TABLE 2. Risk Characteristics of Male Injecting Drug Users Recruited From a Drop-in Center and its Neighboring Area in Tehran in 2004, by HIV-1 Test Results (n = 207)

Characteristics	No.	HIV-1 positive n (%)	Crude OR (95% CI)	P*
Overall	207	48 (23.2)	—	—
Time from last drug injection (months)				
<6	186	45 (24.2)	1.0	—
≥6	21	3 (14.3)	0.5 (0.1–1.9)	0.418†
Length of continual injecting (years)				
<6	100	21 (21.0)	1.0	—
≥6	105	27 (25.7)	1.3 (0.7–2.5)	0.426
Frequency of daily injecting				
Once a day or less	58	14 (24.1)	1.0	—
Twice a day or more	144	33 (22.9)	0.9 (0.5–1.9)	0.853
No. of incarcerations				
0–1	49	5 (10.2)	1.0	—
2–5	112	28 (25.0)	2.9 (1.1–8.1)	0.038
>5	45	15 (33.3)	4.4 (1.4–13.4)	0.009
Total length of incarceration (years)				
No incarceration/<2	112	19 (17.0)	1.0	—
2–5	58	13 (22.4)	1.4 (0.6–3.1)	0.390
>5	35	16 (45.7)	4.1 (1.8–9.4)	0.001
Ever injected a drug inside prison				
No	152	30 (19.7)	1.0	—
Yes	55	18 (32.7)	2.0 (1.0–3.9)	0.050
Ever injected a drug using a shared utensil inside prison				
No	162	32 (19.8)	1.0	—
Yes	45	16 (35.6)	2.2 (1.1–4.6)	0.026
Ever tattooed				
No	71	12 (16.9)	1.0	—
Yes (never inside prison)	52	12 (23.1)	1.5 (0.6–3.6)	0.395
Yes (ever inside prison)	84	24 (28.6)	2.0 (0.9–4.3)	0.089
Ever had an IDU sex partner				
No/never had sex	177	40 (22.6)	1.0	—
Yes	23	6 (26.1)	1.2 (0.4–3.3)	0.708
Ever had sex with another man				
No/never had sex	191	45 (23.6)	1.0	—
Yes	16	3 (18.8)	0.7 (0.2–2.7)	1.000†

*P values based on χ^2 test of proportions unless otherwise specified.
†Two-tailed Fisher exact test.

sociodemographic characteristics of IDUs was associated with HIV-1 infection.

Drug Use Characteristics

The median age for commencing illicit drug use and drug injecting were 18.0 and 25.0 years old, respectively. Opium, hashish, or heroin was the first drug reported to be used by 42%, 37.5%, and 20.5% of the IDU participants, respectively. About 10% of IDUs started drug use via injecting.

Based on the reported age at interview and that of first drug injection, the median length of injecting drugs was estimated to be 6 years. About half of male IDUs reported having ever injected a drug using a shared needle or syringe (receptive sharing of needle or syringe), but this proportion was 11% for the last drug injected. In the month before the interview, 60% of IDUs reported they have been using drugs mainly in public places such as parks or streets. Up to 91% of IDUs reported using heroin in the past month. About 63% reported having ever received sterile needle/syringe from the NGO needle and syringe program previously. None of these characteristics relating to drug use was significantly associated with higher prevalence of HIV-1 infection.

History of Incarceration

As high as 94% of male IDUs had a history of incarceration in their lifetime, with most (81%) having experienced 2 or more prior incarcerations (multiple incarcerations). Of those who were ever incarcerated, the median number and length of lifetime incarcerations were 3 and 18 months, respectively. Among those with a history of incarceration, 28% (55 of 194) reported having ever injected a drug inside prison; of them, 82% (45 of 55) used shared injection device (needle, syringe, or handmade injection device) for drug injecting at some time during their incarceration. Up to 43% of ever-incarcerated IDUs reported being tattooed inside prison.

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TABLE 3. Multivariable Analysis on the Association Between HIV-1 Infection and Risk Characteristics of Injecting Drug Users Recruited From a Drop-in Center and its Neighboring Area in Tehran in 2004

Characteristics	Adjusted OR	95% CI	P
Ever injected using a shared device in prison	2.45	1.01–5.97	0.049
History of multiple incarcerations (≥2 times)	3.13	1.08–9.09	0.036
Ever had sex with another man	0.53	0.12–2.34	0.400
Ever tattooed inside prison	1.34	0.63–2.85	0.442

Variables shown in this table are controlled for age, levels of education, marital status, job situation, recruitment site, homelessness, and years of drug injection.

The prevalence of HIV-1 infection was associated with the number of lifetime incarcerations and with the total length of incarcerations in a dose-dependent manner (Table 2). Those who reported having injected a drug inside prison using a shared injection device (needle, syringe, or handmade device) had a significantly higher prevalence of HIV-1 compared with those who did not (36% vs. 20%, $P < 0.05$). The prevalence of HIV-1 infection among those who reported a history of tattooing inside prison was marginally higher than those without a history of tattooing (29% vs. 17%, $P = 0.089$).

Sexual Behavior

Among 167 IDUs who reported ever being sexually active, 54% reported having had 2 or more sexual partners in their lifetime, and only 53% (88 of 167) had ever used a condom during sex. Of all IDUs, about 8% (16 of 207) reported ever having sex with another man in their lifetime and 11% reported having had an IDU sexual partner. Neither of these risk behaviors relating to sexual behavior of male IDUs were associated with HIV-1 infection.

Multivariable Analysis

The variable related to the history of shared drug injection inside prison and that of multiple incarcerations (≥2 times) were selected as the main incarceration-related exposures to be included in the multivariable model. In the multivariable analysis controlling for basic sociodemographic characteristics, it was shown that HIV-1 infection remained associated with a history of shared drug injection inside prison (adjusted OR, 2.45; 95% CI, 1.01–5.97) and of having had multiple incarcerations (adjusted OR, 3.13; 95% CI, 1.08–9.09) (Table 3). No interaction was found between the number of lifetime incarcerations and shared drug injecting inside prison in association with HIV infection.

DISCUSSION

This study for the first time investigated the prevalence of HIV-1 infection and its correlates among community-based IDUs in Tehran. Our findings show that the HIV prevalence detected in Tehran was at a record high and that it was potentially correlated with a history of shared drug injection inside prison and that of multiple incarcerations.

The association between HIV-1 infection and a history of shared drug injection inside prison has been reported in other countries[12–14] and was found in our earlier study among IDUs who visited treatment centers in Tehran.[4] This association is also supported by our qualitative data[15] that showed that although drugs are available in some prisons, they are much more expensive than those purchased outside of prison in Iran. Having obtained an expensive drug inside prison where drug use is apparently prohibited, the most cost-effective and concealing way for drug users to consume their drugs is by injecting. Meanwhile, an extreme shortage of needles and syringes inside prisons may lead incarcerated IDUs to share needle/syringe or handmade injection device with a large number of partners, which, as shown in this study, puts them at great risk of HIV infection.

In the multivariable analysis including variables related to a history of shared drug injecting and tattooing inside prison, a history of multiple incarcerations remained significantly associated with HIV infection. This finding could be due to underreporting of shared drug injection or same-gender sexual practices inside prison, or other confounding factors inside prison, such as violence, which have not been investigated in this study.

Although health authorities in the Iran Prisons Organization have been scaling up preventive interventions to control the transmission of HIV infection inside prisons,[8] our data, which have been mainly obtained from ex-prisoner IDUs in a community-based setting, highlight the necessity for comprehensive and integrated interventions for currently incarcerated IDUs and ex-prisoner drug users in the community to efficiently prevent HIV transmission among the IDU population.

The high level of HIV-1 among IDUs is also of great concern because of the possibility that the infection could be transmitted from those infected IDUs to their sexual partners.[16–20] This concern is deepened because many IDUs in our sample have had multiple sex partners in their lifetime and condom use has not been well adopted, as about half of sexually active male IDUs reported never having used a condom in their lifetime.

The present study provided first evidence of same-gender sexual practice among drug users in Iran, with 8% of IDUs having reported a history of having sex with another man in their lifetime. Although this practice did not show any additional risk for HIV infection in our small sample, evidence from other countries has shown that male IDUs who have sex with other men are at great risk of acquiring HIV and transmitting the virus sexually to broader populations.[21–24] Thereby, health authorities in Iran are encouraged that it is timely to address same-gender sexual practices of IDUs and to start identifying appropriate sexual risk reduction strategies, while avoiding further stigmatization due to their same-gender sexual activity.

Our study had several limitations. The design of our study was cross-sectional, which precludes us from determining the exact temporal relationship between risk behaviors and HIV infection. We also recruited drug users from one single drop-in center and through outreach activities in Tehran; therefore, our findings may not be representative of wider IDU communities. Many sociodemographic characteristics of the IDU participants in this study, such as age, gender composition, ethnicity, and employment rate were comparable with

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those of IDUs who participated in our previous study in treatment settings in Tehran; however, the proportion of homeless IDUs was significantly higher among the IDUs in the present study (32.5%) compared with our previous study (2.4%). The high proportions of homeless IDUs in this study might be related to the recruitment neighborhood that is known to be a place for migrants from other provinces to gather.[9] We mainly relied on self-reported risk behaviors that could be biased as a result of recall ability or social desirability,[25,26] given the social context where many of the HIV risk behaviors are highly stigmatized.

In conclusion, our findings show that HIV prevalence has reached high proportions among community-based IDUs in Tehran, with incarceration-related exposures revealed to be the main correlates of infection. Urgent and comprehensive harm reduction programs for drug users in prison and those in the community are needed if the epidemic among IDUs in Tehran is to be controlled. At the same time, sexual risk reduction programs are crucial in preventing sexual transmission of HIV infection from sexually active IDUs to a broader population in Iran.

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The Intent and Practice of Condom Use Among HIV-Positive Men Who Have Sex with Men in Japan

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ABSTRACT

To evaluate the intent and practice of condom use among Japanese HIV-positive men who have sex with men (MSM), a survey using anonymous questionnaires was carried out and 117 respondents were investigated. For anal sex and oral sex, respectively, 58.1% and 15.2% intended to use condoms and 47.2% and 12.4% used condoms all of the time. The intent of condom use decisively affected the practice of condom use and was closely related to the perceived risk level of HIV/sexually transmitted (STI) transmission. In anal sex, willingness to protect sexual partners from HIV infection was strongly related not only to the intent but also to the practice. Enhancement of willingness to protect oneself from STI was suggested to enhance willingness to protect his/her sexual partners from HIV infection with secondary enhancement of the intent or the practice of condom use. Specific support of MSM with HIV for improving the intent and practice of condom use is urgently needed.

INTRODUCTION

RECENTLY, as the availability of highly active antiretroviral therapy (HAART) has improved the health outlook for people with HIV (PWH), HIV infection has come to resemble a chronic disease and the continuation of sexual life has been suggested to be important for the enhancement of (QOL) of PWH.[1] While the necessity for attention to the sexual life of PWH has been gradually recognized, several studies have revealed that certain percentages of PWH engage in unprotected intercourse.[2–4] This situation demands study of the sexual life of PWH not only to improve their QOL but also to prevent HIV from spreading. Because there have been reports that multidrug resistant HIV is gradually spreading,[5,6] the need for evaluation of preventive behavior is increasing. Moreover, safer sex among PWH is important for the management of their own health because multiple infections with different types of HIV may accelerate the progression of the disease.[7] Contracting other sexually transmitted infections (STI) while living with a compromised immune system may delay the cure.[8] Therefore, clarifi-

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cation of the state of practice of safer sex by PWH and factors that affect it should have implications as to how PWH should be supported and what type of support programs should be developed. However, as far as we know, there have been few detailed investigations of these issues in Japan. Also, according to the HIV/AIDS Surveillance Committee, 70.6% of HIV-positive Japanese men newly reported in 2004 were those who have sex with men (MSM),[9] which shows high vulnerability of MSM to HIV infection in Japan.

Thus, this study sought to evaluate the intent and practice of condom use, which is considered to be extremely effective for the prevention of HIV infection,[10] among Japanese HIV-positive MSM, to analyze the complex factors, and to develop methods of support and intervention.

MATERIALS AND METHODS

Participants and procedures

Prior to the survey, a research group named the STI and HIV Survey Group consisting of medical staff from HIV care units, researchers, and PWH was established in July 1999 in Tokyo. A questionnaire for the preliminary survey was prepared in collaboration, following the style of participatory research.[11] The preliminary survey was carried out in September to November 2000, and the questionnaire used in this study was prepared on the basis of the results.[12]

Participants in the study were recruited from November 2002 to April 2003 at four major hospitals in Japan (two in Tokyo, one in Osaka, and one in a northern area of Japan), relatively experienced in HIV treatment. Criteria for the participants were as follows: (1) Japanese, with sexually transmitted HIV and (2) those who visited the hospitals regularly. Patients who received notification of HIV infection within 1 month were excluded for ethical reasons.

A total of 299 patients were recruited and approached by physicians or nurses directly involved in their medical care. Anonymous self-completion questionnaire was handed out to each patient and collected by mail in a sealed envelope, addressed directly to the authors, who were not involved in their direct medical care. Valid replies came from 170 and the effective response rate was 56.9%.

Of the 170 respondents, 161 were male (including 134 MSM), 7 were female, and 2 did not specify their gender. Since the intent and practice of condom use were expected to differ markedly by gender and sexuality, the respondents analyzed in this study were limited to 117 MSM who had sexual contact at least once during the past 1 year.

Although little information was available for those who failed to reply the survey, it is possible to speculate that those who had negative attitude toward their sexuality or keeping up with their sexual activity, those who lost interest in sexual activities because of their age, psychological issues such as depression or anxiety, or medical treatments, and those who hesitate to share their sexual issues with their medical staff, were included in nonrespondents.

Variables and scales

When explaining condom use practice for the prevention of HIV infection, the health belief model,[13] the theory of reasoned action,[14] and the social cognitive theory[15] are frequently used. Wulfert and Wan[16] and Wulfert et al.[17] carried out studies using structural equation modeling to examine which of these three models was the most appropriate for studying condom use as a preventive action against HIV infection. They showed that all three models were statistically fit but that some of the paths were not as significant as the models suggested. They concluded that all three models were useful to an extent but that they should be modified and developed further. A small number of new models, including the information-motivation-behavioral skills model[18] and the AIDS risk reduction model,[19] have been developed for the specific objective of understanding preventive behavior against HIV infection, but these are also considered to require further evaluation. Thus, the behavioral theory models that is best for understanding the behavior of the general population remains controversial.[3,20]

Moreover, since there seem to be large differences with regards to the motivation of con-

dom use between PWH and people unaffected by HIV, new variables and scales should be developed on the basis of the existing behavioral theory models to better understand the behavior. For example, the absence of "protecting oneself from HIV infection," which is considered to be an intrinsic motivation, and the voluntary initiative to protect sexual partners from HIV infection with the practice of safer sex have been suggested as characteristics of the motivation for condom use by PWH.[21] Such initiatives may originate from the atmosphere and pressure of people around PWH, demanding that they must not transmit HIV to their partners.[22]

In consideration of the above, we prepared variables and scales to be used for the analysis, taking the following into account: that a gap is considered to exist between the intent and practice, that this gap may be caused by factors in the social environment as well as individual factors, which in turn affects the processes of actually practicing or maintaining particular behavior, that various complex factors are involved in the motivations that lead to the intent.

MEASURES

Characteristics of the respondents

The variables measured included age, educational background, self-rated health (single item with a 5-point scale, scored 1–5), Hospital Anxiety and Depression Scale (HADS, 14 items, each of which was scored 0–3),[23,24] casualness of sexual partners (0 = having sex only with "steady partners" in the past year, 1 = having sex with both "steady partners" and "casual partners," 2 = having sex only with "casual partners"), and frequency of alcohol or drug use during sex (summing up two 4-point scales, 0 = never to 3 = always).

Intent and practice of condom use

Various instruments have been used in the literature to determine the frequency of condom use but three methods have been typically used: frequency counts, Likert-type scales, and proportional indicators.[25] The reliability and validity of these methods have also been evaluated.[26] In this study, the frequency of intended condom use before the actual acts of sex during the past year for anal sex, i.e., intent (anal), and for oral sex, i.e. intent (oral), was evaluated using a 5-point Likert-scale from 0 = never to 4 = all of the time, without specification of sexual partner type. To assess practice of condom use, the frequency during the past year respondents actually used condoms for anal sex, i.e., practice (anal), and for oral sex, i.e., practice (oral), was evaluated using a 5-point scale from 0 = never to 4 = all of the time, without specification of sexual partner type. To obtain results as accurately as possible, we included the following statement, "You may find some questions very embarrassing to answer, but we do appreciate your frankness in answering," since it has been suggested that respondents tend to answer in consideration of social preferences in self-reports of condom use frequency.[27]

Perception of HIV/STI/use of condoms

Because we expected that the perception of various aspects concerning HIV/STI and condom use would be either directly or indirectly related to the intent and practice of condom use, 20 items shown in Table 1 were prepared regarding states during the past year using a 4-point scale from "false" to "true." The percentages shown in Table 1 are those of the respondents who answered "true" or "relatively true" among all respondents. Responses to each item were scored from 0 to 3, except for the risk items (anal and oral) which were reversed. Based on the results of exploratory factor analysis (principal factor method, promax rotation), these items were categorized into eight groups: protecting oneself as willingness to protect oneself from STI (1 item), protecting partners as willingness to protect sexual partners from HIV (1 item), subjective norm as social pressure requiring prevention of transmission of HIV to sexual partners (1 item), risk (anal)as perceived risk level of HIV/STI transmission by anal sex without using condoms (2 items), risk (oral) as perceived risk level of HIV/STI transmission by oral sex without using condoms (2 items), severity as perceived

TABLE 1. PERCEPTION OF HIV/STI/USE OF CONDOMS (n = 117)

Items	%[a]
Protecting oneself	
I don't want to contract STI other than HIV.	96.6
Protecting partners	
I want to protect my sexual partners from HIV infection.	96.6
Subjective norm	
I feel the atmosphere of people around me and society pressuring me not to transmit HIV to my sexual partners.	77.8
Risk (anal)	
The possibility of contracting HIV in anal sex is extremely small.	3.4
The possibility of contracting STI other than HIV in anal sex is extremely small.	1.7
Risk (oral)	
The possibility of contracting HIV in oral sex is extremely small.	37.6
The possibility of contracting STI other than HIV in oral sex is extremely small.	16.2
Severity	
HIV infection forces you to fight diseases over a long period of time.	94.0
HIV infection may result in death.	77.8
HIV infection makes daily life difficult.	73.5
HIV infection makes it difficult to stay healthy.	77.8
HIV infection troubles you by causing changes in your appearance due to treatments.	47.0
Barriers	
I don't want the trouble of obtaining condoms.	29.1
I don't want the trouble of using condoms.	32.5
Using condoms ruins the mood of sex.	34.2
I don't feel good when I use condoms.	56.4
It is difficult to propose the use of condoms to my sexual partners.	29.1
It is difficult to talk about the use of condoms with my sexual partners.	28.2
Condom efficacy	
Condoms are effective for the prevention of transmission of HIV or STI.	87.2
There is no means for the prevention of HIV infection other than condoms.	62.4

[a]The percentages shown are those of the respondents who answered "true" or "relatively true."
STI, sexually transmitted infection.

severity of HIV infection (5 items), barriers as perceived barriers against condom use (6 items)and condom efficacy as perceived effectiveness of condoms for HIV/STI prevention (2 items).

As for the severity, HIV optimism regarding the impact of HAART on survival and degree of infectivity have been reported to be an important issue in terms of its influence on intent to use condoms since the late 1990s, and significant relationships between optimistic views of HIV infection and the practice of unprotected sex were shown in some studies.[28–31] We, therefore, decided to include severity defined as perceived difficulties that people may experience after contracting HIV. Five items shown in Table 1 including, "HIV infection forces you to fight diseases over a long period of time," "HIV infection may result in death," "HIV infection makes daily life difficult" were included in the severity scale.

For each scale, standard scoring procedures were used in which item responses were summed. As shown in Table 2, Cronbach α ranged from 0.65 to 0.86.

STATISTIC ANALYSIS

Partial correlation analysis and hierarchical multiple regression analysis using the intent and the practice of condom use in anal sex and oral sex as dependent variables. Based on the literature,[3,32–34] control variables were selected as follows: age, educational background, self-rated health, HADS, and the frequency of alcohol or drug use during sex (and the intent of condom use when the practice of condom use was used as a dependent variable). SPSS 12.0J software (SPSS, Chicago, IL) was used for the analysis.

TABLE 2. VARIABLES AND SCALES

Variables and scales	*Items*	*α*	*Range*	*Average*
Protecting oneself	1	—	0–3	2.83 ± 0.53
Protecting partners	1	—	0–3	2.76 ± 0.49
Subjective norm	1	—	0–3	2.28 ± 0.92
Risk (anal)	2	0.92	0–6	5.67 ± 0.98
Risk (oral)	2	0.84	0–6	4.21 ± 1.65
Severity	5	0.78	0–15	10.68 ± 2.97
Barriers	6	0.88	0–18	6.71 ± 4.62
Condom efficacy	2	0.65	0–6	4.44 ± 1.59
Casualness of sexual partners	1	—	0–2	1.34 ± 0.71
Frequency of alcohol/drug use during sex	2	—	0–6	1.58 ± 1.20

RESULTS

Characteristics of the respondents

Age ranged from 22 to 61, with a mean of 35.1 ± 7.5. Self-rated health was either "very bad" or "bad" in 19.7%. The mean HADS score was 12.4 ± 8.3. As for casualness of sexual partners in the past year, 13.7% had sex only with "steady partners," 47.9% had sex only with "casual partners," and 37.6% had sex with both "steady partners" and "casual partners." In the past year, 47.9% had experiences of drinking alcohol during sex, and 62.4% had experiences of using drugs including legal drugs during sex.

Intent and practice of condom use

Concerning the intent of condom use (Table 3), 58.1% and 15.2% intended to use condoms all of the time for anal sex and oral sex, respectively. The correlations between the intent (anal) and the intent (oral) were significant, with $r = 0.46$ ($p < 0.001$). Concerning the practice of condom use, 47.2% and 12.4% used condoms all of the time for anal sex and oral sex, respectively. The correlations between the practice (anal) and the practice (oral) were significant, with $r = 0.51$ ($p < 0.001$).

Partial correlation analysis and multiple regression analysis using the intent (anal) as the dependent variable

On partial correlation analysis, the variables that showed significant partial correlations were protecting oneself, protecting partners, risk (anal), and barriers. As a result of hierarchical multiple regression analysis, risk (anal) consistently showed a strong positive association with the intent (anal). The positive trends between protecting oneself and the intent (anal) ($p < 0.1$) disappeared with the advance from model 2 to model 3. When additional variables were applied to model 4, it was found that barriers had significant negative relationship with the intent (anal) ($p < 0.001$) (Table 4).

Partial correlation analysis and multiple regression analysis using the practice (anal) as the dependent variable

On partial correlation analysis, the variables that showed significant partial correlations

TABLE 3. INTENT AND PRACTICE OF CONDOM USE ($n = 117$)

	Anal		*Oral*	
	n	%[a]	n	%[a]
Intent				
All of the time	61	58.1	17	15.2
More than half of the time	21	20.0	24	21.4
Almost half of the time	11	10.5	19	17.0
Less than half of the time	6	5.7	32	28.6
Never	6	5.7	20	17.9
Never had this type of sex	10	—	3	—
NA	2	—	2	—
Practice				
All of the time	50	47.2	14	12.4
More than half of the time	23	21.7	9	8.0
Almost half of the time	14	13.2	18	15.9
Less than half of the time	13	12.3	31	27.4
Never	6	5.7	41	36.3
Never had this type of sex	10	—	3	—
NA	1	—	1	—

[a]Percentages were calculated after excluding NA and "Never had this type of sex."
NA, not available.

TABLE 4. PARTIAL CORRELATION ANALYSIS AND MULTIPLE REGRESSION ANALYSIS USING INTENT (ANAL) AS THE DEPENDENT VARIABLE

Independent variable	Partial correlation[a]	Multiple regression[a]			
		Model 1	Model 2	Model 3	Model 4
	r	b	b	b	b
Protecting oneself	0.240*		0.174+	0.073	0.000
Protecting partners	0.350***			0.234*	0.192+
Subjective norm	0.077				
Risk (anal)	0.399***	0.406***	0.375***	0.320**	0.328**
Severity	−0.062				
Barriers	−0.410***				−0.379***
Condom efficacy	0.060				
Casualness of sexual partners	−0.057				
R^2		0.191**	0.220**	0.249**	0.379***

[a]Control variables: age, educational background, self-rated health, HADS, and frequency of alcohol/drug use during sex.
[b]+: $p < 0.1$; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.
HADS, Hospital Depression and Anxiety Scale.

were protecting partners, barriers. Casualness of sexual partners also showed correlating trends ($p < 0.1$). On multiple regression analysis, a very strong positive association was observed between the practice (anal) and the intent (anal). When protecting partners, barriers and casualness of sexual partners were applied to the multiple regression equation, the practice (anal) was significantly associated with the first two variables and was also associated at $p < 0.1$ level with casualness of sexual partners (Table 5).

Partial correlation analysis and multiple regression analysis using the intent (oral) as the dependent variable

On partial correlation analysis, the intent (oral) was significantly correlated positively with risk (oral), and was also correlated ($p <$ 0.1 level) negatively with casualness of sexual partners. Similar associations were observed among these variables also on multiple regression analysis (Table 6).

Partial correlation analysis and multiple regression analysis using the practice (oral) as the dependent variable

On partial correlation analysis, the practice (oral) was significantly correlated with casualness of sexual partners, and was also correlated with risk (oral) and barriers at $p < 0.1$ level. Hierarchical multiple regression analysis showed a very strong positive association between the practice (oral) and the intent (oral). Also, as shown in model 2, an increase in the casualness of sexual partners was significantly associated with deterioration of the practice (oral). When additional variables were applied to model 3, the trends of negative association between barriers and the practice (oral) were found ($p <$ 0.1) (Table 7).

TABLE 5. PARTIAL CORRELATION ANALYSIS AND MULTIPLE REGRESSION ANALYSIS USING PRACTICE (ANAL) AS THE DEPENDENT VARIABLE

Independent variable	Partial correlation[a]	Multiple regression[a]	
		Model 1	Model 2
	r	b	b
Intent (anal)		0.730***	0.587***
Protecting oneself	0.060		
Protecting partners	0.286**		0.197**
Subjective norm	−0.019		
Risk (anal)	0.108		
Severity	−0.098		
Barriers	−0.257*		−0.187*
Condom efficacy	0.003		
Casualness of sexual partners	−0.188+		−0.114+
R^2		0.567***	0.638***

[a]Control variables: age, educational background, self-rated health, HADS, and frequency of alcohol/drug use during sex. Intent (vaginal/anal) was added in partial correlation analysis.
[b]+: $p < 0.1$; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.
HADS, Hospital Anxiety and Depression Scale.

TABLE 6. PARTIAL CORRELATION ANALYSIS AND MULTIPLE REGRESSION ANALYSIS USING INTENT (ORAL) AS THE DEPENDENT VARIABLE

	Partial correlation[a]	*Multiple regression*[a]
Independent variable	*r*	*b*
Protecting oneself	0.019	
Protecting partners	0.098	
Subjective norm	−0.174[+]	−0.165[+]
Risk (oral)	0.295**	0.294**
Severity	0.078	
Barriers	−0.113	
Condom efficacy	−0.012	
Casualness of sexual partners	−0.148	
R^2		0.142*

[a]Control variables: age, educational background, self-rated health, HADS, and frequency of alcohol/drug use during sex.
[b]+: $p < 0.1$; *: $p < 0.05$; **: $p < 0.01$.
HADS, Hospital Anxiety and Depression Scale.

DISCUSSION

Condom use practice by HIV-positive MSM in Japan

Results revealed that for anal sex, 58.1% of the respondents intended to use condoms all of the time and 47.2% actually used condoms all of the time. Also, for oral sex, 15.2% intended to use condoms all of the time and 12.4% actually used condoms all of the time. These results suggest that there is generally a possibility of HIV infection from HIV-positive MSM to their sexual partners and that many HIV-positive MSM are exposed to the risks of STI or repeated HIV infection, similar to the results of previous research. Concrete measures needed to support for improving practice of condom use from the viewpoint of prevention of damage to the health of HIV positive MSM due to STI or HIV as well as public spread of HIV infection.

Factors related to the intent of condom use

The results revealed that the intent of condom use decisively affected the practice of condom use for both anal and oral sex. It is therefore considered to be more effective to first provide support for developing the intent for condom use.

The level of perceived risk of HIV/STI transmission was shown to be an important variable in determining the intent of condom use. Public dissemination of information, including HIV/STI infectivity, has been taken as an HIV prevention strategy,[35,36] and is also used in the guidelines of PWH intervention.[37] However, the results of our study suggest that if information is provided that a particular risk behavior is associated with a relatively low rate of HIV/STI infectivity, the "low infectivity rate" may make a strong impression on the informed, leading them to continue such risky

TABLE 7. PARTIAL CORRELATION ANALYSIS AND MULTIPLE REGRESSION ANALYSIS USING PRACTICE (ORAL) AS THE DEPENDENT VARIABLE

	Partial correlation[a]	*Multiple regression*[a]		
		Model 1	*Model 2*	*Model 3*
Independent variable	*r*	*b*	*b*	*b*
Intent (oral)		0.679***	0.645***	0.606***
Protecting oneself	0.097			
Protecting partners	0.113			
Subjective norm	0.086			
Risk (oral)	0.163[+]			0.110
Severity	−0.108			
Barriers	−0.191[+]			−0.132[+]
Condom efficacy	−0.044			
Casualness of sexual partners	−0.330**		−0.233**	−0.227**
R^2		0.532***	0.583***	0.599***

[a]Control variables: age, educational background, self-rated health, HADS, and frequency of alcohol/drug use during sex. Intent (oral) was added in partial correlation analysis.
[b]+: $p < 0.1$; **: $p < 0.01$; ***: $p < 0.001$.
HADS, Hospital Anxiety and Depression Scale.

behavior. It is therefore considered to be effective to first clearly state which behavior is risky before mentioning infectivity when disseminating information to the public.

Concerning anal sex, willingness to protect sexual partners from HIV infection was shown to be a very important factor. It was closely related to the intent as well as the practice of condom use, and was found to constitute the core of the motivation, supporting the results of previous studies.[21]

We assumed that willingness to protect oneself from STI and willingness to protect sexual partners from HIV are both directly related to the intent of condom use. However, since the $p < 0.1$ level association of the variable of protecting oneself disappeared when the variable of protecting sexual partners was added to the results of hierarchical multiple regression analysis, it is suggested that enhancement of willingness to protect oneself from STI enhances willingness to protect sexual partners from HIV infection with secondary enhancement of the intent or the practice of condom use for anal sex. The need to mention clearly in messages to PWH has been recommended that safer sex is important not only for protecting their sexual partners but also for protecting their own health.[38] The results of this study support the measure in terms of enhancing the intent of condom use among HIV-positive MSM.

In contrast, for oral sex, the intent of condom use showed no association with willingness to protect oneself from STI or willingness to protect sexual partners from HIV. One possible explanation is that since the respondents perceived infectivity of HIV/STI by oral sex to be much lower than by anal sex (see Table 1), they did not closely associate protection of sexual partners from HIV/STI with condom use in oral sex, which in turn did not lead to an enhancement of the intent of condom use for oral sex.

Factors related to the practice of condom use

"Perceived barriers against condom use" was found to be a factor related to the practice of condom use both for anal sex and oral sex. It was also closely related to the intent of condom use in anal sex. Kelly[39] reported that when there are barriers against condom use, such as negotiation difficulties with sexual partners regarding condom use, the barriers can be reduced by skill-improving interventions not only in PWH but also in the general population. The report also suggested that environmental improvements such as increasing accessibility to condoms may be effective in reducing these barriers. The results of this study suggest that intervention and education for reducing the barriers may be effective in HIV-positive MSM for improving the practice of condom use.

A high level of casualness of sexual partners was suggested to be directly related to the practice of condom use, rather than indirectly as initially expected. The results demonstrated the necessity for taking such situations into consideration when developing support programs to promote condom use in PWH, which were similar to those of previous studies in HIV-positive MSM.[40] As for causes of the relationship, the following three background factors were suggested to exist. First, if the respondents have steady partners, they may have become more aware of the possibility of transmitting HIV or STI to their sexual partners and their responsibility for the prevention of infection, resulting in better condom use practice. Second, the issue of disclosure to sexual partners may exist: if sexual partners are casual, HIV-positive MSM may feel it difficult to disclose that they are HIV positive or to talk about condom use, and they may consequently fail to use condoms. In fact, Marks et al.[41] and Perry et al.[42] reported that PWH tend not to disclose their serostatus to highly casual partners. On the other hand, there have been reports stating that disclosure of HIV status to sexual partners was not related to the state of safer sex practice,[43] and that the frequency of condom use was even lower when PWH disclosed their status to their casual sexual partners.[44] Some researchers have mentioned that prevention interventions designed to encourage people to disclose their serostatus have been misguided.[45] Finally, condom use for oral sex with casual partners is not suggested to become common practice among MSM not only in Japan but also in other countries. If people in general consider condom use in sex with casual sexual partners unnecessary, if condoms are

not actually used, or if condoms are not readily available, PWH may begin to think that "the sexual partners are also responsible for HIV infection."[46] Interpretations of the results obtained in this study need further discussion.

Social environment affecting the intent and practice of condom use

In this study, factors such as "perceived risk level of HIV/STI transmission" and "perceived barriers against the condom use" were shown to be directly or indirectly related to the intent or the practice of condom use by PWH even after controlled by HADS, use of alcohol/drugs during sex, age, educational background, and self-rated health status. These are not perceptions that individuals begin to have only after they have been diagnosed as HIV positive, but may have been formed under the effects of information, education, press reports concerning HIV/STI and sexual health,[47,48] and the trends of the society and community, that they were exposed to before they were diagnosed as HIV positive. Kihara et al.[49] reported that no regular behavior surveillance or national survey programs had yet been introduced in Japan, which can be pointed out as a serious situation compared to other developed countries. The study also strongly suggests that well-targeted and effective prevention programs should be established, because the vulnerability to HIV and STI in Japan is predicted to be greatly enhanced not only among MSM but also among heterosexual youth. In the view of this as well as the finding of this study, intervention and education at the individual level alone is not sufficient in the long term, and society-based measures are also necessary including: (1) more information dissemination regarding sexual health in school education, community education, and administrative publications, (2) to let it be widely known that the use of condoms is invaluable for the prevention of HIV/STI, and to create an environment in which condoms are used generally in sex by increasing the accessibility to condoms, (3) to increase sections that provide consultations for sexual health problems or condom use in administrative offices, nongovernmental organizations (NGOs), and medical institutes. It is strongly suggested that measures to improve the social environment of HIV-positive MSM in Japan will eventually lead to improvement in their condom use practice.

Limitation and future issues

This study is subject to several limitations. First, because the participants were recruited from only four hospitals relatively experienced in HIV treatment, problems unique to these hospitals may be reflected in the results. It is important to conduct a survey including those in other areas or visiting other hospitals. Second, because this study was cross-sectional, judgment concerning the cause–effect relationship was limited. Surveys including longitudinal programs and qualitative evaluations by methods such as interviews should be carried out to confirm the results of this study. Third, in a study of screening for potentially transmitting sexual risk behavior, urethral sexually transmitted infection and sildenafil use among males, Cachay et al.[50] found that the use of medications for erectile dysfunction was an independent risk factor for failure to use condoms among MSM. In future research it would be advisable to include sildenafil use as a predictor of the intent and practice of condom use. Fourth, questions as to the other potential predictors, such as HAART use, perceived efficacy of HAART, HIV status of the partners, or knowledge of their partners' serostatus, remain open to research. To enhance understanding of the social determinants of condom use behavior, there is an urgent need to conduct studies that examine these psychosocial and interpersonal variables. Finally, development of support programs on the individual and societal levels based on the results of this study is needed. In addition, following several examples,[51–54] executing tentative interventions using developed support programs and evaluating their effects for scientific assessment is indispensable.

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日本のHIV流行の現状と国際的文脈

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性感染によるHIV感染者，AIDS患者報告数が増加を続けている．他の先進国に比べ，多剤併用療法の導入後もAIDS報告数が減らない，若い年齢層の感染者の割合が高いという特徴を持ちつつ，地域拡散が進んでいる．献血血液のHIV抗体陽性率も先進国では異例に高く，かつ増加が止まらない．中国，台湾，香港，韓国など周辺地域では，我が国の何倍ものHIV流行が展開し，先進国では，流行が高いレベルで継続，もしくは再燃が始まり，HIV感染者の急速な社会蓄積が進行している．こうした内外の状況から，今後の我が国のHIV流行の行方は楽観を許さない．医学的解決の見通しが不透明な中，系統的な社会的対策を急がなければならない．

1．エイズ発生動向などに見る現状

2007年にエイズ発生動向調査に報告されたHIV感染者とAIDS患者の数は，それぞれ1,082件，418件であり，いずれも過去最高を記録し，2008年に入っても，2007年を上回る数の報告が続いている(**図1**)[1]．報告例の分析と他先進国との比較から，我が国の動向について，以下のような特徴を指摘することができる．

第一は，AIDS患者報告数が1990年代から一貫して増加し続けている先進国は日本だけだということである(注：HIV感染者報告数は西欧でも2000年以降再び増加している)．1996年に多剤併用療法(HAART)が導入されると同時に，先進国では一斉にAIDS患者報告数の大きな減少が観察されたが，我が国では未だにそうした減少が見られない．早期発見・治療の遅れのため，AIDSを発症してから発見される例が多いことを意味している．第二は，29歳以下，あるいは39歳以下の年齢層の割合が大きいことである．2002～2005年の累計を比較すると，29歳以下の割合は，日本33.1%，英国31.7%，独30.5%で，米，豪，加ではいずれ

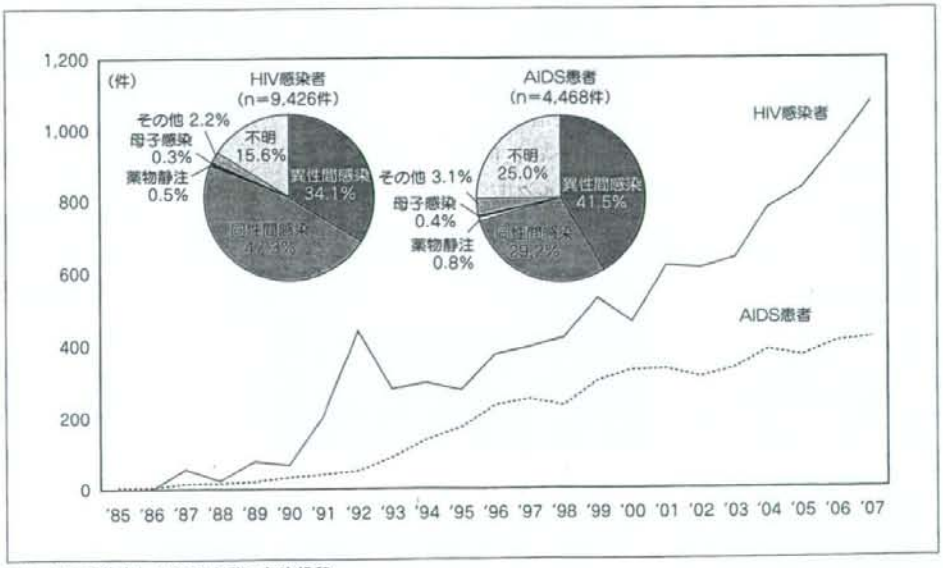

図1　HIV感染者とAIDS患者数の年次推移
出典：厚生労働省エイズ動向委員会．平成19年エイズ発生動向年報

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も26%以下と，日本が最も大きくなっている[2]．我が国のHIV流行が先進国の中でも若い年齢層で広がっていることを示している．第三は，地域拡散が進み，近畿，東海以外にも，北陸を除く全ての地域で報告数が急増していることである．HIV感染者の年間報告数の2007年/2000年比を取ると，東京都が2.0倍であるのに対し，近畿3.9倍，中四国3.8倍，九州7.6倍と，地方での増加率が大きく，AIDS患者についても，同比は，東京都が1.0倍であるのに対し，他の地方ではいずれも2.5倍前後となっている．第四は，性感染が感染経路のほとんどを占め，同性間感染が急増，異性間感染が漸増していることである．これは，ハイリスク層での流行が先行する，HIV流行初期の典型的なパターンであり，対策が滞れば，いずれ異性間感染を主とする流行の相にシフトしていくことになる．

我が国では，献血のHIV抗体陽性率も，一貫して増加し続けており，2007年には10万対2.1となり，2000年からほぼ倍増した[1]．エイズ発生動向調査への報告数の増加が，単に検査数の増加だけではなく，流行自体の進行を反映している可能性を示唆している．ちなみに，10万対2.1という値は，2006年の西欧の平均陽性率1.2[3]を大きく上回る値であり，流行自体は西欧が我が国を5～10倍上回るという状況とは逆転した異常な事態となっている．これは，高リスク者が受けやすい検査体制整備の遅れが，献血の検査利用という形で反映されているものと考えられる．

なお，2007年末までにエイズ発生動向調査に報告されたHIV感染者とAIDS患者の累積数は，それぞれ9,426件，4,468件に上るが，これは氷山の一角に過ぎない．1999年に実施された感染経路別の推計・予測（橋本予測）によれば[4]，2007年時点での生存HIV/AIDS数は3.5万人前後であり，流行の規模は，報告されている数の2～3倍に及ぶことを認識しておかねばならない．

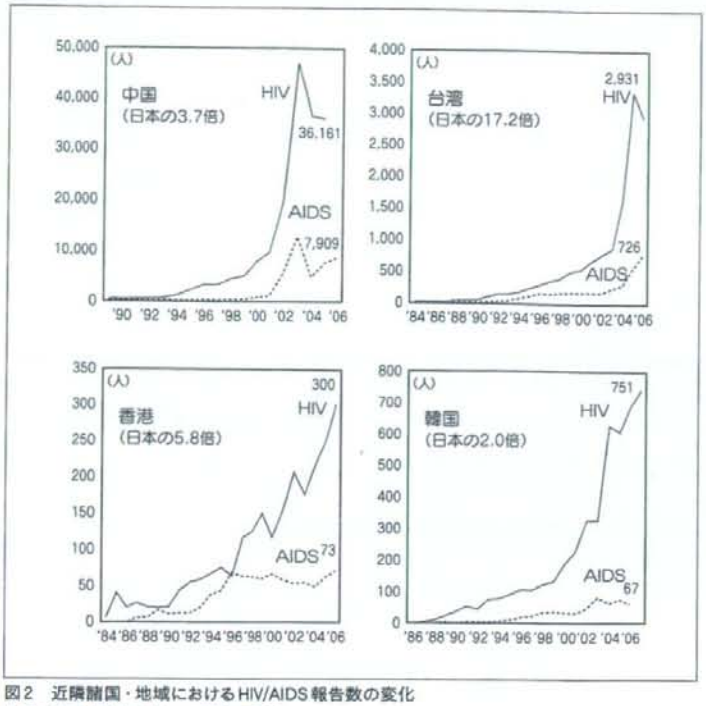

図2　近隣諸国・地域におけるHIV/AIDS報告数の変化
出典：各国HIV/AIDSサーベイランス報告

II．日本に置かれた国際的文脈

最近の国連合同エイズ計画（UNAIDS）の報告によれば，東アジアには2007年末で80万人の感染者が生存し，現在世界で最も急速に流行が拡大している地域となった．日本の近隣諸国・地域におけるHIV/AIDS報告数は，最近急速な増加を示しており，2006年の単位人口当たりのHIV/AIDS報告数は，中国が日本の3.7倍，台湾17.2倍，香港5.6倍，韓国2.0倍となっている（図2）[2]．この勾配に沿って，早晩流行が我が国に流れ込んでくる可能性がある．先進国でも，問題は依然深刻であり，米国では横ばいとは言え，毎年5.6万人もの人々が感染し[5]，西欧では，同性間感染と異性間感染が2000年以降著しい増加を示すようになった（図3）[3]．こうした状況と多剤併用療法の治療効果によって，先進国では，感染者の蓄積が急速に進んでおり，米国は推定感染者

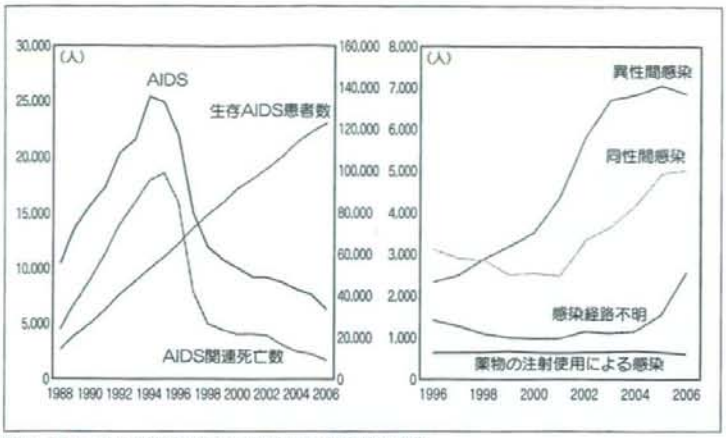

図3　西ヨーロッパ地域におけるHIV/AIDS 報告数の変化
出典：EuroHIV. HIV/AIDS Surveillance in Europe. Mid-year report 2007.

数が120万人と世界で8番目の国になるに至っている[6]．このように，我が国は，流行の進んだ周辺国と流行が依然深刻な先進国との国際的ネットワークの中に置かれているのである．

最後に

以上，我が国の流行に関して，内外の状況を概観した．我が国を取り巻く国際的状況は緊迫の度合いを強めており，我が国の流行状況も悪化の一途にある．これらの状況が交われば，さらに憂慮すべき事態が生じることになるだろう．残念ながら，有効な医学生物学的手法が近未来に登場する可能性は少なく[7]，流行の抑制のためには，行動変容を促進し，行動を左右する社会的要因に向き合う以外にはない[8]．こうした難しさを深く認識し，一日も早く，系統的な社会的対策が確立されなければならない．

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総　　論

性感染症の疫学
—我が国の国際的特徴について—

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Epidemiology of sexually transmitted diseases in Japan
—its international characteristics—

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Abstract

Japan has witnessed the rise of STDs, and the increase in the number of HIV cases infected through sexual contact in the last decade. Background of these trends will be the exceptionally high prevalence of paid sex in Japan among developed countries and the diversified unprotected sexual behaviors that have prevailed among general population since 1990s. STDs are also increasing and HIV infection through sexual contact has resumed to increase among other developed countries in the same period of time. Coordinated research among developed countries is becoming increasingly important to clarify the specific and general causes of such phenomena and thus to explore the possibility of coordinated responses toward these global challenges.

Key words: sexually transmitted diseases (STD), HIV, sexual behavior, developed countries, neighboring regions

はじめに

性感染症(STD)は，現代のライフスタイルや価値観の変化に伴って，国際的にも大きく変動しており，その抑制に成功するかどうかは，その社会のHIV流行を抑制する能力の試金石としても重要である．

本稿では，先進諸国のSTD/HIVの動向との比較を交えながら，我が国のSTD/HIV流行の最近の動向と特徴について考察する．

1．我が国の1990年代以降のSTD/HIVの動向とその背景

図1は，我が国のSTDとHIVの動向を示したものである[1]．性器ヘルペスと尖圭コンジローマは一貫して増加傾向にあり，性器クラミジアや淋菌感染は，2002年にピークに達した後，減少しつつあるものの，なお高いレベルにとどまっている．こうした変化は幅広い年齢層で生

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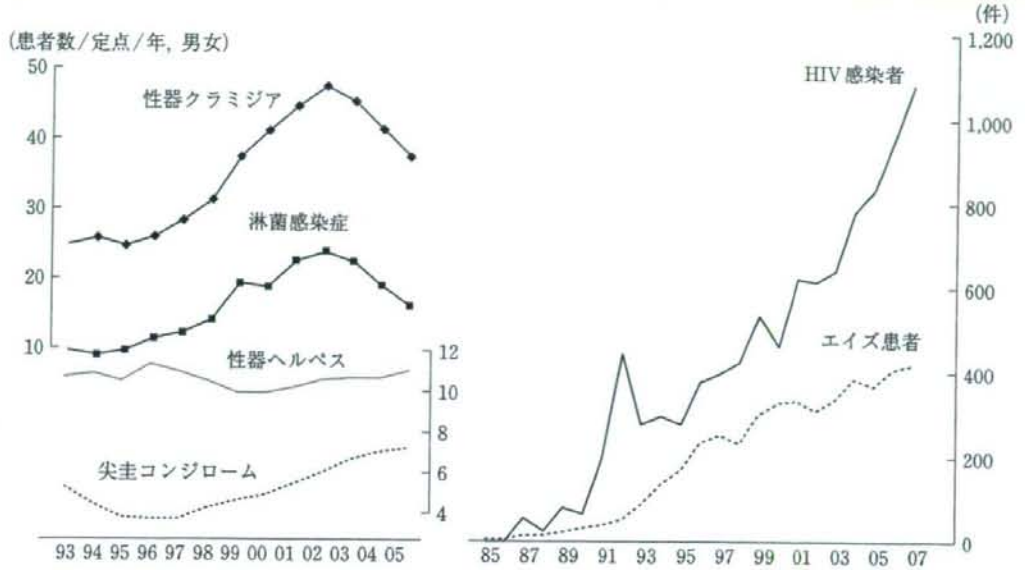

図1 我が国における性感染症患者，HIV感染者，エイズ患者報告数の年次推移
性感染症のグラフは，感染症発生動向調査データを厚生労働省性感染症センチネルサーベイランス研究班(主任研究者：熊本悦明)の2002年度調査報告に基づく連続補正を実施した．

じているが，数のうえでは若い年代が中心である．我が国のSTDサーベイランスには，都道府県単位のデータの精度が低いという問題があるが，こうした変化は全都道府県でほぼ共通している．

一方，HIV感染者とAIDS患者も増加が続いている．エイズ発生動向調査への報告数は，いずれも一貫して増加が続き，2007年でそれぞれ1,082人，418人と過去最高を記録した[2]．1996年に多剤併用療法が登場して以降も，AIDS患者の増加が止まらない国は先進国では我が国だけであり，検査体制の遅れがその背景にあると考えられている．報告地は，東京都が依然最多であるが，近年，近畿地方や東海地方の増加が大きく，またそれ以外の地域でも増加が始まるなど，HIV流行が急速に地方拡散している様子がうかがわれる．また，HIV感染者の中で29歳までの若者の割合は約1/3を占めるが，主要先進国(イギリス，ドイツ，米国，オーストラリア，カナダ)の中では我が国が最も高く[3]，我が国の現在の流行が若い年齢層に偏っていることを示している．感染経路は同性間感染が主流で2007年のHIV感染者報告数中の約70％を占めるが，日本人男性HIV感染者においては，異性間感染も過去5年間で増加傾向にあり，今後は異性間感染拡大にも注意が必要である．

こうしたSTDやHIV流行の背景には，無防備な性行動があることはいうまでもない．1983年以来，東京都内で行われてきた若者の性行動調査からは，1990年代を通して，性行動が急速に若年化を始め，特に女性における変化が著しく，1990年代半ばには，男女逆転して，女性優位になったことが示されている[4]．また，著者らが1999年以来行ってきた一般住民や若者を対象とした20万件を超す性行動調査からは，更に具体的な実態として，若い世代で多数の性的パートナーを経験する傾向が進んでいること，性的パートナーの経験数が多い人ほど無防備であること，オーラルセックスが常態化していること，若い世代で売買春を利用する割合が高いことなどが明らかとなり，我が国では近年，STDやHIVが広がりやすい無防備な性的ネッ

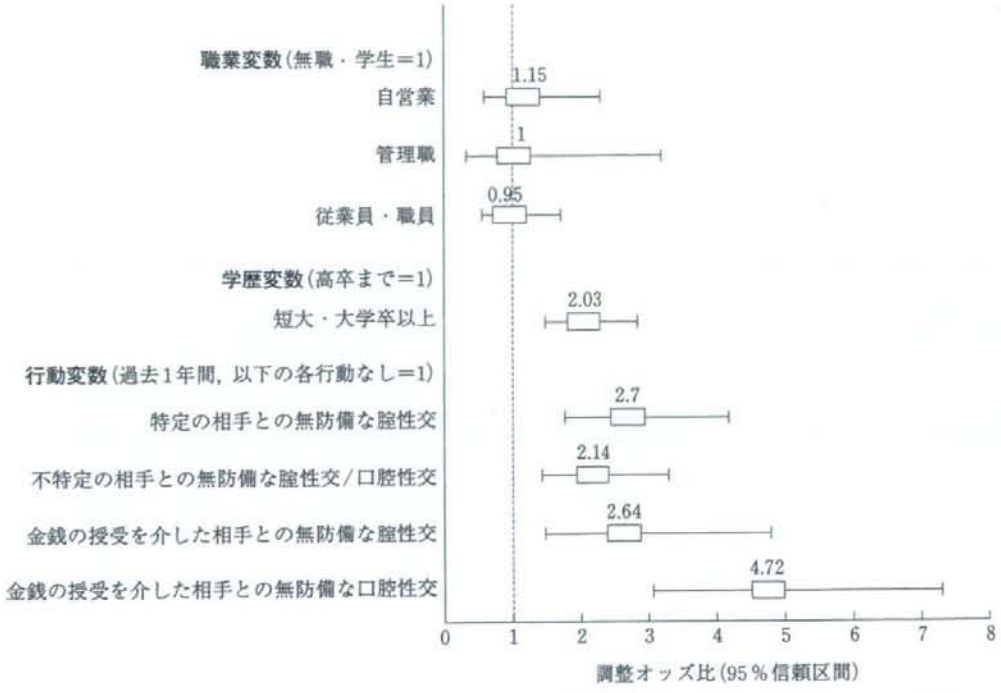

図2 全国規模ケースコントロール研究におけるSTD罹患と各種変数との関連(文献[7]より引用)
図中の変数以外に，年齢，婚姻歴，初交年齢，過去1年間のパートナー数，地域変数を投入して多重ロジスティック解析を行った．

トワークが拡大したことが示唆されている[5,6]．薬品工業生産動態統計調査によれば，コンドームの国内出荷量は，1993年(6.3億個)から2005年(3.2億個)にかけて実に半減しており，こうした推論を支持するものとなっている．

しかし，こうしたデータは状況証拠ではあっても，疫学的には高いエビデンスとはいえない．そこで，著者らは最近，1999年に実施した全国性行動調査と全国STD患者調査の男性データを用いて，ケースコントロール研究を行い，1990年代に生じたSTD流行にどのような要因が関連しているのかを検討することにした[7]．**図2**はその結果の一部を示したものである．この図から，以下のことが理解される．

(1) STD患者と対照群の間に，職業の違いが存在しない

(2) STD患者の方が高学歴者が多い

(3) 特定の相手との無防備な腟性交がSTD感染リスクを高めている

(4) 不特定の相手との性行為(腟性交あるいはオーラルセックス)がSTD感染リスクを高めている

(5) 金銭を介した相手との無防備な腟性交がSTD感染リスクを高めている

(6) 金銭を介した相手との無防備なオーラルセックスがSTD感染リスクを高めている

これらの結果には，幾つか特に注目すべきものがある．まず，(1)(2)の結果は，STDが，職業の区別なく社会全般に，かつ高学歴層に浸透していること，つまり，STDにかかる層が，かつての'性病'の時代からもはや一変していることを示している．(3)の結果は，STD感染の危険が，不特定な相手や金銭の授受を介した相手だけではなく，これまで安全と思われてきた'特定の相手'との性関係の中に既に入り込んでいることを示している．そして，(6)の結果から，オーラルセックスが腟性交に勝るとも劣らないリスク要因であることが示された．これら