations where mass media availability and access might not be the issue. In other words, the mass media prevention messages related to HIV/AIDS that are currently being broadcast might be more appealing and/or relevant to urban residents rather than rural residents, which may have led to differences in media use. To the extent that the perceptions of information relevance vary between urban and rural residents, there could indeed be variations in the level of media use and the resulting effects.

In addition to these data-based explanations, several theoretical assumptions might also be used to explain the widening urban–rural gap. For example, within the theoretical framework of the knowledge gap, Donohue et al. (Donohue et al., 1975:4) state that ‘within any total social system, some subsystems have patterns of behavior and values conducive to change, while others have patterns that are more resistant to change. Therefore, these predisposed subsystems tend to adopt and act upon information at a faster rate than more stagnant subsystems.’ Accordingly, thinking beyond the perceptions of information salience, the rural community might be considered a subsystem that is more resistant and/or less predisposed to adopt and act upon HIV/AIDS information from the mass media. Moreover, in line with Gerbner’s concept of resonance, the fact that urbanites generally tend to have more direct experience with the pandemic given the higher prevalence rate of the infection in urban areas may have helped to amplify the effects of media use. As opposed to rural residents, who are generally considered to lack direct experience with the pandemic, urban residents’ better HIV/AIDS knowledge that results from media use may have resulted from the ‘double dose’ (i.e. direct real world experience plus the mass media or mediated experience).

A further theoretical explanation for the differential impacts of the mass media in urban and rural contexts may also be drawn from the Media Dependency Theory (Ball-Rokeach and DeFleur, 1976). This theory posits that people’s media use and/or dependence on the media is regulated by social stability; the more unstable (politically, economically and/or socially) the society we live in, the more dependent we will be on the media and vice versa. Given the urban–rural disparities in HIV prevalence and AIDS-related death rates, it is conceivable that urban and rural residents may differ in their perceptions of the threat of HIV/AIDS and in their response patterns (Hobfall, 1998). Indeed, in the same population, it has been shown that urban residents possess higher concern about and information needs on HIV/AIDS than do their rural counterparts (Bekalu and Eggermont, 2013). The disproportionate prevalence and impacts of HIV/AIDS in urban contexts may have put urban residents in a position to rely heavily on the media; therefore, they may be affected more by the media at their disposal than their rural counterparts are.

Table 2: Zero-order bivariate correlations between the independent and dependent variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV/AIDS knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV/AIDS media use</td>
<td>0.508**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urbanity versus rurality</td>
<td>0.658**</td>
<td>0.609**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>0.648**</td>
<td>0.455**</td>
<td>0.528**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived salience of info.</td>
<td>0.553**</td>
<td>0.409**</td>
<td>0.631**</td>
<td>0.371**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV/AIDS interpersonal com.</td>
<td>0.314**</td>
<td>0.316**</td>
<td>0.168**</td>
<td>0.272**</td>
<td>0.146**</td>
<td></td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (two-tailed).

CONCLUSION

Despite the widespread utilization of the mass media for HIV/AIDS prevention, little is known about the knowledge gap that results from mass media use. The present study has attempted to respond to this paucity of research. Consistent with previous findings of other knowledge domains (Ettema et al., 1983), the findings of the present study suggest that the infusion of HIV/AIDS-related information into a social system via the mass media can both narrow and widen HIV/AIDS knowledge gaps. While the gaps
between individuals with high and low education and between those with high and low levels of HIV/AIDS interpersonal communication were more likely to narrow, the gap between urban and rural residents was more likely to widen.

These findings have several implications for health promotion and HIV/AIDS information campaigns in sub-Saharan Africa in general and in Ethiopia in particular. First, in situations where the mass media are available and/or accessible, the findings suggest that mass media information campaigns could be harnessed to address possible information inequalities between certain segments of the population. More specifically, HIV/AIDS knowledge deficiencies among individuals with low levels of education and among those who do not engage in HIV/AIDS interpersonal communication for various reasons can possibly be addressed using the mass media.

Second, the present study and other national-level surveys (ECSA, 2005) suggest that the HIV/AIDS knowledge gap between urban and rural residents of Ethiopia is already wide. As such, the rural population, which accounts for approximately 85% of the country’s total population, will be increasingly vulnerable to the pandemic if rural residents continue to lack the knowledge that would enable them to engage in protective behaviors. Although information campaigns utilizing the mass media would normally be expected to narrow this gap, the reality on the ground appears to be the opposite. Current mass media HIV/AIDS campaigns targeted to the two communities are more likely to yield the unintended effect of widening the gap rather than narrowing it. This implies that efforts should be made to redress the relative lack of exposure to the mass media among rural residents and the lack of benefits associated with it. To that end, community-based participatory programs and interpersonal communication activities utilizing existing social, cultural and religious networks might be useful (Hendriksen et al., 2009). Previous research in the region found that socially oriented communication approaches, such as discussions and role play, are more suitable for communicating HIV/AIDS prevention messages to the rural populace (Bogale et al., 2011). Indeed, strategic communication entails utilizing different means of reaching the audience. As such, efforts of integrating mass media campaigns with grassroots level interpersonal communication approaches should be emphasized (Panford et al., 2001; Ramaprasad, 2011).

Third, our findings suggest that the observed differential impacts of the mass media might be more readily attributed to variations in perceptions of information salience. The low perceived salience of HIV/AIDS-related information among rural residents may have resulted in lower levels of HIV/AIDS-related mass media use. Accordingly, the rural populace could be motivated to use the mass media for HIV/AIDS information by including more relevant and appealing content. In more practical terms, programmatic adjustments would have to be made so that mass media HIV/AIDS campaigns could include messages that are more relevant to the rural populace while also providing urban residents with information that is relevant to them. For instance, research has indicated that urban and rural residents differ in their preference for specific HIV/AIDS-related information (Bekalu & Eggermont, 2013). While rural residents were found to be interested in basic (the ABCs of) HIV transmission and prevention information, urbanites showed a preference for information on HIV/AIDS-related care and support due perhaps to the fact that the epidemic has been more prevalent in urban than rural areas over the past three decades (Bekalu and Eggermont, 2013; UNAIDS, 2009). Thus, in targeting the rural populace, the mass media are more likely to be effective if they include in their programs such basic HIV/AIDS-related information as what HIV and AIDS are, symptoms of the infection, risk factors leading to HIV infection and methods of HIV prevention rather than issues dealing with testing and diagnosis, treatment and care (using antiretroviral treatment) and handling opportunistic diseases, issues in which more urbanites than ruralites have been found to be interested (Bekalu & Eggermont, 2013). Overall, the content of mass media prevention programs could become more audience-centered and relevant for both groups through participatory and grassroots approaches (Payton and Kiwanuka-Tondo, 2009; Ramaprasad, 2011).

Overall, the findings suggest that mass media information campaigns prepared and broadcast from urban centers may not improve the HIV/AIDS knowledge of the rural populace, and furthermore, such campaigns are likely to put rural residents at a disadvantage relative to their urban counterparts. The broader literature on health promotion practices in sub-Saharan Africa also suggests that mainstream health information systems in most countries in the region leave
many of the health information needs of rural people largely unmet (Nyamwaya et al., 1998). Several investigators have argued that the rural populace tends to have problems receiving and understanding HIV/AIDS messages, and thus, researchers must acknowledge socio-cultural factors in planning health information interventions targeting rural areas (Nyamwaya et al., 1998; Muturi, 2005; Muturi and Mwangi, 2011). Based on previous studies and our findings, we therefore argue that interventions that are more sensitive to community-level factors might be useful for addressing the observed urban–rural disparities. More specifically, socioecological approaches utilizing community-level interventions, such as community mobilization, development of community infrastructure and enhancing community capacity, might be more rewarding than most present-day HIV/AIDS information campaigns that seem to be based on more reductionist behavioral approaches (Airhihenbuwa and Obregon, 2000; Noar, 2007).

Finally, the findings of the present study can also inform research and theory on health promotion and HIV/AIDS information campaigns in two ways. First, the noted urban–rural gap in knowledge, which is bound to widen as mass media information continues to enter the social system, makes it imperative to revisit the decades-old international literature on the knowledge gap phenomenon and to make further inquiries in the field of HIV/AIDS prevention. Second, in line with a growing body of evidence in the broader field of health promotion (Raeburn et al., 2006; Moore et al., 2010; Southwell et al., 2010), our findings point to the need to address community-level variables in HIV/AIDS information campaigns informed by socioecological approaches (McLeroy et al., 1988; Stokols, 1996; Green et al. 1996).

FUNDING

The fieldwork part of this study was financially supported by a scholarship from HIV Research Trust, UK.

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