

# Determinants of Sexual Awareness among High School Students in Tokyo, Japan

## —Cross Sectional Analysis in Relation to Social Capital

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### Abstract

**Purpose:** The study aimed to clarify the relationship between cognitive social capital and sexual awareness in high school students in Tokyo, Japan. **Method:** The self-administered questionnaire survey was administered to 1073 high school junior students in Tokyo in Feb. 2017 (collection rate 94.5%). Final analysis subjects totaled 1011 boys and girls (94.2%). True/false questions on timing to wear condom for sex knowledge, acceptability to sexual behavior of high school students for sexual awareness, sense of community belonging for social capital, existence of sexually experienced peers, and Rosenberg Self-Esteem Scale score (binarized with the mean value) were verified. Multiple logistic regression analysis assigning sexual awareness for dependent variable and sex knowledge, sexually experienced peers and Self-Esteem score for independent variable [model 1], including social capital for independent variable [model 2] was performed. The study was approved by Ethical Review Board of sub-organ. **Results and Discussion:** Out of subjects, 52.6% answered correctly questions on sex knowledge, 33.2% showed tolerance to sexual behavior of high school students, 68.6% had many peers with sex experience, and 75.9% had a sense of community belonging. In model 1, in both genders, having sex knowledge, high Self-Esteem score, and existence of sexually experienced peers was associated with a sense of intolerance to sexual behavior of high school students. In model 2, in both genders, having a sense of community belonging was associated with a sense of intolerance to sexual behavior of high school students [OR (95% CI): boy 1.11 (0.81 - 1.53), girl 1.14 (0.72 - 1.79)]. Persons with high cognitive social capital were likely to have a cautious sense toward sexual behavior. **Conclusion:** Cognitive social capital was found to be associated with sexual awareness. Cognitive social capital should be emphasized in promoting adolescent reproductive health

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for the future.

## Keywords

Sexual Awareness, Social Capital, Self-Esteem, Sex Knowledge, High School Students, Japanese

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## 1. Introduction

Adolescent sexual behavior, in comparison to adults, is known to become high risk in future health issues such as infertility as consequence of unwanted pregnancy and sexually transmitted diseases (UNFPA. 2013, WHO 2011) [1] [2]. In previous studies, immature sexual awareness, insufficient sex knowledge and low self-esteem reflect an individual's overall subjective emotional evaluation of his or her own worth and have been clarified as factors for likely engaging in sexual behavior in adolescence (Goodson, P. *et al.*, 2006) [3]. On the other hand, recently in developed countries including Japan, the importance of social capital has attracted attention. An adolescent's mental health and daily activities are influenced by relationships with the local community and neighborhood (McPherson, K. *et al.* 2013) [4]. Based on this background, we hypothesized that social capital has some influence on adolescent sexual awareness and behavior, and we have verified the hypothesis by conducting a series of questionnaire surveys since 2012.

Up to now, many studies about factors that influence adolescent sexual awareness and behavior have been conducted, and the importance of rising self-esteem besides fostering sex education was emphasized by a number of domestic and international researchers from 1980's to 2002. (Goodman, P. *et al.* 2006) [3]. This philosophy has been assimilated into the Japanese education. Recently, social capital such as "sense of community belonging" and "neighborhood relationship" is considered an influence on individual behavior even in young people (Kawachi I, *et al.* 2001) [5]. From this perspective, we hypothesized that not only individual factors such as sex knowledge and self-esteem as previously recognized but also social factors such as social capital were associated with adolescent sexual awareness and behavior, and we have verified and reported the association of sexual awareness and cognitive social capital through conducting questionnaire surveys to the eleventh grade high school students in Hanoi, the capital city of Vietnam, where social changes and changes in young people's lifestyles are drastic (Watanabe. *et al.* 2014) [6] [7] [8] [9]. As to testing of determinants of sexual awareness and behavior, using previously unreported method of testing multiple factors simultaneously we clarified that social capital rather than sex knowledge and self-esteem was associated deeply with sexual awareness. Persons with high cognitive social capital possess the socially desired safe sexual awareness. In Ho Chi Min City in Southern Vietnam far away from

the capital, we administered the questionnaires in the same manner and acquired similar results as Hanoi. Thus as described, acquiring the same results from historically and culturally different areas strongly suggested the possibility of acquiring the same or similar results in Japan. Thus, our research in Japan to introduce intervention methods to adolescents is presented herein.

## 2. Methods

### 1) Subjects

We administered our survey to 1073 high school junior students in six high schools in the Tokyo metropolitan area using the Japanese language version of the self-administered questionnaire (collection rate 94.5%). Excluding invalid responses without age and gender specified, analysis subjects were 518 boys, 493 girls, total 1011 students (94.2%). To acquire the average data of high school students in Tokyo, all six high schools were public, fulltime, comprehensive and coed with almost equal boys/girls ratio.

### 2) Survey Contents

We examined the level of self-esteem using the Japanese version (Yamamoto, *et al.* 1965) [10] of the Rosenberg Self-Esteem Scale (Rosenberg M. 1965) [11], sex knowledge, sexual awareness (acceptance of premarital sex, acceptance of premarital sex with love, existence of sexually experienced surrounding peers of the same generation), cognitive social capital (sense of community belonging, willingness of social contribution, reliability to surrounding people), structural social capital (existence of events in school and community and participating situations, involvement with family) in addition to basic attributes.

We translated the questionnaire from English into Vietnamese and used it for surveys in Vietnam in 2012 and 2014. We then modified the translation from English into Japanese complying with Japanese culture and climate and used it after discussion with representatives and persons in charge of subject high schools (head of year, homeroom teacher, nursing teacher) and making further adjustments. In this process we used the words and terms of the textbooks of high school health and physical education and homemaking courses approved by the Japan Ministry of Education, Culture, Sports, Science and Technology.

### 3) Analysis Method

After simple tabulation, we performed multivariate analysis assigning true or false answers to questions on: timing to wear condom for “sex knowledge”; acceptable or unacceptable premarital sex of high school students for “sexual awareness”; sense of community belonging for “social capital”; presence or absence of sex experienced peers; and Rosenberg Self-Esteem Scale score (binarized with the mean value). Then, we performed multiple logistic regression analysis assigning sexual awareness for dependent variable and sex knowledge, sexually experienced surrounding peers and Self-Esteem score for independent (explanatory) variable [model 1], and including social capital for independent variable [model 2].

### 4) Ethical Consideration

This study was approved by the Ethical Review Board of the National Center for Global Health and medicine (Approval number: NCGM-G-002071-00). We had the cooperation of the high schools and obtained written informed consent from the participating students before conducting this survey.

### 3. Results

#### 1) Basic attribute of Subjects

Out of the 1011 analysis subjects, 99.6% were 16 or 17-year-olds and 77.6% were from nuclear families. **Table 1** shows physical development status of subjects tabulated by genders. Numbers of valid responses by boys on height and weight were almost equal, but girls' responses on weight were 15% less than responses on height. The reason for nonresponse on weight by girls was unknown. However, when we looked at whole boy and girl subjects, the average physical development of high school students in Japan (White Paper on Children and Young People 2017) [12] and therefore the subjects of this study can be considered as the population of average Japanese high school students.

#### 2) Experience of Risky Behavior

**Table 2** shows responses to questions on experience of risky behavior at adolescence: alcohol drinking and its initiation age; cigarette smoking and its initiation age; and tendency to comply with daily traffic rules. Both boy and girl subjects who answered that they had no experience in smoking and drinking and and drinking and they tended to comply with traffic rules were high with 83%.

**Table 1.** Physical development.

Gender	Item	Number of Subjects	Boy			Girl			
			Minimum	Maximum	Mean $\pm$ SD	Number of Subjects	Minimum	Maximum	Mean $\pm$ SD
	Height (cm)	515	152	191.0	171.0 $\pm$ 6.4	479	143	181	157.9 $\pm$ 5.3
	Weight (kg)	510	38.0	126.0	61.1 $\pm$ 10.6	437	38.0	85.0	50.9 $\pm$ 6.8

**Table 2.** Experience of alcohol drinking, cigarette smoking and compliance of traffic rules.

Gender	Choices	Boy			Girl		
		Yes No (Number%)	No Yes (Number%)	Age of Experience (Mean $\pm$ SD)	Yes No (Number%)	No Yes (Number%)	Age of Experience (Mean $\pm$ SD)
	Drinking Alcohol	75 (14.6)	440 (85.4)	15.0 $\pm$ 3.6	70 (14.3)	420 (85.7)	13.2 $\pm$ 3.9
	Smoking Cigarette	27 (4.3)	495 (95.7)	14.0 $\pm$ 3.3	4 (0.8)	489 (99.0)	12, 14, 15 1 person each
	Traffic Rules	87 (16.9)	429 (83.1)		66 (13.5)	423 (86.5)	

Particularly as to smoking almost all were inexperienced. For persons who had experience of smoking and drinking, first-time experiences started at around 12 - 15 years old.

### 3) Ownership of Personal Use Items

**Table 3** shows responses on items owned for personal use. Valid answers to this question were 518 boys and 493 girls. As responses can be multiple choices, counts of selectors and percentages were shown. Almost all subjects answered that they owned a mobile phone or smart phone for personal usage, and about 70% of them were allocated a private room. To sum it up we may say that they seem to be living with privacy relatively esteemed or guaranteed.

### 4) Airtimes of Communication Devices

Airtime of mobile phone, PC and other devices (including telephone call, e-mail, Social Media, internet search) was 120 minutes median for boys and 150 minutes median for girls. Although responded airtime was a bit longer in girls, there was not much difference between boys and girls as to behavior of communication tool usage.

### 5) Situation of Social Capital

**Table 4** and **Table 5** show answers to questions composed of two groups of “structural social capital” and “cognitive social capital” that were divided by characteristics of social capital. Regarding structural social capital, more than 70% of the subjects in both genders responded that there were events in which they could participate at their place of residence but only less than 25% of them answered that they actually participated in those events. Among other inclusions of structural social capital, we included factors of parents and family considering that students require parental support for daily living activities and for other economic factors.

Among the subjects who responded that they had interfamilial communion such as going out to eat, the number of girls was slightly higher than boys. Also, as to parental meddling into children’s sexual behavior, many responses stated mother interfered more often than father did.

Regarding cognitive social capital, more than 75% of the subjects in both genders responded that they had a sense of community belonging, and more

**Table 3.** Ownership of personal use items.

Item	Boy (%) n = 518	Girl (%) n = 493
Private Room at Home	378 (73.0)	337 (68.4)
Mobile Phone, Smart Phone	505 (97.5)	488 (99.0)
PC	143 (27.6)	918 (18.5)
Communication Devices other than Mobile and Smart Phone	90 (17.4)	34 (6.9)
Bicycle	464 (89.6)	441 (89.5)
Motor Bike	36 (6.9)	20 (5.1)
Automobile other than Motor Bike	4 (0.8)	2 (0.4)

**Table 4.** Structural social capital.

Gender	Boy n = 518		Girl n = 493	
	Yes (%)	No (%)	Yes (%)	No (%)
1) Events for Residents in Community	392 (76.0)	124 (24.0)	355 (72.3)	136 (27.7)
2) Participating in (1)	125 (24.2)	391 (75.8)	122 (24.8)	370 (75.2)
3) Interfamilial Communion such as eating out	281 (54.5)	235 (45.5)	316 (64.2)	176 (35.8)
4) Father's Meddling in behavior	169 (32.9)	345 (67.1)	141 (29.2)	342 (70.8)
5) Mother's Meddling in behavior	272 (52.8)	243 (47.2)	259 (52.9)	231 (47.1)

**Table 5.** Reality of cognitive social capital.

Gender	Boy n = 518		Girl n = 493	
	Strongly think so/Think so (%)	Strongly don't think so/Don't think so (%)	Strongly think so/Think so (%)	Strongly don't think so/Don't think so (%)
I Have a Sense of Community Belonging	393 (76.0)	124 (24.0)	372 (75.8)	119 (24.2)
I'd Like to Contribute to Society in the Future	407 (78.9)	109 (22.1)	422 (85.9)	69 (14.1)
I Can Trust Surrounding People	409 (79.6)	105 (20.4)	370 (75.2)	122 (24.8)

than 78% of them responded they would like to contribute to the society in the future. Also, more than 75% of the subjects responded they could trust people in their surroundings.

#### 6) Situation of Self-Esteem (Rosenberg Self-Esteem Scale Score)

To measure the level of self-esteem which reflects an individual's overall subjective emotional evaluation of his or her own worth, we employed Rosenberg Self-Esteem Scale (Rosenberg M, USA Maryland Univ., the Japanese version by Yamamoto, *et al.* 1965) [10] [11]. The score range is from 0 to 30, and the average score of Japanese is 21.

The average score of the subjects of boys was  $24.0 \pm 3.2$  and girls was  $24.4 \pm 2.7$ . No huge differences were seen in either gender, and the scores were higher than the average scores of Japanese.

#### 7) Reality of sexual awareness

**Table 6** shows responses to questions on sexual awareness of the subjects. We categorized those responses of four choices "strongly think so", "think so", "strongly don't think so", and "don't think so" into two groups and tabulated them; "think so" group for "strongly think so" and "think so", "don't think so" group for "strongly don't think so", and "don't think so". Compared to boys (63.8%), more girls (69.9%) had a sense of intolerance to sexual behavior of high school students. Also, compared to girls (77.3%), more boys (84.5%) tolerated

**Table 6.** Reality of sexual awareness.

Gender	Boy n = 516		Girl n = 493		
	Choices	I think so (%)	I don't think so (%)	I think so (%)	I don't think so (%)
	High school students should not conduct sexual behavior	329 (63.8)	187 (36.2)	342 (69.9)	147 (30.1)
	High school students may conduct sexual behavior if love exists	435 (84.5)	80 (15.5)	378 (77.3)	111 (22.7)
	I can refuse undesired sexual behavior	493 (95.7)	22 (4.3)	463 (95.3)	23 (4.7)
	If I have a sex during high school time, I will do contraceptive	499 (97.5)	13 (2.5)	472 (96.9)	15 (3.1)
	Man is responsible for contraceptive	491 (95.7)	22 (4.3)	442 (88.9)	54 (11.1)
	Many peers surrounding me have sexual experience	364 (71.0)	149 (29.0)	323 (66.1)	166 (33.9)

sexual behavior of high school students if love exists. Among the subjects who responded that there were many peers around with sexual experience, the number of boys (71.0%) was slightly higher than girls (66.1%).

#### 8) Reality of Sex Knowledge

**Tables 7-9** show reality of sex knowledge of the subjects. Regarding questions on sexually transmitted diseases and contraceptive methods with which respondents were acquainted, since responses were multiple choices the count of selectors and percentages were shown. We requested respondents to select only one with which they actually were acquainted and they could explain what it was.

The only sexually transmitted disease known by a majority of the subjects was chlamydia infection in boys. The rest of diseases known were all less than 35%. Not only trichomoniasis of which reported cases were few recently but also Hepatitis B of which a certain number of cases were reported constantly and the other transmission paths existed besides sexual transmission were known by only less than 15% of the subjects in both genders.

Among acquainted contraceptive methods, the only method known by more than 90% of the subjects was the condom. The oral contraceptive pill was known by more than 75% the subjects in both genders.

As to correct or incorrect answers to questions on condom usages, the subjects who answered correctly on either question were less than 60% in both genders. A huge disparity was seen between so-called “acquainted” contraceptive methods and actual knowledge of the subjects.

#### 9) Sexual Problem and Person to Consult, and Sex Education

**Table 10** shows the situation of a sexual problem, person to consult, sex education and awareness of sex knowledge.

The subjects who had a sexual problem were less than 25% in both genders

**Table 7.** Acquainted sexually transmitted diseases.

	Boy (%) n = 518	Girl (%) n = 493
Chlamydia	261 (50.4)	158 (32.0)
Gonorrhea	91 (17.6)	40 (8.1)
Venereal/Syphilis	151 (29.2)	8.5 (17.2)
HIV (AIDS)	166 (32.0)	112 (22.7)
Hepatitis B	64 (12.4)	68 (13.8)
Trichomoniasis	23 (4.4)	16 (3.2)

**Table 8.** Acquainted contraceptive methods.

	Boy n = 518 I know (%)	Girl n = 493 I know (%)
Condom	484 (93.4)	452 (91.7)
Oral Contraceptive Pill	380 (73.4)	389 (78.9)
Rhythm Method	68 (13.1)	39 (7.9)
Coitus Interruptus (Pull-Out Method)	260 (50.2)	178 (36.1)
Intrauterine Contraceptive Device (IUD)	140 (27.0)	141 (28.6)

**Table 9.** Correct/incorrect answers to questions on condom usage.

Gender	Boy n = 492		Girl n = 449		
	Answer	Correct (%)	Incorrect (%)	Correct (%)	Incorrect (%)
Proper Timing to Wear Condom		240 (48.8)	252 (51.2)	255 (56.8)	194 (43.2)
Countermeasure When Condom Breakage		148 (31.0)	329 (69.0)	158 (35.2)	291 (64.8)

**Table 10.** Sexual problem and person to consult, and sex education.

Gender	Boy n = 511		Girl n = 486		
	Yes (presence)/No (absence) Answer	Yes (%)	No (%)	Yes (%)	No (%)
Sexual Problem (worries)		125 (24.5)	386 (75.5)	93 (19.1)	393 (80.9)
Person To Consult on Physical and Sexual Issue		225 (43.9)	287 (56.1)	293 (60.3)	193 (39.7)
Experience of Receiving Sex Education		345 (67.4)	167 (32.6)	361 (74.1)	126 (25.9)
Self-Confidence on Sexual Knowledge		260 (52.2)	238 (47.8)	217 (45.4)	261 (54.6)

and who had a person to consult on sexual and physical problem were less in boys (43.9%) compared to girls (60.3%). Although the subjects who had experience of receiving guidance about sex were more than 65% in both genders, the ones who had confidence in sufficient sex knowledge were less than 55% and particularly lesser in girls, thus showing disparity of self-awareness education from actual acquirement of knowledge.

## 10) Testing Multiple Determinants of Sexual Awareness Simultaneously

**Table 11** shows the results of multiple logistic regression analysis with sexual awareness assigned as dependent variable. In model 1, having sex knowledge, high Self-Esteem score and having many peers with sex experience were associated with a sense of intolerance to sexual behavior of high school students in both genders. In model 2, after social capital was included in model 1, influence of sex knowledge and Self-Esteem score disappeared, having a sense of community belonging was associated with a sense of intolerance to sexual behavior of high school students [OR (95% CI): boy 1.11 (0.81 - 1.53), girl 1.14 (0.72 - 1.79)], and having many peers with sex experience was associated with a sense of tolerance to sexual behavior of high school students [OR (95% CI): boy 2.46 (1.69 - 3.59), girl 2.41 (1.61 - 3.56)].

#### 4. Discussion

The subjects of this study were considered to be the average Japanese high school students from a perspective of the kind of high school in which they were enrolled, physical development, family structure, living style, etc. Therefore, this survey to these subjects, and tabulating and analyzing these results may be considered to lead to acquire the average data of Japanese high school students.

As for social capital of the subjects, the level of their structural social capital was not so high, but the level of cognitive capital was high in both genders. Although, in general structural social capital is supposed to be the base for cognitive social capital and thus to boost cognitive social capital (Kawachi I, *et al.*

**Table 11.** Multiple logistic regression analysis on acceptability to sexual behavior of high school students.

Variables	Model 1				Model 2			
	Boy		Girl		Boy		Girl	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR 95% CI	P
Answer to Question on Proper Timing to Wear Condom								
Correct	0.70 (0.51 - 0.97)	0.03	0.51 (0.36 - 0.71)	<0.01	0.96 (0.67 - 1.38)	0.82	0.72 (0.49 - 1.05)	0.85
Incorrect	ref		ref		ref		ref	
Are There Many Peers with Sexual Experience Around								
Yes	1.8 (1.27 - 2.56)	<0.01	1.73 (1.20 - 2.49)	<0.01	2.46 (1.69 - 3.59)	<0.01	2.4 (1.61 - 3.56)	<0.01
No	ref		ref		ref		ref	
Rosenberg Self-Esteem Scale Score								
>21	0.55 (0.4 - 0.74)	<0.01	0.64 (0.47 - 0.88)	<0.01	0.94 (0.64 - 1.37)	0.74	1.07 (0.71 - 1.6)	0.75
21≤	ref		ref		ref		ref	
I Have Sense of Community Belonging								
Yes					1.11 (0.81 - 1.53)	<0.01	1.14 (0.72 - 1.79)	<0.01
No					ref		ref	

OR: Odds Ratio; CI: Confidence Interval. Results are based on logistic regression analysis. Model 1 has been adjusted for Rosenberg Self-Esteem Scale Score, Proper Timing to Wear Condom and Most of Peer Have Sexual Experience. Model 2 has been adjusted for Rosenberg Self-Esteem Scale Score, Proper Timing to Wear Condom, Community Belonging and Most of Peer Have Sexual Experience.

2001) [5] resulting that a difference between structural and cognitive social capital to be small, in the case of the subjects in our study the differences between structural social capital and cognitive social capital were large. From this result, the subjects were considered to have acquired factors that cultivate cognitive social capital from somewhere other than the belonging environment or considered to be boosted by some kind of high internal factors.

Regarding sexual behavior of high school students, a majority of the subjects had a sense of intolerance, and it was especially-pronounced in girls. Also, almost all subjects refused unwilling sexual behavior and they had awareness of using contraceptive in case they do engage in sex during high school years. This observed awareness strongly suggested the possibility of control over the initiation of sexual behavior and risky sexual behavior of high school students.

As to sex knowledge, the result was that the subjects who had correct and sufficient sex knowledge were few. Because not having correct knowledge may lead to increase a risk of sexually transmitted diseases and unwanted pregnancy, countermeasures against this are needed. Although many of the subjects thought they received sex education, actually few subjects had sufficient sex knowledge. This result suggested acquisition and familiarization of sex knowledge may become a future health or social issues to be concerned.

Since almost no one responded that they acquired information about sex from their family members, more effective educational means such as implementation of sex education at home in early stages of child-rearing, providing parents with correct knowledge and edification of awareness, and facilitating interactions between school and family and so on were thought to be necessary.

Through testing two models by multiple logistic regression analysis, it was found that not sufficient sex knowledge and high self-esteem had a deep association with sexual awareness as previously recognized but high social capital had significant association with sexual awareness and persons with high cognitive social capital were likely to have cautious and conservative awareness toward sex. If we can cultivate cognitive social capital we can change sexual awareness of high school students. Therefore, as cultivating cognitive social capital of high school students should be the goal of parents and educators, measures to approach to enhance cognitive social capital of high school students need to be considered and introduced in the future education at school, home and community.

Simultaneously using multiple logistic regression analysis made us able to review factors previously considered to have a deep association and find more detailed associations. From now on it is important to test by not only analyzing between invariant factors but also by analyzing multiple factors simultaneously.

On the basis of these results, we will try in future to devise effective measures to clarify issues of reproductive health for high school students by adding further analysis on these data, by developing longitudinal researches, and by implementing an intervention using educational materials.

Several study limitations need to be considered. First, the cross-sectional nature of this survey design does not allow for change in the subjects' beliefs, past, present and future to be examined. This can be achieved with long-term longitudinal study in the future. Second, because this is a self-administered questionnaire survey, there is a possibility of reporting bias.

## 5. Conclusion

Cognitive social capital was found to be associated with sexual awareness. Thus, this suggests that the concept of cognitive social capital should be emphasized in promoting adolescent reproductive health. Formulating measures to enhance cognitive social capital are needed for the future.

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## Conflicts of Interest

The authors declare no conflicts of interest (COI) associated with this study.

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