Proximity to HIV testing center on experience of HIV test in Madagascar

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Background

 Madagascar is one of the lowest HIV prevalence countries. but the numbers of PLHIV detected are much lower than the estimated HIV positive. The strategy for integrating HIV testing in routine health services is one of key activities to optimize HIV testing rate. Japan International Cooperation Agency (JICA) has introduced Geographical Information System (GIS) to the National AIDS program and supported to connect and update the fundamental geographical information (longitude and latitude). Furthermore the master code-database was created to integrate the health resources database from different source. Then we started to apply such fundamental information to practical health-planning in national level.

Objectives

 To conduct an epidemiological study to descriptive the current distribution of HIV-testing center, and evaluate the association between a proximity to HIV-testing center and individual experience of HIV testing by using the national represented sample in Madagascar.

Methods

 After establishing the HIV testing sites inventory in 2009, we held the seminars with regional/district Health officers to gather the location information (longitude and latitude) by using Google Earth software. Next, we conducted the epidemiological study. The subjects were 8439 men aged 15-54 and 17046 women aged 15-45, and obtained from the 2008-2009 Madagascar Demographic and Health Survey IV. We measured the distance from each household to the nearest HIV-testing centers.

The odds ratios (ORs) and their confidence intervals (CIs) for non-experience of HIV testing were estimated by using multilevel logistic regression models, with 25485 subjects (level 1), nested within 585 village locations (level 2), and within 22 regions (level 3).The fixed and random parameter estimates (along with their standard errors) for the multilevel binomial logit link model were calibrated

using a marginal quasi-likelihood procedure with first order Taylor

series expansion, as implemented within the Statistical software MLwiN 2.23.

We adjusted the wealth status, education attainment, and age. To explore whether the heterogeneity effect of proximity to HIV-testing center is existed in different education level, we estimated the mean predicted probability for experience of HIV testing stratified by education attainment.
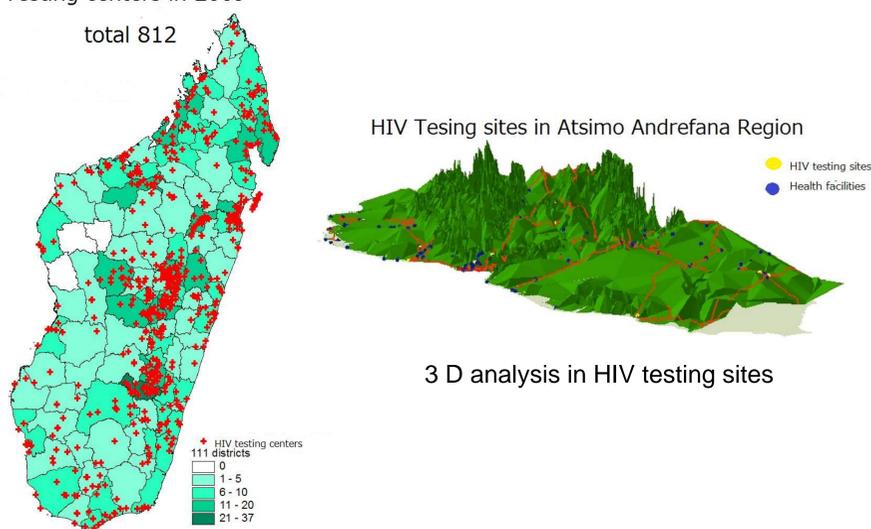
HIV Testing centers in 2009

total 812

HIV Tesing sites in Atsimo Andrefana Region

3 D analysis in HIV testing sites

Results

 We gathered the location information of 3317 health centers and 781 of 812 HIV-testing centers. Then, the proportion of experience of HIV testing for each distance category was higher among those who lived in closer area for both men and women; 21.4%, 10.9%, 4.7%, and 3.1% for men among those who lived ≤2.5km, 2.5-5.0km, 5.0-10km, and >10km; and 14.1%, 8.0%, 5.0%, and 2.5% for women. The 81% for men and 77% for women of total who had HIV-testing experience lived within 5km from HIV-testing center.
 Adjusted probability of man without experience of HIV testing among those who lived in 5.0-10km away was 2.5 times (CI=2.08-3.04) higher than those who lived ≤2.5km away, and women was 1.95 times (CI=1.73-2.19). In the stratified analysis, although we observed diverse probability of experience of HIV testing in different education attainment; higher education group have highest experience of HIV testing and no education group have lowest experience, no heterogeneity effects of proximity were observed in all education level among men. By contrast, second lowest education (primary school) group was sensitive from distance effects among women.

Table2. Numbers, proportion, and ORs with 95% CIs between proximity to a HIV-testing center and no experience of HIV testing, Madagascar. (n=25485)

	Total N	No experience of HIV testing		Crude		Adjusted model*	
		N	(%)	OR	(95% CI)	OR	(95% CI)
Men							
≤2.5 km	2650	2082	78.6	1	(reference)	1	(reference)
2.5 - 5 km†	1197	1066	89.1	2.21	(1.86 - 2.62)	1.22	(1.03 - 1.44)
5 - 10 km†	1452	1384	95.3	5.54	(4.60 - 6.67)	2.51	(2.08 - 3.04)
>10 km	3140	3043	96.9	8.74	(7.46 - 10.25)	2.98	(2.50 - 3.54)
Women							
≤2.5 km	5758	4945	85.9	1	(reference)	1	(reference)
2.5 - 5 km†	2404	2211	92.0	1.98	(1.77 - 2.21)	1.44	(1.30 - 1.60)
5 - 10 km†	2903	2758	95.0	3.15	(2.80 - 3.54)	1.95	(1.73 - 2.19)
>10 km	5981	5831	97.5	6.91	(6.18 - 7.73)	3.70	(3.28 - 4.17)

OR, odds ratio; CI, confidence intervals; N, number.

* Adjusted for the age, households wealth status, and highest education attainment.

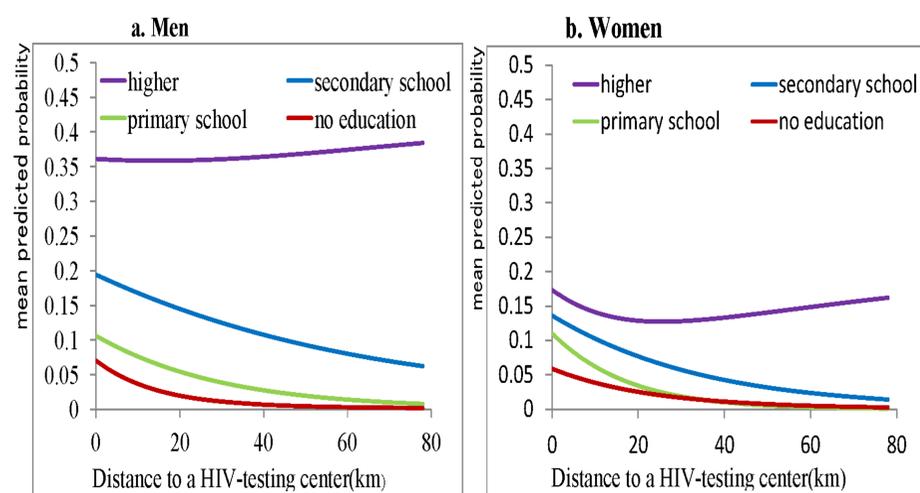† Greater than the lower value to less or equal to the upper value, e.g., 2.5 - 5 km means >2.5 to ≤5 km.

Figure2. Predicted probability for experience of experience of HIV testing stratified by education level, Madagascar (n=8439 for men, and n=17046 for women). We modeled the distance to a HIV testing-center as a continuous variable (per increase of 1 km).

Recommendations

 We found that the longer distances decrease the experience of HIV testing. These present findings are now adopting the current plan for the optimized location of HIV-testing center. Also present location-information would encourage the future study for understanding the different local situations by using routine reporting system from each health center.

Table1. Demographic characteristics of the participants in Madagascar. (n=25485)

	Men				Women			
	≤2.5 km	2.5 - 5 km*	5 - 10 km*	> 10 km	≤2.5 km	2.5 - 5 km*	5 - 10 km*	> 10 km
subject	2650	1197	1452	3140	5758	2404	2903	5981
Age [no. (%)]								
15-19	541(20)	261(22)	287(20)	625(20)	1383(24)	539(22)	655(23)	1392(23)
20-24	421(16)	182(15)	206(14)	457(15)	959(17)	374(16)	469(16)	1024(17)
25-29	375(14)	149(12)	197(14)	465(15)	882(15)	351(15)	467(16)	975(16)
30-34	336(13)	139(12)	192(13)	383(12)	812(14)	356(15)	425(15)	856(14)
35-39	279(11)	137(11)	146(10)	340(11)	667(12)	304(13)	357(12)	701(12)
40-44	218(8)	96(8)	126(9)	302(10)	584(10)	264(11)	298(10)	550(9)
45-49	201(8)	105(9)	129(9)	233(7)	471(8)	216(9)	232(8)	483(8)
50-55	149(6)	71(6)	101(7)	192(6)				
55-60	130(5)	57(5)	68(5)	143(5)				
Wealth [no. (%)]								
highest	2018(76)	320(27)	189(13)	202(6)	4436(77)	614(26)	335(12)	348(6)
middle	461(17)	582(49)	719(50)	1192(38)	925(16)	1101(46)	1370(47)	2194(37)
lowest	171(6)	295(25)	544(37)	1746(56)	397(7)	689(29)	1198(41)	3439(57)
Heighest Education [no. (%)]								
higher	308(12)	30(3)	10(1)	20(1)	463(8)	36(1)	8(0)	7(0)
secondary school	1391(52)	363(30)	323(22)	473(15)	3127(54)	713(30)	567(20)	787(13)
primary school	781(29)	614(51)	843(58)	1720(55)	1783(31)	1209(50)	1633(56)	3193(53)
no education	170(6)	190(16)	276(19)	927(30)	385(7)	446(19)	695(24)	1994(33)

no, number.

* Greater than the lower value to less or equal to the upper value, e.g., 2.5 - 5 km means >2.5 to ≤5km.

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