Sex-Ratio Patterns of AIDS Patients in Thailand

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Abstract

The summary report of AIDS cases in Thailand, as of 31 July 1996, was reviewed for the information on male-to-female sex-ratio. The ratios were recalculated for different risk-factors and for different age-groups annually and cumulatively.

The male-to-female ratios calculated for annual case reports are lower than the cumulative number. This finding demonstrates the earlier detection of change in risk behaviour among the general population by the sex-ratio from annual case reports, compared to the ratio from the cumulative number of cases. Among different age-groups, the older age shows the highest male-to-female ratio. The ratio among sexually active age-group (15-49 years of age) is declining during the most recent year. These changes confirm the present pattern of AIDS epidemic in Thailand, the fourth wave among females, followed by the last wave—pediatric AIDS.

It is well known that AIDS is one of the emerging diseases and recognized as a threat to mankind world wide[1], including Thailand. Since early recognition and early management is the concept of disease control, this disease was included in the list of diseases to be reported from 1983 and then being a notifiable disease under the Infectious Disease Control Acts from March 1, 1985[2]. Thailand has been accepted and mentioned in many AIDS conferences as a country where the information system about AIDS is good enough to provide clear and reliable data openly. This factor allows every party concerned to know the status of HIV infection in Thailand regularly and continuously.

The case reporting system has been developed as an epidemiological surveillance tool to monitor infectious diseases of public health importance in Thailand for many years. Health care personnel in every health unit send reports of patients with notifiable diseases in a data collection form to the district health office. The district health office compiles and analyses all data in the collection forms from every health unit in the district as well as from district hospitals then forward it to the provincial medical office, where routine analysis of all data collected in the province for local health administration is performed. The data collected are also submitted immediately to the Epidemiological Division in the Ministry of Public

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Health. Flow of the data and information from grassroots to central level forms a network called "Epidemiological network". In order to standardize and control the quality of information, involved health personnel are trained annually. In preparation to detect AIDS cases as early as possible, information on AIDS cases reported in the U.S.A. were disseminated to raise awareness among health-care personnel in the epidemiological network in early 1984[3-5]. Special lectures and discussions on clinical signs and symptoms were held in many training workshops. This is the first approach to collect information on AIDS patients in the early phase of epidemic upto present. The cumulative data of the reported AIDS cases are routinely analyzed by the Division of Epidemiology. The resulting report on the information of AIDS is presented periodically to show distribution of cases in time, sex-ratio, proportion of cases by mode of transmission, age, occupation and provinces[6].

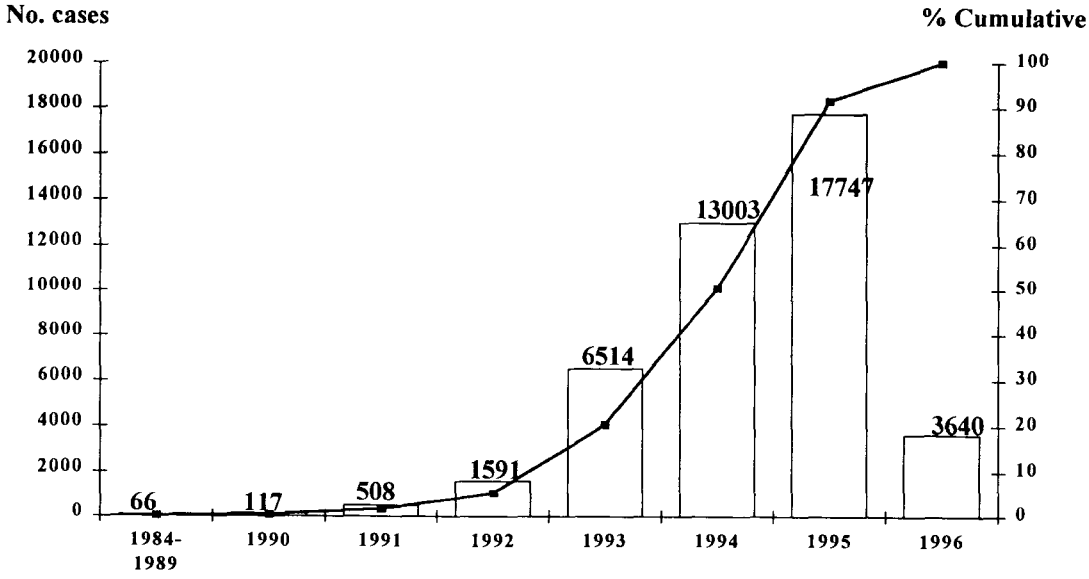
It was reported in the VIII International Conference on AIDS that the pattern of sex-ratio for AIDS prevalence reflected the major risk factors of the study regions and its trends indicated the impact of changing behaviour towards the known risk factors[7]. This paper reviews the information on the sex-ratio among reported AIDS cases in Thailand.

Epidemiologic information of AIDS cases

The first AIDS case was detected in Thailand in September 1984[8]. The number of cases reported in the following year was only one digit until 1989 when it went up to two digits and jumped to three digits two years later[9-12]. As of 31 July 1996, the cumulative number of reported AIDS cases from every province throughout the country is 43,186[13]. Among the total cases, only 20.35 per cent of them were reported during the first ten year period, 1984 - 93. (Fig. 1)

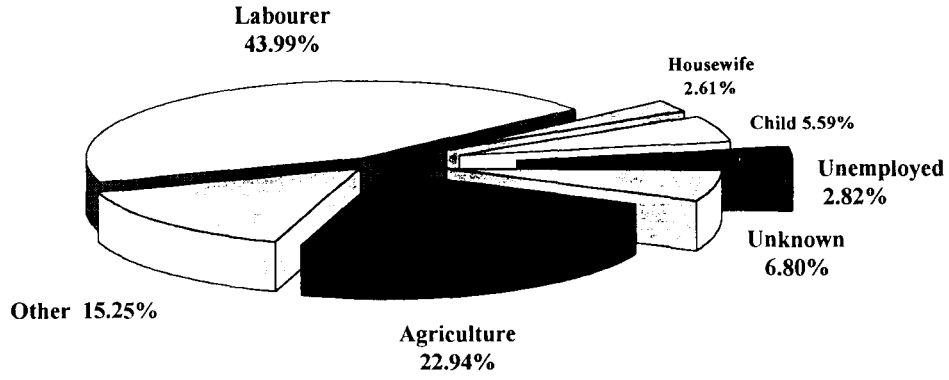
Among various types of occupation, the reported AIDS cases were found in every category with variation of number. The highest proportion is among employees (43.99%) followed by the labour force in agriculture (22.94%). (Fig. 2)

Among the total AIDS cases reported from the whole 76 provinces throughout the country, the highest proportion of 40.04 per cent was from the upper part of the Northern area. Number of reported AIDS cases from Bangkok accounts



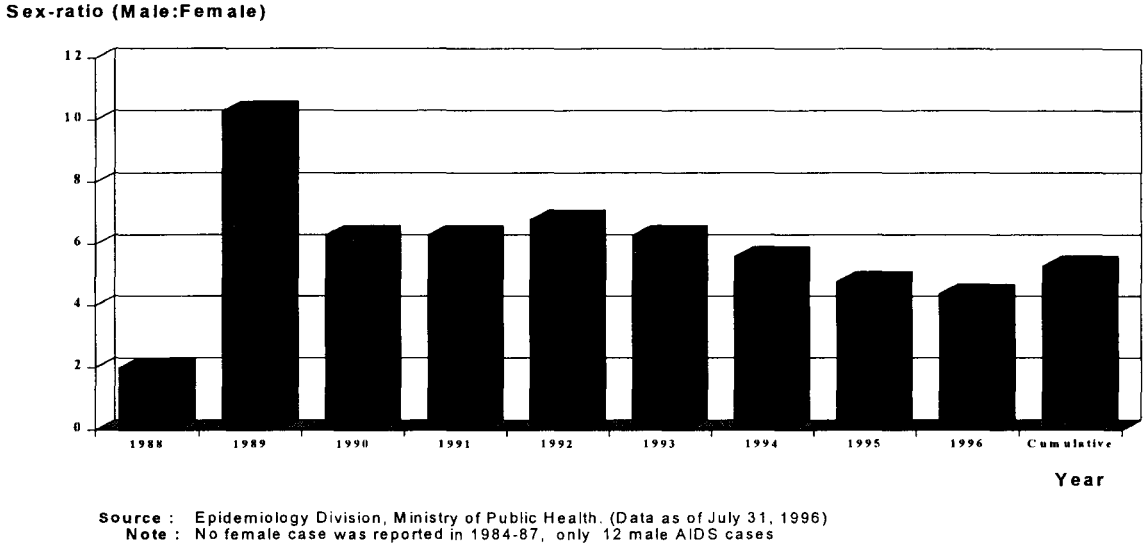
Source : Division of Epidemiology, Ministry of Public Health (Data as of July 31, 1996)

Fig. 1. Distribution of reported AIDS cases in Thailand by year of diagnosis, 1984-1996.



Source : Division of Epidemiology, Ministry of Public Health (Data as of July 31, 1996)

Fig. 2. Distribution of reported AIDS cases in Thailand by occupation, 1984-1996.



Source : Epidemiology Division, Ministry of Public Health. (Data as of July 31, 1996)
Note : No female case was reported in 1984-87, only 12 male AIDS cases

Fig. 3. Sex-ratio of total AIDS cases in Thailand, 1988-1996.

for 9.51 per cent. Another substantial number of AIDS cases were reported from two provinces in the industria-lized zone in the East.

Sex-ratio of different risk behaviour

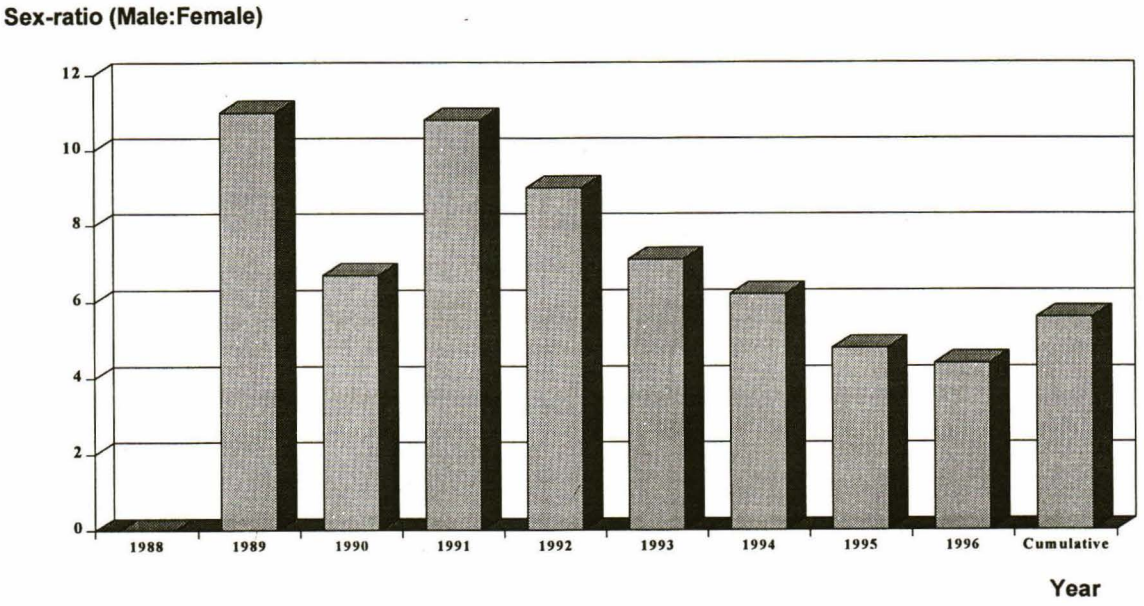
Out of a total of cumulative AIDS cases, 84.02 per cent were males giving the overall male-to-female ratio of 5.3 : 1 (Table 1). Female cases were first reported in 1988, giving a male-to-female ratio of reported cases in that year at 2 : 1. However, their risk factors were not directly associated with sexual behaviour. The trend of annual sex-ratio for total cases of all risk factors and its change could be observed from 10.3 : 1 in 1989 to 6.8, 6.3, 5.6,

Table 1. Sex-ratio reported AIDS cases by different risk factors.

Year of diagnosed		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Cumulative
Sexual Transmission	M	1	1	1	7	6	33	67	345	1,104	4,303	8,867	11,853	2,446	29,034
	F	0	0	0	0	0	3	10	32	122	608	1,438	2,448	561	5,222
	Ratio	**0**	**0**	**0**	**0**	**0**	**11**	**6.7**	**10.8**	**9**	**7.1**	**6.2**	**4.8**	**4.4**	**5.6**
Injection drug used	M	0	0	0	2	0	6	21	41	133	487	848	1,177	213	2,928
	F	0	0	0	0	0	0	1	0	3	11	22	18	2	57
	Ratio	**0**	**0**	**0**	**0**	**0**	**0**	**21**	**0**	**44.3**	**44.3**	**38.5**	**65.4**	**106.5**	**51.4**
Blood transfused	M	0	0	0	0	0	1	1	3	8	5	4	7	0	29
	F	0	0	0	0	1	0	0	1	2	3	6	3	0	16
	Ratio	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**4**	**1.7**	**0.7**	**2.3**	**0**	**1.8**
Vertical transmission	M	0	0	0	0	0	1	10	36	64	256	389	421	92	1,269
	F	0	0	0	0	2	1	5	35	70	200	351	399	72	1,135
	Ratio	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**1**	**0.9**	**1.3**	**1.1**	**1.1**	**1.3**	**1.1**
Unknown	M	0	0	0	0	0	0	2	13	79	569	927	1,219	218	3,027
	F	0	0	0	0	0	0	0	2	6	72	151	202	36	469
	Ratio	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6.5**	**13.2**	**7.9**	**6.1**	**6**	**6.1**	**6.5**
TOTAL	M	1	1	1	9	6	41	101	438	1,388	5,620	11,035	14,677	2,969	36,287
	F	0	0	0	0	3	4	16	70	203	894	1,968	3,070	671	6,899
	Ratio	**0**	**0**	**0**	**0**	**2**	**10.3**	**6.3**	**6.3**	**6.8**	**6.3**	**5.6**	**4.8**	**4.4**	**5.3**

Source : Epidemiology Division , Ministry of Public Health.

Note : Data as of July 31, 1996.



Source : Epidemiology Division, Ministry of Public Health. (Data as of July 31, 1996)
Note : No female case was reported in 1984-87, only 12 male AIDS cases

Fig. 4 Sex-ratio of AIDS cases in Thailand from sexual transmission, 1988-1996.

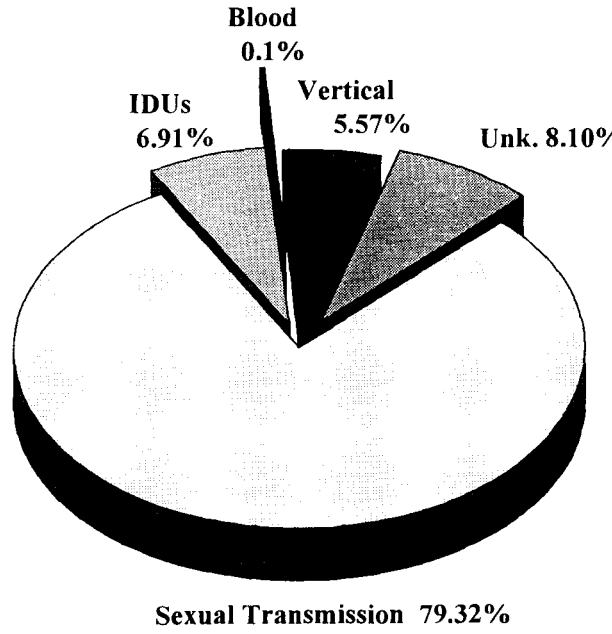
4.8 and 4.4 in 1992 to 1996 respectively. (Fig. 3). It should be noticed here that the cumulative number of total cases gives a higher male-to-female ratio than the annual figure in this year. But they are almost equal in the year before 1994.

In 1989, female cases of sexual transmission were first reported. The male-to-female ratios among the group of sexually transmitted are higher than the ratios for total cases of all risk factors, almost every year with a slight difference among their trends. The high ratio of 11 : 1 was observed in 1989 then fell to 6.7 in the following year. In 1991, it increased to 10.8 : 1 and then declined steadily until 1995 and 1996, the ratios are at 4.8 and 4.4 equal to the ratios of annual total cases of all risk factors in the same years. (Fig.4)

To understand further, the distribution of cases according to mode of transmission was also reviewed. Sexual intercourse, the major route of getting infection, accounts for 79.32 per cent of the total AIDS cases, while being IDUs, getting blood transfused and vertical transmission account for 6.91 per cent, 0.10 per cent and 5.57 per cent respectively. (Fig. 5)

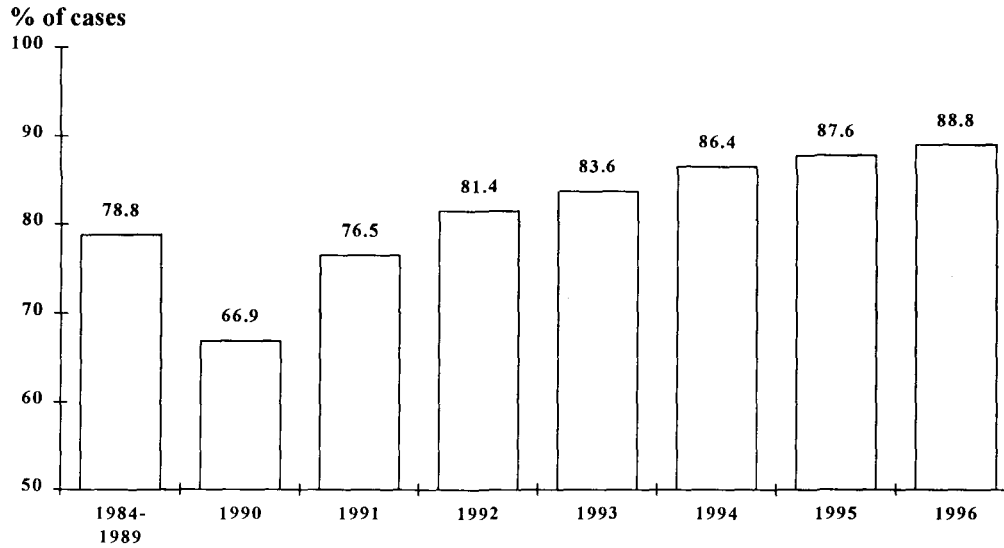
It is noteworthy that when the number of unknown risk factors was excluded from the total number of reported cases each year, the annual changes of proportion of reported AIDS cases among different modes of transmission could be observed (Fig. 6). The highest proportion still falls into sexual transmission with 78.78 per cent in 1984-89. It was down to 66.95 per cent in 1990 and became higher again at 76.47 per cent in 1991. The proportion of this group increased steadily until reaching 88.8 per cent this year. This means that the change of sex-ratio among the group of sexually transmitted will surely effect the pattern of sex-ratio for the total cases.

For the male-to-female ratio among the group of injection drug users (IDUs), it is constantly higher every year (Fig. 7). It increased from 21:1 in 1990 to 65.39:1 in 1995 and 106.5:1 in 1996. This evidence corresponds with the demographic pattern of drug users admitted to drug treatment nationwide showing 96 per cent male [14]. But the group of IDUs accounted for only 12.12 per cent of total AIDS cases in 1984-89, then climbed up to 19.13 per cent in 1990. The propor-



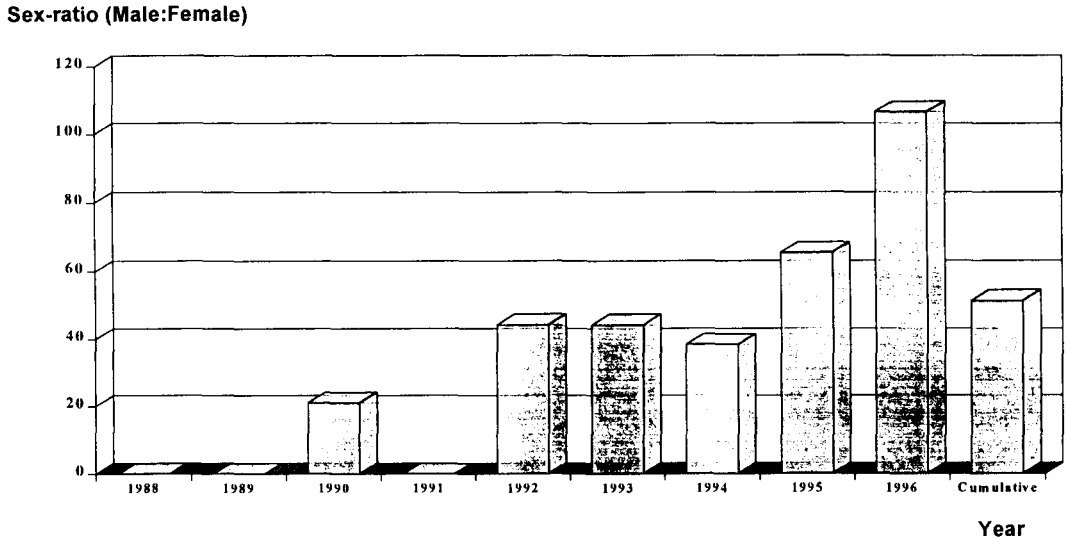
Source : Division of Epidemiology, Ministry of Public Health (data as of July 31, 1996)

Fig. 5. Distribution of reported AIDS cases in Thailand by mode of transmission, 1984-1996.



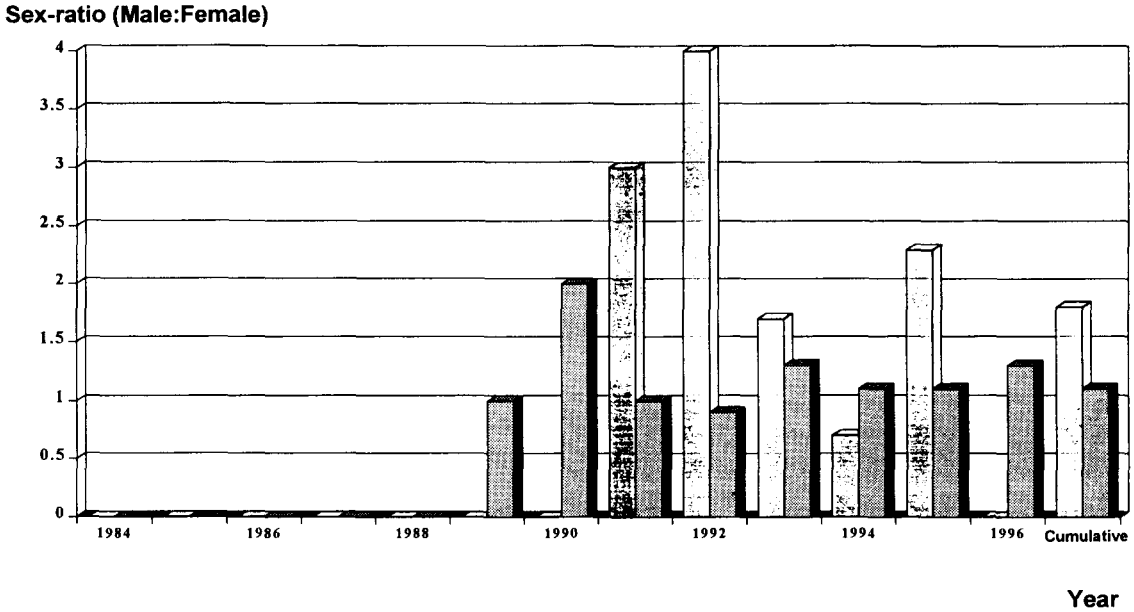
Source : Division of Epidemiology, Ministry of Public Health (Data as of July 31, 1996)
Note : Excluded cases of unknwn risk factor

Fig. 6. Sexual transmission of AIDS cases in Thailand by year of diagnosis, 1984-1996.



Source : Epidemiology Division, Ministry of Public Health. (Data as of July 31, 1996)
Note : No female case was reported in 1984-87, only 12 male AIDS cases

Fig. 7. Sex-ratio of AIDS cases in Thailand from injection drug use, 1988-1996.



Source : Epidemiology Division, Ministry of Public Health. (Data as of July 31, 1996)
Note : No female case was reported in 1984-87, only 12 male AIDS cases

Fig. 8. Sex-ratio of AIDS cases in Thailand from blood and vertical transmission, 1988-1996.

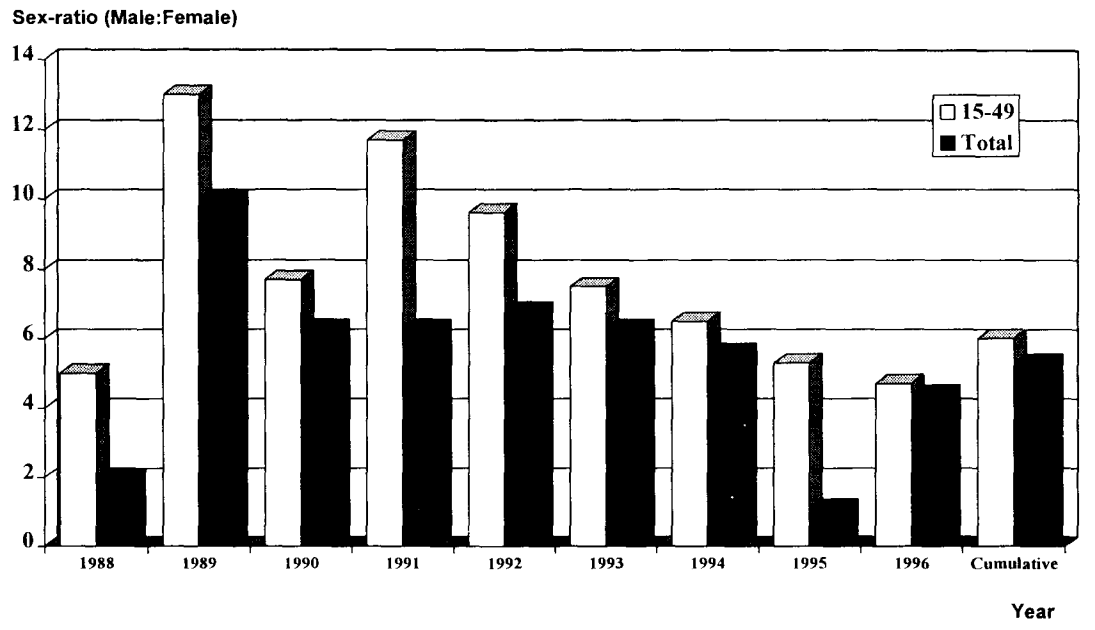
Table. 2. Sex-ratio of reported AIDS cases by different age group.

Age group	1988			1989			1990			1991			1992			1993			1994			1995			1996			Cumulative		
	M	F	Ratio	M	F	Ratio	M	F	Ratio	M	F	Ratio	M	F	Ratio	M	F	Ratio	M	F	Ratio	M	F	Ratio	M	F	Ratio	M	F	Ratio
0-9	0	2	**0.0**	1	1	**1.0**	10	5	**2.0**	36	36	**1.0**	67	70	**1.0**	256	201	**1.3**	390	352	**1.1**	421	400	**1.1**	92	72	**1.3**	1,273	1,139	**1.1**
10-14	0	0	**0.0**	0	0	**0.0**	0	0	**0.0**	0	1	**0.0**	1	0	**0.0**	0	3	**0.0**	1	1	**1.0**	4	1	**4.0**	0	0	**0.0**	6	6	**1.0**
15-49	5	1	**5.0**	39	3	**13.0**	85	11	**7.7**	364	31	**11.7**	1,223	128	**9.6**	4,971	662	**7.5**	10,045	1,551	**6.5**	13,620	2,561	**5.3**	2,746	583	**4.7**	33,098	5,531	**6.0**
50-54	0	0	**0.00**	0	0	**0.0**	3	0	**0.0**	13	0	**0.0**	35	3	**11.7**	125	8	**15.6**	222	28	**7.9**	235	46	**5.1**	50	6	**8.3**	683	91	**7.5**
55-59	0	0	**0.00**	0	0	**0.0**	1	0	**0.0**	12	1	**12.0**	19	0	**0.0**	103	9	**11.4**	165	22	**7.5**	180	24	**7.5**	42	4	**10.5**	522	60	**8.7**
60+	0	0	**0.00**	0	0	**0.0**	2	0	**0.0**	11	0	**0.0**	40	1	**40.0**	143	7	**20.4**	200	11	**18.2**	210	37	**5.7**	38	6	**6.3**	644	62	**10.4**
Unknown	1	0	**0.00**	1	0	**0.0**	0	0	**0.0**	2	1	**0.0**	3	1	**3.0**	22	4	**5.5**	12	3	**4.0**	7	1	**7.0**	1	0	**0.0**	49	10	**4.9**
TOTAL	6	3	**2.0**	41	4	**10.3**	101	16	**6.3**	438	70	**6.3**	1,388	203	**6.8**	5,620	894	**6.3**	11,035	1,968	**5.6**	14,677	3,070	**4.8**	2,969	671	**4.4**	36,275	6,899	**5.3**

Source : Epidemiology Division, Ministry of Public Health

Note : 1. No female case was reported in 1984 - 87, only 12 male AIDS cases

2. Data as of July 31, 1996



Source : Epidemiology Division, Ministry of Public Health. (Data as of July 31, 1996)
Note : No female case was reported in 1984-87, only 12 male AIDS cases

Fig. 9. Comparison of sex-ratio between age group 15-49 and total cases of AIDS in Thailand, 1984-1996.

tion of this group fluctuated down to 8.31 per cent in 1991 and upward again to 9.03 per cent in 1992. After 1992 the trend of proportion decreased until reaching 6.34 per cent in 1996. Thus, it has no effect on the sex-ratio from annual total number after female AIDS cases became obvious.

The ratios among the other risk factors---getting blood transfusion and vertical transmission, are usually low with no specific pattern and fluctuation of trends. (Fig.8)

Sex-ratio of different age-group

Male-to-female ratio in various age-groups was also reviewed. With regard to the cumulative number, high ratios were found among the older age-group, while the group younger than 14 years of age was found at around 1 : 1. (Table 2) The group of sexually active, 15-49 years of age gives a male-to-female ratio of 6 : 1.

The sex-ratios of AIDS cases in different age groups illustrates change in different years of diagnosis. (Fig. 9) Among the sexually active group of 15-49 years of age, the highest ratio of 13.0 : 1 was noticed in 1989. In recent years it decreased to 5.3, then 4.7 in 1996. Among the older age group, it seems like not much change except in the group older than 60, which gave a very high ratio of 40.0 : 1 in 1992 then lowered down to 5.7:1 in 1995.

The reported cases of AIDS, were mainly found between the age group of 20-24 to 35-39 which accounted for 76.39 per cent in 1984-1994 cumulatively, and 79.61 per cent in 1996. The highest proportion of cases reported could be observed in the age group of 25 - 29 years old in both sexes every year. So, whatever change of sex-ratio happens to the age group of 15-49 years of age, will impact the ratio from the total number each year.

DISCUSSION

The number of reported AIDS cases is inevitably increasing. The increment could be noticed every year and became obvious in the year 1993. If it is accepted that AIDS entered Thailand no later than 1984, then 1993 could be the year of average incubation period, 10 years as reported elsewhere[15]. It is foreseeable for the increasing number of reported cases even though Thailand has launched many strategic activities since the outbreak was realized[16].

The very high sex-ratio among the group of sexually transmitted during 1984-89 might be the result of homo-, bi-sexual behaviour among

men in the first few years of the epidemic[9]. Male prostitutes were the first group infected by HIV since 1985[17]. According to the frequency of their sexual contacts, for those who work in bars catering for foreigners; it varied from 10.5 to 200 times [17,18]. From the study on sexual practices of male bar workers in Bangkok, it shows the evidence of male prostitutes in Thailand being preferently bisexual practices[19]. Many risky males practicing bisexual behaviour are the important disease carriers to their wives, girlfriends or female customers, causing female cases of AIDS later[20]. This could be an explanation to the drop of sex-ratio in 1990 and 1991, after the first HIV detection in a serosurvey among female prostitutes in a tourist area in 1987[21] and the evidence of markedly high prevalence of HIV among female prostitutes in 1989, the second wave of epidemic after IDUs[22,23].

After the first HIV detection among IDUs in 1985-87[24,25] followed by an explosive spread in late 1988,[26-29] the number of AIDS cases due to injection drug used becomes substantial. This change could explain the slight increase of the male-to-female ratio in 1992. Nevertheless, there could also be another effect from the third wave of epidemic among sexually-active heterosexual men in 1990[22,23]. However, the heterosexuality involves both sex, men who have sex with prostitutes also put their non-prostitute sexual partners---wives, girlfriends, and acquaintances---at risk for HIV infection[23]. The fourth wave of epidemic was evidence among non prostitute women in 1991[22,23]. This pattern could be an explanation for the continual decrease of the male-to-female ratio since 1993. These changes demonstrate the dynamicity of risk behaviour in the general population. The annual male-to-female sex ratio of AIDS cases can then be used as an indicator for changes of risk behaviour among the general population, especially sex behaviour. Trend of sex ratio change annually can also reflect certain changes in the mode of transmission of the disease as well. In the planning process we need to know the direction of the disease spreading in time. The sex-ratio calculated from the cumulative number of cases gives rather late information compared to the ratio from annual cases report.

Thailand, as a country in Asia, was once classified as a country of disease pattern III[23,30]. However, the overall changes of disease pattern with regard to male-to-female sex ratio, makes it look like a mixture of pattern I&II. The pattern of high sex ratio of 10.3 : 1 with the evidence of disease among homosexual and bisexsual men and injection drug users during the early phase of the epidemic was compatible with pattern I areas of the industrialized countries including North America, many Western European countries, Australia, New Zealand and parts of Latin America[30]. The pattern of change recently is close to pattern II areas of Africa where most of the cases occur among heterosexuals[30]. This might be a specific pattern for developing countries like Thailand where the direction of development aiming to be a "new industrialized country---NIC" which creates the fundamental factor of AIDS epidemic, people migration. Combination of those factors with the physical development of urbanization and inapropriate social adaptation leads to risky behaviour practice among vulnerable groups of population.

The incremental rate of cases reported used to be around 2-4 times annually since 1990, but the number reported in 1995 did not follow such a pattern. This could be claimed as the effect of preventive interventions which started since the early phase of epidemic, and then targeted at sexual behaviour in 1990[16]. Expanding the proportion of sexual transmission as well as shrinking of sex ratio have illustrated the effects of heterosexual transmission as a major risk behaviour and higher number of female being infected. This pattern happened in Africa where the situation was so severe that the social structure was affected[20,31,32]. Moreover, the number of reported cases of vertical transmission, the outcome of family transmission, is increasing. It indicates that Thailand is now facing the last waves of the epidemic the population not practicing risk behaviour themselves are also at risk[22,23,33].

Recommendations

In trying to calculate the male-to-female ratio for the prognosis of epidemic, the number of cases reported in each year should be used instead of the cumulative number. The annaul sex-ratio allows comparison between different years and clearly illustrates the actual sex-ratio for each particular period. The planners, both national and local levels, could gain from this kind of information by making better AIDS plan appropriately adjusted to the current situation. It has been predicted that

the AIDS epidemic in Thailand is spreading from the upper North to the lower North and then Northeast[34]. The analysis of annual sex-ratio will help AIDS managers to monitor such changes.

The evidence of higher HIV-infection among females is obvious from the higher proportion of sexual transmission risk behaviour and lower sex-ratio. Along with the growing number of AIDS cases due to vertical transmission, health administrators should be aware of improving health care facilities to be ready for rendering services to a higher number of pediatric AIDS in the near future.

The increasing number of AIDS cases is the warning sign for all health administrators to review and assess the existing health care facilities and be prepared to respond to the growing demands on health care services properly. A high proportion of asymptomatic HIV in previous years is turning out to be symptomatic HIV and AIDS more and more according to HIV infectivity and its incubation period[15] which makes the number of reported cases bigger and bigger every year. Despite this, the demands for health care might not be met at the same time, they must respond someday. In preparation to cope with such a demand, not only should hospital beds be made available and accessable to them, but referral system should also be revised and designed with standard guidelines to all institutions in the network of the health system. Enabling and empowerment of the community for caring for symptomatic HIV and AIDS, especially the family case should be another approach in responding to the growing demands for health care at the community level. Concepts of Primary Health Care (PHC) should be revitalized and implemented in order to support the idea of community participation for care among their neighbours. Home-based care, by family members, and community care will serve the continuum of care for HIV/AIDS patients.

Besides the impact on the health care system, labour forces and businesses will also be affected. The review on distribution of AIDS cases by occupation has shown that employees are most affected by HIV/AIDS followed by agricultural workers. The diseases are distributed more among active working age group between 20-24 years to 35-39 years old. This finding can also be used as a message for business owners and personel managers to realize that AIDS is not only a health problem, it is moving toward every business with no exception. The better way to relieve stress on the manpower shortage is trying to maintain their staff with the organization as long as they can contribute to the business without discrimination. Planning for preventive intervention in the work place is equally important as it could be sure that their staff will be saved from HIV infection. Businesses and industry in the area where a high proportion of cases should be educated and convinced of the real situation. There are those in the upper-Northern provinces, including Bangkok as well as industrial provinces in the East. The Ministry of Labour and Social-welfare could be the focal point to encourage such activities.

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อัตราส่วนเพศชาย : หญิงของผู้ป่วยเอดส์ในประเทศไทย

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ได้ทำการทบทวนรายงานสรุปสถานการณ์ผู้ป่วยโรคเอดส์ในประเทศไทยตั้งแต่เริ่มมีรายงานผู้ป่วยรายแรกเมื่อเดือนกันยายน พ.ศ. 2527 จนถึงวันที่ 31 กรกฎาคม พ.ศ. 2539 เพื่อศึกษาอัตราส่วนเพศชาย : หญิง สำหรับปัจจัยเสี่ยงและกลุ่มอายุต่าง ๆ ทั้งจำนวนผู้ป่วยสะสมและแยกเป็นรายปี พบว่าอัตราส่วนเพศชาย : หญิง จากจำนวนผู้ป่วยเป็นรายปีนั้นมีค่าต่ำกว่าอัตราส่วนที่ได้จากจำนวนผู้ป่วยสะสม โดยมีค่าเป็น 4.4 : 1 สำหรับปี พ.ศ. 2539 ขณะที่อัตราส่วนจากจำนวนผู้ป่วยสะสมมีค่าอยู่ที่ 5.3 : 1 แสดงให้เห็นถึงความสามารถตรวจพบการเปลี่ยนแปลงพฤติกรรมเสี่ยงในประชากรที่เสี่ยงต่อการติดเชื้อเอดส์ ด้วยการคำนวณหาค่าอัตราส่วนเพศชาย : หญิง จากจำนวนผู้ป่วยเป็นรายปีได้ไวกว่าการการคำนวณจากจำนวนผู้ป่วยสะสม ซึ่งน่าจะมีผลสำคัญต่อการวางแผนการดำเนินงานป้องกันและควบคุมโรคเอดส์ให้มีประสิทธิภาพสอดคล้องกับสถานการณ์มากยิ่งขึ้นทั้งในระดับชาติและระดับท้องถิ่น นอกจากนี้ยังพบว่าอัตราส่วนดังกล่าวในประชากรวัยเจริญพันธุ์ (กลุ่มอายุ 15–49 ปี) มีแนวโน้มลดต่ำลงเรื่อย ๆ ในปีหลัง ๆ นี้เช่นกัน การเปลี่ยนแปลงทั้งสองกรณีนี้เป็นการยืนยันให้เห็นถึงการแพร่ติดต่อของโรคเอดส์ ที่ระบาดเข้าไปถึงหญิงไทยทั่วไปที่ไม่ได้มีพฤติกรรมเสี่ยงด้วยตนเองแล้ว ตามที่มีผู้รายงานไว้ว่าเป็นคลื่นการระบาดลูกที่ 4 ซึ่งแน่นอนที่สุดว่าย่อมจะตามมาด้วย คลื่นลูกที่ 5 คือ การพบโรคเอดส์ในเด็กที่เกิดจากมารดาติดเชื้อเอดส์อันถือได้ว่าเป็นคลื่นลูกสุดท้าย สำหรับครอบครัวของประชากรไทย

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