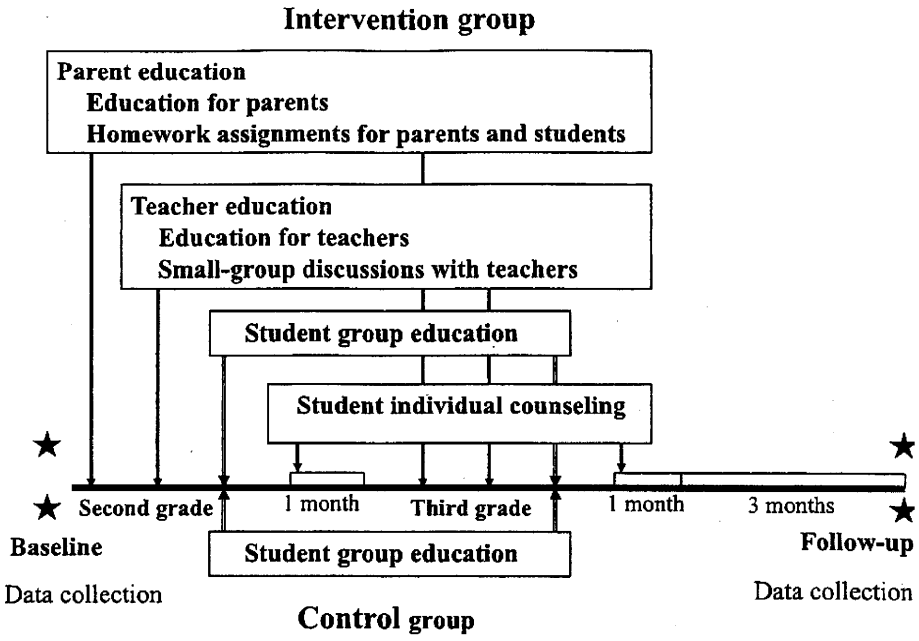

Fig. 1 Process of the intervention and the control

Teacher education

The objective of teacher education was to provide teachers with knowledge about changes and prevention of potential risks during puberty, to understand methods of education for improving self-esteem and rejecting sexual activity, and to teach their students how to improve self-esteem and refuse sexual activity.

Education for teachers A midwife, a gynecologist, and two school nurses provided training for class teachers before small-group discussions.

Small-group discussions with teachers Two small-group discussions were conducted by class teachers after training. The objective was to improve communication skills related to refusal of sexual activity and negotiations with regard to sexual relations. The students also performed role-playing exercises. If examples of dangerous behavior arose during the exercises, the students were asked to think of ways to avoid such behavior and to fill out forms listing their ideas. Students wrote essays about their impressions after each small-group discussion.

Student education

The objective of professional counseling was to provide knowledge about HIV and sex to students, improve their self-esteem by answering questions and alleviating concerns, and to provide them with a careful attitude toward sexual activity.

Student group education A gynecologist or a midwife gave two types of group education to the students, who wrote essays about their impressions after each type of group education.

Student individual counseling Based on data from four sources—(1) the homework assignment, (2) the essay written after group education, (3) the small-group discussion forms, and (4) the essays written after the discussions—school nurses, midwives, and gynecologists selected students who had questions and worries about their education. These students were given individual counseling by a school nurse, midwife, or gynecologist after regular school hours.

Control group

Student group education

A gynecologist or a midwife gave two group education sessions to the students. After the 3-month follow-up survey, information was provided to teachers and parents, and individual counseling was provided for adolescents who requested it.

Study procedure

The authors distributed an explanatory document, the questionnaires, and consent forms to the school teachers. The explanatory document contained instructions on how to distribute and recover the questionnaires. It emphasized

the confidentiality of material in the questionnaires, which were sealed before recovery. The consent form contained a detailed explanation of the objectives of the research, the confidentiality of all information, the freedom to refuse to participate, and contact information for the researchers. Before the survey was conducted, a letter and a consent form were distributed to the parents through the students. For students without parents, we obtained the consent of their guardians [the adult(s) responsible for their upbringing]. Students consented after parental consent. If a student did not want to participate in the survey, the student could refuse to hand the consent form to his/her parents or guardians. The student could refuse to participate in the survey, even if his/her parents or guardians had consented to the participation. The survey was conducted only when both students and their parents or guardian gave consent for the survey. The students could receive the education if they wanted. Students were not made to undergo education if they refused. Students were also not made to provide certain data if they refused.

To all students, including those who had consented to participate in the survey, instructors at the large- and small-group education sessions explained at the beginning that students could leave the classroom if they did not feel like participating. Students were also told that the forms and essay sheets collected at each session would be checked by the instructor, and that a subsequent individual counseling session could be provided for selected students. Students were told that they did not have to submit the forms/essays unless they consented. Parents or students who did not consent did not have to complete or submit the homework forms. Those who agreed to participate signed and submitted the forms at the end of the session. Individual counseling sessions were provided after the school nurses had obtained prior consent from the students. Instructors explained at the beginning of individual sessions that students could leave in the middle if they so wished. The study protocol was approved by the Ethics Committee of Saga University Medical School. The approval of each school principal was also obtained.

Investigations

Frequency of communication about AIDS with parents or teachers

A Japanese study showed that communication by children with their parents about AIDS when the children were 16 or younger delayed the start of sexual activity by adolescents [5]. We asked students about their frequency of communication about AIDS for assessment before intervention and 3 months after intervention. "Did you talk to your parents/guardians about AIDS during the past 3 months?" In addition, we added the question: "Did you talk to any teachers at your school about AIDS in the past 3 months?" For the questions that we devised, students selected one of four alternatives: 1 = never, 2 = seldom, 3 = sometimes, 4 = often.

Table 2 HIV/AIDS knowledge

1. The AIDS virus cannot be transmitted by coughing
2. The AIDS virus cannot penetrate healthy skin
3. There is no concern over infection if sexual activity is limited to one specific partner
4. People infected with the AIDS virus look unhealthy
5. Sexual intercourse has the danger of HIV infection
6. The routes of infection are through the blood, from sexual intercourse, and from mother to child
7. There is no possibility of infection if there are no abnormalities in the sexual organs or the surrounding area
8. Sexual intercourse is completely safe if a condom is used
9. The period for the development is long after a person is infected with HIV. While it differs according to the individual, it ranges from five to 15 years, and averages 10 years
10. The onset of AIDS after infection with HIV can be delayed due to advances in treatment with drugs

Knowledge of HIV/AIDS

The scale to evaluate knowledge of HIV/AIDS developed by Kelly et al. consisted of 40 items [23]. In 2003, this scale was translated into Japanese by Matsumoto and Takeda [24]. They excluded 20 items that did not accord with the Japanese culture and created a Japanese version of such a scale that contained 30 items, i.e., 20 items from Kelly's scale and an additional 10 items regarding current knowledge of HIV and AIDS. They reported that 14 of the 30 items showed a high level of appropriateness in evaluating knowledge of HIV/AIDS (α-coefficient for reliability = 0.67) [24]. We used the scale with permission from the copyright holder. Our preliminary study in 13- to 14-year-old participants showed that the response rate for 4 of the 14 items was low. Therefore, we used a simplified version of the scale, with 10 items. We demonstrated that the scale was appropriate in 13- to 14-year-old students for this study ($\alpha = 0.69$) (Table 2).

Self-esteem

We used the general self-esteem scale ($\alpha = 0.78$) developed by Rosenberg [25] for assessment before intervention and 3 months after intervention. This scale has 10 items. It was translated into Japanese by Hoshino [26], and its suitability has been demonstrated ($\alpha = 0.75$). This scale is commonly used for school education in Japan. It is often used for surveys of high-risk behavior among adolescents

in Japan. It was also used to survey the current level of sexual activity and relevant factors among Japanese junior high school and high school students in 2007 [27]. For each item, a participant was instructed to select one of four options: (1) strongly agree, (2) agree, (3) disagree, and (4) strongly disagree.

Attitude to rejecting sexual intercourse

Currently, there is no validated Japanese version of scales that can measure attitudes to sexual intercourse. Therefore, two original questions were devised to assess the attitude of junior high school students to rejecting sexual intercourse. In the present study they were used as single and separate questions.

These two questions were as follows:

1. Attitude to rejecting sexual activity

   "What do you think about having sex when you are in junior high school?" For this question, students selected one answer from two alternatives: "I do mind (reject sexual activity)." or "I don't mind (accept sexual activity)."
2. Confidence about rejecting sexual advances

   "Do you have the confidence to reject sexual advances when you are asked?" For this question, students selected one answer from two alternatives; "Yes (I have the confidence to reject advances)" or "No (I do not have enough confidence to reject advances)."

High-risk behavior (alcohol consumption, cigarette smoking, and sexual intercourse)

Inoue et al. [6] have shown that smoking and drinking have an influence on the sexual behavior of both boys and girls in Japan. We used the following three original questions to evaluate high-risk behavior before and 3 months after intervention with respect to alcohol consumption, cigarette smoking, and sexual intercourse during the past 3 months. (1) Have you consumed alcohol within the last 3 months? (2) Have you smoked within the last 3 months? (3) Have you had sexual intercourse within the last 3 months? The α-coefficient for assessing the reliability of these questions was 0.61. In the present study, we used these questions singly and separately.

Statistical analysis

Data were collected at two points in time and thus provided repeated measures of the frequency of communication about AIDS, the knowledge of HIV/AIDS, self-esteem, and behavior. The mean and standard deviation of the total score were calculated for each scale. The frequency of communication about AIDS, knowledge of HIV/AIDS, and self-esteem were compared between baseline and 3 months after intervention in the intervention group and the control group by using Student's t-test. We also analyzed the attitude to sexual intercourse and the rates of alcohol consumption, cigarette smoking, and sexual activity using the χ^2 test. In addition, we compared the frequency of communication about AIDS; knowledge of HIV/AIDS; self-esteem; attitudes to sexual intercourse; and the rates of alcohol consumption, cigarette smoking, and sexual activity between the intervention group and the control group at baseline and follow-up. Repeated measures were treated as an additional level in multilevel analysis. In order to assess whether there was a significant interaction effect between measures of the effect of intervention and gender, three-way analysis of variance (ANOVA) was performed.

Multiple regression analysis was used to analyze numerical data (the frequency of communication about AIDS, knowledge of HIV/AIDS, and self-esteem) for each gender. Logistic regression models were used to analyze categorical variables (attitude to sexual intercourse and the rates of alcohol consumption, cigarette smoking, and sexual activity) for each gender. Two types of significance data are provided, which are the results of tests indicating whether the difference of each variable between baseline and follow-up was statistically significant for each gender, and tests indicating whether the impact of intervention was statistically significant for each gender. The Statistical Package for the Social Sciences (SPSS 14.0) was employed for all analyses. Significance of differences was accepted at $p < 0.05$. When logistic regression analysis was performed, the odds ratio and the 95% confidence interval were calculated to assess the differences between baseline and follow-up, as well as the differences between the intervention group and the control group.

Results

Survey findings

Table 3 shows the survey results (mean scores and percentages) at baseline and follow-up for the intervention group and the control group. The questionnaire was completed before intervention by 423 students (86.3%) who gave informed consent to the survey. There were 211 males (49.9%) and 212 females (50.1%). The mean age of the 423 students before intervention was 13.7 ± 0.45 years (mean $\pm$ SD). At the intervention group schools, there were 192 students, of whom 164 (85.4%) gave informed consent and took part in the survey, including 87 males

Table 3 Comparative knowledge, self-esteem, attitudes, and behavior among the adolescent intervention group and control group from baseline to follow-up

Number of subjects at baseline and follow-up Overall (male/female)	Intervention			Control			Interaction	
	Baseline 164 (87/77)	Follow-up 135 (80/55)	Baseline versus follow-up p value	Baseline 259 (124/135)	Follow-up 236 (115/121)	Baseline versus follow-up p value	Baseline follow-up	
							Intervention p value	Gender p value
Frequency of communicating about AIDS								
Talking with parents mean [(SD) min–max]	1.2 (0.4) 1–3	1.2 (0.6) 1–3	0.179	1.3 (0.5) 1–3	1.3 (0.6) 1–3	0.117	0.768	0.181
Talking with teachers mean [(SD) min–max]	1.2 (0.5) 1–4	1.7 (0.9) 1–4	<0.001	1.4 (0.7) 1–4	1.6 (0.6) 1–4	0.056	<0.001	0.012
HIV/AIDS knowledge mean [(SD) min–max]	6.5 (2.1) 0–10	8.1 (1.6) 3–10	<0.001	6.8 (2.3) 0–10	7.8 (1.7) 1–10	<0.001	0.028	0.026
Self-esteem mean [(SD) min–max]	24.4 (5.0) 10–37	26.2 (5.0) 16–40	0.003	24.3 (5.4) 10–37	24.8 (5.4) 10–40	0.298	0.107	0.056
Attitude to sexual intercourse								
Rejection of sexual activity (%)	79.6	86.0	0.199	81.9	77.1	0.235	0.034	0.030
Confidence in rejecting sexual advances (%)	82.2	73.6	0.130	79.0	79.7	0.904	0.186	0.440
Risky behavior								
Alcohol use (%)	13.1	15.2	0.735	21.2	17.7	0.356	0.463	0.008
Cigarette tobacco use (%)	1.9	1.5	1.000	4.9	3.9	0.660	0.857	0.737
Sexual activity (%)	0.7	1.5	1.000	1.7	1.5	1.000	0.538	0.584

Analyses used Student's t-test or the χ^2 test for differences in each characteristic between baseline and follow-up. Three-way analysis of variance (ANOVA) was used for analysis in order to assess whether there was a significant interaction effect between measures of the effect of intervention and gender

(53.0%) and 77 females (47.0%). At the control group schools, there were 298 students, of whom 259 (86.9%) gave informed consent to the survey, including 124 males (47.9%) and 135 females (52.1%). Of the 423 students who participated in the survey before intervention, 371 (88.8%) participated in the second survey at 3 months after intervention, including 135 students (82.3%) from the intervention group and 236 students (91.1%) from the control group.

Effect of intervention

We compared the results between baseline and follow-up for the intervention group (Table 3). The frequency of communication about AIDS with parents did not change for either the intervention group or the control group. However, the frequency of communication about AIDS with teachers increased in the last 3 months for the intervention group ($p < 0.001$). After 3 months, in the intervention group, the mean scores for HIV and AIDS knowledge ($p < 0.001$) and for self-esteem ($p = 0.003$) were significantly higher than at baseline. When we compared the results between baseline and follow-up for the control group, the mean scores for HIV and AIDS knowledge ($p < 0.001$) were significantly higher than at baseline. Both the intervention and control groups showed some positive results at the baseline and follow-up.

There was a significant interaction effect of the intervention involving an impact on the frequency of communication about AIDS with teachers ($p < 0.001$), HIV/AIDS knowledge ($p = 0.028$), and refusal of sexual activity ($p = 0.034$). In addition, there was a significant interaction effect of gender with an impact on the frequency of communication about AIDS with teachers ($p = 0.012$), HIV/AIDS knowledge ($p = 0.026$), refusal of sexual activity ($p = 0.030$), and alcohol use ($p = 0.008$).

Influence of gender

For males and females in both groups, results were compared between baseline and follow-up by multiple regression models or logistic regression models (Table 4). For males and females in both groups, the frequency of communication about AIDS with parents did not change.

At follow-up, for males and females in the intervention group and females in the control group the frequency of communication about AIDS with teachers increased in the last 3 months. Also, the interaction with the intervention was significant among females for the impact on the frequency of communication about AIDS with teachers ($p = 0.027$).

The scores for HIV and AIDS knowledge ($p < 0.001$) at follow-up were significantly higher than those at baseline in males from both groups. However, the interaction with the intervention was not significant for males with respect to HIV and AIDS knowledge. The scores for HIV and AIDS knowledge were significantly higher at follow-up in girls from the intervention group ($p < 0.001$) and the control group ($p = 0.019$). Also, the interaction with the intervention was significant for the impact on HIV/AIDS knowledge in females ($p = 0.023$).

The score for self-esteem was significantly higher at follow-up than at baseline in females from the intervention group ($p = 0.029$) and the control group ($p = 0.036$). However, no significant interaction of self-esteem with the intervention was detected for either gender. In addition, the percentage of males refusing sexual activity was significantly lower ($p = 0.020$) at follow-up than at baseline in the control group. However, boys from the intervention group showed a higher refusal rate of sexual activity at follow-up than at baseline. Intervention had a significant impact on refusal of sexual activity by males ($p = 0.045$). The intervention had no significant impact on other variables in either males or females.

Discussion

This study suggested that adolescents showed more positive changes in measures of attitudes to sexual activity and HIV/AIDS knowledge with an expanded intervention education program for students, parents, and school teachers. There were gender differences in the effects of the intervention. Among females, the intervention had a significant impact on the frequency of communication about AIDS with teachers and HIV/AIDS knowledge, and in males it had a significant impact on refusal of sexual activity.

We consider that the differences between males and females might be related to communication and differing values about sexual activity between male and female adolescents in Japan. It has been reported that the percentage of students who have had sex increases with age among Japanese junior high school and high school students, and young males who are sexually active and have strong sexual desires take a greater interest in sex and are more positive toward sexual behavior than young females who are passive with respect to sex [2]. For female students who only had a slight interest in sex, a program that addressed their questions and concerns by increasing the opportunities for education from teachers was more effective for providing accurate knowledge than group education only. The present study showed that for females in the intervention group, the frequency of communication about AIDS with teachers had increased at the 3 month follow-up compared with this communication aftergroup education for students. On the other hand, male students were more likely to have a strong interest in sex, so that even group education led to an improvement of knowledge. Among the young females with a higher risk of pregnancy and sexual abuse, the percentage of students refusing sex was increased by group education in both the intervention and control groups. On the other hand, among the young males showing a decrease in rejection of sex with age, there was an increase in the percentage of students refusing sex that was probably due to the intensified education provided by this program (including education for teachers, as well as individual counseling).

Kirby et al. [28] created a School Health Promotion Council that consisted of school teachers, students, parents, administrators, and members of the community. They reported an increase in the number of male students who used condoms after intervention by Council programs, but they also reported there was no effect on female students. Flay et al. [29] conducted a School Community Intervention Program that lowered the rate of increase in sexual activity among male students aged 10–13 and also increased condom use, although these effects were not observed among female students. The results of such studies indicate that there is a limit to the effectiveness of group education for preventing HIV infection because of the influence of student attitudes, gender, and individual differences in sexual behavior. It has been reported that the effects of these programs show differences between males and females. For example, an education program designed to increase the use of condoms had a definite effect in males, but was ineffective in females.

In the sex education program delivered by life skill training for junior high school students in Japan, nine educational sessions of different styles conducted by medical experts and school staff were compared. Significant improvements were seen in self-esteem, willingness to study, and attitudes toward sexual information among male students, as well as in willingness to study and attitudes toward sexual information among female students [30]. Thus, it was clarified that an intervention with the program had an effect on self-esteem, willingness to study, and the attitude to sexual information among males, as well as on study and the attitude to sexual information among females.

Table 4 Comparison of knowledge, self-esteem, attitudes, and behavior between intervention group and control group and between baseline and follow-up among male and female students

Number of subjects at baseline and follow-up (male/female)	Intervention			Control			Intervention versus control		
	Baseline (87/77) versus follow-up (80/55)			Baseline (124/135) versus follow-up (115/121)			Baseline follow-up × intervention		
	Estimate	95% CI	*p* value	Estimate	95% CI	*p* value	Estimate	95% CI	*p* value
Frequency of talking with parents about AIDS									
Male	0.035	(−0.104 to 0.175)	0.616	0.034	(−0.095 to 0.164)	0.600	0.001	(−0.192 to 0.194)	0.992
Female	0.143	(−0.041 to 0.327)	0.126	0.124	(−0.026 to 0.275)	0.106	0.019	(−0.230 to 0.268)	0.882
Frequency of talking with teachers about AIDS									
Male	0.372	(0.145 to 0.599)	0.001	0.168	(−0.015 to 0.350)	0.072	0.204	(−0.084 to 0.493)	0.164
Female	0.710	(0.496 to 0.924)	<0.001	0.367	(0.179 to 0.555)	0.001	0.343	(0.039 to 0.646)	0.027
HIV/AIDS knowledge									
Male	1.838	(1.255 to 2.421)	<0.001	1.358	(0.792 to 1.924)	<0.001	0.480	(−0.348 to 1.308)	0.255
Female	1.513	(0.898 to 2.128)	<0.001	0.579	(0.094 to 1.064)	0.019	0.934	(0.131 to 1.737)	0.023
Self-esteem									
Male	1.269	(−0.204 to 2.742)	0.091	−0.409	(−1.876 to 1.059)	0.584	1.678	(−0.466 to 3.822)	0.125
Female	2.005	(0.207 to 3.804)	0.029	1.408	(0.091 to 2.725)	0.036	0.597	(−1.651 to 2.845)	0.602
Rejection of sexual activity									
Male	OR = 1.298	(0.587 to 2.868)	0.519	OR = 0.446	(0.225 to 0.883)	0.020	OR = 2.910	(1.022 to 8.286)	0.045
Female	OR = 2.673	(0.809 to 8.832)	0.107	OR = 1.236	(0.633 to 2.413)	0.536	OR = 2.163	(0.550 to 8.512)	0.270
Confidence in rejecting sexual advances									
Male	OR = 0.586	(0.267 to 1.287)	0.183	OR = 0.858	(0.436 to 1.691)	0.659	OR = 0.683	(0.242 to 1.929)	0.471
Female	OR = 0.650	(0.254 to 1.660)	0.368	OR = 1.263	(0.647 to 2.468)	0.494	OR = 0.515	(0.163 to 1.629)	0.259
Alcohol use									
Male	OR = 2.133	(0.842 to 5.403)	0.110	OR = 1.227	(0.663 to 2.269)	0.515	OR = 1.739	(0.570 to 5.300)	0.331
Female	OR = 0.587	(0.208 to 1.657)	0.314	OR = 0.454	(0.222 to 0.929)	0.031	OR = 1.291	(0.366 to 4.555)	0.692
Cigarette tobacco use									
Male	OR = 1.105	(0.152 to 8.040)	0.921	OR = 0.857	(0.254 to 2.891)	0.803	OR = 1.290	(0.126 to 13.226)	0.830
Female	OR = 000	–	0.998	OR = 0.725	(0.199 to 2.633)	0.625	OR = 000	–	0.998
Sexual activity									
Male	OR = 000	–	0.997	OR = 0.673	(0.110 to 4.107)	0.668	OR = 000	–	0.997
Female	OR = 000	–	0.998	OR = 1.05	(0.067 to 17.539)	0.954	OR = 000	–	0.997

Multiple regression analysis or multiple logistic regression analysis was used for analysis

OR odds ratio, *CI* confidence interval

Saito et al. [7] have reported that individualized counseling in response to student requests requires coordination with medical institutions. In addition to counseling by nurse teachers at schools, regular visits by medical and healthcare personnel to schools are recommended to provide counseling on specific issues related to sexual intercourse. Similarly, counseling provided by the local community is advised. However, these activities are not sufficiently available in Japan. In the present study, we provided an extended program, with parental training, teacher training, more education for adolescents, and individual counseling for students who had questions or concerns about the information they received. As a result of the individual counseling, we discovered some students with incorrect knowledge about the routes of HIV infection and prevention of infection. We also discovered that male students who accepted sexual intercourse at junior high school believed that their peers also accepted sex. Further, we found that male students who lacked the confidence to refuse sex also wanted to have sexual intercourse if they had the opportunity. It was possible that some of the students who were having sexual intercourse could contract STDs. For students who had begun sexual activity, we provided education about HIV/STDs, explained the need for testing, and recommended that they undergo testing at a public health center or medical institution.

Small-group adolescent discussion and individualized education showed us how the students were influenced by the values of their peers and how this shaped their attitude to sexual intercourse. Male students also reported that the behavior of their peers contributed greatly to the decision about when to have sex for the first time. Larsson and Svedin [31] reported that adolescents began sexual relations with partners close to their own age, and that 93% of young people first had sex with someone within 2 years of their own age. Further, Papadopoulos et al. [32] reported that most adolescent females initially did not think they would have sexual intercourse when engaged in social interaction with a male, but had sexual intercourse unexpectedly. It is necessary to emphasize to students involved in male–female interactions the ever-present risk of unwanted pregnancy and STDs caused by sexual intercourse as a way of reducing such risks.

A previous Japanese study showed that high school students who received peer counseling by university students had a higher sense of self-esteem than adolescents who did not receive such counseling. However, the risks of pregnancy and STDs were not significantly lower than those in the adolescents without such education [33]. We believe that an individualized approach to students by school nurses or medical professionals is required. During our individual counseling sessions, we informed the students that more of their peers disapproved of sexual activity than approved. Accordingly, the significant increase in male students who rejected sexual activity after individual education may have occurred because they recognized that their preconceived ideas about sexual behavior were erroneous. We also suggested to the students during their individual education sessions that they should not rush into sexual activity because it was easy for adolescents to have sexual intercourse with someone close to their own age, but that there was a risk of unwanted pregnancy and STD as a result of such relations. The present study suggested that a stronger and persistent influence on adolescents was achieved through multiple methods of intervention, including education for teachers and individual counseling.

The frequency of communication about AIDS with parents did not change for either males or females in our study. Takedomi et al. [34] reported that Japanese parents of new college students answered that they could easily discuss physical growth and pregnancy with their children, but they answered that it was difficult to discuss HIV/AIDS, sexual behavior, and contraception for children younger than 18 years old. There is a negative feeling about communication on sexual matters between parents and adolescents because sex and sexual relations are topics less easily discussed between parents and adolescents and between men and women in Japan than elsewhere. In addition, Hiraoka [35] identified clear differences in the awareness of sex by generation between junior high school students and their parents. We consider that parents and adolescents did not conduct high-level communications about sexual matters, including AIDS, in the home because of the Japanese cultural background in which parents find it difficult to educate adolescents about sexual matters. There is particular resistance to talking about sexual matters between adolescents and parents at home in Japan. It may be necessary to educate for parent of the child before adolescence to be able to talk about sexual matters without resistance. Based on the results of the present study, we think it is important to enhance sex education at school, and maintain good communications with each family member at home.

Furthermore, we found that the students who had begun having sexual intercourse were more likely to have problems at home, such as parents who were too lenient or too strict. It has been reported that the age of initiation of sexual activity is influenced by the parent–child relationship [5]. Saito et al. [7] stated that, when interacting with individual students, personal information should be handled with care and contact with the parents should be dependent upon agreement with the students. In the future, considering the existence of various problems with parent–child relationships, we think that it may be necessary to provide individual counseling for the parents of high-risk students.

Limitations of the study

It would have been preferable to establish a control group with absolutely no intervention, but the schools would not permit two surveys to be carried out without education also being provided to the students. After the 3-month follow-up survey, information on the control group was given to teachers and parents, and individual counseling was provided for adolescents who requested it. Because some parents and guardians did not participate in the education for parents, we provided health information sheets for all parents and guardians after the education program. To improve the participation rate of parents and guardians, a better method should be found for a future program. We asked the students about their frequency of communication about AIDS with parents for assessment before the intervention and 3 months after the intervention. However, we could not collect any data from the parents or guardians, or from the teachers. Due to the Japanese culture, parents and school teachers have a tendency to resist surveys on sexual matters and training conducted by external organizations. Future studies should investigate how to survey parents and teachers in order to devise better methods. Also, it would have been informative to conduct long-term follow-up after our intervention, but this was not possible because the participating students soon graduated from their junior high schools and moved to high schools.

Conclusion

The efficacy of an extended program of education, including education for parents and teachers, in-depth education for adolescents, and individual counseling, was evaluated among students aged 13–14 attending four public junior high schools in Saga Prefecture, Japan. Female students from the intervention group showed a better frequency of communication about AIDS with teachers, and better AIDS and HIV knowledge than female students from the control group. Male students from the intervention group showed less acceptance of sexual activity at 3 months after intervention than male students from the control group. We consider that the differences between males and females might be related to differences in communication and differing values about sex between male and female adolescents in Japan. In future, it will be important to promote adolescent education by maintaining close ties with the school and family, and by providing individual counseling that takes into consideration the sexual differences in Japanese adolescents.

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慢性疼痛とうつ病

Chronic pain and depression

特集

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うつを診る

Key words 慢性疼痛 うつ病 認知行動療法 エアロビクス 集団療法

慢性疼痛によって失われるものは，人間関係，病気・手術・事故などによる身体喪失，身体機能の傷害，身体的自己像の損傷などが含まれる[1]．さらに，精神的に拠り所となるような自己を一体化させていた集団や，自己の価値観，自信，誇り，名誉なども含まれる．慢性疼痛に悩まされる患者は生きていく目標や自信を失い，社会的な職業を失い，家族を失うなど，喪失体験ばかりである．そこには対象喪失に伴う悲哀の心理過程を経験する．その経過のなかで，一般的に否認，怒り，取引，絶望，抑うつ，最終的に受容といった心理的なプロセスを辿るといわれている．この悲哀の心理過程をうまく切り抜けることができれば，社会的に適応していくことが可能となるが，慢性疼痛に伴う深刻な問題は「抑うつ」の段階にとどまっている場合であろう．

日常の診療場面で感じられること

慢性疼痛患者との日常診察場面で経験することは，現実の問題に焦点を当てることができず，絶え間なく，痛みに関連する不安な過去と未来の考えに支配されている「認知の歪み」が存在することにある．この破局的状況を少しでも解決するために，今ここで身体に感じるもの，見えるもの，聞こえるもの，治療者との関係で感じられるもの，などを表現させようと試みるがうまくいかない場合も多い．次に問題なのは，この認知の歪みによって，日常生活における行動も著しく制限されている．何を始めるにも不安(痛みがひどくなるかもしれない)が伴い，具体的な行動に移すことが難しい．さらには，人と交わることが辛く，周囲の人に配慮しすぎるため，人間関係に過度に疲れ，どうしても集団に加わることができない(孤立・ひきこもり)．

以上の現状から，診療場面ではどうしても痛みの話題が中心となってしまい，医療者と患者で交わされる話題は広がらず，個人精神療法，薬物療法には限界が感じられる[2)3)]．

しかし，慢性疼痛患者の包括的な治療を考えるうえで，上記に示した「認知の歪み」，「体を動かすことへの不安」，「集団力の低下(孤立・ひきこもり)」に焦点を当て，慢性疼痛患者との長期的な治療関係を維持していくことが大切である．確か

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表1 認知の歪みの10パターン

□(1)白か黒か，全か無か(白黒思考)
物事に対し「白か黒」「0か100」といった極端な捉え方や決断をし，中間にあることを考慮にいれる柔軟な思考が難しい．ほとんどの問題の解決策は中間にあるが，物を見るとき，両極端な見方をしてしまうことから，「白黒思考」と呼ばれている．
□(2)一般化のしすぎ
1つよくないことが起こると，「すべてが・・」「いつもこうです・・」という考え方やものの言い方をしてしまう．自信喪失になりやすい物の考え方．
□(3)心のフィルター(こころのサングラス)
ちょっとしたひとつの欠点を大事に捉え，他のすべてのことを無視してしまう傾向．
□(4)マイナス化思考(プラス思考の否定)
成功や喜びの価値を割り引いてしまう．
□(5)結論の飛躍(早まった結論)
具体的な根拠もないまま，自分で勝手に結論を急ぎ，物事を否定的に考えてしまう．
□(6)過大視と過小評価
自分の短所や失敗を必要以上に大変なことだと捉え，自分の長所やしたことをつまらないとして見積もってしまう傾向．
□(7)感情的決め付け
「嫌なものは嫌」「ダメなものはダメ」「できないといったら，できない」
□(8)すべき思考
何かしようとする時に「・・すべき」「・・すべきではない」「・・こうあるべきだ」と考えてしまう．
□(9)レッテル貼り
自分にネガティブなレッテルを貼ってしまうこと．自分で勝手に物事を決めてしまう傾向．
□(10)自己関連づけ(自己中心思考)
自分に直接関係がないようなことでも，自分のせいにしてしまう傾向．

に，一部の患者は抗うつ薬や抗不安薬が奏効する場合もある．漢方薬で痛みと戦っていける自信も生まれる．また，リハビリテーションを含めた運動療法も有効な治療手段であろう．しかし，薬物を中心とした治療だけでは，患者の依存性を高め，治療に対する患者側の責任性の放棄を招くことも少なくないと指摘され，理学療法的リハビリ治療が有効であった例などを丸田[4]は紹介している．

サイコ・エアロ・グループセラピー

われわれは，慢性疼痛患者を含めた遷延化したうつ病患者に対して，涙と汗の表出を促す「サイコ・エアロ・グループセラピー」と自ら名付けた試みを行っている．

サイコセラピーに関しては，認知行動療法的なアプローチを行っている．それは，患者の多くが痛みや抑うつを引き起こしやすい歪んだ認知(物の考え方や捉え方)を持っており，心理的に大きな負担をかけてしまい，そのために心穏やかな生活を送るのが困難になっている．バーンズ[5]が提唱している認知の歪みの10パターンを紹介し(表1)，それぞれの対処法を一緒に考える．瞬間的に脳裏に浮かぶ思考やイメージを語り合い，感じること，実感すること，体感することを大切にしながら，自分の中で整理しながら，歪んだ認知を少しずつ修正していく．慢性疼痛に悩むうつ病患者にとっては，自分の認知の歪みのパターンに気づくことで，涙を浮かべ，癒されることも多い．さまざまな例を提示しながら，どのような認知の歪みがうつ状態に発展しているかを紹介している．

エアロビクスに関しては，「エアロビクスダンス」と呼ばれるダンス形式の有酸素運動を適用している(図1)．ウォーミングアップから始めて，体温と心拍数を上昇させ，多少動いたりストレッチが入り，強度の高い運動ができる状態にする(約5分)．次に，ローインパクトの運動に移り，ウォーキングを中心とした動きで身体を暖める．手足のストレッチを行い，それほど複雑な運動は行わない(約5分)．徐々にジョギング中心の動きを加え，

図1 エアロビクスダンスの実際
上左：ローインパクト 上中央：ハイインパクト 上右：ローンインパクト
中左：水分補給 中中央：ストレッチ 中右：筋力トレーニング
下左：クーリングダウン

手の動きが入り，縦横の速い動きを入れ，より複雑な運動を取り入れていく．さらに，ハイインパクトの運動に移り，ジャンピングやニーアップなどの複雑な運動に入る(約5分)．次に，徐々に心拍数を落とすために，ウォーキングや軽いステップの動きを行い，手足のストレッチに入り，深呼吸で終わる(約5分)．ここで前半のエクササイズを終了し，運動中は発汗により体内の水分が失われるので，水分補給の時間を取り入れる．

後半では，ストレッチを行い，関節を動かし筋肉をゆっくり伸ばし，適度に伸びたところで，その姿勢を適当な時間(約10～20秒程度)保持する(約5分)．次に，筋力トレーニングを行う．マットを使い，腹筋運動を中心に行う．腕立て伏せやレッグカールのような足や臀部の運動も加える(約25分)．最後に，クーリングダウンに移り，ストレッチで運動前の身体に戻し，筋肉の疲れをとり，体の柔軟性を上げることになる(約3分)．前半と後半を合わせて約1時間のエクササイズとなる．

なお，疼痛やうつ病に対するエアロビクス運動の有効性に関する報告は最近では，増加している．

グループセラピーに関しては，エアロビクスダンスが始まる前に約10分間，水分補給の休憩時間に行う．参加するメンバーが自分のことを語ることを通じて，お互いの考え方を共有するという実践が行われる(図2)．多くは肥満，うつ，痛みなどの問題を抱える人で，他者を鏡にして自分を知り，一人で問題を深刻に考えるよりも，みんなで共有し，他者から学ぶといった姿勢をとっていく．何を語ってもよい自由な雰囲気を大切にして，われわれがファシリテーターとしてそれぞれが自由に語りやすい雰囲気を作っていく．また，参加者みんなが自分のことを正直に語り，自分の話がうけとめてもらったという信頼と安心が生まれていき，お互いの人間関係が深まるように配慮している．

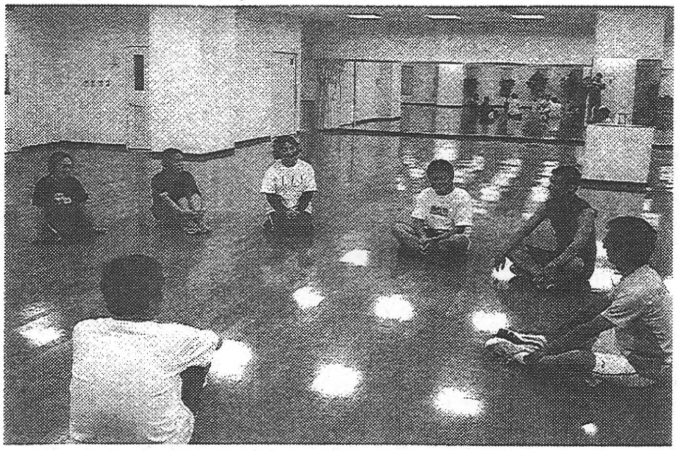

図2 グループセラピーの実際

慢性疼痛とうつ病の治療に関する最近の知見

Greden[6]は慢性疼痛とうつ病は高頻度に合併するが，抑うつ気分よりも身体愁訴が前景にみられるため，うつ病が見逃される可能性を指摘している．また，2つの問題を抱える患者は薬物療法だけでなく，認知行動療法，運動療法，患者教育を含めた包括的治療が必要であることを強調している．

本邦でも，牛嶋ら[7]は有酸素運動の長期的な精神的影響として，抑うつや不安の低減が顕著に認められたと報告した．Blumenthal ら[8]は高齢者のうつ病患者では，16週間の運動療法を行うことで，抗うつ薬治療群と同等の抑うつ症状の改善が認められたと報告した．

最近の報告では，慢性疼痛患者に対して，エアロビクス運動は疼痛の軽減だけでなく，抑うつ症状も改善されたとの報告もある[9]．Sallivan ら[10]の報告では，慢性疼痛患者に10分間の運動前後に抑うつ症状や疼痛の程度を評価した結果，即効性のある鎮痛効果は得られなかったが，抗不安・抗うつ効果がみられたと証明されている．

以上から，慢性疼痛とうつ病を合併する患者では，これまでの個人精神療法的なアプローチでは治療の限界があり，運動療法，集団療法あるいは代替療法(ヨガ，太極拳，鍼灸，マッサージ，漢方薬，ピラティスなど)を加えた包括的治療が必要である．

おわりに

慢性疼痛とうつ病の治療に関して，日常診療で感じている個人精神療法の限界を述べ，運動療法や集団療法を加えた「サイコ・エアロ・グループセラピー」の実際を紹介した．最近の知見においても，同様なことが報告されており，とくにエアロビクス(有酸素運動)の重要性を強調した．

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特集　最近の大学生の精神保健

最近の動向とトピック*

● 佐藤　武**

Key Words : college mental health, autism spectrum disorder, game addiction, depression, social connectedness

発達障害の歴史的変遷とゲーム中毒の現代大学生像―その類似性

1943年，アメリカの精神科医Kanner L. が「早期自閉症」として自閉症(カナー症候群)を報告し，翌年の1944年，オーストリアの小児科医Asperger H. によってアスペルガー症候群が報告された．発達障害の概念が変遷する中で，1957年にはPasamanick B. が微細脳損傷(minimal brain damageもしくはminimal cerebral damage)なる用語を導入した．その後，正常な知能に行動異常と学習能力における特殊な障害をあわせ持つ子どもに，微細脳損傷という言葉が乱用され，両親に恐怖感，絶望感を与え，患者に対する周囲の偏見を助長した．1962年から1963年にかけて開かれた米国でのシンポジウムにおいて，微細脳損傷という用語は不適当であり微細脳障害が適当であるとされた．その頃の1960年代には多動などの行動に焦点が当てられ，多動児症候群，多動症候群，小児運動反応といった言葉が使われ始める．1970年代には，問題の焦点が多動から注意力へと移り，注意欠陥障害と呼ばれるようになる．その後1987年に注意欠陥多動性障害となり，現在では注意欠陥障害(ADH)と注意欠陥多動性障害(ADHD)とに分類されている．

一方，本邦で1978年に発売されたスペースインベーダーゲーム．ゲームセンターが日本各地に乱立され，「インベーダー喫茶」なども出現した．その後，家庭でプレイしたいという欲求が「第一次パソコンブーム」の火つけ役となり，現在もさまざまなゲームが開発され続けている．その中で，ゲーム依存症あるいはゲーム中毒症に陥る学生が増え，社会的問題となっている．ゲーム(特にテレビゲーム)に没頭するあまり睡眠時間の減少や疲労などによりゲームに関する事柄以外の生活面に悪影響を及ぼしたり，人間らしい生活を営むことが困難になる症状をいう．テレビゲームでもネット上で不特定多数の者とプレイできるオンラインゲームに関しては，オンラインゲーム依存症という言葉も存在する．海外でもゲーム依存症に関する問題は深刻であり，ゲーム依存症のリハビリを専門とする施設が作られている国も存在する．最近では，韓国や中国で10代や20代の人間が寝食を忘れてゲームに熱中し過労死してしまうという事態も発生している．これに関しては中国国内でも社会問題化しており，2006年7月には国家主導によるオンラインゲーム依存症防止プログラムが導入されることが報じられているほどとなっている．本邦でスペースインベーダーゲームが開発され流行した1978年から30年が経過した2008年4月，英国心理学学会は，ビデオゲームに中毒的な兆

* Recent trend and topics among college students in Japan.

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候を示す人は，高機能自閉症に類似したサインを示すと報告した．ボルトン大学のCharlton[1]によると，「過度にゲームに熱中する人は，そうでない人よりも自閉症スペクトラムにより近いことがわかった」と発表し，ゲームに過度に熱中する人は，アスペルガーに類似した3つの症状を示すと報告した．すなわち，①神経症，②同調性の欠如，③外向性の欠如(内向性)である．アスペルガー症候群では，他者とのかかわりにおいてしばしばトラブルを起こし，たとえば，微妙な問題やユーモアを理解できないなどの特徴を有するが，ゲーム中毒の学生も同じような問題を有している．ただし，ゲーム中毒が自閉症をひき起こすということではない．ゲーム中毒の学生は，技師，数学者，コンピュータ科学者と並んで他人に対して共鳴性が欠落しやすい傾向があり，次にゲームに熱中しすぎると「自閉症スペクトラム」に類似した症状が現れやすいといわれている．

そこで，本邦における現代の大学生を一部垣間見てみると，幼少期をゲームなどの一人遊びで過ごしてきたのか，欧米にみられる個人主義的な対人関係に憧れているのか，大学生における人間関係が全体的に希薄化しているように思われる．したがって，集団で行動するのが苦手な大学生，周囲の評価に過敏な大学生が増えている．動物の社会では集団から離れることは死を連想させるが，人間社会ではそうではない．アパートに引きこもることもできるし，大学ではトイレに引きこもることも可能である(食事の際に，友人がいないためにトイレで一人で食事をする現象を「便所飯」といわれ，朝日新聞「平成21年7月6日夕刊」に掲載されている)．概して，人と交わることが少なくなると周囲の人の態度や言葉に敏感となり傷つきやすい．それは，人間関係を避け続けたために，傷ついたり傷つけられたりの経験が少ないからである．この現象は「こころアレルギー」と命名されている[2)3)]．

実は，現代人はこころアレルギーの問題だけではない．2001年，Riedlerら[4]による農村地帯における調査では，農家の子供は農家以外の子供と比べて(馬小屋での生活や農場の牛乳消費量の関係)，喘息が1％対11％，花粉症が3％対13％，アトピーが12％対29％で，農家の子供はかなりの割合でアレルギー疾患が少ないことが証明された．その後，幼い頃に家畜の糞から舞い上がる細菌の死骸成分が多く漂う環境の中で1歳になるまでに過ごした経験があると，アレルギー疾患になりにくくなる可能性があるといわれている．つまり，「からだアレルギー」になりにくいというわけである．

こころとからだは密接に関係するが，日本の場合，からだアレルギーが増加している要因として，汲み取り式便所が少なくなり，水洗便所が一般的となり，ハエも少なくなってきた．また，畳部屋の減少もあり，ダニもいない「超清潔な生活環境」となっている．一方，こころアレルギーが増加している要因として，現代人の人間関係もからだと同様「超清潔な人間関係」になってきたといえる．さらに，欧米の大学生は一般に「フラット(一軒の家を数人の学生で借りて，シェアーする)」で共同生活を営み，中国の大学生は4年間大学の寮生活を営むが，日本の大学生は出生率の低下(一人っ子の増加)とともに現在のところ一人でアパート生活をする習慣があり，他人と妥協して生きていく力が育成されにくい．いずれのアレルギーも免疫力および人間関係力の低下と関連していると思われる．

生活環境や人間関係の問題は現在の大学生の健康に多少なりとも影響を与えていると思われるが，2010年に入ると，他者とのコミュニケーションや社会性の発達に遅れがみられる「自閉症スペクトラム」の原因が遺伝子の問題であるというエビデンスが発表された[5)]．つまり，自閉症スペクトラムを有する学生は，両親から1つずつ受け継ぐべき遺伝子が1つ足りなかったり，3つになるコピーミスが患者では健康な人より平均19％多く，健康な人ではめったに起きない遺伝子で起きていたと報告された．つまり，遺伝子の「コピーミス」が自閉症スペクトラムの原因という事実が報告されたわけである．

以上から明らかなように，現在の大学生のメンタルヘルスが悪化している要因はますます複雑多岐にわたっており単純化することは困難であるが，最近の文献に基づき3つの観点に絞ってその問題と対応について提示したい．

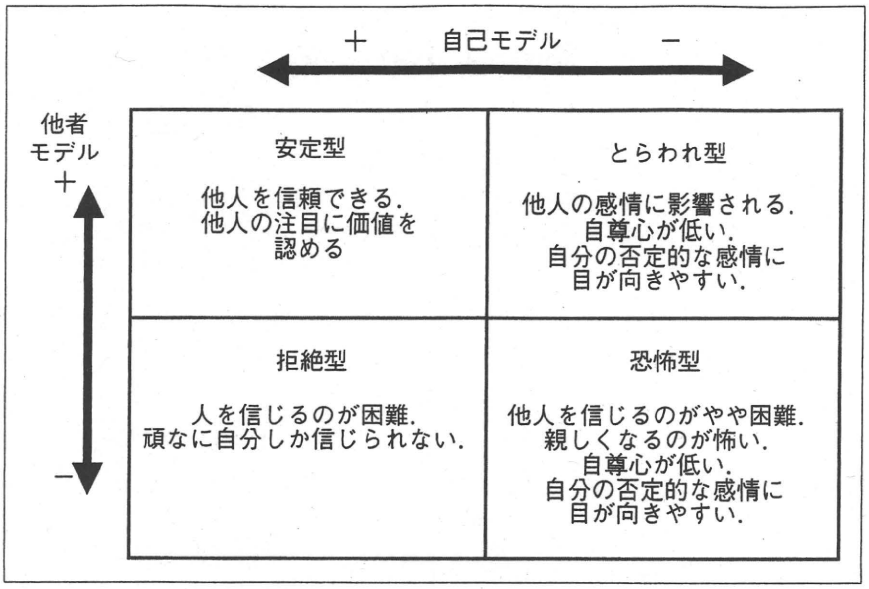

図１　人間関係の４つの類型（Bartholomewらによる）

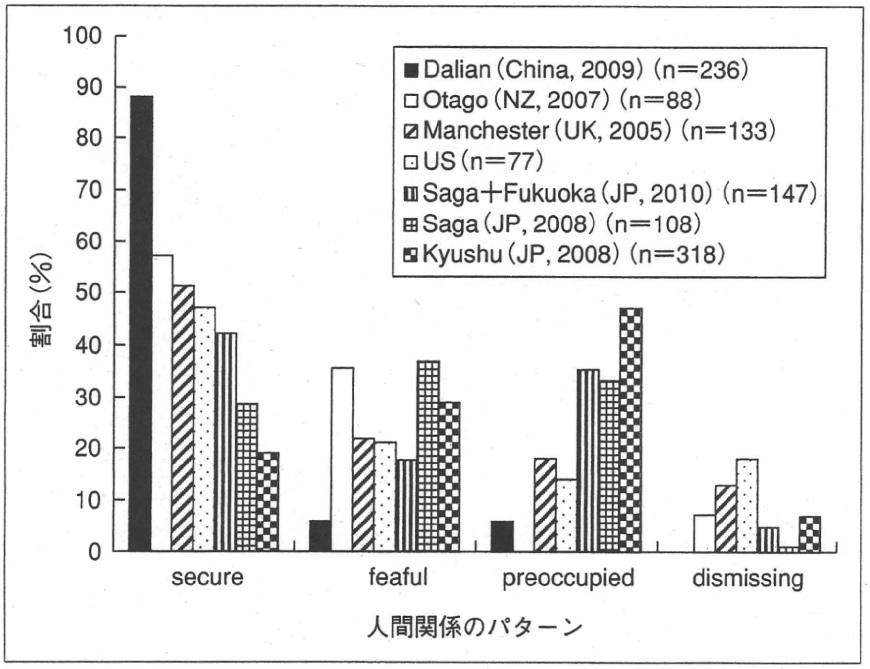

図２　欧米および日本の大学生における人間関係類型の比較

メンタルヘルスにおける大学生の問題点とその対応

１．日本の大学生における自尊感情の低下

この「こころアレルギー」の背景には，日本人は本来，自尊感情が外国人と比較してきわめて低い傾向が認められる．Relationship Questionnaire（Bartholomewら[6]によって作成）を用いた研究では，人間関係を４つに類型されている（図１）．それは，質問票から，自己モデルをpositiveとnegative，他者モデルをpositiveとnegativeの２×２の分割表に分け，それぞれを「安定型（secure type）」，「恐怖型（fearful type）」，「とらわれ型（preoccupied type）」，「拒絶型（dismissive type）」に分類する方法である（加藤[7]によって日本語版が作成され，詳細な研究がなされている）．図２の結果でも明らかなように，日本の大学生はとらわれ型と恐怖型の占める割合が有意に高く，

いずれも自分に対してネガティブな感情を抱きやすく，一部は他人に対してもネガティブな面に目を向けやすい傾向がある[7)~10)]．したがって，日本では親が子供へ批判的な感情を投げかけやすく，褒めることが苦手な親も多いことが考えられる．結果として，自尊感情が低い国民性に加えて子供の行動に批判的な親から否定的なメッセージを受け続けると，徐々に自尊感情は低下することが予測される．この問題は台湾北部の研究[11)]でも明らかにされているが，被批判感情(perceived criticism)を受け続けるとうつ病に陥りやすいことでも理解できる．

したがって，大学生の心理相談において母親から否定的なメッセージを受け続けてうつ状態に陥った学生の相談は意外に多く，さらに，親の過剰な期待に押し潰された大学生の相談も多い．いかにして自尊感情を高めるかが，大学生のメンタルヘルス向上のために重要であるかがすでにオランダでも2004年に報告されている[12)]．自信づけ(相談者の思考や行動におけるポジティブな面に目を向けさせ，褒め，自尊感情を高める)がこれからもとりわけ大切である．

2．現代における大学生の運動不足と肥満

小栗[13)]によって報告された「大学生は運動不足である」という論文によれば，大学生男子146人，女子174人を対象に，各人にKENZカロリーカウンターを1週間腰部につけさせ，1日あたりの歩行数，身体活動量を測定した．その結果，男子の平均歩行数は8,387歩，女子は8,018歩，1日10,000歩以上歩いている人は男子で22.6%，女子で18.4%であった．また，1日に体重の5倍以上の活動量がある人は男子で28.8%，女子で32.2%であり，大学生の歩行不足，運動不足が明らかになったと報告されている．さらに，韓国ではソウルの2カ所の大学生におけるメタボリック症候群の有病率が調査され，National Cholesterol Education Programの診断基準に当てはめると大学生の12～20%がメタボリック症候群であるとされ，肥満の予防活動が重要かつ早急な課題であると指摘されている[14)]．

運動は脳内のセロトニンを増加させうつ病の予防効果があることは，すでに人間[15)]でも動物[16)]でも証明されている．最近では，エアロビクスのうつ症状の改善効果に関する論文も数多く報告されている[17)]．うつ状態に陥った大学生も薬物治療に限定せず，外出が可能な状態に至れば積極的にリハビリテーションの一環として散歩を推奨することが重要である．運動は夜間の睡眠を促す作用もあり，薬物の服用に躊躇する大学生にとっては今後も有効な治療手段となりえる．さらに，大学生のアスリートは非アスリートと比較して，うつ状態に陥りにくく，自尊感情が高く，社会的なつながり力(social connectedness)が高いと指摘されている[18)]．

3．社会的なつながり力(集団力)の低下

日本の大学生は個人主義か，集団主義かと問われると，それは単純に答えられない．Triandis[19)]は，どの文化にも個人主義的な個人と集団主義的な個人がおり，どの個人も個人主義的な要素と集団主義的な要素を持ち合わせており，ある個人が個人主義的であるか集団主義的であるか，ある文化が個人主義的な文化であるか集団主義的な文化であるかは，そのバランスによって決まると指摘している．最近問題となった「便所飯」の問題は，日本人は以前にも増して「自分が周囲にどうみられているか」に敏感になっている傾向を反映している可能性がある．それはこころアレルギー現象でも指摘したように，これまで人間関係で傷つけたり傷つけられたりなどのトラブルがないように，学生は慎重に配慮して生活している．そのような対人関係の中で，もともと日本人の民族症候群とされる「対人恐怖(face to face phobia)」に悩む性格傾向を有する学生にとって，携帯電話は格好のコミュニケーション手段となっている．不登校に悩む学生は携帯電話によって心理的に友人とつながり合い，支えられているという現実もあり，一概に携帯電話の利用を否定するわけにはいかないが，好ましい傾向ではない．

問題は将来を見据えて，大学生の人間関係力あるいは集団力をいかに育んでいくのかというテーマである．最近，共同生活(shared house)の重要性(一人ではなく，集団で行動および生活する体験を持たせる)が問われている．国際教養大学(秋田市)では，1年間，共同で生活する体験および1年間，海外で生活する体験を課しているといわ

れている．このような体験はこれからの日本人が集団で行動し，海外と積極的に交渉していく上で，貴重な体験になるものと思われる．

おわりに

最近のうつ状態に陥った大学生の特徴とその支援法に関して，3つの問題点を指摘した．それは，①自尊感情の低下，②運動不足と肥満，③社会的なつながり力の低下，からなる．これらの問題に対応するアプローチとして，①自信づけ，②運動(散歩)のすすめ，③共同生活の重要性を取り上げた．このような働きかけによって，従来の個人カウンセリングやSSRIや抗不安薬による薬物治療に加えて，将来を見据えた人間関係力をどのように身につけさせるか，社会へとうまく引き継ぐ大学生活にどのような視点でサポートしていけばよいのかを考察した．

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