

A Literature Review regarding Cervical Cancer Prevention Targeting Junior and Senior High School Students

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Abstract

Objective: To understand the state of education for the prevention of cervical cancer and trends in research. The subject of cervical cancer prevention will be examined. **Method:** Articles from the ICHUSHI Web version 5, CiNii, and PubMed databases for the period from 2009-2019 were used. Search terms used were cervical cancer, HPV/human papillomavirus, prevention, public awareness, and education. **Results:** 17 articles (9 Japanese and 8 English) were analyzed. The majority of students had heard of cervical cancer but did not know of the link between it and HPV. Vaccinated individuals were significantly more likely to have deeper knowledge regarding cervical cancer and HPV. Various factors affect the vaccination rate. These include knowledge of HPV and cervical cancer, age, ethnicity, the organization or location which administers the vaccine, how to breach the subject, finances, and the opinions of friends and family. In particular, consultations with parents lead to mothers recognizing the importance of the vaccine. By way of educational intervention, opinions have grown more positive about advancing awareness, being vaccinated, and having cervical cancer screenings for the future. **Conclusion:** The prevention of cervical cancer requires support and fostering the judgement based on sufficient awareness and adequate education. What we need is educational intervention rooted firmly in the current societal climate aimed not only at students, but at their parents as well.

Keywords

Cervical Cancer, Prevention, Junior and Senior High School Students

1. Preface

In Japan, the largest proportion of STI patients falls between ages 16 - 20, due to

an increase in sexual activity among young people. Furthermore, the proliferation of HPV, which is a risk factor for cervical cancer, has been lowering the age of patients in which pathological changes to the cervix are found.

In 2016, recorded deaths due to cervical cancer increased to 2710 cases. Of special note is the rate of cervical cancer in women aged 15 - 30, which has increased by 5.6 times in the past 30 years [1]. Between the ages of 15 - 24, the rate has increased by 24.1 times [1]. The proliferation of HPV has brought on an increase in cervical cancer cases and a lowering trend in the age of patients, becoming a fertility issue.

As a prevention measure against cervical cancer, Japan has established a free vaccination period for students from the first year of junior high school to the first year of high school, as well as lowered the age in which free cervical cancer screening vouchers are distributed to age 20 [2]. However, rates of treatment are low when compared to those abroad, at 0.3% for HPV vaccine and 42.3% for cervical cancer screenings in 2016 [1] [3]. In light of this situation, there is concern that the problem of cervical cancer will continue to grow. Prevention of cervical cancer is an important factor in lifelong health for our youth which can help them to protect their reproductive health and avoid life-threatening conditions.

Research on HPV vaccination and educational resources concerning cervical cancer mainly focuses on college students, adult women, and parents. However, the increase of cervical cancer cases in Japanese women in their 20s demonstrates the need for investigation into the situation regarding preventative measures in junior high school students. As such, we have conducted a literature search to understand the state of cervical cancer prevention education and trends in research in order to prepare fundamental educational materials for the future.

2. Method

Searches were performed on the ICHUSHI Web ver 5, CiNii, and PubMed databases for literature published between 2009 and December 2018. The keywords used were cervical cancer, HPV (Human Papilloma Virus), prevention, enlightenment, education, junior high school, and high school, shown in **Figure 1**. The literature search returned 251 entries from ICHUSHI, 71 from CiNii, and 297 from PubMed. After excluding duplicate results, setting the criteria to research targeting junior high school students, senior high school students, and adolescents from academic journals 17 entries (9 Japanese language entries and 8 English language entries) were selected (**Table 1**).

3. Results

3.1. Summary of Target Literature

Because the subject of this research was junior high and high school students, all

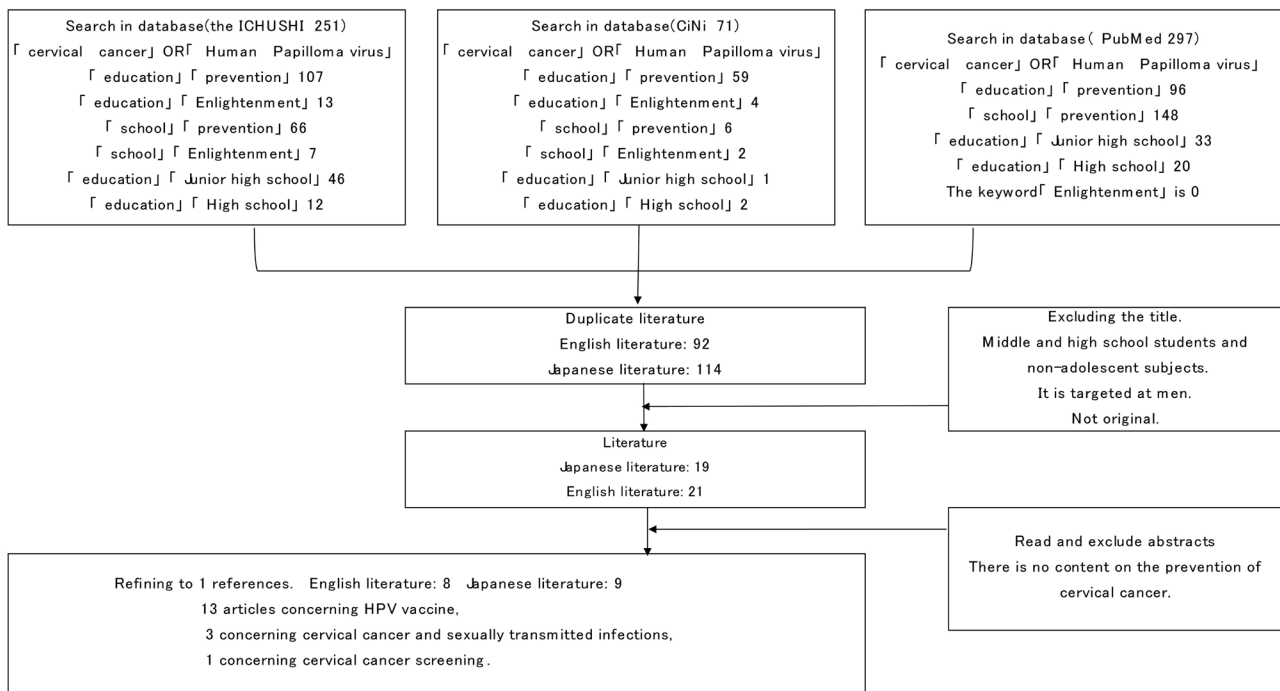


Figure 1. Literature of refinement.

target literature concerning the prevention of cervical cancer was related to HPV vaccinations.

As shown in the list of literature (**Table 1**), the literature referenced included the following methods: qualitative research (semi-structural interview) (1), quantitative research (16), comparison before/after execution of educational program (3), comparison of target group (6), analysis based on qualitative survey (5), analysis employing public institution surveillance (2).

13 articles were about HPV vaccination, 3 about STIs, and 1 about cervical cancer screening. The contents of the questionnaires mainly concerned awareness of HPV/cervical cancer, information sources, whether the respondent had been vaccinated and how many times, factors in deciding to be vaccinated, and comments from the respondent's parents. Some also surveyed STIs, contraceptive methods, and other vaccines.

After considering the content of the essays, results were classified into three major points (understanding of cervical cancer/HPV, state of HPV vaccination, and determining factors in subjects' intention to be vaccinated). Target literature used for analysis is listed in **Table 1** and numbered [4]-[20].

3.2. Awareness and Knowledge of Cervical Cancer/HPV

Awareness of cervical cancer was 70.8% - 94.0% [11] [12] [19], while it was 5.6% - 27.3% [12] [16] [19] [20] for HPV. Awareness among female students was significantly higher than male students, and that of high school students higher than that of junior high school students [12]. In a survey of all 17- and 18-year-olds in Greece, no differences were found based on location (urban,

Table 1. Citations.

NO	Author Year of Publication Country	Research Design/ Demographic/ No. of Subjects	Objective	Results
[4]	Kwan TT <i>et al.</i> 2010 Hong Kong	Quantitative 953 junior high school students	Assess education before and after a cervical cancer education program was initiated in school.	Before the program, HPV vaccine acceptance was favorable but relevant knowledge was low. After the program, participants had greater knowledge and a more positive attitude, with more girls anticipating family (41.6% before vs. 58.9% after) and peer support (32.8% before vs. 56.9% after).
[5]	Maya B. Mathur <i>et al.</i> 2010 USA	Quantitative Survey 170 female high school students, grades 9 - 12	Study the vaccination decision-making process and predictive factors for vaccination.	Overall, 48.4% participated in the vaccination decision making and 37.8% were vaccinated, but there were significant vaccine-related knowledge gaps. Vaccination was significantly associated with older age, vaccine information sources, and higher vaccine-related knowledge, but not with estimates of risk of HPV-related diseases, religion, or frequency of health care visits.
[6]	Charlene A. Wong <i>et al.</i> 2011 USA	Quantitative Data Analysis 2205 girls aged 9 - 17	Survey 1 - 2 years after the HPV vaccine was approved aiming to understand sociodemographic behaviors, and why parents refuse to allow girls to be vaccinated.	We observed increased vaccine uptake with increased age. There were no differences in HPV vaccine initiation dependent on race/ethnicity. Costs were cited as the main reason not to vaccinate daughters, and they said they would get the vaccine if it were free or provided at a much lower cost.
[7]	Deboran Watson <i>et al.</i> 2012 Tanzania	Quantitative/Comparativ e 3352 sixth grade students 2180 subjects born in 1998	Compared grade-based and age-based delivery methods to determine which is more effective.	HPV vaccine coverage was 84.7% for dose 1, 81.4% for dose 2, and 76.1% for dose 3. For each dose, coverage was higher in class-based schools than in age-based schools. Reasons for not vaccinating included absenteeism (6.3%) and parent refusal (6.7%).
[8]	KOBAYAS HI Yuko <i>et al.</i> 2013 Japan	Qualitative/Semi-structur ed interview 26 high school students	Study factors in vaccination behaviors for the prevention of cervical cancer and correlate the formed concepts to explain vaccination behaviors.	The process to vaccination was affected by knowledge, awareness and perceptions of cervical cancer and the vaccine, relations with the opposite sex, and sexual activity. Barriers to vaccination and family factors were obstacles, but treatment was linked to the capacity to accommodate.
[9]	Mellisa B. Gilkey <i>et al.</i> 2014 USA	Quantative/Comparison of consulting, web consulting, and no consulting Data Analysis 107,434 subjects aged 11 - 18	Determine the effectiveness of the AFIX program (Assessment Feedback Incentive Exchange) and examine methods to improve the vaccination rate in adolescents.	At the 5-month follow-up, AFIX consultations increased vaccine coverage among younger adolescents. At 1 year, the 3 arms showed similar coverage changes. The effectiveness of in-person and webinar consultations was not statistically different at either time point.
[10]	SAITO Ryoko <i>et al.</i> 2014 Japan	Quantitative/Comparing urban and rural environments Questionnaire 1500 first-year high school students	Explore the decision-making factors and knowledge concerning cervical cancer among first-year high school students who received the vaccination.	The HPV vaccination coverage was 67.3%. Knowledge of cervical cancer was greater in the city than rural communities, and greater in vaccinated individuals than unvaccinated individuals. Decision-making factors for getting vaccinated were recommendations from family members, if the vaccine was free or not, and the number of side effects.
[11]	HATTORI Keiko <i>et al.</i> 2014 Japan	Quantitative Questionnaire 736 junior high students (1 st -3 rd year)	Study experience with the HPV vaccine and related factors.	HPV vaccine coverage was 25.2%, increasing in correlation to the school grade. Associated factors were awareness of the HPV vaccine, previous experience with vaccinations, and free availability of the vaccine. The mother's opinion had the largest impact on the decision to get the shot.
[12]	MIYAJI Takami <i>et al.</i> 2014 Japan	Quantitative Questionnaire 2205 subjects ages 9 - 17	Study the awareness of sexually transmitted disease and vaccinations among junior high school students.	46.1% knew of public subsidization of the vaccine, 70.8% of cervical cancer, and 52.5% of the causes of sexually transmitted infections, with more high school students having awareness than junior high school students, and girls more than boys.

Continued

[13]	Emilien Jeannot <i>et al.</i> 2015 Switzerland	Quantitative Data Analysis 20,541 subjects ages 11 - 19	Evaluate the success of programs concerning the HPV vaccine.	Coverage for girls aged 16 - 18 years at the beginning of the program reached 80% or more four years into the program. High coverage by this HPV vaccination program was likely related to free vaccination and easy access to the vaccine using a combination of delivery services, including school health services, a public hospital, and private physicians.
[14]	Kobayashi Yuko <i>et al.</i> 2015 Japan	Quantitative/Questionnaire 1004 high school students (1 st -3 rd year)	Study factors that influence opinions about the cervical cancer prevention vaccine.	78.8% of students wished to receive the HPV vaccine. Decision making factors included a positive impressions and interest in the vaccine, anxiety about the vaccine, and school grade.
[15]	Sueda Chie <i>et al.</i> 2015 Japan	Quantitative Questionnaire 481 first-year high school students	Study the effect in awareness of sexually transmitted infections before and after a sexual education course.	73.9% of subjects had been vaccinated. Of these, 37% understood the possibility of being infected through sexual contact. Awareness of STIs was low before the course, but a statistically significant increase in correct answers was seen following the course.
[16]	Kimura Yoshihide <i>et al.</i> 2015 Japan	Quantitative/Comparison of vaccinated vs non-vaccinated subjects 639 public junior high students	Study awareness about the HPV vaccine and cervical cancer.	65.1% of subjects had received the HPV vaccination. Reasons included the suggestion of parents and school, and because it was available at no cost. 60% were aware of cervical cancer and the HPV vaccine. 6% were aware that HPV is a cause of cervical cancer, with no difference in knowledge between vaccinated and non-vaccinated individuals.
[17]	Manika <i>et al.</i> 2016 USA	Quantitative Questionnaire 889 subjects ages 14 - 26	Study attitudes about and the adoption rate of the HPV vaccine based on level of education.	57% and 42% of the 889 students reported starting and completing HPV vaccine series, respectively, with no statistical difference by education level. 61% of students who reported receiving a provider recommendation had completed the series, compared to 6% of those who did not receive recommendation. The belief that HPV vaccine prevents cancer was strongly associated with vaccine completion
[18]	FURUTA Kazue <i>et al.</i> 2016 Japan	Quantitative Questionnaire 206 second-year junior high students	Study the relationship between students' deciding to get vaccinated or not based on explanation from their parents.	The 50.5% of students whose parents talked to them about the HPV vaccine to them showed improved knowledge of cervical cancer. Talking about the vaccine is a good opportunity for the students to consider their sexual behavior and whether they need the vaccine.
[19]	Dennis Vaidakis <i>et al.</i> 2017 Greece	Quantitative/Urban, suburban and rural Questionnaire 4547 students ages 17 - 18 entering university	Study awareness, attitudes, beliefs and sexual activity in relation to sexual infections, with a focus on HPV.	More than 60% of the participants could not answer correctly neither about HPV infection and cervical cancer frequency in sexually active women, nor about protection methods against HPV and cervical cancer. The low vaccination coverage may be due to lack of information and awareness of the adolescents and their parents.
[20]	IMAI Miwa <i>et al.</i> 2017 Japan	Quantitative/Before-and-after comparison Questionnaire 91 high school students (1 st -3 rd year)	Study the change in female high school student's knowledge and awareness before and after participating in an educational course about cervical cancer prevention.	Students who participated in educational programs showed increased scores on a knowledge test about cervical cancer, HPV, and cervical cancer screenings. Students showed increased interest in preventative care. The percentage of students who expressed an intention to start screening when they turned 20 increased from 13.2% to 49.5%.

suburban, rural) or religion [19]. Regarding high school students' knowledge of STIs, recognition was lower than that of AIDs (77.8%) and genital herpes (75.5%) [12]. However, among female high school students in the United States, 89.8% of vaccinated students and 7.04% of non-vaccinated students knew of the link between HPV and cervical cancer [5]. Knowledge pertaining to cervical

cancer screening was higher among vaccinated individuals than non-vaccinated individuals, and females than males [10] [12].

Students in Japan, Hong Kong, and Switzerland who participated in sex education courses and incentive programs showed improved awareness of cervical cancer [4] [13] [15] [20]. In Japan, in a comparison of students' knowledge before and after a sex education course targeted at first-year high school students, participants showed a greater knowledge of STIs and more appropriate perceptions of sex [15]. In Japan as well as other countries, the content of these courses and incentive programs was knowledge, causes, and symptoms of cervical cancer/infection, routes of infection, time before onset of symptoms, complications, and prognoses. Content related to HPV included its relation to cervical cancer, ages at which vaccination is encouraged, screening periods, number of times, side effects, and free vouchers [4] [8] [12] [15] [20].

Regarding the source of students' knowledge, 59.9% of junior high school students said their parents or grandparents, and 52.8% said TV. 44.4% of high school students said grandparents, parents, or TV [8] [10] [11] [12] [14] [15] [16] [18] [20].

In Greece, data collection via the Internet and mobile phones is prevalent [19], while in the United States this information was provided by pediatricians and OB/GYNs which function as family doctors or by parents [5] [6] [9] [17].

3.3. The State of HPV Vaccination

In Japan and the United States, the percentage of students vaccinated was 25.2% - 65.1% for junior high and 50% - 78% for high school, increasing with each successive grade level [5] [9] [10] [11] [13] [14] [15] [16] [20]. Switzerland and Tanzania both had high rates of 80%. Both countries have systems by which the vaccination can be received at schools and public institutions, and encourage vaccination through financial aid, media advertisements, and by direct mail advertising [7] [13]. Additionally, in Tanzania, comparative research based on sending materials according to school rank or date of birth found that class rank was significant to vaccination rate [7]. In countries outside of Japan, vaccination took place at schools, public hospitals, pediatricians, OB/GYNs and family practitioners [4] [6] [7] [13] [19]. However, in the United States, this was affected by a number of factors, including race, state of residence, type of medical insurance or lack thereof, lack of a family physician. This, as well as a transition of the HPV vaccination period from childhood, was connected to non-vaccination [17].

3.4. Determining Factors in Subjects' Intention to Get the HPV Vaccine

The determining factors of intention concerning the HPV vaccine included knowledge of cervical cancer, aggressiveness toward disease prevention, fear of cervical cancer, awareness of the possibility of contracting cervical cancer, and

the medical experiences of people in one’s social circle [4]-[18] [20]. Explanation from parents played a large part in the decision to be vaccinated, especially that from the mother [4] [6] [8] [10] [16].

Cervical cancer prevention programs targeting female high school students increased the percentage of students who intended to received screenings in the future from 13.2% to 49.5% [20]. In Hong Kong as well, following an educational program for female junior high school students, students’ attitudes toward the HPV vaccine improved and students intending to be vaccinated increased by 11.3% (from 74.9% to 86.2%) [4]. In an American survey, the determining factors were knowledge of cervical cancer/HPV, judgement based on proper education and information, the presence of a family physician, societal trends, the opinions of friends and family, the method of approaching the subject, and financial support [5] [6] [9] [17]. Determining factors related to the HPV vaccine are shown in **Figure 2**. Education and information programs build awareness of the HPV vaccine and the threat of cervical cancer. Interest in cervical cancer prevention depends on the family physician and mother’s explanation and approach toward the subject and is positively affected by the learning which results from acquisition of information. At the same time, it is also affected by the opinions of friends and the state of society in each country. The increase in interest toward cervical cancer prevention promotes decision-making leading to preventative behavior. Encouragement to undergo a screening, financial support, and

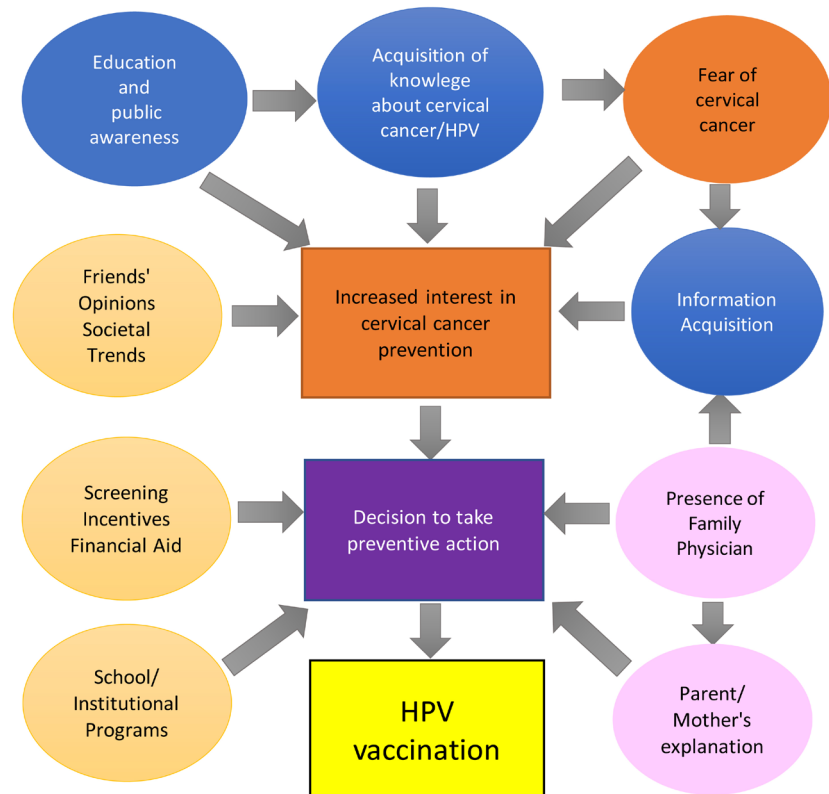


Figure 2. Outline of decision-making process for HPV vaccination.

the establishing of schools and public institutions as places to get vaccinated are all potentiating factors for the HPV vaccine.

4. Study

Both the primary prevention method of vaccination and the secondary prevention method of screening are vital to the cervical cancer prevention strategy. Because the target of study was junior high and high school students, the focus was on the primary prevention method of HPV vaccination, while the topic of the secondary prevention method of cervical cancer screenings was limited to whether students had an intention to be screened in the future.

While awareness of cervical cancer among female junior high and high school students was as high as over 70%, awareness of the link between HPV and cervical cancer was low in other countries as well as Japan. However, lectures and educational programs on cervical cancer showed signs of stimulating the vaccination rate in addition to improving awareness. In Japan, education on cancer was included in MEXT's 2009 Official Curriculum Guidelines, but on the topic of cervical cancer this only included information on screening. Similarly, even the Ministry of Health's Basic Plan to Promote Cancer Countermeasures only mentions cervical cancer screenings in the early detection through cancer screenings clause [21] [22] [23]. Since the knowledge of cervical cancer and sexual contact are related, it is important to educate junior high school students with care. It was reported that in the United Kingdom the rate of parents/guardians visiting the doctor is high and education on the subject of cervical cancer and the HPV vaccine took place at home [6]. Because the source of information for over half of junior and senior high school students was their parents or grandparents, it can be said that the role of the household in passing on this information is important. If parents/guardians are able to understand and take action, the educational responsibility is born by the household and leads to preventative action.

In the majority of Western countries, vaccinations for girls around age 12 were covered by public expenses. In addition, the United States and some other countries offered the vaccine to girls starting in the latter half of their teens, when many are likely to have sexual experiences, as well as to women in their 20s, through a fixed-time public subsidy until the vaccination rate had increased. Countries such as Australia and Canada which offered the HPV vaccine in national programs show a decrease in HPV cases and precancerous lesions among the vaccinated generation [24]. On the other hand, the vaccination rate in Japan has dropped dramatically after active efforts to promote the vaccine ceased in 2013 due to post-vaccination side effects [25]. Side effects included pain at the injection site, redness, swelling, etc. However, these side effects are not by any means unique to the HPV vaccine. Improving vaccination rates requires not only the students' awareness, but parents' support and consent. For this reason, providing correct and trustworthy information is vital.

5. Conclusions

The prevention of cervical cancer depends on the acquisition of knowledge, suitable education, and support so that informed judgements can be made. It is necessary to provide that information and opportunity. The task at hand is an approach which considers societal trends aimed at not only the patients concerned but also their parents.

There are no businesses, etc. related to COI that should be disclosed in regard to the subject presentation.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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