

Prevention of HIV and other STIs in rural Senegal: a study of prevention-related events collected by sentinel observers

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ABSTRACT

We conducted a study of AIDS/STI prevention-related events based on a network of sentinel observers over a 35-month period in three rural communities of Senegal (May 2000 – March 2003). In one of these communities we also conducted a population-based study on self-reported prevention events and attitudes towards AIDS. Sentinel observers recorded 1 590 AIDS/STI prevention-related events. More than half of the reported events were radio programmes. The proportion of events on the occasion of which therapies was addressed increased significantly between 2000 and 2001, from less than 3% to about 10%, while sharp decreases in the proportion of events dealing with condoms and STIs, both from around 25% to less than 15%, were observed at the same time. The population-based survey indicated that men were more influenced by individual events like informal discussions or radio programmes while women seemed to be more influenced by collective events such as public meetings and school education.

Keywords: rural Africa, AIDS/STI prevention-related events, sentinel observers, population-based survey.

RÉSUMÉ

Nous avons mené une étude des événements relatifs à la prévention du SIDA et des IST à l'aide d'un réseau d'observateurs-sentinelles sur une durée de 35 mois (mai 2000 – mars 2003) dans trois communautés rurales du Sénégal. Dans l'une d'elle, nous avons également conduit en population générale une étude des événements auto-déclarés relatifs à la prévention et des attitudes vis-à-vis du SIDA. Les observateurs-sentinelles ont enregistré 1 590 événements. Plus de la moitié concernaient des émissions de radio. La part des événements faisant état des traitements du SIDA a augmenté de 3% à 10% entre 2000 et 2001 alors que celles des événements qui faisaient état du préservatif d'une part et des IST d'autre part, ont chuté toutes deux de 25% à 15% sur la même période. L'enquête en population générale a révélé que les hommes étaient plus influencés par les événements individuels comme les discussions informelles ou les programmes radiodiffusés alors que les femmes semblaient avoir été plus sensibles aux événements collectifs du type réunion publique ou cours donnés à l'école.

Mots clés: Afrique, zone rurale, SIDA/STI, événements relatifs à la prévention, observateurs-sentinelles, enquête en population générale.

INTRODUCTION

Capturing the nature and impact of routine national prevention programmes is always a difficult exercise. In Africa, routine prevention is hardly ever evaluated and when studies on prevention are conducted this is almost always to evaluate a specific programme implemented in a limited community (Balyagati, Luhamba, Nnko, Nyonyo & Schapink, 1995; Coghlan, Kabandu &

Musungu, 1994; Evian, de Beer, Crewe, Padayachee & Hurwitz, 1991; Green, Zokwe & Dupree, 1995; Kagimu, Marum & Serwadda, 1995; Muyinda, Nakuya, Pool & Whitworth, 2003; Skinner, Metcalf, Seager, de Swardt & Laubscher, 1991; Ventmiglia, 1995; Williams, *et al.*, 2003). A small number of studies attempted to assess the impact of broader prevention programmes (Agha, 2003; Balyagati, *et al.*, 1995; Kiwanuku-Tondo &

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Snyder, 2002; Tambashe, Speizer, Amouzou & Djangone, 2003; Wilson, Sibanda, Greenspan & Wilson, 1989; Witte, Cameron, Lapinski & Nzyuko, 1998), but outside the framework of a specific prevention programme. Information is however generally scarce on sources of information on AIDS from the population point of view (Ndlovu & Sihlangu, 1992).

Senegal has received attention because of its low level of HIV infection (estimated at 1.4% in 2002 by UNAIDS) despite intense internal and international migration flows. A number of hypotheses have been proposed to explain why Senegalese people have been relatively spared by the epidemic. It is thought that an early and strong political commitment to HIV/AIDS and social mobilisation and/or the control of sexuality by the social organisation of the Senegalese society (92% of the population is Muslim) have contributed to maintaining low prevalence (Meda *et al.*, 1999). While a sharp increase in condom use has been reported among adults in Dakar, the capital city (Meda *et al.*, 1999), data are missing in remote rural areas on how prevention messages are provided and perceived.

This paper presents a study of prevention-related events based on a network of sentinel observers over a 35-month period (May 2000 – March 2003) in three rural communities of Senegal: Niakhar in centre Senegal, Bandafassi in eastern Senegal, and Mlomp in southern Senegal. In the community of Niakhar, we also conducted a population-based study on self-reported prevention events among a random sample of adults aged 15 – 59. The objective of this study was to describe AIDS and sexually transmitted infections (STI) prevention-related messages that are disseminated to these three rural areas and to assess how these messages have been perceived.

METHOD

Setting

All three study areas are located in rural Senegal and have been monitored demographically for up to 25 years. Because all new vital events (births, deaths, marriages and migrations) are recorded periodically, a population list is available from which random samples can easily and accurately be drawn.

Niakhar

Niakhar is located in the region of Fatick, in central Senegal. As of 1 January 2000, 30 215 individuals lived in the study area (Delaunay, Marra, Levi & Etard, 2002). The population consists mainly of farmers of the Sereer

ethnic group, and 74% are Muslim, 20% Catholic and 3% Protestant. Although very few report to be Animist (1%), all comply to some degree with traditional rites. The matrimonial system is polygamous, with half of married women in a polygamous union. A large proportion of the adult population (40% of the men and 26% of the women each year) spend several months (5 on average) away from the area in seasonal migration.

Bandafassi

Bandafassi is located in the region of Tambacounda in southeast Senegal. As of 1 January 2000, 10 509 individuals lived in the study area (Pison, Guyavarch & Sokhna, 2002). The population consists mostly of farmers belonging to three ethnic groups. The Fula (57% of the population) are Muslims, while the Bedik (28%) and the Malinke (16%) are more mixed, including Muslims, Animists and Christians. The matrimonial system is polygamous. In 1998, 18% of men and 8% of women aged 15 – 59 years reported to have been out of the village for 1 day or more in the past 12 months.

Mlomp

Mlomp is located in the region of Ziguinchor, in the southwest of Senegal. As of 1 January 2000, 7 243 inhabitants lived in the study area (Pison, Wade, Gabadinho & Enel, 2002). The population consists mainly of farmers of the Diola ethnic group, and mainly of Animist religion. Although half of the population declare to have Christian names, only 10% are baptised Catholics. The matrimonial system is monogamous. Both men and women migrate seasonally before they are married, but once married, women do not migrate any more. Men often continue their seasonal migrations up to the age of 60 years. In 1992, 62% of the women aged 10 – 29 years left to work as maids in the major cities of Senegal. Seventy per cent of men aged 15 – 54 years migrated to other regions of Senegal during the dry season, a large number of them to harvest palm wine (Pison, LeGuanno, Lagarde, Enel & Seck, 1993).

Sentinel observer surveys

In each of the three communities, a coordinator recruited and managed a network of sentinel observers in charge of recording prevention actions occurring in their living area (11 observers in Niakhar, 9 in Bandafassi and 6 in Mlomp). Collected information allowed building a descriptive timetable of these prevention actions, which included not only prevention campaigns but also all events related to STIs and prevention (meetings involving women, men, youth or chiefs, political or cultural meetings, theatre, radio or

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television programmes, information provided by health staff, casual discussions between villagers, etc.). For that purpose, sentinel observers were provided with standardised cardboard sheets that they were asked to fill in each time they witnessed or were reported a prevention-related event. The sheet contained fields for circumstances of the event, subjects addressed, investigator, support used, an estimate of the audience size and demographic characteristics, and the duration. Every 6 months, the coordinator organised a summary meeting with all sentinel informants in one site. All events reported by one or several observers were reviewed for completion and validation. All validated sheets were data captured. From the data file, all events were recoded using new summary variables describing the type of event and subjects addressed.

Population survey in Niakhar

In order to assess perception of prevention events in the general population, a questionnaire survey was conducted in Niakhar in April 2003. The demographic database was used to build a random sample of adults aged 15 - 59 years. A sample size of 1 000 adults (500 men and 500 women) was sought. Consequently, the initial sample included 802 men and 609 women. Eligible subjects were asked to answer the study questionnaire. Interviewers were recruited from the local population, and went through a 4-day training period made up of collective courses and individual simulations of interviews. They were taught to translate the questionnaire extemporaneously from written French to spoken local language (they do not write nor read their local language, as school education in Senegal is in French). Therefore, a great part of the training period was devoted to the standardisation of the translation. After informed consent, interviews were conducted in private places in order to protect confidentiality. The questionnaire was derived from a questionnaire previously used in the same area (Lagarde *et al.*, 2000). A section was added to record any events related to AIDS or STI prevention (press, meeting, broadcasts, casual discussions, training sessions, etc.) that participants may have witnessed within the 6 months preceding the interview. For each event, questions were asked on location, date, duration, subjects addressed, investigator and media.

Analysis

Specific subjects addressed on the occasion of events reported by sentinel observers and, in Niakhar, reported by participants in the population survey, were tabulated. Trends over the 2001 - 2003 period in relation to the proportion of events addressing AIDS treatments, STIs,

condoms and testing were assessed. Other subjects were reported too rarely to be included in this analysis. The population survey conducted in 2003 in Niakhar enabled the study of event reports in relation to individual characteristics, AIDS-related knowledge and attitudes. Socio-demographic characteristics associated with the report of at least one event were assessed using a regression logistic model. A very large proportion of reported events were in the 3 months preceding the interview. We therefore restricted further analyses to such events in order to minimise potential recall bias. Five dependent variables were selected as indicators of AIDS-related knowledge, AIDS-related attitudes and stigmatisation of persons living with HIV/AIDS (PLWA). These included a summary score of AIDS-related knowledge developed from seven questions about routes of AIDS transmission, two indicators of participant adherence to prevention-related beliefs (whether the participant agreed that condom protects against AIDS and that AIDS does exist) and two indicators related to stigmatisation (whether the participant reported that PLWA should not have social contacts and whether the participants reported that they would not provide care to a PLWA). Linear or logistic regression models, with age and educational levels as adjusting variables, were fitted to assess any potential association between any of these five indicators (dependent variables) and the report of prevention-related events in the 3 months preceding the interview (independent variables). Types of events and a variable indicating the report of at least one prevention-related event of any kind were submitted to inclusion in a forward stepwise process. These analyses were conducted for men and women separately.

RESULTS

Prevention-related events in the three rural communities

From May 2000 to March 2003, 1 590 events were collected by sentinel observers in the three populations: 735 in Niakhar, 535 in Bandafassi and 320 in Mlomp representing 21, 15 and 9 events per month in the three respective communities. More than half of the events were radio programmes (50.9%), 10.4% were booklets or posters, 9.6% were newspapers, 7.9% were television programmes and 7.1% public meetings. Informal events like discussions between people of the community (witnessed by a sentinel observer) were also recorded: these accounted for 9.9% of the 1 590 collected events. Training sessions or information from health centre staff accounted for less than 2% of all events. The distribution of the types of events differed noticeably

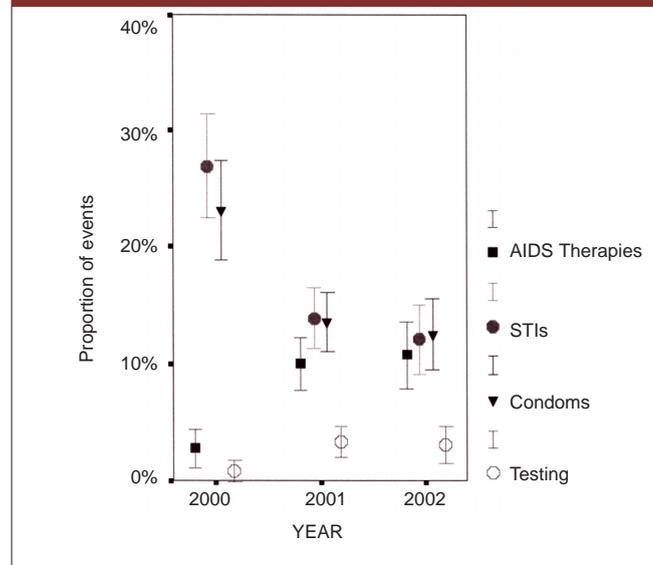
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across the three communities: in Mlomp, radio programmes accounted for only 20.9% of events while booklet or poster and newspapers accounted for 26.6% and 28.1% respectively. Television programmes were more frequent in Niakhar (12.5%) and public meetings were more frequent in Bandafassi (13.6%) than in the other populations.

Subjects addressed in prevention events are tabulated in Table 1. STIs and condom use were the most common subjects, especially in Bandafassi where they were cited on the occasion of 25% and 21% of events respectively. AIDS therapy was addressed in Niakhar and Mlomp during more than 10% of events, but only during 3.2% of events in Bandafassi. Other subjects corresponded to less than 4% of events. In Niakhar, when reported by a sample of adults during the population survey, fewer events addressed condoms (3.9% v. 11.6% for sentinel observers) and AIDS therapies (5.8% v. 10.6% for sentinel observers), while fidelity was addressed in a much larger proportion of events (11.7%) than when reported by sentinel observers (2.6%).

In 2000, 2001 and 2002, 377, 690 and 460 events were recorded respectively, at all sites combined. Temporal trends in subjects addressed (Fig. 1) showed that the study period corresponded to the advent of AIDS treatments as an issue addressed in prevention-related events: in 2000, they accounted for less than 3% of events but increased to more than 10% in 2001 and in 2002. During the same period, the contribution of condoms and STIs exhibited a sharp decrease. We also noted a slight increase for testing but the overall level remained very small (less than 3%). Other subjects

FIG. 1. TRENDS IN REPORTED SUBJECTS ADDRESSED IN PREVENTION EVENTS BY YEARS



addressed were not frequent enough to be analysed as temporal trends throughout the study period.

Socio-demographic determinants of events report

In order to describe the population of those who both received and recalled prevention events, we compared characteristics of those who did and did not report one or more prevention events in Niakhar. The initial sample size of the 2003 population survey conducted in Niakhar included 1 411 adults aged 15 – 59 years (802 men and 609 women): 677 (48.0%) were away from their village, deceased, or mentally disabled and could not be interviewed. Another 6 (1% of those present) refused to participate. The final sample size consisted of 709 respondents (316 men and 393 women). Among them, 381 participants reported 515 events related to AIDS and STI prevention in the past 6 months. Table 2 shows that the report of at least one event was strongly associated with radio exposure, confirming radio as the main source for AIDS prevention in the area. Not surprisingly, the more educated participants were more likely to report prevention-related events. Catholics, those practising religion (either Muslims or Christians) and those who reported to be mobile were also more likely to report a prevention event.

Association between knowledge and attitudes and reported events

Participants in the 2003 population survey in Niakhar were asked to report prevention-related events of the last 6 months. Time between interview and event was

TABLE 1. SUBJECTS ADDRESSED DURING PREVENTION EVENTS

	Niakhar % (N)	Niakhar (population % (N) survey) % (N)	Bandafassi % (N)	Mlomp % (N)
Specific subjects addressed*				
STIs	11.4 (84)	11.1 (57)	25.0 (134)	13.4 (43)
Condoms	11.6 (85)	3.9 (20)	21.3 (114)	14.7 (47)
AIDS therapy	10.6 (78)	5.8 (30)	3.2 (17)	10.3 (33)
Testing	3.9 (29)	1.0 (5)	0.4 (2)	3.4 (11)
Immunisation	3.4 (25)	0.2 (1)	0.9 (5)	2.5 (8)
Commercial sex work	3.0 (22)	3.1 (16)	1.9 (10)	2.8 (9)
AIDS existence	2.2 (16)	0 (0)	7.1 (38)	1.9 (6)
Family planning	2.7 (20)	0.2 (1)	1.3 (7)	1.3 (4)
Fidelity	2.6 (19)	11.7 (60)	2.6 (14)	3.1 (10)
Number of events	735	515	535	320

* Only subjects more specific than 'AIDS and STIs in general' are tabulated. Female condom, excision and addictive drug abuse were cited in 30 events across all sites combined and were not tabulated here.

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available for 503 of the 515 reported events. Among them, 88.3% events were reported to have occurred less than 3 months before the interview, suggesting a strong recall bias. We therefore considered in further analyses only the events of the 3 months preceding the

TABLE 2. COMPARISON OF CHARACTERISTICS OF THOSE WHO REPORTED AND DID NOT REPORT A PREVENTION-RELATED EVENT IN NIAKHAR, POPULATION SURVEY

	Reported one or more events % (N)	p	Adjusted OR in FLCR OR [95%CI] p
Sex		0.07	
Male	57.0 (316)		
Female	51.1 (393)		
Age		0.46	
15 - 24	51.0 (243)		
25 - 39	53.5 (215)		
40 - 59	56.6 (251)		
Marital status		0.35	
Single	53.7 (177)		1
Married	53.2 (506)		1.23 [0.83 - 1.83] 0.31
Divorced, separated or widowed	68.0 (25)		2.91 [1.05 - 8.09] 0.04
Religion		0.003	
Non-practising Muslims	46.4 (319)		1
Practising Muslims	59.3 (221)		1.50 [1.04 - 2.16] 0.03
Practising Christians	64.3 (70)		1.90 [1.09 - 3.29] 0.02
Non-practising Christians	58.8 (97)		1.61 [1.00 - 2.60] 0.05
Educational level		0.008	
No school	50.6 (542)		1
1 - 5 years	60.3 (73)		1.51 [0.89 - 2.57] 0.12
6 - 20 years	66.7 (93)		2.06 [1.23 - 3.46] 0.01
Listen to radio		<10 ⁻³	
Never	15.4 (13)		1
Less than once a week	47.3 (243)		5.02 [1.04 - 24.2] 0.05
At least once a week	51.0 (100)		5.44 [1.09 - 27.1] 0.04
Every day	60.3 (350)		7.50 [1.56 - 36.1] 0.01
Watch TV		0.011	
Never	46.6 (277)		
Less than once a week	58.5 (349)		
At least once a week	50.0 (44)		
Every day	65.7 (35)		
Read a journal		0.06	
Sometimes or more frequently	64.6 (65)		
Never	52.6 (639)		
Travelled outside the village for 1 month or more during the last 12 months		0.07	
Yes	81.8 (11)		
No	53.3 (694)		
Travelled outside the village for 1 day or more during the last 4 weeks		0.01	
No	50.5 (467)		1
Yes	60.2 (241)		1.42 [1.02 - 1.97] 0.04

FLCR = forward logistic conditional regression; OR = odds ratio.

interview (444 events). Table 3 presents results of the 10 regression models (five for men and five for women) fitted to assess the association between the five indicators of AIDS-related knowledge and attitudes and reports of events. Almost no specific event types were found to be associated with the three indicators AIDS knowledge score, thinking that condoms protect against AIDS, and thinking that AIDS exists. The exception was that men who reported informal discussion were also more likely to have higher scores for AIDS knowledge. However, the generic variable 'report of at least one event of the last 3 months' entered all models related to these three indicators (for men as well as for women). As far as stigmatisation against PLWA was concerned, men who reported radio programmes were less likely to report that they would not provide care to a PLWA, and women who reported public meetings were less likely to say that PLWA should not have social contacts.

DISCUSSION

From May 2000 to March 2003, 1 590 events were collected by sentinel observers in the three areas. The proportion of events on the occasion of which AIDS therapies were addressed increased significantly between 2000 and 2001, while a sharp decrease in the proportion of events dealing with condoms and STIs was observed over the same time period. In Niakhar, the more educated, more religious and more mobile respondents and those who frequently listened to radio were more likely to report prevention-related events. Increased AIDS knowledge, more positive attitudes towards AIDS prevention and lower level of stigmatisation of PLWA were found among those who reported prevention-related events. Men appeared to be more influenced by individual interactions like informal discussions or radio programmes while women seemed to be more influenced by collective events such as public meetings and school education.

Rates of HIV infections are low in these communities. In 1997 - 1998, we conducted a comparative cross-sectional multisite study in two of the areas of the present study (Lagarde *et al.*, 2003). In Niakhar HIV infection level was very low (0.3%). In Bandafassi HIV prevalence was also very low (0%) but adults were found with a high level of active syphilis (5%). A seroprevalence survey was also conducted in Mlomp in 1995. The proportion of adults infected with HIV was 0.9% (0.6% for HIV-2 and 0.3% for HIV-1) (Diop, Pison, Diouf, Enel & Lagarde, 2000).

Observers were selected in order to represent as broad as possible a range of geographical and socio-economical status. However, one of the requirements for

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TABLE 3. ASSOCIATION BETWEEN SELECTED INDICATORS AND PREVENTION-RELATED EVENTS OF THE LAST 3 MONTHS

Dependent variables	Mean / proportion [range] (N)	Associated events (independent variables)	Measure for association (coeff*/aOR† [95%CI])	p
Men				
AIDS-related knowledge score	2.9 [0-7] (316)	At least one event	0.13	0.015
		Informal discussions	0.18	0.048
Condom protects against AIDS	51.9% (316)	At least one event	2.95 [1.83-4.76]	<10 ⁻⁴
Think AIDS does exist	79.4% (316)	At least one event	3.87 [2.09-7.18]	<10 ⁻⁴
PLWA should not have social contacts	14.6% (313)	‡		
Would not provide care to PLWA	28.2% (316)	Radio	0.40 [0.23-0.71]	0.002
Women				
AIDS-related knowledge score	3.5 [0-7] (393)	At least one event	0.17	0.001
Condom protects against AIDS	29.3% (393)	At least one event	1.79 [1.13-2.83]	0.013
Think AIDS does exist	85.4% (391)	At least one event	4.18 [2.08-8.39]	<10 ⁻⁴
PLWA should not have social contacts	89.1% (391)	Public meeting	0.11 [0.01-0.81]	0.03
Would not provide care to PLWA	41.2% (389)	Informal discussions	2.22 [0.90-5.56]	0.08

* Non-standardised regression coefficients adjusted on age in 3 groups and educational level in 3 groups.
† Odds-ratios adjusted on age in 3 groups and educational level in 3 groups (forward stepwise logistic regression model).
‡ No variable entered the model.

selection was to be literate. This probably explains the differences between sentinel observers and participants' reports in Niakhar. It was also very difficult to find literate observers living permanently in the areas. Most literate individuals are students who spend only part of the year in the village. Consequently, the number of observers was dictated more by field constraints than by selection criteria. Another particularity of the observers was that they were more alert to prevention events than the general population: they underwent a training session and met every 6 months with the coordinator. Data collected in the present study should therefore not be considered as exhaustive nor as representative, but rather as a convenient sampling of events.

Only 50% of the sample selected from the demographic database for the population survey in Niakhar participated in the study. Most of non-participants were away from their village at the time of the interview and a very small proportion refused to participate (1% of those present). Consequently, the association between mobility and the report of a prevention-related event should be interpreted with caution. In addition, as shown in Table 2, a very small number of participants reported to have travelled outside the village for 1 month or more in the previous 12 months. Yet, most of those who answered yes to this question reported one or more prevention-related events (81.8% v. 53.3% for those who answered no). It is however likely that many of those who were absent at the time of the interview would have reported having travelled outside the village for 1 month or more in the previous 12 months. This

leads us to think that the proportion in the general population of those who would remember a prevention-related event could be more than the 54% in our sample.

Both being Christian and practising were associated with the report of prevention-related events. Being both practising and Christian corresponded to an adjusted odds ratio (OR) of 1.91 when compared with non-practising Muslims. Religious authorities are actually delivering prevention messages but one should be cautious about the impact of these messages. Indeed, we conducted a study in the same area in 1997 to describe the association of religion with factors related to prevention, attitudes and behaviours regarding STI and AIDS. Those who reported religion to be important were slightly more knowledgeable about AIDS but reported fewer preventive behaviours (Lagarde *et al.*, 2000).

The decline in the proportion of events dealing with condoms and with STI is worrying and corresponds to an increase in the proportion of events dealing with AIDS treatments. While the advent of free and effective AIDS treatments in Senegal that started in Dakar in 2000 is very encouraging (Laurent *et al.*, 2002), the authorities should be very cautious not to endanger success gained in AIDS and STI awareness, as treatments will never replace prevention. Our results are consistent with a behavioural surveillance survey conducted in urban Senegal in 2001 that suggested that the treatments will never replace prevention. Our results are

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consistent with a behavioural surveillance survey conducted in urban Senegal in 2001 that suggested that the population's knowledge about STI is being replaced by knowledge about AIDS. Sustained awareness of STI threat is crucial, as success in prevention in Senegal is largely due to successful management of STI (Meda *et al.*, 1999).

Results from regression analysis of determinants of AIDS-related knowledge and attitudes towards PLWA (Table 3) in Niakhar showed differences between men and women. Radio and informal discussions appeared to play a role for men. The importance of radio has already been shown in a previous study conducted in Mlomp, Senegal (Spira *et al.*, 2000). This is not surprising considering the widespread use of radio in rural areas, with programmes using local language. In the population survey conducted in Niakhar, 56.5% of men reported to listen to radio every day. We were more surprised that informal discussions were associated with an increased AIDS-related knowledge score among men. This is encouraging as it was thought that information informally propagated is generally erroneous. This may not be the case in Niakhar. The proportion of women who reported to listen to radio every day was lower than among men (44%). Women seemed to learn more from collective prevention events. Those interventions are primarily implemented in the context of reproductive health interventions (family planning, antenatal care) where women are regularly in contact with health staff.

Frequent AIDS prevention-related events were thus recorded in these rural areas and about half of the population remembered at least one event. This study stresses the importance of radio in rural areas and the need to focus on the recent decrease in the number of messages that address STI and condom use.

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