

Original Article

## Developing effective HIV education in Central Asia: a cross-sectional study among Kazakh medical students

Zhamilya Sakenovna Nugmanova<sup>1</sup>, Gulzhakhan Mazhitovna Akhmetova<sup>2</sup>, Gulnara Sayabekovna Kurmangalieva<sup>2</sup>, Nataliya Grigorievna Kovtunenka<sup>1</sup>, Gulmira Rakhatovna Kalzhanbaeva<sup>1</sup>, Malika Kamalovna Abdumananova<sup>2</sup>, Louise-Anne McNutt<sup>3</sup>

<sup>1</sup> Division of HIV infection and Infection Control, Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan

<sup>2</sup> Almaty City AIDS Centre, Almaty, Kazakhstan

<sup>3</sup> Institute for Health and the Environment, University at Albany, State University of New York, Rensselaer, NY, United States

All authors equally contributed to this work.

### Abstract

**Introduction:** The HIV epidemic continues to expand in Central Asia, bridging from injecting drug users to the general population, largely through heterosexual transmission. This study describes medical students' attitudes and behaviours regarding HIV and sexual practices in response to recently introduced HIV curriculum.

**Methodology:** Medical students in Almaty, Kazakhstan, were invited to participate in a cross-sectional survey between April and November, 2013. The survey assessed participant's risk behaviours (*e.g.*, injecting drug use, condom use), concerns related to HIV infection risk (*e.g.*, medical care exposures, personal behaviours), and ability to identify HIV-positive individuals without asking their status. Bivariate analyses (Chi-square test or Fisher's exact test) and multivariate analysis (log-binomial regression) were conducted.

**Results:** Of 647 medical students, the majority were female (82.2%) and single (92.8%) with a median age of 21-22 years. Sexual activity was reported by 176 (27.2%); males were substantially more likely to report sexual activity (74.8% males vs. 16.9% females,  $p < .0001$ ). The majority of sexually active medical students (65.6% and 68.3% males and females, respectively) believe they can determine if their partner is HIV-positive without asking or seeking a laboratory test. This proportion is much higher (92.6%) among married or cohabitating women. No association between perceived ability to ascertain HIV status and condom use was identified.

**Conclusions:** The medical students in our study had a relatively naïve perception of HIV risk, and their knowledge of risk did not translate to appropriate precautionary behaviours. Much work remains if the epidemic in Central Asia is to be contained.

**Key words:** HIV infection; medical education; students' knowledge and perception.

*J Infect Dev Ctries* 2017; 11(7):571-576. doi:10.3855/jidc.9046

(Received 25 June 2016 – Accepted 30 July 2016)

Copyright © 2017 Nugmanova *et al.* This is an open-access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

### Introduction

The HIV epidemic continues to expand in eastern Europe and central Asia. Having gained a foothold in the region through transmission among people who inject drugs (PWID) the epidemic has now bridged to the general population, largely through heterosexual sexual transmission. Kazakhstan is a central Asian country of 17 million citizens bordered by two countries with substantial HIV epidemics. Within the region, the estimated adult prevalence of HIV infection is approximately 1.0% or higher [1]. In Kazakhstan, the estimated prevalence of 0.3% is believed to be an underestimate [2], although the prevalence is thought to be lower than in neighbouring countries. Thus, there is

growing concern among Kazakh public health professionals that the incidence and prevalence of HIV may dramatically increase unless substantial efforts are exerted.

Clearly, prevention programs targeting young people are critical to slow the HIV epidemic. Yet according to a 2011 review, education is limited as Kazakh schools do not comply with UNESCO recommendations [3,4]. Limited studies of students have been conducted in Kazakhstan. A knowledge, attitudes and behaviours survey of students in the city of Semey found about 75% of males and 25% of females reported sexual activity, and consistent condom use was infrequent [5]. About half the students

identified health care professionals as resources they would seek out for counsel.

The purpose of this study was to understand the risk behaviours and perspectives of medical students in Almaty, the largest city in Kazakhstan. Medical students will become the educators, counsellors and treating physicians in the near future. A new HIV education program was developed at the Asfendiyarov Kazakh National Medical University (KazNMU) in 2011. Students are now required to take a one-day course on HIV clinical care during their fourth academic year (first clinical year of training). While the university does administer exams that assess students' basic HIV knowledge, these exams do not cover more subjective information, such as their perspectives on transmission. Such perceptions can impact personal risk behaviours and interactions with patients, including counselling and education.

This study assesses the attitudes and behaviours of medical students. Our primary interest was to determine the current status of students' thinking about their

personal HIV exposure risk with the goal of improving HIV education. To measure these perceptions, we focused on understanding which factors were associated with the students' perception of their partner's HIV risk.

## Methodology

This cross-sectional study was conducted at the Almaty AIDS Centre (Almaty, Kazakhstan) where training sessions on infection control and HIV prevention are provided for medical students. Fourth- and fifth-year medical students were approached to enrol in the study while they were attending courses during the study period (April – November 2013). A researcher, neither on faculty nor involved in medical education, introduced the study to students in the classroom setting. The students were asked to complete a survey.

The study was approved by the KazNMU Research Ethics Committee. To protect students, the survey was anonymous. No names or other identifiers were

**Table 1.** Demographic characteristics of surveyed medical students, by level of sexual activity, Kazakhstan, 2013.

Factor	Ever Sexually Active		Not Sexually Active		P-value
	N	%	N	%	
<b>Age (years)</b>					
19-20	28	25.93	80	74.07	.6037
21-22	126	23.36	352	73.64	
23+	17	32.69	35	67.31	
missing	5	-	4	-	
<b>Gender</b>					
male	86	74.78	29	25.22	<.0001
female	90	16.92	442	83.08	
<b>Married or cohabitating</b>					
married	32	91.43	3	8.57	<.0001
cohabitating	9	81.82	2	18.18	
neither	134	22.64	458	77.36	
missing	1	-	8	-	
<b>Residence</b>					
spouse/partner	41	89.13	5	10.87	<.0001
parents or relatives	53	24.09	167	75.91	
on own or with friends	61	29.61	145	70.39	
dormitory	19	11.52	146	88.48	
missing	2	-	8	-	
<b>Family residence</b>					
oblast centre	84	31.00	187	69.00	.1209
district centre	50	29.24	160	34.26	
rural area	37	21.64	120	25.70	
missing	5	-	4	-	
<b>Family economic condition</b>					
difficult to buy clothes	13	19.70	53	80.30	.2889
buying long use items (e.g., refrigerator) is problematic	44	26.35	123	73.65	
can afford much, but nothing expensive (e.g., car)	79	29.70	187	70.30	
can easily afford buying a new car	21	33.33	42	66.67	
missing	19	-	66	-	

included on the survey. A written informed consent was provided to potential participants; however, no signed informed consent form was required. A waiver for signed informed consent was granted because the consent itself would be the only identifier linking results to the participant. To minimize peer pressure for students related to participation, students were told that if they refused to participate they could leave the survey blank or write anywhere on the form “do not use” and it would be discarded.

The survey included questions about the participant’s risk behaviours, including their injection drug use history and their use of condoms with regular and other partners. Students were also asked about their concerns related to HIV infection risk due to exposures from providing medical care or personal risk behaviours. Additionally, they were asked about their ability to identify HIV-positive individuals without asking their status. Finally, information on demographic and educational characteristics were collected, including age, gender, marital status, living situation and socioeconomic status.

Bivariate analyses were conducted to provide a basic description of the student participants. Frequencies and percentages were computed for categorical variables and means/medians with standard deviations were computed for continuous variables.

Bivariate analyses were conducted using Chi-square tests, or for sparse data, Fisher’s exact test.

## Results

A total of 785 medical students agreed to participate in the study, of whom 647 (82.4%) provided sufficient information to be included in these analyses. (Table 1) Similar to the general student body, the majority of students were females (82.2%) who were 21-22 years old. Most students were single (92.8%), but females were twice as likely as males to be married (5.9% compared to 3.3%, respectively). Female students were also more likely to live in dormitories (29.2%) compared to male students (12.2%); conversely, male students were more likely to live on their own or with friends (51.3%) compared to female students (29.2%) ( $p < 0.001$ ). Aside from these gender differences, female and male participants were equally likely to be from urban vs. rural areas and had a similar, more affluent socio-economic background compared to the average Kazakh family, reflecting the relatively small middle class in Kazakh society. Sexual activity was reported by 176 (27.2%) students with males much more likely to report sexual activity compared to females (74.8% vs. 16.9%,  $p < 0.0001$ ). Female students living in the dormitory and from rural areas were among the least likely to report being sexually

**Table 2.** Perception of partners’ HIV risk and use of condoms among sexually active students, Kazakhstan, 2013.

Factor	Male		Female		P-value
	N	%	N	%	
<b>How easy and well can you determine that your sexual partner has no HIV (without asking)?</b>					
I am always 100% sure about my partners, without asking	24	30.98	46	51.69	.0138
It is easy, but I am not 100% sure	1	1.27	4	4.49	
It is <u>not</u> easy, but usually I can guess pretty well	25	31.65	17	19.10	
I can’t tell	29	36.71	22	24.72	
Missing	7	-	4	-	
<b>Thinking about your “REGULAR” sexual partner, in the last 12 months, how often did you use a condom?</b>					
All the time	35	50.00	16	18.18	<.0001
Sometimes	27	38.57	43	48.86	
Never	8	11.43	29	32.95	
Missing	16	-	2	-	
<b>Thinking about your “NON-REGULAR” sexual partner, in the last 12 months, how often did you use a condom?</b>					
All the time	23	56.10	3	30.00	
Sometimes	17	41.46	5	50.00	
Never	1	2.44	2	20.00	
Missing	-	-	-	-	
<b>How much concern do <u>you</u> have about HIV due to personal behaviours (e.g., unprotected sex, drug use, etc.)?</b>					
A lot	49	62.03	45	52.94	.4272
Some/A little	20	25.31	24	28.24	
None	10	12.66	16	18.82	
Missing	7	-	5	-	

active. While not statistically significant, increasing socioeconomic status was associated with increased reports of sexual activity.

The majority of sexually active medical students believe they can determine if their partner is HIV-positive without asking the question directly or seeking a laboratory test. For males and females who are neither married nor cohabitating, 65.6% and 68.3%, respectively, believe they usually can spot HIV-positive individuals. (Table 2) For married or cohabitating women, 92.6% believe they know their partner's HIV status without asking. No association between perceived ability to ascertain HIV status and condom use was identified. In general, among non-cohabitating couples, about half of males and a quarter of females reported using condoms all the time with no significant difference based on perceived ability to ascertain the HIV status of partners. Multivariate regression analysis did not identify any significant predictors of a student's reported ability to assess his/her partner's HIV status without asking.

## Discussion

This study found that a critical piece of HIV education is lacking among medical students in Kazakhstan, and likely other regional countries as well. The majority of medical students surveyed perceived that they can determine if a partner is HIV positive without inquiry. This perspective identified an important lack of understanding of the typically asymptomatic presentation of HIV. This misunderstanding impacts personal protective behaviours, and potentially how the new doctor delivers medical care in the future. This naïve perspective may arise from a misunderstanding about symptomatic AIDS presentation (*e.g.*, cutaneous lesions due to Kaposi's sarcoma) and HIV infection. Additionally, because the HIV epidemic historically occurred primarily among PWID and other high risk groups, some medical students may think HIV-positive individuals should necessarily have physical signs of risk behaviours.

The surveyed students had one day of HIV/AIDS training in medical school and typically no formal education prior. The previous curriculum focused on microbiology and immunology. In 2011, HIV education was introduced into the medical curriculum. During years 1 and 2 the students take virology and immunology classes at the Department of Microbiology and Virology. In year 6, Ob-Gyn interns learn about the prevention of mother-to-child transmission and

Dentistry interns study HIV prevention specific to dentistry.

The misperceptions may have been precipitated by a novel change to the HIV curriculum: introducing persons with HIV into the classroom to discuss the disease. The medical university is in the process of moving from didactic lectures to an active learning environment. Programs such as these can provide an opportunity for faculty to see how active teaching occurs and, when done well, strengthens the understanding of core concepts. However, due to the lingering stigma of HIV, only PWID and their partners working for non-governmental organizations located at the Almaty AIDS Centre volunteer to participate in these educational endeavours; professionals and students prize confidentiality and do not volunteer. Active learning, such as interviewing patients, can have a profound impact on knowledge acquisition. In light of our results, we realize that effective HIV education requires more than one day of training, and more than one infected demographic. This is particularly true given that no systematic HIV education exists in secondary schools. Students need to better understand risk behaviours that lead to HIV and other diseases transmitted sexually or through nosocomial prevention breaks.

Experiential education may be particularly useful in teaching students about HIV [6]. Students need to understand that HIV-positive individuals may be young and appear healthy. Today's clinician needs to have a full understanding that there is no "typical" HIV-positive patient as the epidemic continues to bridge to the general population. The primary mode of transmission of HIV infection is now heterosexual sex [7]. Students reported infrequent condom use, consistent with student reports in other countries [8-10]. Condom use was not associated with concern about risk of HIV infection. Substantial research on key facilitators of behaviours has suggested that fear is not sufficient for behaviour change. Rather, fear of infection needs to be taught in conjunction with culturally appropriate educational messages and access to condoms that are perceived to be effective [11,12].

As with all studies, some caveats exist. We asked about knowledge of risk factors for HIV status in the context of a personal relationship rather than the more didactic fact list often used by teaching institutions. As such, we may have elicited an artificially high (but realistic) proportion of students who believe they can predict HIV status based on personal experience. While this is less than precise, the student's opinion is informed by personal knowledge of important



environmental and experiential characteristics of the individual which might not otherwise be available to a clinician without such a relationship.

The sample was from one medical university. However, the findings are consistent with results from medical students surveyed in another Kazakh city and a national survey of young people [13], suggesting that the findings may be generalizable to other university students. We suggest that medical students may have minimally better knowledge and behaviours than students in other disciplines and thus a slight bias may exist. We suspect that women reported sexual activity based on the still relatively conservative norms, particularly for students from rural areas. However, the focus of the study was largely among those students who reported sexual activity. While academic metrics ascertain general HIV knowledge, we focused on attitudes and behaviours, and the survey results reported here suggest knowledge did not translate well to either. Finally, although we did not fully assess HIV knowledge on the survey to make correlations at the individual student level, studies which have assessed both directly also find a lack of correlation between knowledge and behaviour [14,15].

## Conclusions

This preliminary study takes a somewhat novel research approach in that we assessed medical student perceptions of their partner's HIV status to develop a real-world perspective on risk behaviours among the most educated Kazakhs. As such, this study provides a window on the best case scenario for the state of HIV knowledge and awareness in order to inform public health interventions focusing on the next generation of clinicians. The medical students in our study had a relatively naïve perception of HIV risk, and their knowledge of risk did not translate to appropriate precautionary behaviours. Much work remains if the epidemic in Central Asia is to be contained.

## Acknowledgements

The authors recognize the support of Aikan Akanov MD, PhD, former Rector of the S. D. Asfendiyarov Kazakh National Medical University. This paper also benefited greatly from the thoughtful contributions of Allison Krug, MPH.

Funding: This study was supported by Asfendiyarov Kazakh National Medical University Research Grant and New York State International Training and Research Program (NYS-ITRP) sponsored by the Fogarty International Centre and National Institute of

Drug Abuse, National Institutes of Health, USA (NIH Grant D43 TW000233).

## Authors' contributions

Drs. Nugmanova and McNutt jointly developed the study design. Dr. Nugmanova worked with Drs Akhmetova, Kurmangalieva, Kovtunenکو, Abdumananova, and Kalzhanbaeva to implement the study, including developing study protocols, data collection and data entry. Dr. McNutt analyzed the data and, with Dr. Nugmanova interpreted the findings and drafted the manuscript. All authors provided insight into the findings. All authors approved the final manuscript.

## References

1. Joint United Nations Programme on HIV/AIDS (2010) UNAIDS report on the global AIDS epidemic. Available: [http://www.unaids.org/globalreport/documents/20101123\\_GlobalReport\\_full\\_en.pdf](http://www.unaids.org/globalreport/documents/20101123_GlobalReport_full_en.pdf) Accessed 19 June 2016.
2. Republican Centre on Prevention and Control of AIDS (2015) Kazakh National Report. Available: [http://www.rcaids.kz/ru/about/publishing/country\\_reports/](http://www.rcaids.kz/ru/about/publishing/country_reports/) Accessed 24 June 2016.
3. The Records of the 29th Session of the UNESCO General Conference (1997) Recommendations concerning the status of higher-education teaching personnel UNESCO. Available: <http://unesdoc.unesco.org/images/0011/001102/110220e.pdf>. Accessed 19 June 2016.
4. Central and Eastern European Women's Network for Sexual and Reproductive Rights and Health (2011) Sexual and reproductive health and rights of adolescents: Central and Eastern Europe and Balkan countries. ASTRA Youth report. Available: [http://www.astra.org.pl/youth/pdf/SRHR\\_of\\_adolescents\\_in\\_CEE\\_and\\_Balkan\\_countries\\_AY\\_2011.pdf](http://www.astra.org.pl/youth/pdf/SRHR_of_adolescents_in_CEE_and_Balkan_countries_AY_2011.pdf). Accessed 18 March 2017.
5. Hansson M, Stockfelt L, Urazalin M, Ahlm C, Andersson R (2008) HIV/AIDS awareness and risk behavior among students in Semey, Kazakhstan: a cross-sectional survey. *BMC Int Health Hum Rights* Available: <http://bmcinthealthhumrights.biomedcentral.com/articles/10.1186/1472-698X-8-14> Accessed 24 June 2016.
6. Marsiglia FF, Jacobs BL, Nieri T, Smith SJ, Salamone D, Booth J (2013) Effects of an undergraduate HIV/AIDS course on students' HIV risk. *J HIV AIDS Soc Serv* 12: 172-189.
7. Richardson ET, Collins SE, Kung T, Jones JH, Tram KH, Boggiano VL, Bekker L-G, Zolopa AR (2014) Gender inequality and HIV transmission: a global analysis. *J Int AIDS Soc* 17: 19035
8. Fonner VA, Armstrong KS, Kennedy CE, O'Reilly KR, Sweat MD (2014) School based sex education and HIV prevention in low- and middle-income countries: a systematic review and meta-analysis. *PLoS One* 9: e89692.
9. Iyoke C, Ezugwu F, Lawani O, Ugwu G, Ajah L, Mba S (2014) Peer-driven contraceptive choices and preferences for contraceptive methods among students of tertiary educational institutions in Enugu, Nigeria. *Patient Prefer Adherence* 31: 1043-1050.
10. Mehra D, Östergren PO, Ekman B, Agardh A (2014) Inconsistent condom use among Ugandan university students from a gender perspective: a cross-sectional study. *Glob Health Action* 10: 22942.

11. Witte K, Allen M (2000) A meta-analysis of fear appeals: implications for effective public health campaigns. *Health Educ Behav* 27: 591-615.
12. Joint United Nations Programme on HIV/AIDS (2015) UNFPA, WHO and UNAIDS: Position statement on condoms and the prevention of HIV, other sexually transmitted infections and unintended pregnancy. Available: [http://www.unaids.org/en/resources/presscentre/featurestories/2015/july/20150702\\_condoms\\_prevention](http://www.unaids.org/en/resources/presscentre/featurestories/2015/july/20150702_condoms_prevention) Accessed 11 March 2017.
13. Hansson M, Stockfelt L, Urazalin M, Ahlm C, Andersson R (2008) HIV/AIDS awareness and risk behavior among students in Semey, Kazakhstan: a cross-sectional survey. *BMC Int Health Hum Rights* 8: 14.
14. Kanekar A, Sharma M (2010) Determinants of safer sex behaviors among college students. *Acta Didactica Napocensia* 27: 27-38.
15. Moura LR, Lamounier JR, Guimarães PR, Duarte JM, Beling MT, Pinto JA, Goulart EM, Grillon, C de FC (2013) The gap between knowledge on HIV/AIDS and sexual behavior: a study of teenagers in Vespasiano, Minas Gerais State, Brazil. *Cad Saude Publica* 29: 1008-1018.

**Corresponding author**

Zhamilya S. Nugmanova, MD, PhD  
Chair, Division of HIV-Infection and Infection Control  
Asfendiyarov Kazakh National Medical University  
94 Tole bi Str.  
050012 Almaty, Kazakhstan  
Phone: + 7 777 698 08 79  
Fax: + 7 727 338 70 90  
Email: [zhamilya.nugmanova@gmail.com](mailto:zhamilya.nugmanova@gmail.com)

**Conflict of interests:** No conflict of interests is declared.