AN EMPIRIC RISK SCORE TO GUIDE PREP UPTAKE IN MSM IN COASTAL KENYA

Poster No. 856

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BACKGROUND



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Pre-exposure prophylaxis (PrEP) is effective in reducing the risk of HIV-1 acquisition [1], and has been recommended for populations with substantial risk of HIV-1 acquisition [2]. While the 2016 Kenyan ART guidelines recommend PrEP for individuals meeting several risk criteria [3], HIV-1 acquisition risk is heterogeneous in men who have sex with men (MSM) [4].

We set out to develop an empiric risk score to target PrEP use among MSM, using data from a cohort of high-risk MSM in follow-up.

METHODS

Since July 2005, men considered to be at high risk for HIV-1 acquisition were prospectively recruited for the cohort study in the Kenyan Coast. Men aged 18-49 years were eligible if they reported anal sex with a man during 3 months prior to enrollment. Enrolment and follow-up included a face-to-face interview using a standardized behavioral questionnaire, HIV-1 testing and counseling, medical history and physical examination at each visit [5].

We used Poisson regression method to identify predictors of incident HIV-1 infection. We assigned a predictor score to each statistically significant predictor based on its model coefficient, summing predictor scores to calculate a risk score for each participant. We then determined which risk score cut-off would correspond to an HIV-1 incidence ≥3%.

We evaluated risk score algorithm performance, assessed whether higher risk scores correlated with higher HIV-1 incidence and calculated the proportion of MSM who should start PrEP, if this algorithm was used.

RESULTS

Between 2005 and 2016, a total of 757 HIV-1 negative enrolled MSM contributed 1398.3 person-years (PY) with a median follow-up time of 14.3 months (interquartile range: 5.6-32.2). HIV-1 incidence was 6.9 [95% confidence interval (CI), 5.7–8.5] per 100 PY.

RESULTS

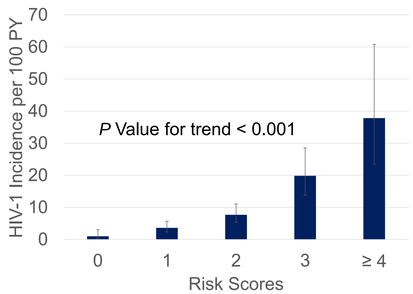
Risk factors for HIV-1 acquisition among 757 MSM in Kilifi, Kenya, 2005-2016

		HIV-1 incidence cases/ Per PY	Incidence/100 PY (95% CI)	Adjusted analysis IRR (95% CI)	*P* Value	Predictor scores
	All men (n=757)	97/1398.3	6.9 (5.7-8.5)			
	Sex with men and women (MSMW)	69/1274.5	5.4 (4.3-6.9)	Reference	0.001	
	Sex with men exclusively (MSME)	28/123.7	22.6 (15.6-32.8)	2.5 (1.4-4.4)		1
Age categories (years)	18-24	57/574.9	9.9 (7.6-12.9)	3.3 (1.9-11.3)	0.097	1
	25-34	37/652.0	5.7 (4.1-7.8)	2.5 (0.7-8.2)		
	35+	3/171.3	1.8 (0.6-5.4)	Reference		
Sexual exposure and protection with condoms in past week	No activity	17/468.2	3.6 (2.3-5.8)	Reference	<0.001	
	All protected	25/431.0	5.8 (3.9-8.6)	1.2 (0.7-2.2)		
	Any unprotected	55/499.0	11.0 (8.5-14.4)	2.6 (1.5-4.4)		1
Receptive anal intercourse (RAI) in past 3 months	No	32/685.4	4.7 (3.3-6.6)	Reference	<0.001	1
	Yes	65/712.8	9.1 (7.2-11.6)	2.8 (1.7-4.7)		
Group sex in past 3 months	No	76/1290.1	5.9 (4.7-7.4)	Reference	0.005	1
	Yes	21/108.1	19.4 (12.7-29.8)	2.1 (1.3-3.5)		

CI, confidence interval; PY, person-years

Independent predictors of HIV-1 infection and corresponding risk scores were: 1 for exclusive sex with men, receptive anal intercourse, any unprotected sex, group sex and age 18-24 years. While laboratory-confirmed urethral or rectal gonorrhea infection was the strongest predictor of HIV-1 infection, we did not include this in the model as few providers have access to such information.

HIV-1 Incidence and 95% CI by Risk scores among 757 MSM, Kilifi, Kenya, 2005-2016



Risk score	HIV-1 incidence cases / PY	Total No. of MSM	HIV-1 Incidence (95% CI)
0	3/304.2	79	1.0 (0.3-3.1)
1	19/525.6	264	3.6 (2.3-5.7)
2	29/377.3	255	8.0 (5.6-11.4)
3	29/146.2	114	19.2 (13.2-27.8)
≥ 4	17/45.0	45	37.8 (23.5-60.8)

RESULTS

A risk score ≥1 corresponded to an HIV-1 incidence ≥3% (Figure). The area under the receiver operator curve (AUC) for predictive ability of the risk score was 0.71 (95% CI, 0.68-0.78).

A unit increase in risk score strongly correlated with an increase in observed HIV-1 incidence (test for trend: $P < 0.001$). A total of 81% of MSM participating in this cohort met eligibility criteria for PrEP start.

DISCUSSION

A risk score based on summation of four reported risk behaviors and age (18-24) strongly correlated with increasing HIV-1 risk.

A risk score cut-off of 1 or more corresponded to an incidence rate of ≥ 3.6% per year and would identify 4 out of 5 MSM in our cohort for PrEP initiation.

MSM with recent laboratory-confirmed gonorrhea infection qualify for PrEP a priori.

The study had a few limitations; first, self-reported sexual behavior may have been subject to recall and social desirability bias, secondly the MSM we studied are not representative of all Kenyan MSM as they all reported high-risk sexual behavior and most (about 70%) participated in transactional sex.

CONCLUSION

A simple risk score can be used to identify MSM at highest risk of HIV-1 infection who should be prioritized for PrEP. This risk score may help Kenyan health providers to assess HIV-1 acquisition risk in MSM and encourage PrEP uptake.

Given the high HIV-1 incidence in MSM, consideration should be given to acute HIV infection evaluation before PrEP start.

REFERENCES

1. Fonner VA, et al. Aids **2016**.
2. WHO, **2016**.
3. Kenya ART guidelines, **2016**
4. Cowan F.M, et al. Int AIDS Soc. **2016**.
5. Sanders EJ, et al. Aids **2013**.

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