

A Survey of Digital Content Required for STD Prevention Education Taught by School Nurses

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Abstract

Purpose: In recent years, there has been concern in Japan about the increase in STDs among adolescents aged 15 - 19. In order to prevent STDs and guide adolescents toward desirable sexual behavior, this study's goal was to examine the actual state of STD prevention education taught by school nurses as part of the school curriculum, as well as the kinds of digital content they wish to have for teaching on the subject. **Method:** An anonymous, self-administered questionnaire was distributed by email and leaflet. Targeting the 100 valid responses received from the surveyed school nurses, descriptive statistics were made for each survey item and comparisons were made between the early- and mid-career groups based on years of experience. **Results:** 70.0% of respondents reported teaching about STDs in Health & Physical Education classes. School nurses in the early-career group used ready-made materials, while the mid-career group used both ready-made and self-made materials. 95% of respondents reported that they had little or no knowledge of STDs, while 84% reported that they were "good" or "fairly good" at teaching classes on sexuality. Both groups reported difficulty with the topics of "phimosis" and "nocturnal emissions" in the physiological category, "sexual behavior" in the "sex-adjacent" category, and "sexual and reproductive issues" in the psychosocial category. Respondents expressed a need for digital content covering the topics of "sexual violence", "sexual abuse", "sexually transmitted diseases", and "how to turn down sex". The mid-career group desired digital content for more items than the early-career group, with significant differences in the pathogens involved in sexually transmitted diseases and sex-adjacent items. 32.0% of respondents answered that they had done self-study for sex education classes in the past three years, and both groups desired self-study on "sexually transmitted diseases", with the mid-career group significantly higher than the early-career group on "cervical cancer & HPV", "emergency contraceptives", and "media literacy". **Conclusion:** Health & Physical Education is the main subject that covers STDs, and pre-existing materials are

commonly used. It is expected that this is due to nurses' busy schedules and the fact that only one school nurse is assigned to each school. The data collected suggested that nurse teachers want categorized digital content that can be used in the classes they are responsible for, rather than educational content on topics they are not comfortable with. In addition, given the changing environment surrounding sex, it was clear that they wish to understand the realities and needs of the high school students they teach, and desire self-study opportunities to improve their teaching methods.

Keywords

High School Students, Sexually Transmitted Diseases, Digital Content, School Nurses

1. Introduction

In recent years, the incidence of sexually transmitted diseases among young people in Japan has been rapidly increasing. The incidence rate of cervical cancer caused by HPV is the highest among the G7 countries, and even when compared to other G20 countries, it is the fifth worst [1]. In addition, cervical cancer among those in their 20s has increased by 2.2-fold over the past 40 years (1982-2022), and chlamydia, which is a cause of infertility, continues to be most prevalent among both men and women in their early 20s. Sexually transmitted diseases are a serious threat to fertility [2] [3]. In light of this situation, the "Healthy Parents and Children 21" guidelines strongly emphasize the importance of acquiring correct knowledge about teenage sexual issues and advocate the promotion of medically and scientifically correct knowledge about pregnancy, childbirth, etc., starting at the school education stage [4]. High school is the final stage of sex education in Japan, and there are few opportunities to acquire such knowledge after graduation. For this reason, it is necessary to educate students while they are in high school on how to protect themselves from sexually transmitted diseases on their own so that they can build a future life plan and be prepared for the many life events that await after graduation such as marriage, pregnancy, giving birth, and raising children.

Sex education in schools is handled by a variety of teachers, including school nurses, but it is cross-curricular and not positioned in the curriculum. It has also come to face fierce criticism for going too far in response to the 2002 sex-ed booklet "LOVE & BODY" and the implementation of sex-ed in special needs schools. In light of this, many schools and teachers have become wary of practicing sex education [5]. Since more than 70% of school nurse teachers have experienced being actively consulted about sex, it is evident that they are expected to take the central role in sex education [6]. However, school nurses have difficulty due to being too busy to collaborate with the teachers in charge of sex education, and having few opportunities to acquire specialized knowledge and shar-

pen their teaching skills [7].

STD education in Japan is deployed by “Prevention of AIDS and Sexually Transmitted Diseases” in the official courses of study guidelines [8], but as it is left to the discretion of each school whether to cover STDs other than AIDS in the classroom, the actual situation is unclear. In addition, high school students, who are greatly influenced by their environment, the state of the times, and the abundance of sex-related information around them, each have individual differences in growth and development [9]. Due to this, school nurses are expected to plan their teaching methods with an understanding of the reality and needs of their students. However, school nurses have expressed that they have difficulty securing time to spend on sex education due to the volume of their work, and that existing teaching materials are difficult to use because the information is outdated and not divided according to the educational objective [10]. In other words, effective teaching materials are needed to educate students according to their readiness by the time they graduate from high school. In addition, educational interventions using digital content tailored to educational objectives such as the relationship of STDs to fertility and life outcomes, developments in assisted reproductive technology, and sexual diversity are needed so that students can protect themselves from STDs.

Considering the above, this survey was conducted to clarify the realities of STD education in the school curriculum and the types of digital content required by the school nurses who teach it.

2. Terminology

In Japan, school nurses are subject to Article 9 of the Basic Act on Education: “Teachers of the schools prescribed by law shall endeavor to fulfill their duties, while being deeply conscious of their noble mission and continuously devoting themselves to research and self-cultivation”. Mid-career training workshops for teachers are conducted at the prefectural level by the Special Act for Education Personnel. These workshops are intended for teachers who have been in their positions for around 10 years, and who are expected to play a central role in the smooth and effective implementation of educational activities and other school operations.

It is possible that the results differ due to mid-career school nurses’ years of experience. This is due to those in the mid-career group having higher specialized knowledge and skills, improved hands-on teaching ability, broader experience, and experience with a variety of school types. For the purposes of this study, school nurses who had held the position for one year to less than 10 years were defined as the “early-career group” and those who worked in the position for 10 years or more were defined as the “mid-career group”.

3. Research Method

1) Study design

Fact-finding survey

2) Study period

March 1, 2023, to September 30, 2023

3) Research subjects

The target audience was 450 school nurses working in Prefecture and urban areas.

4) Method of data collection

With the prior consent of the chairperson of the school nurse teachers' association in Prefecture, we made a verbal request at the end of a lecture and mailed a leaflet to each high school; with the consent of the chairpersons of the school nurse teachers' association in Urban areas, the chairpersons sent the leaflet to school nurses via e-mail. An online questionnaire was run via Survey Monkey, which could be accessed and filled out using either the QR code or URL on the leaflet. Those who wished to participate could answer the questions anonymously after reading the description of the study.

5) Survey items

The survey items were newly developed concerning previous studies [7] [9] [11] [12] [13] [14]. The educational content related to STD classes was divided into three categories: 20 items in “physiological”, 23 items in “incidental to sexual activity”, and 12 items in “psychosocial”.

6) Method of analysis

The statistical software SPSS version 27.0 was used to analyze each survey item using descriptive statistics. χ^2 and Mann-Whitney-U tests were conducted separately for the two groups (early- and mid-career employees). The significance level was set at less than 5%.

4. Ethical Considerations

This study was conducted with the approval of the Ethics Committee of the University of Hyogo (approval number 22,017). In addition, the study was conducted with the prior approval of the school principals and the chairperson of the school nurse teachers' association in prefecture A, and the chairpersons of the school nurse teachers' associations in cities B and C. This study adheres to the following rules: for the protection of participants' personal information, data is to be collected anonymously and results to be coded such that the subjects cannot be personally identified; anonymity shall be protected when the research results are published in essays or by other means; requests from the subjects or concerned parties must be responded to, including the method of storage and disposal of the information and the status of conflicts of interest related to the research by the researchers and other parties. The survey questions and response format were carefully selected to minimize the burden to the subjects.

5. Results

1) Subject Background (Table 1)

The background of the subjects is shown in Table 1. Four hundred and fifty

Table 1. Subject background.

		Total n = 100	Early-career (n = 35)		Mid-career (n = 65)		p-value
Age	Mean Age	38.0 ± 1.15	26.6 ± 0.54		44.1 ± 1.18		
Years of Experience	Mean Years	14.2 ± 1.13	3.6 ± 0.37		19.9 ± 1.23		
		Total (%) n = 100	#	%	#	%	p-value
Current Position	High school	28 (28.0)	12	34.3	16	24.6	ns
	Junior high school	24 (24.0)	7	20.0	17	26.2	0.016*
	Elementary school	32 (32.0)	6	17.1	26	40.0	0.00**
	Preschool	10 (10.0)	5	14.3	5	7.7	ns
	Special Ed school	6 (6.0)	5	14.3	1	1.5	ns
Working Experience	High school	35 (35.0)	12	34.3	23	35.4	
	Junior high school	42 (42.0)	9	25.7	33	50.8	
	Elementary school	58 (58.0)	12	34.3	46	70.8	ns
	Preschool	38 (38.0)	9	25.7	29	44.6	
	Special Ed school	19 (19.0)	5	14.3	14	27.7	
Subjects Implementing STD Education	Health & Phys Ed	70 (70.0)	26	74.3	44	67.7	
	Home Economics	2 (2.0)	0	0.0	2	3.1	
	Science	1 (1.0)	0	0.0	1	1.5	ns
	Social Studies	0 (0.0)	0	0.0	0	0.0	
	Homeroom	13 (13.0)	1	2.9	12	18.5	
	Other	14 (14.0)	8	22.9	6	9.2	
Other responses (None: 9, Integrated Studies: 5, Daily life: 2, etc.)							

Mann-Whitney Test, **p < 0.01, *p < 0.05, ns = not significant.

school nurse teachers were asked to cooperate in the study, and 100 (22.2%) provided input for the survey. Of these, 35 were in the early-career group and 65 in the mid-career group. The mean age of the subjects was 38.0 ± 1.15 (22 - 64) years overall, 26.6 ± 0.54 years for the early-career group, and 44.1 ± 1.18 years for the mid-career group. The mean years of experience was 14.2 ± 1.13 (1 - 41) overall, 3.6 ± 0.37 years for the early-career group, and 19.9 ± 1.23 years for the mid-career group. The current position of the subjects consisted of 28 at high

Table 2. Materials used for sex education.

		Total (%) n = 86	Early-career (n = 27)		Mid-career (n = 59)		p-value
			#	%	#	%	
			Materials used in STD education classes	Textbook	31 (36.0)	7	
Self-made materials	47 (54.7)	13		48.1	34	57.6	
Ready-made materials	54 (62.8)	19		70.4	35	59.3	
Video	22 (25.6)	10		37.0	12	20.3	
Overhead projector	2 (2.3)	1		3.7	1	1.7	
Newspaper	1 (1.2)	0		0.0	1	1.7	
Novels	0 (0.0)	0		0.0	0	0.0	

Mann-Whitney Test, * $p < 0.05$, ns = not significant.

school, 24 at junior high school, 32 at elementary school, 10 at special needs school, and at 6 preschools, with 35 having high school experience. Concerning the schools that subjects had worked at, statistically significant differences were found with elementary and junior high school, but not with high school or current position.

Table 2 shows the content related to classes on STDs. Of the classes that covered STDs, “Health and Physical Education” accounted for 70.0%, followed by “Homeroom” (13.0%), “Home Economics”, and “Science”, in that order. The “other” category included Integrated Studies, special activities, and “daily life”, as well as 9 respondents who did not teach the topic at all. As for the teaching materials used in class, the order was “ready-made materials”, “self-made materials”, “textbooks”, and “video viewing”, with 70.4% of the early-career group using ready-made materials and 48.1% using self-made materials, while 59.3% of the mid-career group used ready-made materials and 57.1% used self-made materials.

The most common difficulties for school nurses in implementing sex education were “time availability” at 63.0%, followed by “differences in sexual knowledge among teachers” at 54.0%, “school nurses’ teaching skills” at 47.0%, and “school leadership” at 42.0%. In the early-career group, “time availability”, “school nurses’ teaching skills”, and “difference in sexual knowledge among teachers” were the most common concerns. For the mid-career group, “time availability” and “difference in sexual knowledge among teachers”, were the most common, each with 39 responses (60.0%).

2) School nurses’ awareness of sexuality and the content they find difficult to teach (**Tables 3-4**)

Table 3 shows the content of school nurses’ knowledge about sex and the content of classes on STDs. 1.0% of the respondents answered that they were

Table 3. Sexual knowledge and perception of classes concerning STDs.

		Total (%)	Early-career (n = 35)		Mid-career (n = 65)		p-value
			#	%	#	%	
Sexual Knowledge	Knowledgeable	1 (1.0)	0	0.0	1	1.5	ns
	Some knowledge	4 (4.0)	3	8.6	1	1.5	
	Little knowledge	70 (70.0)	29	82.9	41	63.1	
	No knowledge	25 (25.0)	3	8.6	22	33.8	
Self Perception of Ability to Teach STD Classes	Good	22 (22.0)	11	31.4	11	16.9	ns
	Fairly good	62 (62.0)	19	54.3	43	66.2	
	Not very good	15 (15.0)	5	14.3	10	15.4	
	Not good	1 (1.0)	0	0.0	1	1.5	

Mann-Whitney Test, $p < 0.05$, ns = not significant.

Table 4. Subjects which give school nurses difficulty.

Category	Item	Total	(%)	Early-career (n = 35)		Mid-career (n = 65)		p-value
				#	%	#	%	
Physiological	<u>Genitalia</u>	24	(24.0)	14	40.0	10	15.4	<u>0.006*</u>
	Secondary sexual characteristics	9	(9.0)	6	17.1	3	4.6	ns
	Menstruation	7	(7.0)	4	11.4	3	4.6	ns
	Physical development	7	(7.0)	4	11.4	3	4.6	ns
	Creation of life	8	(8.0)	3	8.6	5	7.7	ns
	Pregnancy	10	(10.0)	6	17.1	4	6.2	ns
	Childbirth	8	(8.0)	5	14.3	3	4.6	ns
	Phimosis	57	(57.0)	19	54.3	38	58.5	ns
	Semenarche	41	(41.0)	17	48.6	24	36.9	ns
	Nocturnal Emissions	43	(43.0)	18	51.4	25	38.5	ns
	Premenstrual syndrome	9	(9.0)	4	11.4	5	7.7	ns
	Menstrual irregularity	8	(8.0)	3	8.6	5	7.7	ns
	Coping with PMS	11	(11.0)	5	14.3	6	9.2	ns
	Sexually transmitted diseases	24	(24.0)	7	20.0	17	26.2	ns
	AIDS	23	(23.0)	6	17.1	17	26.2	ns
	Chlamydia	26	(26.0)	6	17.1	20	30.8	ns
	Herpes	27	(27.0)	7	20.0	20	30.8	ns
Syphilis	30	(30.0)	7	20.0	23	35.4	ns	

Continued

Physiological	Gonorrhea	30	(30.0)	7	20.0	23	35.4	ns
	Condyloma	30	(30.0)	7	20.0	23	35.4	ns
	Ebola	31	(31.0)	7	20.0	24	36.9	ns
	HPV	20	(20.0)	5	14.3	15	23.1	ns
	Infertility	30	(30.0)	10	28.6	20	30.8	ns
	Diet	10	(10.0)	5	14.3	5	7.7	ns
	Sexual behavior	58	(58.0)	21	60.0	37	56.9	ns
	Sex drive	39	(39.0)	14	40.0	25	38.5	ns
	How to turn down sex	23	(23.0)	9	25.7	14	21.5	ns
	Body changes in pregnancy	6	(6.0)	4	11.4	2	3.1	ns
Sex-adjacent	How to check if you are pregnant	5	(5.0)	4	11.4	1	1.5	ns
	Birth control	16	(16.0)	5	14.3	11	16.9	ns
	Obtaining condoms	26	(26.0)	9	25.7	17	26.2	ns
	How to use condoms	36	(36.0)	9	25.7	27	41.5	ns
	Access to "the pill"	16	(16.0)	5	14.3	11	16.9	ns
	Side effects of "the pill"	19	(19.0)	6	17.1	13	20.0	ns
	Emergency contraceptives	17	(17.0)	4	11.4	13	20.0	ns
	Access to emergency contraceptives	19	(19.0)	5	14.3	14	21.5	ns
	Abortion	24	(24.0)	11	31.4	13	20.0	ns
	Effects of abortion	24	(24.0)	9	25.7	15	23.1	ns
	Timing of abortion	24	(24.0)	7	20.0	17	26.2	ns
	How abortion is done	26	(26.0)	9	25.7	17	26.2	ns
	About STDs	15	(15.0)	5	14.3	10	15.4	ns
	Infection routes of STDs	15	(13.0)	5	14.3	10	15.4	ns
	STD symptoms	13	(15.0)	3	8.6	10	15.4	ns
	STD testing	19	(19.0)	5	14.3	14	21.5	ns
	Chlamydia & infertility	24	(26.0)	8	22.9	16	24.6	ns
	HPV & cervical cancer	19	(19.0)	5	14.3	14	21.5	ns
	Cervical cancer prevention	16	(16.0)	4	11.4	12	18.5	ns
	Psychosocial	<u>Puberty worries</u>	7	(7.0)	6	17.1	1	1.5
<u>Differences between the sexes</u>		9	(9.0)	6	17.1	3	4.6	ns
Sex and reproductive issues		34	(34.0)	14	40.0	20	30.8	ns
About romantic love		26	(26.0)	9	25.7	17	26.2	ns

Continued

Psychosocial	Consulting on sexuality	15	(15.0)	4	11.4	11	16.9	ns
	Consulting on pregnancy	12	(12.0)	7	20.0	5	7.7	ns
	LGBT	26	(26.0)	12	34.3	14	21.5	ns
	Sexual harassment	18	(18.0)	6	17.1	12	18.5	ns
	Sexual abuse	22	(22.0)	9	25.7	13	20.0	ns
	Sexual violence	28	(28.0)	10	28.6	18	27.7	ns
	Media literacy	28	(28.0)	7	20.0	21	32.3	ns
	STDs trends in Japan	31	(31.0)	10	28.6	21	32.3	ns

Mann-Whitney Test, **p < 0.01, *p < 0.05, ns = not significant.

“knowledgeable” about sex and 4.0% answered that they had “some knowledge” about sex, while 70.0% answered that they had “little knowledge” and 25.0% answered that they had “no knowledge”. The most common response for both groups was “little knowledge”, but 3 (8.6%) of the early-career group responded “no knowledge” compared to 22 (33.8%) of the mid-career group.

Concerning respondents’ perception of their abilities in conducting classes about STDs, the largest percentage of respondents (62.0%) considered themselves “fairly good”, followed by 22.0% who answered “good”, 15.0% who answered “not very good”, and 1.0% who answered “not good”. “Fairly good” was the most common choice in both groups, comprising 19 (54.3%) of the early-career group and 43 (66.2%) of the mid-career group.

Table 4 shows the STD education items that school nurses had difficulty with. The most common physiological subjects that school nurses had difficulty with were “phimosis” (57.0%), followed by “nocturnal emissions” (43.0%) and “menarch” (41.0%), while the other 17 items ranged from 10 to 30%. As for sex-adjacent items, “sexual behavior” was cited by 58.0% of the respondents, while the other 22 items ranged from around 10 to 30.0%. As for the psychosocial items, “sexual and reproductive issues” and “STD trends in Japan” were the most cited at 34.0% and 31.0%, respectively, while the other 12 items were around 10 - 20%.

Among the three domains, 21 (60.0%) of the early-career group reported that they were most uncomfortable with teaching about “sexual behavior” from the sex-adjacent category, followed by 19 (54.3%) who answered “phimosis”, 18 (51.4%) “nocturnal emissions”, and 14 (40.0%) “genitalia”. In the psychosocial category, 14 (40.0%) answered “sexual and reproductive issues”.

The most difficult subject for the mid-career group was “phimosis” in the physiological category with 38 (58.5%), followed by “sexual behavior” and “condom usage” in the sex-adjacent category with 37 (56.9%) and 27 (41.5%) responses, respectively. In addition, items in the physiological category which at

Table 5. Digital content desired by school nurses.

Category	Item	Total	(%)	Early-career (n = 35)		Mid-career (n = 65)		p-value
				#	%	#	%	
				Physiological	Genitalia	40	(40.0)	
Secondary sexual characteristics	40	(40.0)	12		34.3	28	43.1	ns
Menstruation	27	(27.0)	7		20.0	20	30.8	ns
Physical development	26	(26.0)	7		20.0	19	29.2	ns
Creation of life	44	(44.0)	13		37.1	31	47.7	ns
Pregnancy	36	(36.0)	12		34.3	24	36.9	ns
Childbirth	29	(29.0)	8		22.9	21	32.3	ns
Phimosis	46	(46.0)	17		48.6	29	44.6	ns
Semenarche	48	(48.0)	18		51.4	30	46.2	ns
Nocturnal Emissions	42	(42.0)	16		45.7	26	40.0	ns
Premenstrual syndrome	49	(49.0)	14		40.0	35	53.8	ns
Menstrual irregularity	38	(38.0)	10		28.6	28	43.1	ns
<u>Coping with PMS</u>	48	(48.0)	11		31.4	37	56.9	0.015*
<u>Sexually transmitted diseases</u>	58	(58.0)	14		40.0	44	67.7	0.008*
<u>AIDS</u>	32	(32.0)	6		17.1	26	40.0	0.020*
<u>Chlamydia</u>	31	(31.0)	6		17.1	25	38.5	0.029*
Herpes	29	(29.0)	6		17.1	23	35.4	ns
<u>Syphilis</u>	30	(30.0)	6	17.1	24	36.9	0.041*	
<u>Gonorrhea</u>	31	(31.0)	6	17.1	25	38.5	0.029*	
<u>Condyloma</u>	33	(33.0)	6	17.1	27	41.5	0.014*	
Ebola	25	(25.0)	5	14.3	20	30.8	ns	
HPV	34	(34.0)	8	22.9	26	40.0	ns	
Infertility	41	(41.0)	10	28.6	31	47.7	ns	
Diet	42	(42.0)	13	37.1	29	44.6	ns	
Sex-adjacent	Sexual behavior	57	(57.0)	23	65.7	34	52.3	ns
	Sex drive	51	(51.0)	19	54.3	32	49.2	ns
	How to turn down sex	58	(58.0)	17	48.6	41	63.1	ns
	Body changes in pregnancy	34	(34.0)	11	31.4	23	35.4	ns

Continued

	How to check if you are pregnant	37	(37.0)	10	28.6	27	41.5	ns
	Birth control	53	(53.0)	14	40.0	39	60.0	ns
	Obtaining condoms	42	(42.0)	11	31.4	31	47.7	ns
	How to use condoms	55	(55.0)	17	48.6	38	58.5	ns
	<u>Access to “the pill”</u>	41	(41.0)	9	25.7	32	49.2	0.023*
	<u>Side effects of “the pill”</u>	39	(39.0)	9	25.7	30	46.2	0.047*
	<u>Emergency contraceptives</u>	53	(53.0)	13	37.1	40	61.5	0.020*
	<u>Access to emergency contraceptives</u>	38	(38.0)	8	22.9	30	46.2	0.023*
Sex-adjacent	Abortion	42	(42.0)	13	37.1	29	44.6	ns
	Effects of abortion	41	(41.0)	13	37.1	28	43.1	ns
	Timing of abortion	38	(38.0)	11	31.4	27	41.5	ns
	How abortion is done	37	(37.0)	12	34.3	25	38.5	ns
	About STDs	51	(51.0)	14	40.0	37	56.9	ns
	<u>Infection routes of STDs</u>	50	(50.0)	12	34.3	38	58.5	0.022*
	<u>STD symptoms</u>	48	(48.0)	11	31.4	37	56.9	0.015*
	<u>STD testing</u>	43	(43.0)	10	28.6	33	50.8	0.033*
	<u>Chlamydia & infertility</u>	34	(34.0)	6	17.1	28	43.1	0.009**
	HPV & cervical cancer	41	(41.0)	11	31.4	30	46.2	ns
	Cervical cancer prevention	38	(38.0)	9	25.7	29	44.6	ns
	Puberty worries	39	(39.0)	10	28.6	29	44.6	ns
	Differences between the sexes	39	(39.0)	12	34.3	27	41.5	ns
Psychosocial	Sex and reproductive issues	42	(42.0)	14	40.0	28	43.1	ns
	About romantic love	26	(26.0)	9	25.7	17	26.2	ns
	Consulting on sexuality	39	(39.0)	14	40.0	25	38.5	ns
	Consulting on pregnancy	39	(39.0)	12	34.3	27	41.5	ns

Continued

Psychosocial	LGBT	56	(56.0)	16	45.7	40	61.5	ns
	Sexual harassment	35	(35.0)	6	17.1	29	44.6	0.006**
	Sexual abuse	60	(60.0)	17	48.6	43	66.2	ns
	Sexual violence	62	(62.0)	20	57.1	42	64.6	ns
	Media literacy	48	(48.0)	12	34.3	36	55.4	ns
	STDs trends in Japan	46	(46.0)	12	34.3	34	52.3	ns

Mann-Whitney Test, **p < 0.01, *p < 0.05, ns = not significant.

least 30% of subjects found difficult included “nocturnal emissions” with 25 responses (38.5%), “menarch” and “Ebola” with 24 each (36.9%), and “syphilis”, “gonorrhoea”, and “condyloma” with 23 responses each (35.4%). Among psychosocial items, “LGBT”, “media literacy”, “STDs trends in Japan”, and “sexual and reproductive issues” were found difficult by 30% or more of subjects. “Genitalia”, “puberty worries”, and “gender differences” were the only items that showed significant differences between the two groups.

3) Digital content wanted by school nurses for classes on STDs (Table 5)

Table 5 shows the topics about which school nurses most wanted digital content to use in their classes. In the physiological category, “STDs” were the most wanted topic (58.2%), followed by “premenstrual syndrome” (49.0%), “coping with PMS” (48.0%), “phimosis” (46.0%), “creation of life” (44.0%), “nocturnal emissions” (42.0%), “diet” (42.0%), and “infertility” (41.0%). The remaining 11 items ranged from 8% to 38%. In the sex-adjacent category, “turning down sex” was the most wanted topic (58.0%), followed by “sexual behavior” (57.0%), “how to use condoms” (55.0%), and “emergency contraceptives” (50.0%). The 30 - 40% range included “STD symptoms”, “STD testing”, “cervical cancer & HPV”, “access to condoms”, “access to ‘the pill’”, “abortion”, and “effects of abortion”. The remaining 9 items were each under 30%. In the psychosocial category, the most wanted topic was “sexual violence” (62.0%), followed by “sexual abuse” (60.0%), and “LGBT” (56.0%). The 30 - 40% range included “sexual and reproductive issues”, “media literacy”, and “STD trends in Japan”. The remaining 6 items fell in the 20% to 30% range.

The topics for which digital content was most wanted by the early-career group were “sexual behavior” by 23 (65.7%) and “sexual violence” by 20 (57.1%), while for the mid-career group these were “STDs” by 44 (67.7%), “sexual abuse” by 43 (66.2%) and “sexual violence” by 42 (64.6%). “How to turn down sex”, “emergency contraceptives” and “contraception” were also high. More than half of the mid-career group also wanted the following topics: “sexual behavior”, “how to use condoms”, “STDs”, “transmission routes of STDs”, and “STD testing” in the sex-adjacent category, and “media literacy” and “STD trends in Japan” in the psychosocial category.

Significant differences between the two groups were found in “coping with

Table 6. Self-study training participation in the past 3 year.

	Total	Early-career (n = 35)		Mid-career (n = 65)		p-value
Yes	32 (32.0)	7	20.0	25	38.5	0.059
No	68 (68.0)	28	80.0	40	61.5	

*p < 0.05, χ^2 Test.

Table 7. Self-study training desired by school nurses.

Item	Total	(%)	Early-career (n = 35)		Mid-career (n = 65)		p-value
			#	%	#	%	
Genitalia	13	(13.0)	7	20.0	6	9.2	ns
Secondary sexual characteristics	24	(24.0)	10	28.6	14	21.5	ns
Menstruation	15	(15.0)	7	20.0	8	12.3	ns
Physical development	16	(16.0)	4	11.4	12	18.5	ns
Creation of life	19	(19.0)	6	17.1	13	20.0	ns
Pregnancy	21	(21.0)	9	25.7	12	18.5	ns
Childbirth	15	(15.0)	5	14.3	10	15.4	ns
Phimosis	21	(21.0)	9	25.7	12	18.5	ns
Semenarche	25	(25.0)	12	34.3	13	20.0	ns
Nocturnal Emissions	22	(22.0)	10	28.6	12	18.5	ns
Premenstrual syndrome	35	(35.0)	10	28.6	25	38.5	ns
Menstrual irregularity	26	(26.0)	10	28.6	16	24.6	ns
Coping with PMS	28	(28.0)	8	22.9	20	30.8	ns
<u>Sexually transmitted diseases</u>	57	(57.0)	15	42.9	42	64.6	0.037*
Sexual behavior	33	(33.0)	13	37.1	20	30.8	ns
Birth control	26	(26.0)	10	28.6	16	24.6	ns
Condoms	30	(30.0)	11	31.4	19	29.2	ns
“The Pill”	25	(25.0)	7	20.0	18	27.7	ns
<u>Emergency contraception</u>	36	(36.0)	7	20.0	29	44.6	0.015*
Abortion	32	(32.0)	10	28.6	22	33.8	ns
<u>Cervical cancer & HPV</u>	36	(36.0)	8	22.9	28	43.1	0.046*
About romantic love	16	(16.0)	4	11.4	12	18.5	ns
Puberty worries	29	(29.0)	12	34.3	17	26.2	ns
Differences between the sexes	17	(17.0)	5	14.3	12	18.5	ns
LGBT	49	(49.0)	13	37.1	36	55.4	ns
Sexual violence	47	(44.0)	13	37.1	34	52.3	ns
<u>Media literacy</u>	44	(44.0)	8	22.9	36	55.4	0.002**

Mann-Whitney Test, **p < 0.01, *p < 0.05, ns = not significant.

PMS”, “STDs”, “AIDS”, “chlamydia”, “syphilis”, “gonorrhea”, and “condyloma” in the physiological category. In the sex-adjacent category, significant differences were found in “access to ‘the pill’”, “side effects of ‘the pill’”, “emergency contraceptives”, “access to emergency contraceptives”, “transmission routes of STDs”, “STD symptoms”, “STD testing”, and “chlamydia and infertility”. In the psychosocial category, a significant difference was found in “sexual harassment”.

3) Self-study training for teaching STD prevention (Tables 6-7)

Regarding whether school nurses received self-study training for sex education in the past three years, 32.0% said “yes” and 68.0% said “no”, as shown in Table 6. As shown in Table 7, the most common items that school nurses wanted training in for teaching about STD prevention were “STDs” (57%), followed by “LGBT”, “sexual violence”, and “media literacy”. More than 30% of the school nurses indicated that they wanted training on “premenstrual syndrome”, “sexual behavior”, “condoms”, “abortion”, and “cervical cancer & HPV”, while the rest of the items were around 10% - 20%.

“STDs” was the most wanted topic for both the early-career group (42.9%) and the mid-career group (64.6%), more than 50% of the mid-career group wanted training on “LGBT”, “sexual violence”, and “media literacy”. On the other hand, none of the items in the early-career group exceeded 40% except for “STDs”. Significant differences between the two groups were found in the three items of “STDs”, “cervical cancer & HPV”, and “media literacy”.

6. Observations

1) Subject backgrounds

Sixty-five percent of the school nurses who responded to this survey were in the mid-career group, a group that can be said to have abundant experience based on its average age and years of experience. It is also not surprising that the mid-career group has a significant number of school nurses in positions at elementary and junior high schools, given the greater number of school types in which they have experience.

In many cases, classes on sexually transmitted diseases are only taught within “Health & Physical Education” classes, since there is no independent subject for sex education and the content is private and sensitive [15]. Similarly, in this study, Health and Physical Education played a central role in education on STDs.

It has been reported that school nurses want class materials and example teaching plans, as well as digital teaching materials to make use of, due to the difficulty of securing time to research these materials themselves [16]. This study revealed that most of the early-career group utilized ready-made materials because there are many such pre-existing materials already available and because it is difficult to secure time to research teaching materials. On the other hand, more than half of the mid-career group utilized self-prepared materials, suggesting that they are making use of their experience in teaching.

The school nurses cited the following difficulties: time availability, differences

in awareness among teachers, teaching skills, and school leadership. This lines up with prior research. In Japan, schools often only have one assigned school nurse. In addition to a lack of manpower, the lack of colleagues in the same specialized field to consult within the work place hurts their effectiveness [17]. Outside Japan, social workers, counselors, and psychologists are also assigned to schools alongside school nurses, each of which has their own specialized roles [18]. However, in Japan, schools are forced to engage in mental health activities in addition to physical health activities. Thus, it is assumed that the early-career group ranked teaching skills high in their sense of difficulty. Through the use of digital content, both mid- and early-career school nurses will be able to teach students the same material. This digital content may also be helpful for early-career school nurses who find teaching difficult. However, due to time constraints and the low level of instructional structure in the schools, the question is how to use such digital content in courses.

2) School nurses' knowledge of sexuality and the educational content they have difficulty with

Ninety-five percent of the school nurses responded that they had “little knowledge” or “no knowledge” about STDs. Takeda stated that one of the factors that make education on STDs difficult is that “teachers themselves have few opportunities to learn about sexually transmitted diseases, their knowledge is poor, and there are many other items to be educated, so they cannot mention sexually transmitted diseases in the limited time they have” [19], and Ikeda et al. stated that more than half of high school teachers feel that their knowledge is insufficient [20]. The “Healthy Parents and Children 21” initiative recommends that effective sex education be implemented, including the use of obstetricians, midwives, and other specialists as lecturers on health measures to support schoolchildren and adolescents on their way to adulthood [4]. In response to this recommendation, schools are cooperating with doctors, midwives, and other specialists to provide lectures on sex education, STDs, and other topics. Therefore, it has been inferred that school nurses have limited knowledge of content that they themselves are not in charge of.

Tokuda *et al.* state that even school nurses, who should have received more specialized education than other teachers, feel that “sex education” is the most difficult class to teach, despite feeling that it is necessary [16]. Contrary to this, many school nurses participating in this survey answered that they were “fairly good” or “good” at teaching about sex. One reason for this may be that most of the school nurses surveyed were in the mid-career group and had a great deal of experience.

Both the early- and mid-career groups mentioned items related to male reproductive function such as, “nocturnal emissions” and “phimosis” as topics that gave them difficulty. This may be because sex education in Japan focuses on menstruation and barely covers male sexuality [21], meaning there is a lack of content related to male reproductive functions. Therefore, it was inferred that the school nurses listed content related to male reproductive organs that were

not included in the items covered because of their research of teaching materials on the content items to be taught.

In both groups, “sexual behavior” in the sex-adjacent category was mentioned as an item of weakness, as well as “sexual and reproductive issues” in the psychosocial category.

Murase states that sexual behavior includes “sexual behavior as reproductive sex” and “sexual behavior as a form of connecting and deepening communication” [22]. Focusing only on the mechanism of sexual behavior would lead to a lack of understanding of sexual behavior in terms of human thoughts, feelings, and actions, as well as inter-personal relationships. Therefore, when teaching about sex, it is necessary to express the importance of interpersonal connection, that there is relationship between two people behind. However, the reality of school education in Japan is that the “Courses of Study” government curriculum prohibits teaching about sexual intercourse, and it is suspected that both groups had a high level of difficulty teaching “sexual behavior” due to this.

In addition, in the item of “sexual and reproductive issues,” a variety of issues are seen, including evolving reproductive medicine, sexual diversity, the involvement of STDs and chlamydia, which is common among young people, in infertility and fertility. School nurses are urged to be creative in new teaching plans by carefully selecting the content that students should learn amid the changing social landscape.

While no other items were higher than 50%, most of the respondents in this study had working experience in elementary or junior high school, which may have been a factor. However, items related to STDs, diversity (such as LGBT), and media literacy reached 30% in the mid-career group. When devising sex education teaching methods, it is important to consider the changing environment high school students find themselves in and the barrage of sex-related information around them brought on by the spread of social media and other factors.

3) Digital content wanted for teaching about STDs

In this survey, the digital content most wanted by school nurses was that about pertaining to “sexual violence”, “sexual abuse”, “sexually transmitted diseases”, and “how to turn down sex”. While items that school nurses reported difficulty with such as “sexual behavior” and “STDs” were mentioned, items concerning male physiology were not. In addition, the mid-career group desired digital content for more items than the early-career group, with significant differences in STD pathogens in the physiological category and in sex-adjacent items. School nurses are responsible for physiological, sex-adjacent, and psychological aspects of sex education such as HIV/AIDS, pregnancy, reproductive organs and abortion, STDs, male-female relationships, and contraception [11] [12]. Therefore, it is believed that they want digital content for the items they are responsible for in their classes. It can be assumed that the reason there were many requests from the mid-level group was that they had learned through experience that digital content can arouse students’ interest and leave a lasting im-

pression. In other words, digital content has synergistic learning effects when effectively combined with face-to-face classes.

Tsuji stated that, “In general, audiovisual media materials are used to deepen the understanding of learning. One of the advantages of audiovisual media materials is that they can present realistic scenes that leave a lasting impression on learners” [23]. In high schools, visual materials such as pictures and DVDs are often used for teaching materials [12]. In other words, it can be inferred that school nurses make use of digital content to attract students’ interest and attention as a way to help them understand and retain knowledge. And, since some students are not interested in sexual matters, the content must be able to effectively communicate the information to those students so it can be useful to them in the future. However, since the creation of audiovisual media materials requires a great deal of effort and time, it is difficult for school nurses themselves to create such materials. In addition, it has been reported that “digital content for use in classes should be separated into detailed portions rather than handed out all at once. Dividing the presentation materials into smaller portions is expected to facilitate the revision of individual portions” [23]. Therefore, it is important to create categorized digital content on the most in-demand sex-adjacent topics such as STDs that school nurses can use in their classes.

3) Self-study training for teaching STD prevention

Only about 30% of school nurses participated in sex education training in the past three years. Nakamura et al. stated that “even though school nurse teachers have many opportunities to provide individualized instruction on sex, they are anxious and lack confidence in their ability to do so, and thus training to improve their own teaching skills is necessary” [9]. However, the fact that the school nurses were busy and could not coordinate with teachers to train their teaching skills also created a sense of difficulty. In other words, although they felt the need for such training, it was difficult for them to take the initiative due to the COVID-19 pandemic and their extremely busy work schedules.

In terms of the content of self-training, “about STDs” was highly desired by both groups, and along with “cervical cancer & HPV”, it was significantly higher in the mid-career group. According to the findings of a Health Science study on trends in the incidence of sexually transmitted diseases (2012-2017), there has been an increase in sexually transmitted diseases among young people, especially syphilis, which showed a marked increase [24]. Syphilis infection is of concern in young women because of its association with pregnancy and congenital syphilis. It should also be remembered that HPV and chlamydia infections are critical issues that can lead to cervical cancer and infertility. In addition, it is necessary to take appropriate measures against *Neisseria gonorrhoeae* and *Chlamydia* as causative pathogens of male urethritis as an STD. In other words, school nurses need to be knowledgeable about the types of sexually transmitted diseases and their future effects. The mid-career group was highly aware of these issues.

Significantly more of the mid-career group wanted training on “emergency contraceptives” and “media literacy”, than in the early-career group and more

than half of the mid-career group wanted training on “LGBT” and “sexual violence”. Today’s high school students are born digital natives [25] and the development of social media and other online platforms has led to an increase in the sexual victimization of young people via the Internet [26]. From November 2023, the sale of emergency contraceptives without a prescription began on a trial basis, in cases where a potential unplanned pregnancy is possible. In addition, there is a demand for the advancement of sex education to include topics such as the menstrual cycle, the mechanisms of sexual intercourse and pregnancy, birth control options and their effects, and preventing domestic violence/dating abuse/sexual violence [27]. The Ministry of Education, Culture, Sports, Science and Technology (MEXT), extolls the need for training for the teachers who are responsible for “Japanese-style school education in the Reiwa generation”, stating “As the times are changing rapidly, it is even more necessary for teachers to continue to learn the latest knowledge and skills” [28]. The thoughts, judgments, and behaviors of high school students are strongly influenced by psychosocial influences from their family, friends, and other people around them, as well as the mass media. At the same time, the trends of the times are always changing. Therefore, it is assumed that school nurse teachers desire the necessary training to keep up with a changing society. On one hand, it is inferred that the reason behind the lower desire for training among the early-career group is due to their experience with social media, the Internet, e-learning at school, YouTube viewing, etc. On the other hand, school nurses attended more training sessions related to sexuality education than other teachers and purchased more books with the keyword “sexuality” as a source for sexuality education [29]. As health and healthcare specialists, school nurse teachers acquire knowledge from books in order to nurture the specialized expertise required, which shows a high awareness and active learning of sex education among school nurses.

7. Conclusions

This study led to the following conclusions:

- 1) Health and Physical Education plays a central role in STD education, with Health and Physical Education being the main subject for 70.0% of the respondents. As for the teaching materials used, the early-career group used ready-made materials, and the mid-career group used ready-made as well as self-made materials.
- 2) The most common difficulty for school nurse-teachers in implementing sex education in both groups was “time availability” (63.0%), followed by “teaching skills of school nurses” for the early-career group, and “differences in sex awareness among teachers” for the mid-career group. In Japan, often only one school nurse is assigned to a school, and so they are forced to conduct psychological health activities in addition to physical health activities, meaning they are affected by a lack of manpower.
- 3) Ninety-five percent of the school nurses responded that they had “little knowledge” or “no knowledge” of STDs, inferring that school nurses have li-

mitted knowledge of content that they are not in charge of. On the other hand, many school nurses answered that they were “fairly good” or “good” at teaching about sex, which may be because most of the subjects surveyed were experienced school nurses in the mid-career group.

4) Both groups of school nurses mentioned items related to male reproductive functions, such as “phimosis” and “nocturnal emissions” as their weakest, along with “sexual behavior” in the sex-adjacent category, and “sexual and reproductive issues” in the psychosocial category. It is assumed that the respondents had difficulty teaching about sexual behavior, because Japanese sex education in schools is focused on menstruation and rarely deals with male sexuality, and the official courses of study guidelines prohibit the teaching of “sexual intercourse”. In addition, various challenges were seen in “sexual and reproductive issues”, such as evolving reproductive medicine, sexual diversity, and the involvement of STDs in infertility and fertility, including chlamydia, which is common among young people.

5) The digital content school nurses most wanted was that on “sexual violence”, “sexual abuse”, “STDs”, and “how to turn down sex”. Additionally, early-career school nurses wanted content in more items than the mid-career group, with significant differences in the sex-adjacent category and in STD pathogens in the physiological category. It can be inferred that the mid-career group has experienced the synergistic learning effect of digital content when combined with face-to-face classes. It is necessary to create categorized digital content for use in classes that cover STDs and sex-adjacent topics.

6) Thirty-two percent of the school nurses responded “yes” and 68.0% responded “no” to the question asking if they had participated in self-study training for sex education in the past three years. Both groups wanted self-study training on “STDs”. The mid-career group was significantly higher than the early-career group in “cervical cancer & HPV”, “emergency contraceptives”, and “media literacy”, and more than half of them mentioned “LGBT” and “sexual violence”, suggesting that they wanted necessary training in response to social changes.

8. Study Limitations

This study was limited in its generalizability due to a limited geographic area and a small sample size with a 22.2% collection rate. A nationwide survey and a higher collection rate should be aimed for. However, the study did indicate the state of education on the prevention of STDs by school nurses and the specific items that school nurses would like to see. It is hoped that the survey will have significance as a basic resource for creating digital content for the prevention of STDs among high school students that can help in developing educational methods and teaching materials in the future.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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