



Trends and Determinants of HIV Sexual Risk Behaviors among Young Men Aged 15–24 Years Old: Data Analysis of Cambodia Demographic and Health Surveys 2005, 2010, and 2014

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ABSTRACT

Introduction

Young people who lack HIV-related knowledge are vulnerable to sexual risk behaviors (SRBs), which could lead to HIV infection. Men have a greater intention of engaging in unsafe sexual practices and are more likely to have more sexual partners, use paid sex services, and use condoms inconsistently than women. We aimed to assess the trend of HIV-SRB and its determinants among Cambodian male youth aged 15–24 years old.

Methods

We used data from the Cambodia Demographic and Health Surveys (CDHS) with total samples of 2884 (CDHS 2005), 3265 (CDHS 2010), and 1760 (CDHS 2014) in young men aged 15–24 years old. Sampling weight was used to compensate for the two-stage stratified cluster sampling. Multiple logistic regression was used to determine the main predictors of HIV-SRB.

Results

Overall, more than one-fifth (22%) of young men reported being sexually active across CDHS surveys. Young men reported a significant decline in HIV-SRB from 2005 (17.5%) to 2010 (9.5%), then leveling off at 9.3% in 2014. Determinants of HIV-SRB were more likely to be unmarried (AOR=4.8, 95% CI: 2.8–8.4), be in the rich wealth quintile (AOR=2.0, 95% CI: 1.3–3.3), and having a history of mobility in the past 12 months (AOR=2.4, 95% CI: 1.5–3.8). Youths who reported a more discriminatory attitude toward HIV patients were less likely to have HIV-SRB (AOR=0.7, 95% CI: 0.5–0.9).

Conclusion

The trend of HIV-SRB declined from 2005 to 2010 and was stable between 2010 and 2014. Determinants of HIV-SRB among young men were associated with being nonmarried, being in a better economic status, and having a history of mobility. Interestingly, the discriminatory attitude toward HIV patients was associated with the reduction of HIV-SRB. Program interventions on male youth should be prioritized based on these determinants given the limited budget and youth program priorities. Future studies should further explore the trend of HIV-SRB and discriminatory attitudes toward PLHIV when CDHS 2022 data are available.

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Introduction

Young people who lack human immunodeficiency virus (HIV)-related knowledge are vulnerable to sexual risk behaviors (SRBs), which potentially lead to HIV infection among themselves and their sexual partners [1]. SRB is commonly defined as any sexual behavior that puts individuals at risk for adverse health outcomes [2]. Risky sexual behaviors play a significant role in the HIV epidemic and other sexual reproductive health (SRH) issues, such as unwanted pregnancies, unsafe abortion, and other sexually transmitted infections (STIs), among youth, particularly males [3]. It is suggested that HIV-SRB among young people varies by socioeconomic status, education level, peer pressure, mental health, emotional support, and inaccessibility to proper health information and services [1]. Moreover, migration from rural to urban areas often places young people at social and economic disadvantages [4,5].

Globally, over the past decades, HIV-related risk behaviors have stabilized, and the trend of HIV infection has been reversed significantly. As a result, overall improvements in SRB have been observed, such as an increased percentage of condom use, reduced visits of sex workers, delayed age of first intercourse, and decreased number of sexual partners [5]. Moreover, new HIV infection for adults aged 15 years and over declined from 2.3 million in 2000 to 1.3 million in mid-2020 [6]. However, stagnant numbers of new HIV infections among young people are still a public health concern. Consistently, HIV has become the second leading cause of adolescent mortality globally [7]. In the United States, the CDC 2018 report highlighted that 21% of all new HIV diagnoses were among young people aged 13-24 years old, and 87% of them were young men [8].

Young men have been found to have greater intentions to engage in sexual activities and have greater SRB than women [9]. Studies have suggested that men are more likely to have multiple sexual partners [10,11] and pay for sexual intercourse than women [12]. A UNAIDS report entitled 'Blind Spot: Reaching out to men and boys-2017' indicated that they were less likely than women to know their HIV status, less likely to access and adhere to HIV treatment and more likely to die as a result of AIDS-related illnesses [13]. Therefore, improved engagement of men across the HIV care cascade is the critical barrier to reaching the UNAIDS indicator '95-95-95' by 2030 [14].

Cambodia has been globally recognized for controlling HIV/AIDS epidemics in the last two decades [15]. HIV prevalence among the general population aged 15-49 years old dropped from 1.7% in 2001 to 0.5% by 2020 [16]. This success comes from joint efforts between the government leadership and multi-sectoral responses with significant contributions from international funders, stakeholders, and civil societies. For example, between 2001 and 2011, the government of Cambodia implemented a rapid expansion of HIV prevention and HIV health services, including the scale up of HIV testing, counseling, care and treatment [17].

By 2015, Cambodian youth aged 15-24 contributed close to 25% of the whole population, which is the youngest population in Southeast Asian nations [18]. One of the key elements of reducing the prevalence of HIV/AIDS requires health education and prevention efforts among the general population. In addition, the Ministry of Health (MoH) and Ministry of Education, Youth and Sport have also addressed the importance of SRH's needs since 2012 [3,19]. Despite these commitments, efforts and achievements, there have been limited studies specifically exploring trends in HIV-SRB and its determinants among the general population, especially young men in Cambodia. Noticeably, previous studies have mostly focused on HIV key population groups, such as entertainment workers, men who have sex with men, people who use drugs and transgender individuals. These groups were considered pooled HIV transmitters and were therefore targeted for intervention and prevention programs.

Previous studies have separately focused on a single risk dimension, such as having multiple sexual partners or ever paid for sexual intercourse or inconsistent condom use, as an outcome of interest, while those could be combined and used as a multidimensional outcome of interest [20]. Taking advantage of multidimensional SRB and the feasibility of CDHS datasets, we combined the three SRB, including multiple sexual partners, ever paid for sexual intercourse and inconsistent condom use during paid sexual intercourse, as a single outcome of interest. Therefore, we aimed to assess trends over time and determinants of HIV-SRB among young men aged 15 – 24 years old within the past 12 months from CDHS 2005, 2010, and 2014 [21-23].

Methods

A. Data sources

Data were derived from the three CDHS datasets – 2005, 2010, and 2014. The CDHS is a nationally representative survey in which data were collected through a standardized and structured questionnaire. CDHS samples were selected through a two-stage stratified cluster sampling design. First, enumeration areas (EAs) were defined by using probability proportionate to size stratified by urban and rural areas. Second, the numbers of fixed households were randomly selected by using systematic random sampling in each EA. The detailed methodology used in the surveys was reported in the CDHS reports [21–23]. Men aged 15–49 years old who were usual members of subsampled households or who slept in the households the night before the survey were eligible to be recruited into the CDHS.

The dependent variable, HIV-SRB, was a combination of having multiple sexual partners, ever paid for sexual intercourse and/or used condoms inconsistently in the past 12 months. The combination was defined based on the following three questions:

1- In total, how many different people have you had sexual intercourse in the last 12 months? (2 or more partners=1, otherwise=0)

2- Did you pay anyone in exchange for sex in the last 12 months? (Ever paid for sex=1, otherwise=0)

3- Did you use a condom every time you paid someone in exchange for sex in the last 12 months? (Inconsistent condom uses=1, otherwise=0)

To construct the HIV-SRB variable, any answer corresponding to 1 among the three variables was coded as ‘having SRB=1’; otherwise, it was coded as ‘not having SRB=0’.

Independent variables

- Sociodemographic characteristics including the following variables: age group in years (15 – 17, 18 – 24), marital status (ever married, nonmarried), education level (never, primary school, secondary school or higher), employment status (unemployed, employed), type of residence (urban, rural), household wealth index (poor, middle, rich), number of times away from home in the last 12 months (never, one time, 2 or more times), and duration away from home in the last 12 months (never, ≤ 1 month, > 1 month).

- HIV knowledge of prevention and transmission was divided into 3 categories (‘No knowledge’, ‘Some knowledge’, ‘More knowledge’). The variable was based on the five questions below:

- 1- A healthy-looking person can have AIDS
- 2- Always using condoms during sex could reduce the risk of developing AIDS
- 3- Having only one sex partner can reduce the chances of getting HIV,
- 4- HIV can be transmitted by mosquito bites,
- 5- A person becomes infected by sharing food with someone who has HIV.

HIV knowledge was categorized into 1=no knowledge if the respondents gave no correct response, 2=some knowledge if any of two or fewer responses were correct, and 3=more knowledge if three to five responses were correct.

- Discrimination attitude toward HIV patients was divided into 3 categories (‘No discriminatory’, ‘Some discriminatory’, ‘More discriminatory’). The variable was composed of four questions below:

1- Not buying fresh vegetables from a person if they knew that this person had the AIDS virus,

2- Keep positive HIV status of a family member secret,

3- Not willing to care for a family member sick with AIDS and

4- Not allowing a female teacher with HIV to continue teaching.

Discriminatory attitude was categorized into “1=no discriminatory attitude” (if they responded ‘no’ to all variables), “2=some discriminatory attitude” (if they responded ‘yes’ to any two variables or less), and “3=more discriminatory attitude” (if they responded ‘yes’ to at least three variables).

- Other variables included knowing a place to get HIV tested, sexually active status and age at sexual debut.

B. Data management and analysis

Young men aged 15–24 years were retrieved from male CDHS datasets. After cleaning and keeping the eligible participants, there were a total sample of 2,884 in CDHS 2005, 3,265 samples in CDHS 2010 and 1,760 samples in CDHS 2014 that remained for the analysis. These datasets were combined into a single dataset using STATA V.12 (Stata Corp, Texas, USA). To compensate for the two-stage stratified cluster sampling, a weighted analysis was applied by using survey command (SVY). The sampling weight was calculated based on

a standard of statistical analysis of the Global Demographic and Health Survey Program [24].

Frequency, percentage, mean, and standard deviation were generated to describe the sociodemographic characteristics of the participants. Proportions of HIV-SRB, including multiple sexual partners, paying for sexual intercourse, inconsistent condom use, and the combined main HIV-SRB variable, were calculated and disaggregated by CDHS years. Binary logistic regression was used to calculate the magnitude of association (OR and 95% CI) between independent variables and HIV-SRB. A backward multiple logistic regression was used. Variables with a significance level at p value ≤ 0.10 in the bivariate analysis were included in the multiple logistic regression model to adjust for confounders and assess the independent effects of each factor. CDHS years and marital status were included in the models regardless of the significance level.

C. Ethics approval

Ethics approval was obtained from the National Ethics Committee for Health Research in Cambodia for the CDHS and the Institutional Review Board (IRB) of ICF International in Rockville, Maryland, USA. The publicly available CDHS data were provided to us upon request to the DHS Program, ICF website at <https://dhsprogram.com/data>. Written consent was obtained from all participants before the CDHS interview.

Results

A. Demographic characteristics

Table 1 presents the characteristics of the 7,909 young men aged 15–24 years who were included in this study. There was a similar proportion of young men aged 15–17 years and 18–24 years across CDHS surveys. The proportion of married men increased from 17.9% in 2005 to 20.9% in 2014. Youths who attended secondary school or higher increased from 49.3% in 2005 to 64.3% in 2014. The majority of respondents were employed (2005: 63.8%, 2010: 69.4% and 2014: 80.2%). Approximately 45% of respondents were in the rich wealth category.

B. HIV knowledge and attitudes toward HIV patients

The majority of respondents had high knowledge scores on the prevention and transmission of HIV,

ranging from 88.2% to 90.0% across survey years. Although the majority of respondents had more knowledge on HIV prevention and transmission, the proportion of having some or more discrimination attitude toward HIV patients remained considerably high (2005: 61.3%, 2010: 66.0% and 2014: 67.7%). (**Table 2**).

C. Trends of SRB between 2005 and 2014

The mean age of sexual debut was similar across survey years, at approximately 19.5 years. Trends of respondents who reported having at least two sexual partners in the last 12 months dropped from 17.1% in 2005 to 3.8% in 2014. In contrast, the trend of men who reported ever paying for commercial sex in the last 12 months increased from 1.7% in 2005 to 7.0% in 2014. Overall, HIV-SRB, which combined three SRB dimensions, including multiple sexual partners, ever paid for sexual intercourse and inconsistent condom use, declined from 17.5% (CDHS 2005) to 9.5% (CDHS 2010) and leveled off at 9.3% (CDHS 2014). (**Table 3**).

D. Factors associated with HIV-SRB

Youth was likely to report a 50% reduction in HIV-SRB in CDHS 2010 (AOR=0.5, 95% CI: 0.3–0.8) and has been stable since then, CDHS 2014 (AOR=0.5, 95% CI: 0.3–0.7) compared to CDHS 2005. Additionally, youth who reported a more discriminatory attitude toward HIV patients were likely to reduce their odds of having HIV-SRB (AOR=0.7, 95% CI: 0.5–0.9). In contrast, factors that were significantly more likely to report HIV-SRB were nonmarried (AOR=4.8, 95% CI: 2.8–8.4), being in the rich household wealth index group (AOR=2.0, 95% CI: 1.3–3.3) and ever reporting mobility from home > 1 month (AOR=2.4, 95% CI: 1.5–3.8). (**Table 4**).

Discussion

We found that the trend of HIV-SRB declined from 2005 to 2010, and no further decline was observed in 2014. The decline in HIV-SRB among male youth between CDHS 2005 and CDHS 2010 may be influenced by effective HIV intervention programs with engagement from government, civil societies, and funding agencies. For instance, the national implementation of the condom use program occurred in 2001 and the subsequent years in Cambodia [25].

Table 1: Demographic characteristics among young men aged 15–24

Characteristics	CDHS 2005 (N=2,884)		CDHS 2010 (N=3,265)		CDHS 2014 (N=1,760)	
	n	%	n	%	n	%
Age group (years)						
15–17	1,388	48.1	1,507	46.2	736	41.8
18–24	1,496	51.9	1,758	53.9	1,025	58.2
Marital status						
Ever married	517	17.9	504	15.4	368	20.9
Nonmarried	2,367	82.1	2,761	84.6	1,392	79.1
Education level						
Never	141	4.9	104	3.2	57	3.3
Primary	1,322	45.8	1,115	34.2	572	32.5
Secondary or higher	1,421	49.3	2,045	62.6	1,131	64.3
Employment status						
Unemployed	1,033	36.2	999	30.6	347	19.9
Employed	1,820	63.8	2,265	69.4	1,403	80.2
Type of residence						
Urban	509	17.6	715	21.9	324	18.4
Rural	2,375	82.4	2,550	78.1	1,436	81.6
Household wealth index						
Poor	930	32.3	1,118	34.2	627	35.6
Middle	590	20.4	663	20.3	354	20.1
Rich	1,364	47.3	1,484	45.5	780	44.3
Times away from home in the last 12 months						
Never	1,501	52.1	1,777	54.4	761	43.3
One time	435	15.1	466	14.3	208	11.9
2 or more times	948	32.9	1,022	31.3	789	44.9
Report of the duration away from home in the last 12 months						
Never	1,501	52.1	1,777	54.4	761	43.3
≤ 1 month	998	34.6	1,051	32.2	632	35.9
> 1 month	385	13.3	437	13.4	366	20.8

Table 2: HIV knowledge and attitudes toward HIV patients among study participants

Variables	CDHS 2005 (N=2,884)		CDHS 2010 (N=3,265)		CDHS 2014 (N=1,760)	
	n	%	n	%	n	%
Knowledge on prevention and transmission of HIV/AIDS						
No knowledge	61	2.1	73	2.2	68	3.9
Some knowledge	228	7.9	309	9.5	140	8.0
More knowledge	2,594	90.0	2,883	88.3	1,552	88.2
Knew a place to get HIV tested						
No	1,631	57.3	1,070	33.3	458	26.9
Yes	1,214	42.7	2,140	66.7	1,246	73.1
Discrimination attitude toward HIV patients						
No discriminatory	1,116	38.7	1,109	34.0	568	32.3
Some discriminatory	1,590	55.1	2,061	63.1	1,096	62.3
More discriminatory	178	6.2	95	2.9	96	5.5

Table 3: Behavioral characteristics and trends of HIV-SRB of study participants

Variables	CDHS 2005 (N=2,884)		CDHS 2010 (N=3,265)		CDHS 2014 (N=1,760)	
	Freq.	%	Freq.	%	Freq.	%
Reported sexually active						
Never having sex	2,095	72.7	2,529	77.5	1,236	70.9
Active in the last 4 weeks	455	15.8	396	12.1	314	17.8
Not active in last 4 weeks	333	11.5	340	10.4	209	11.9
Age at sexual debut, Mean (±SD)	19.2 (±2.1)		19.5 (±1.2)		19.5 (±1.2)	
Never	2,095	72.7	2,529	77.5	1,236	70.9
<18 years	155	5.4	94	2.9	74	4.2
≥ 18 years	633	22.0	640	19.6	434	24.9
Reporting ever had sex with a man	8	3.0	4	1.2	0	0.0
HIV-SRB in last 12 months						
Multiple sexual partners	135	17.1	22	2.9	19	3.8
Ever paid for sexual intercourse	9	1.7	54	7.9	36	7.0
Inconsistent condom use	0	0.0	2	2.3	2	6.7
Have HIV-SRB	138	17.5	69	9.5	47	9.3

Table 4: Factors associated with HIV-SRB among young men aged 15-24

Factors	Has HIV- SRB			N = 2,029		N = 1,998
	Freq.	%	P value	OR (95% CI)	P value	AOR (95% CI)
CDHS year						
2005	138	17.5	<0.01	Reference		Reference
2010	69	9.5		0.5 (0.4-0.8)	<0.01	0.5 (0.3-0.8)
2014	47	9.3		0.5 (0.4-0.8)	<0.01	0.5 (0.3-0.7)
Age group						
15-17 years	34	25.9	<0.01	Reference		Reference
18-24 years	220	11.6		0.4 (0.3-0.7)	<0.01	0.7 (0.4-1.5)
Marital status						
Ever married	81	5.9		Reference		Reference
Nonmarried	174	26.2	<0.01	5.7 (3.9-8.1)	<0.01	4.8 (2.8-8.4)
Education level						
Primary or lower	88	8.6	<0.01	Reference		Reference
Secondary or higher	166	16.5		2.1 (1.5-3.1)	<0.01	1.3 (0.9-1.8)
Employment status						
Unemployed	41	27.0	<0.01	Reference		Reference
Employed	213	11.4		0.4 (0.3-0.6)	<0.01	0.9 (0.6-1.7)
Type of residence						
Urban	90	19.9	<0.01	Reference		Reference
Rural	165	10.4		0.5 (0.4-0.7)	<0.01	0.9 (0.7-1.5)
Household wealth index						
Poor	42	5.9	<0.01	Reference		Reference
Middle	32	8.3		1.5 (0.8-2.6)	0.23	1.3 (0.7-2.2)
Rich	180	19.3		3.8 (2.5-5.9)	<0.01	2.0 (1.3-3.3)
Times away from home in the last 12 months						
Never	62	8.4	<0.01	Reference		-
1 time	32	10.7		1.4 (0.8-2.4)	0.38	-
2 or more times	161	16.1		2.1 (1.4-3.2)	<0.01	-
Reporting away from home in the last 12 months						
Never	62	8.4	<0.01	Reference		Reference
≤ 1 month	121	14.2		1.8 (1.2-2.8)	<0.01	1.6 (0.9-2.5)
> 1 month	72	16.3		2.2 (1.4-3.4)	<0.01	2.4 (1.5-3.8)
Sexually active						
In the last 4 weeks	100	8.7	<0.01	Reference		Reference
Not in last 4 weeks	154	17.6		2.2 (1.6-3.1)	<0.01	0.8 (0.4-1.2)
Age at sexual debut						
<18 years	58	17.9	0.02	Reference		Reference
≥ 18 years	197	11.5		0.6 (0.4-0.9)	0.02	0.8 (0.4-1.4)
Knowledge on prevention and transmission of HIV/AIDS						
Less knowledge	14	8.4	0.16	Reference		-
More knowledge	241	12.9		1.7 (0.9-3.2)	0.16	-
Discrimination attitude toward HIV patient						
No discriminatory	106	14.7	0.07	Reference		Reference
Had discriminatory	148	11.3		0.8 (0.6-1.1)	0.07	0.7 (0.5-0.9)
Ever known a place to get HIV test						
No	53	9.4	0.03	Reference		Reference
Yes	202	13.9		1.6 (1.1-2.4)	0.03	1.6 (0.9-2.5)

OR = Odds ratio; AOR = Adjusted odds ratio; CI = Confidence interval;

AOR model excluded: Times away from home in the last 12 months and knowledge on prevention and transmission of HIV/AIDS

However, no further decline in HIV-SRB was observed between CDHS 2010 and CDHS 2014. This stable trend may indicate that the existing intervention programs were at the saturation stage. In the 2010s, Cambodia mainly prioritized their HIV program on key populations, such as entertainment workers, men who have sex with men, transgenders, and people who inject drugs, rather than the general population or youth [17].

This study indicates that nonmarried youths are more likely to exhibit HIV-SRB than ever-married youths. Similarly, research found that married people were less likely to engage in HIV-risk behaviors than those who were not married [26]. Consistently, the UNFPA reported that nonmarried young people are commonly curious and interested in dating and having sexual activities despite cultural norms regarding the forbidden of nonmarried sexual relationships [27]. Other factors contributing to HIV-SRB among nonmarried youth were peer pressure,

low self-esteem, alcohol or other drugs, migration and non-school engagement [27].

We also found that those who were in the rich wealth quintile had higher odds of increasing HIV-SRB compared to those who were in the poor category. Commonly, people with high socioeconomic status might have better access to HIV and SRHR education than those who are of low socioeconomic status [20]. This group of people should understand more about the consequences of SRB and be able to make a decision that reduces the risk of HIV infection. However, our data suggest that better-off young men reported a higher risk of HIV-SRB. This could explain why young men with better-off are easily able to access paid sex service or more sex partners, putting them at risk of HIV-SRB.

Report of mobility increased the risk of unsafe sexual practices and vulnerability to HIV infection. Likewise, a report of the Cambodian Rural Urban Migration Project in 2012 highlighted that those migrant workers were most likely youth, single, had no children, and freedom from family control [28]. Migration among youth from rural to urban areas can be an opportunity for them to seek decent employment or higher education; however, migration can also place young people at a social and economic disadvantage [29]. Therefore, integrated HIV/SRH education programs should target specific youth groups with frequent travel jobs or migrant workers.

Although HIV discrimination-related attitudes toward people living with HIV (PLHIV) should be discouraged, the current study indicates that young men with more discriminatory attitudes report less HIV-SRB regardless of their level of HIV-related knowledge. An explanation of this determinant may be linked to cultural and behavioral norms of stigma and discrimination against PLHIV in the Cambodian context [30]. Similarly, research conducted among the Chinese general population found that approximately one-fourth expressed that they were more fearful of contacting PLHIV than patients with chronic diseases [31]. Fear and worry about contracting the disease may have a positive impact on disease prevention [32,33]. Therefore, it could suggest that people who discriminate against HIV patients tend to avoid or abstain from exposing HIV-SRB or may stay more alert for HIV transmission and infection than their nondiscriminatory counterparts. However, further study to confirm this should be conducted, and this discriminatory attitude should be discouraged.

Findings from this study should be interpreted cautiously due to some limitations. HIV-SRB was self-reported prior to the date of the survey. This approach is likely to introduce underreporting due to the social desirability of respondents. Additionally, the nature of a cross-sectional study does not allow investigators to determine causality between exposure(s) and outcome [34]. Respondents were classified as having HIV-SRB unless they had 2 or more sexual partners in the past 12 months. This criterion might introduce misclassification of HIV-SRB in case respondents had one sexual partner, but their only partner might be an HIV key population who was involved with sex work. Moreover, variables including living alone or with family members, alcohol use, drug use, partner violence, mental health, emotional support, and peer pressure were found to be factors associated with HIV-SRB but were not collected in CDHS.

Conclusions

Although the trend of HIV-SRB declined from 2005 to 2010, it was stable between 2010 and 2014. The main determinants of HIV-SRB among young men were likely linked to socioeconomic characteristics (nonmarried, rich wealth index) and a history of mobility, but a discriminatory attitude toward HIV patients was associated with a reduction in HIV-SRB. Program intervention for young men should be prioritized based on these key determinants where feasible, given the shrinking budget and other main priorities. Future studies should be explored to confirm whether there is a further decline in HIV-SRB when CDHS 2022 data are available.

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