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Awareness about HIV-Infection among HIV-Infected Individuals Attending Medical Moscow Center, Russia

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Abstract**—**This paper presents results of the survey regarding the awareness about HIV/AIDS among HIV-infected individuals. A questionnaire covering various aspects of HIV-infection was conducted among 110 HIV-infected individuals who attended the G.A. Zaharyan Moscow Tuberculosis Clinic, Department for treatment of TB patients with HIV. The questionnaire included questions about modes of HIV transmission and preventive measures against HIV/AIDS, as well as questions about age, gender, education and employment status. The survey revealed that the respondents in the whole had a good knowledge regarding modes of HIV transmission and preventive measures against HIV/AIDS: about 83,6% male respondents and 85,7% female respondents gave an accurate answers regarding the HIV-infection. However, the overwhelming majority of the study participants, that is, 88,5% men and 98% women, was quite ignorant about the risk of acquiring HIV through saliva and toothbrush of HIV-infected individual. Though that risk is rather insignificant, it is still biologically possible. And this gap in knowledge needs to be filled. As the study showed another point of concern was the fact, that despite the knowledge of HIV transmission risk through unprotected sex about 40% percent of HIV-positive men and 25% of HIV-positive women did not insist on using condoms with their sexual partners. These findings indicate that there are still some aspects about HIV-infection which needed to be clarified and explained through more detailed and specific educational programs.

Keywords**—**AIDS, HIV transmission risks, HIV misconceptions, risk behavior.

I. Introduction

THE Human Immunodeficiency Virus (HIV) is one the most dangerous and widely spread infection in the world. The global spread of HIV-infection which took a character of epidemic became one of the world's major serious public health challenges. Millions of people are already infected with HIV and every minute there is a new case of HIV-infection. Annually 1.7 million people die from HIV-infection and AIDS related causes [1]. Unfortunately in Russia HIV infection also continues to be of major public health importance. According to UNAIDS nearly 90% new cases of HIV-infection in Eastern Europe are largely due to Russian Federation and Ukraine [1]. In 2014, there were 864.394 officially registered cases of HIV-infection in Russia. And the number of new cases is still growing. There were 63.863 new cases of HIV-infection in 2014 of which 6.193 cases were children under 15 years of age [2]. Russia is among 10 countries worst affected by HIV-infection. According to UNAIDS and Federal Research and Methodological Centre for Disease Prevention and Control of AIDS an estimated 1.3 million people are living with HIV in Russia plus 100.000 HIV-infected foreign citizens temporally living in country [2], [3]. The character of AIDS epidemic is also has changed. Beginning from 1990 up to the 2004 the HIV-infection in Russia was mostly limited to high-risk groups and primarily to IDUs [4]-[6]. However, in last few years the number of HIV-transmission through heterosexual contacts increased up to 41%. In large cities this index is as high as 50% [2], [7]-[9]. The great concern is the fact that the number of HIV-infected women of reproductive age is increased dramatically over the last 5 years. If at beginning of AIDS epidemic in Russia the number of HIV-infected women was no more than 10% up from 2005-2006 that index was significantly increased.

Nowadays with access to the Highly Active Antiretroviral Therapy (HAART) which allows suppressing virus replication the number of lethal cases among HIV-infected individuals considerably decreased. But the antiviral drugs only slow down the progression of disease and do not cure it. And there is still no HIV vaccine. So the only option is to educate population. The accurate knowledge about HIV/AIDS transmission, risk factors, preventive measures and pre-prophylaxis is the clue to HIV prevention.

Since 1996 – the starting point of AIDS epidemic in Russia- a lot was done in disseminating knowledge about HIV/AIDS through different educational programmes targeted specifically at high risk population and young people. This study presents an analysis of awareness about HIV/AIDS among HIV-infected individuals who attended the G.A. Zaharyan Moscow Tuberculosis Clinic, Department for treatment of TB patients with HIV.

II. Methods

A questionnaire covering various aspects of HIV-infection was conducted among 165 HIV-infected individuals who attended the G.A. Zaharyan Moscow Tuberculosis Clinic, Department for treatment of TB patients with HIV. All participants were 18 years old or above. The participation in the survey was anonymous and voluntary. The questionnaire consisted of basic questions about HIV infection which could be answered "Yes", "No", "I don't know" as well as the misleading questions which could reveal the common myths about HIV transmission. Participants with "I do not know" response were considered as the participants with a "No"

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response. Basing on the previous experience of similar survey about HIV-infection awareness among HIV-infected individuals the number of questions were reduced to 15. As the previous studies showed the participants found it too boring to answer to a lot of questions and as result did not complete the questionnaire. The questions regarding the knowledge about possibility for HIV-infected woman bearing a healthy child was primarily aimed at women but, however, the men also volunteered to answer those questions. Besides the questions regarding modes of HIV transmission the questionnaire included questions about age, gender, education, employment status. As to marital status/constant sexual partner the participants often refused to answer that question and it was excluded from the questionnaire. After the questionnaires were completed an oral interview was conducted with each of participants by attending physicians.

Of the 165 participants initially enrolled in the survey 55 respondents did not complete the questionnaire and was excluded from the study. The majority of the respondents who did complete the questionnaire gave rather detailed answers to all the questions on their own initiative.

III. Results

Out of the 110 individuals included in the study there were 61 (55,5%) men and 49 (44,5%) women. Both men and women were of three age groups: 60 (54,5%) were 28-36 years; 39 (35,5%) were 37-45 years; 4 (3,6%) were of 46-50 years and 7 (6,4%) were of 51-71 years. The majority (79/71,8%) of the respondents had secondary or secondary-special level education: 43 (70,5%) men and 36 (73,5%) women. The university level education had only 31 (28,2%) participants: 18 (29,5%) men and 13 (26,5%) women. Forty six (41,8%) participants had regular job. Out of 64 (58,2%) participants who did not work 11 individuals had a disability pension and the others were supported by relatives.

TABLE I
Demographic Characteristics of Study Population (n=110)

Gender	Male	Female
	61 (55,5%)	49 (44,5%)
Age:		
28-36 years	28 (45,9%)	32 (65,3%)
37-45 years	27 (44,2%)	12 (24,5%)
46-50 years	1 (1,6%)	3 (6,1%)
50-71 years	5 (8,2%)	2 (4,1%)
Education:		
Secondary	31 (50,8%)	26 (53,1%)
Secondary-special	12 (19,6%)	10 (20,4%)
University	18 (29,5%)	13 (26,5%)
Employment Status:		
Regular work	31 (50,8%)	15 (30,6%)
No work	30 (49,2%)	34 (69,4%)
Route of infection:		
Sexual intercourse	35 (57,4%)	38 (77,6%)
IDUs	24 (39,3%)	6 (12,2%)
Transfusion	2 (3,3%)	5 (10,2%)

As to the route of HIV transmission 73 (66,4%) individuals were infected through sexual intercourse: 35 (57,4%) men and 38 (77,6%) women; 30 (27,3%) participants were IDUs: 24 (39,3%) men and 6 (12,2%) women; 7 (6,4%) individuals were infected through blood transfusion: 2 (3,3%) men and 5 (10,2%) women. The demographic characteristics of the participants are summarized in Table I.

Out of 61 male participants, 51 (83,6%) were aware of HIV transmission through unprotected sex, use of unsterile needles/syringes and blood transfusion: 24 (85,7%) were of 28-36 years; 23 (85,2%) were of 37-45 years and 4 participants were of age 48, 52 and 61 years old (Table II).

Forty seven (77%) individuals knew about risk of HIV transmission through instruments in Beauty salons: 21 (75%) of age 28-36 years; 22 (81,5%) of age 37-45 years and 4 participants in age group 48-61 years. As to sharing toothbrush with HIV-infected person only 10 (16,4%) male respondents - 6 (21,4%) of age 28-36 years and 4 (14,8%) of age 37-45 years- indicated that there was a potential risk of HIV transmission. The possibility of acquiring HIV during "open-mouth" kissing (or wet kissing) were acknowledged by the minority of respondents, that is 7 (11,5%) individuals of 37-45 years old. Nine (14,8%) participants) believed that

HIV could be transmitted through shaking hands with a person with HIV/AIDS and 17 (27,9%) that it could be acquired through sharing dishes with a person with HIV/AIDS. The majority of the respondents knew about such preventive measures against HIV/AIDS as using condoms and not sharing needles/syringes: 51 (83,6%) and 51 (83,6%), correspondently. However 24 (39,3%) participants did not insist on using condoms during sexual intercourse. There was no difference in knowledge between respondents regarding their education level.

Forty two (85,7%) female participants as the majority of male participants were aware of HIV transmission through unprotected sex and blood transfusion: 31 (96,9%) were of 28-36 years; 7 (58,3%) were of 37-45 years and 5 participants were of age 48, 50, 55, 66 and 71 years old (Tables III and IV).

Transmission of HIV through sharing needles/syringes were acknowledged by 40 (81,6%) respondents: 29 (90,6%) of age 28-36 years; 7 (58,3%) of age 37-45; 2 of age 48-50; 2 of age 55 and 71. The risk of acquiring HIV through instruments in Beauty salons were known to the majority (39/79,6%) of female participants: 27 (84,4%) of age 28-36; 8 (66,7%) of age 37-45; 2 of age 46-50 and 2 of age 50-71. However, out of 49 female participants only 1 (2%) knew about potential risk of HIV transmission through "open-mouth" kiss and only 2 (4,1%) knew about potential risk of sharing toothbrush.

Twenty (40,8%) respondents believed in acquiring HIV through shaking hands with HIV-infected individual: 14 (43,7%) of age 28-36 years; 6 (50%) of age 37-45 years and 11 (22,4%) through sharing dishes with a person with HIV/AIDS: 5 (15,6%) of age 28-36 and 6 (50%) of age 37-45 years.

TABLE II
KNOWLEDGE ABOUT HIV TRANSMISSION AMONG MALES PARTICIPANTS (N=61)

Question	Age group (years) 28-36 (n=28)		37-45 (n=27)		46-50* (n=1)		50-71* (n=5)	
	Yes	No	Yes	No	Yes	No	Yes	No
Do you think you can be HIV infected through:								
- unprotected sexual intercourse	24 (85,7%)	4 (14,3%)	23 (85,2%)	4 (14,8%)	1	_	3	2
- sharing needles/syringes	24 (85,7%)	4 (14,3%)	23 (85,2%)	4 (14,8%)	1	_	3	2
- blood transfusion	24 (85,7%)	4 (14,3%)	23 (85,2%)	4 (14,8%)	1	_	3	2
- instruments in Beauty salons	21 (75%)	7 (25%)	22 (81,5)	5 (18,5%)	1	_	3	2
- sharing toothbrush of a person with HIV/AIDS	6 (21,4%)	22 (78,6%)	4 (14,8%)	23 (85,2%)	_	1	_	5
-kissing a person with HIV/AIDS:								
(a)"dry kiss"	-	28 (100%)	-	27 (100%)	-	1	-	5
(b)"open-mouth kiss"	-	28 (100%)	7 (25,9%)	20 (74,1%)	-	1	-	5
-shaking hands with a person with HIV/AIDS	_	28 (100%)	7 (25,9%)	20 (74,1%)	_	1	2	3
-sharing dishes with a person with HIV/AIDS	7 (25%)	21 (75%)	10 (37%)	17 (63%)	_	1	_	5
What preventive measures against HIV/AIDS do you know?								
- using condoms	24 (85,7%)	4 (14,3%)	23 (85,2%)	4 (14,8%)	1	_	3	2
- choosing less risky sexual behaviors	4 (14,3%)	24 (85,7%)	_	27 (100%)	1	_	_	5
- never sharing needles	24 (85,7%)	4 (14,3%)	23 (85,2%)	4 (14,8%)	1	_	3	2
Do you insist on using condom during sexual intercourse?	22 (78,6%)	6 (21,4%)	13 (48,1%)	14 (51,9%)	1	_	1	4

***** - number of participants in that group was too small to calculate the percentage

TABLE III
KNOWLEDGE ABOUT HIV TRANSMISSION AMONG FEMALE PARTICIPANTS (N=49)

Question	Age group (years) 28-36 (n=32)		37-45 (n=12)		46-50* (n=2)		50-71* (n=3)	
	Yes	No	Yes	No	Yes	No	Yes	No
Do you think you can be HIV infected through:								
- unprotected sexual intercourse	31 (96,9%)	1 (3,1%)	7 (58,3%)	5 (41,7%)	2	_	2	1
- sharing needles/syringes	29 (90,6%)	3 (9,4%)	7 (58,3%)	5 (41,7%)	2	_	2	1
- blood transfusion	31 (96,9%)	1 (3,1%)	7 (58,3%)	5 (41,7%)	2	_	2	1
- instruments in Beauty salons	27 (84,4%)	5 (15,6%)	8 (66,7%)	4 (33,3%)	2	_	2	1
- sharing toothbrush of a person with HIV/AIDS	2 (6,2%)	30 (93,8%)	_	12 (100%)	_	2	_	3
-kissing a person with HIV/AIDS:								
(a)"dry kiss"	-	32 (100%)	-	12 (100%)	_	2	_	3
(b)"open-mouth kiss"	-	32 (100%)	_	12 (100%)	_	2	1	2
-shaking hands with a person with HIV/AIDS	14 (43,7%)	18 (56,3%)	6 (50%)	6 (50%)	_	2	_	3
-sharing dishes with a person with HIV/AIDS	5 (15,6%)	27 (84,4%)	6 (50%)	6 (50%)	_	2	_	3
What preventive measures against HIV/AIDS do you know?								
- using condoms	31 (96,9%)	1 (3,1%)	7 (58,3%)	5 (41,7%)	2	_	2	1
- choosing less risky sexual behaviors	4 (12,5%)	28 (87,5%)	3 (25%)	9 (75%)	_	2	1	2
- never sharing needles/syringes	29 (90,6%)	3 (9,4%)	7 (58,3%)	5 (41,7%)	2	_	2	1
Do you insist on using condom during sexual intercourse?	28 (87,5%)	4 (12,5%)	7 (58,3%)	5 (41,7%)	1	1	1	2

***** - number of participants in that group was too small to calculate the percentage

As the male participants females were well informed about preventive measures against HIV/AIDS: 42 (85,7%) indicated using condoms and 36 (73,5%) not sharing needles/syringes. Less risky sexual behaviors as the preventive measure were indicated only by 8 (16,3%) respondents. Despite the knowledge of consistently use of condom only 37 (75,5%) respondents insisted on using it during sexual intercourse. No difference was observed in knowledge between female respondents regarding their education level.

Almost all female participants, that is, 42 (85,7%) were aware of possibility for HIV-infected woman to give birth to a healthy child and answered correctly what measures should be taken for that (Table V).

There were only 2 negative answers: 1 participant was of age 66 years and 1 of age 71 years. Surprisingly 52 (85,2%) male participants also were well aware of possibility for HIV-infected woman to have a healthy child. Thirty two (52,5%) respondents knew what measures should be taken for that case.

IV. DISCUSSION

The study results indicate quite a good knowledge among HIV-infected individuals about modes of HIV transmission and preventive measures against HIV/AIDS. About 83,6% male respondents and 85,7% female respondents gave an accurate answer regarding the HIV-infection. As the few previous studies showed not recently the situation was

different [10]-[12]. The awareness about HIV/AIDS even among high risk groups was rather poor. Due to lack of education in discordant couples the HIV- negative partners were exposed to high risk of HIV transmission through sexual contacts with their HIV-infected partners (who were mainly IDUs). Sixty five percent of IDUs practiced unprotected sex with their HIV- negative partners. That data were consistent with molecular results which had shown that HIV subtypes acquired by non- DUs and HIV-negative heterosexual partners were the same found among HIV-infected IDUs [6].

Due to the wide educational campaign in Medical Centres and through media (internet, brochures) the awareness about risk of HIV-transmission among high risk population became rather high and as in Western Europe was associated with increased condom use [12], [13].

As the present survey revealed 75,5% of women and 60,7% of men practiced safe sex and were using condoms during sexual intercourse. However, about 40% percent of HIV-positive men and 25% of HIV-positive women despite the knowledge of HIV transmission risks did not insist on using condoms with their sexual partners. As face- to- face interviews revealed the usual explanations to that were: 1) dislike of condoms, 2) sex with condom was less attractive and 3) a belief that it was safe not to use condoms because of undergoing HAART. Also 91,8% male respondents and 83,7% female respondents did not indicate less risky sexual behaviours (such as reduction of number of sexual partners) as preventive measure against HIV/AIDS. These findings consistent with other studies, show that there are still some aspects about HIV-infection which needed to be clarified and explained through more detailed and specific educational programmes [10], [14], [15].

TABLE IV
KNOWLEDGE OF PARTICIPANTS ABOUT MODE OF HIV TRANSMISSION

Question	Yes		No	
	Male (n=61)	Female (n=49)	Male (n=61)	Female (n=49)
Do you think you can be HIV infected through:				
- unprotected sexual intercourse	51 **(83,6%)**	42 **(85,7%)**	10 **(16,4%)**	7 **(14,3%)**
- sharing needles/syringes	51 **(83,6%)**	40 **(81,6%)**	10 **(16,4%)**	9 **(18,4%)**
- blood transfusion	51 **(83,6%)**	42 **(85,7%)**	10 **(16,4%)**	7 **(14,3%)**
- instruments in Beauty salons	47 **(77%)**	39 **(79,6%)**	14 **(23%)**	10 **(20,4%)**
- sharing toothbrush of a person with HIV/AIDS	10 **(16,4%)**	2 **(4,1%)**	51 **(83,6%)**	47 **(95,9%)**
-kissing a person with HIV/AIDS:				
"open-mouth kiss"	7 **(11,5%)**	1 **(2%)**	54 **(88,5%)**	48 **(98%)**
-shaking hands with a person with HIV/AIDS	9 **(14,8%)**	20 **(40,8%)**	52 **(85,2%)**	29 **(59,2%)**
-sharing dishes with a person with HIV/AIDS	17 **(27,9%)**	11 **(22,4%)**	44 **(72,1%)**	38 **(77,6%)**
What preventive measures against HIV/AIDS do you know?				
- using condoms	51 **(83,6%)**	42 **(85,7%)**	10 **(16,4%)**	7 **(14,3%)**
- choosing less risky sexual behaviors	5 **(8,2%)**	8 **(16,3%)**	56 **(91,8%)**	41 **(83,7%)**
- never sharing needles/syringes	51 **(83,6%)**	36 **(73,5%)**	10 **(16,4%)**	13 **(26,5%)**
Do you insist on using condom during sexual intercourse?	37 **(60,7%)**	37 **(75,5%)**	24 **(39,3%)**	12 **(24,5%)**

TABLE V
KNOWLEDGE OF PARTICIPANTS ABOUT POSSIBILITY FOR HIV-UNFECTED WOMEN HAVING A HEALTHY CHILD

Question	Negative Answer			
	Female (n=49)		Male (n=61)	
	28-45 years (n=44)	46 - > 50 years (n=5)	28-45 years (n=55)	46 - > 50 years (n=6)
Do you think an HIV-infected woman can give birth to a healthy child?	9 (18,4%)	2	29 (47,5%)	2
Do you know what measures should be taken for prevention mother-to-child transmission of HIV?	9 (18,4%)	2	29 (47,5%)	4

As the result of wide educational campaign targeted at high risk group population 85,7% female respondents and even 85,2% male were aware of the possibility for HIV-infected woman to have a healthy child and knew what measures should be taken for that. Similar findings were reported in another study which showed that 82% HIV-positive women were well informed about the possibility of giving birth to a healthy child versus 55% HIV-negative women [16].

Though the majority of male and female participants were well informed about HIV transmission, still 14,8% men and 40,8% women believed that HIV could be acquired through shaking hands with a person with HIV/AIDS. About 28% male and 22% female respondents thought that HIV could be transmitted through sharing dishes with HIV-infected individual. It must be noted that although in the whole there was no difference in knowledge about HIV/AIDS among the participants regarding their educational level, the misconceptions were characteristic solely for respondents with secondary level education. There are no data published on surveys conducted in Russia which examined the difference in HIV/AIDS knowledge among individuals regarding their educational level, but our findings are consistent with the results of studies conducted in other countries [17]-[19]. The

prevalence of misconceptions was high among individuals with low level of education.

While the awareness about modes of HIV transmission and preventive measures was good among HIV-infected individuals there were aspects which caused some concern. Only 7,3% respondents acknowledged the potential risk of acquiring HIV through "open-mouth kiss" and only 10,9% respondents indicated risk of HIV transmission through sharing toothbrush with HIV-positive individual. HIV transmission through kissing is rather rare. Generally the risk of getting infected with HIV via saliva is very low partly because the concentration of the virus in the saliva is rather small and partly of multiple secreted factors that inhibit HIV replication [20]-[24]. However, it is known a several proven cases when the persons were infected with HIV through saliva. The first case was reported in 1986 [25]. A child had died of AIDS six months after been bitten by his HIV-seropositive younger brother. Another case was reported by CDC in 1997 [26]. The HIV-infected men who had an extensive dental problems and as a result frequent gum bleeding transmitted HIV to his female sex partner through "open-mouth" kiss. Supposedly the woman became infected through mucous membrane exposure to the man's saliva that was contaminated by blood from his bleeding gums. The female partner appeared also to have inflamed gingival mucosa. The couple denied known risk exposures for HIV. In 1999 one more case of HIV-transmission through bite was reported [27]. A woman of 59 year old was bitten by her HIV-seropositive son during a seizure. Forty days later after the incident she was found to be HIV-positive. She was a widow, with no sexual intercourse for the past 10 years. It was molecularly confirmed that the viruses infecting the mother and the son were of the same HIV-1 quasi species. In all reported cases there was exposure to saliva contaminated with blood. One case was reported of acquiring HIV through bite where there was no blood in saliva [28]. A man had an argument with his HIV-positive son during which the son bit his father. Four weeks after the fight the man was found to be HIV-positive. The man had no history of unprotected sex or multiple sex partners, his wife was HIV-negative and he was non-IDU. The son had no bleeding gums or oral ulcers. The sequence of the viruses from source and recipient showed 91% homology of C2-V3 HIV region. The reported cases indicate that no matter how the possibility of HIV transmission through saliva is negligible it deserve a special attention. Taking into account that gingivitis is rather common among healthy individuals and that HIV-infected individuals very often have extensive dental problems, it would be wise not to practice "open-mouth" kissing with a person known to be infected, as there is a potential risk for contact with saliva mixed with infected blood. Also some HIV-infected individuals are hyper-excretors and have high levels of infectious virus in their saliva [29]. Thus those individuals may harbor a discrete oral reservoir of infection despite undetectable or low viral burden in their blood. Usually when one typing in Google a question ""Does kissing cause AIDS?" and getting a "No" for an answer is quite sure he cannot get infected or transmit the virus to his/her partner. The results of the study show that people does not differentiates "dry kiss" and "open-mouth" kiss. For them a kiss is a kiss and people feel safe. As the findings revealed 92,7% participants of the study did not realize there was a potential risk of HIV transmission through "open-mouth" kiss. It is evident that a special attention should be paid in educational programs to that specific question.

During face-to-face interview the respondents admitted that sharing a toothbrush with their partner was a common practice. However, it was shown that toothbrushes besides containing potentially pathogenic bacteria and viruses such as *Staphylococcus aureus*, Pseudomonas and herpes simplex virus also collect and retain blood epithelial cells from infected gingival of AIDS patients [30]-[33]. There is one documented case of a child becoming HIV infected by sharing toothbrushes with parents who were both HIV infected [34]. Transmission probably occurred from blood left on the toothbrushes. Aside from the fact that toothbrush retain mucosal and inflammatory cell it comes in contact with saliva. And it was shown that viral load in the saliva of some individuals was 2-5-fold greater than in their plasma [29], [35]. The toothbrush, therefore, may be a potential source of HIV transmission. So the question of sharing toothbrush with HIV-infected person alongside with practice of deep (wet kissing) with HIV-positive individual deserves a special attention and must not be overlooked in educational programmes.

REFERENCES

[1] Global report. "UNAIDS report on the global AIDS epidemic 2013", UNAIDS 2013.
[2] Newsletter No. 39. "HIV-infection". Federal Research and Methodological Centre for Disease Prevention and Control of AIDS, Russian Federation, 2014.
[3] Surveillance Report. "HIV/AIDS Surveillance in Europe, 2013".
[4] Newsletter No. 26. "HIV-infection". Federal Research and Methodological Centre for Disease Prevention and Control of AIDS, Russian Federation, 2004.
[5] T. Rhodes et al., "HIV transmission and HIV prevention associated with injecting drug use in the Russian Federation". *Int J Drug Pol*, 2004, vol.15: pp. 1–16.
[6] A. Bobkov et al., "Temporal trends in the HIV-1 epidemic in Russia: predominance of subtype A". *J Med Virol*, 2004, vol.74: pp.191-196.
[7] M. Nosik et al., "Routes of transmission of HIV-infection in the North-Western and North Regions of Russian Federation". *Russian Journal of AIDS, Cancer and Public Health*, 2010, vol. 14 (1): pp.32-33.
[8] M. Nosik et al., "Changes in HIV/AIDS epidemic in Russia over the period of 2000-2014 years". *Sanitarnyi vrach (in Russian)*, submitted for publication.
[9] UNAIDS/WHO (Joint United Nations Programme on HIV/AIDS and the World Health Organization). AIDS Epidemic Update—December 2005. Special Report on HIV Prevention. Geneva: UNAIDS/WHO, 2005.
[10] O. Toussova and W. Wechsberg, "Sociodemographic features and behavior patterns of discordant couples in St.Petersburg, Russia". In: 6th IAS Conference on HIV Pathogenesis, Treatment and Prevention, Rome, Italy; 2011 (abstract CDC336).
[11] L.M. Niccolai et al., "The potential for bridging of HIV transmission in the Russian Federation: sex risk behaviors and HIV prevalence among drug users (DUs) and their non-DU sex partners". *J Urban Health*, 2009, vol. 86 (Suppl 1):pp.131–143.
[12] L.E. Grau et al., "HIV Disclosure, Condom Use, and Awareness of HIV Infection Among HIV-Positive, Heterosexual Drug Injectors in St. Petersburg, Russian Federation". *AIDS Behav*, 2011, vol. 15(1): pp. 45–57.

[13] M.G. Schlumberger et al., "European Community Study Group on HIV in Injecting Drug Users. Knowledge of HIV serostatus and preventive behaviour among European injecting drug users: second study". *Eur J Epidemiol*, 1999, vol.15:pp. 207–215.
[14] Y.A. Amirkhanian, J.A. Kelly and D.D. Issayev, "AIDS knowledge, attitudes, and behaviour in Russia: results of a population-based, random-digit telephone survey in St. Petersburg". *Int J STD AIDS*, 2001, vol.12: pp. 50–57.
[15] L.M. Niccolai et al., "High HIV prevalence, suboptimal HIV testing, and low knowledge of HIV-positive serostatus among injection drug users in St. Petersburg, Russia". *AIDS Behav,* 2010, vol.14 (4):pp. 932–41.
[16] V.G. Kanestri et al., "Awareness about vertical transmission of HIV-infection among women and obstetrician-gynecologists". Federal Research and Methodological Centre for Disease Prevention and Control of AIDS, Russian Federation, 2005.
[17] T.S. Mwamwenda, "Education level and (HIV/AIDS knowledge in Kenya". *J AIDS HIV Res*, 2014, vol.6 (2): pp.28-32.
[18] W.J. Ugarte, "Assessing knowledge, attitudes, and behaviors related to HIV and AIDS in Nicaragua: A community-level perspective". *Sex Reprod Healthc*, 2013, vol.4(1): pp.37-44.
[19] U. Ayranci, "AIDS knowledge and attitudes in a Turkish population: an epidemiological study". *BMC Public Health*, vol. 5: pp. 95-104.
[20] D.C. Shugars, K.Fu. Alexander and S.A. Freel, "Endogenous salivary inhibitors of human immunodeficiency virus". *Arch Oral Biol*, 1999, vol.44: pp.445-453.
[21] D.C. Shugars et al., "Saliva and inhibition of HIV-1infection: molecular mechanisms". *Oral Dis*, 2002, vol. 8 (Suppl 2): pp.169-175.
[22] P. Skott et al., "Inhibitory function of secretory leukocyte protein inhibitor (SLPI) in human saliva is HIV-1 specific and varies with virus type". *Oral Dis,* 2002, vol. 8 (Suppl 2): pp.160-167.
[23] J.G. Bolscher et al., "Inhibition of HIV-1 IIIB and clinical isolates by human parotid, submandibular, sublingual and palatine saliva". *Eur J Oral Sci*, 2002, vol. 11: pp.149-156.
[24] S.H. Kazmi et al., "Comparison of human immunodeficiency virus type-1 specific inhibitory activities and other human mucosal fluids". *Clin Vaccine Immun,* 2006, vol.13 (10): pp.1111-1118.
[25] V. Wahn et al., "Horizontal transmission of HIV infection between two siblings". *Lancet*, 1986, vol.2: p. 694.
[26] MMWR. "Transmission of HIV possibly associated with exposure of mucous membrane to contaminated blood". 1997, Vol. 46(27): pp. 620-623.
[27] S.M. Andreo et al., "HIV type 1 transmission by human bite". *AIDS Res Hum Retroviruses*, 2004, vol. 20: pp. 349-350.
[28] A.K. Deshpande, S.K. Jadhav and A.H. Bandivdekar, "Possible transmission of HIV infection due to human bite". *AIDS Res Ther*, 2011, vol. 8: pp.16-18.
[29] D.C. Shugars et al., "Hyper-excretion of human immunideficiendy virus type 1 RNA in saliva". *J Dent Res*, 2001, vol.2: pp.414-420.
[30] R.T. Glass, "The infected toothbrush, the infected denture and transmission of disease: a review". *Compendium,* 1992, vol. 13 (7): pp.592-598.
[31] R.T. Glass and M.M. Lare, "Toothbrush contamination: a potential health risk?". 1986, *Quintessence Inter*, vol. 17 (1): pp. 39–42.
[32] A. Mehta, P. S. Sequeira, and G. Bhat, "Bacterial contamination and decontamination of toothebrushes after use". *The New York State Den J*, vol. 73 (3): pp. 20-22.
[33] R.T. Glass et al., "Detection of HIV proviral DNA on toothbrushes: a preliminary study". *J Oklahoma Dent Assoc,* 1994, vol. 84 (3): pp. 17-20.
[34] MMWR. "Human Immunodeficiency virus transmission in household settings – United States", 1994, vol.43 (19): pp.353-356.
[35] M. Balamane et al., "Detection of HIV-1 in saliva: implications for case-identification, clinical monitoring and surveillance for drug resistance". *The Open Virol J*, 2010, vol. 4: pp.88-93.