

**THE EFFECTIVENESS OF HEALTH EDUCATION
PROGRAMME ON KNOWLEDGE AND ATTITUDE ON
CERVICAL CANCER PREVENTION AND HUMAN
PAPILLOMAVIRUS (HPV) VACCINATION AMONG
SECONDARY SCHOOL GIRLS IN KOTA BHARU,
KELANTAN**

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LIST OF ABBREVIATIONS

%	Percentage
CDC	Centre for Disease Control and Prevention
EFA	Exploratory Factor Analysis
HPV	Human Papillomavirus
HEP	Health Education Program
MCH	Maternal and Child Health
SHP	School Health Program
SPSS	Statistical Package for Social Sciences
WHO	World Health Organisation

ABSTRAK

KEBERKESANAN PROGRAM PENDIDIKAN KESIHATAN KEPADA PENGETAHUAN DAN SIKAP TERHADAP PENCEGAHAN KANSER SERVIKS DAN VAKSINASI HUMAN PAPILLOMAVIRUS DALAM KALANGAN PELAJAR PEREMPUAN SEKOLAH MENENGAH DI KOTA BHARU, KELANTAN

Pengenalan: Kanser serviks adalah kanser ketiga terbanyak dikesan dalam kalangan wanita di Asia dan kedua di Malaysia selepas kanser payudara. Pada 2010, Malaysia telah memperkenalkan Program Vaksinasi Pencegahan HPV Kebangsaan di kalangan pelajar perempuan yang bersekolah berumur 13 tahun. Walaubagaimanapun, banyak kajian menunjukkan pengetahuan pelajar masih rendah tentang vaksinasi HPV dan kanser serviks. Kajian kami bertujuan menentukan keberkesanan program pendidikan kesihatan baru ini dalam meningkatkan tahap pengetahuan dan sikap pelajar di Kelantan mengenai pencegahan kanser serviks and vaksinasi HPV.

Metodologi: Satu kajian intervensi dengan kawalan telah dijalankan antara bulan April hingga Ogos 2015 dalam kalangan pelajar perempuan sekolah menengah secara pemilihan berperingkat. Dua buah sekolah menengah di daerah Kota Bharu dipilih sebagai sekolah kawalan dan intervensi. Kumpulan intervensi menerima program pendidikan kesihatan baru mengenai vaksinasi HPV dan kanser serviks. Ia disampaikan dalam Bahasa Melayu oleh kakitangan terlatih melalui ceramah kesihatan dengan bantuan PowerPoint, pertunjukkan video dan carta flip dengan inovasi penyampaian yang lebih interaktif di samping pelajar diberikan sumber rujukan yang berkaitan. Pelajar kumpulan kawalan menerima bahan pendidikan biasa digunakan oleh unit kesihatan sekolah. Set soalan kaji selidik yang

divalidasi digunakan untuk menilai keberkesanan intervensi terhadap pengetahuan dan sikap mereka sebelum dan 3 bulan selepas intervensi dijalankan. Data dianalisa menggunakan SPSS versi 22.

Keputusan: Sejumlah 198 pelajar perempuan Melayu terlibat dengan bilangan yang sama dalam setiap kumpulan. 176 daripada mereka melalui penilaian selepas intervensi dengan kadar respon 88.8%. Pada peringkat awal, nilai purata (SD) peratusan skor pengetahuan kumpulan intervensi adalah 44.9 (18.99) dan kumpulan kawalan adalah 47.2 (15.29). Bagi penilaian sikap, purata (SD) kumpulan intervensi adalah 69.86 (10.43) dan 66.37 (9.18) oleh kumpulan kawalan. Perbandingan purata peratusan skor pengetahuan dalam setiap kumpulan berdasarkan masa awal dan tiga bulan menunjukkan perbezaan purata (SD) (95% CI) sebanyak 12.23 (18.48, 7.98) pada kumpulan intervensi dan 3.80 (0.77, 6.83) pada kumpulan kawalan. Selepas intervensi, 'estimated marginal mean' (EMM) (95% CI) untuk skor peratusan pengetahuan adalah 57.6 (49.12,60.71) bagi kumpulan intervensi dan 50.63 (41.81,53.47) bagi kumpulan kawalan. Manakala, EMM (95% CI) untuk skor peratusan sikap adalah 70.3 (68.32,72.70) bagi kumpulan intervensi dan 66.3 (64.09, 68.59) bagi kumpulan kawalan. Secara statistik, purata perbezaan di antara kumpulan pada peringkat awal dan 3 bulan adalah signifikan untuk pengetahuan ($P=0.001$) tetapi tidak signifikan untuk sikap ($P=0.870$).

Kesimpulan: Intervensi pendidikan kesihatan ini berjaya meningkatkan tahap pengetahuan tentang kanser serviks dan vaksinasi HPV dalam kalangan pelajar perempuan. Namun, ia tidak menunjukkan keberkesanan dalam meningkatkan tahap sikap berbanding dengan amalan pendidikan kesihatan semasa. Intervensi pendidikan kesihatan baru ini boleh digunakan sebagai intervensi yang mempunyai daya saing budaya dan seterusnya dijadikan modul pendidikan selaras untuk menambahbaik amalan pendidikan kesihatan yang

dijalankan oleh unit kesehatan sekolah sekarang. Selain itu, ia membantu kakitangan kesihatan dan paramedik dalam menyampaikan pendidikan kesihatan tentang kanser serviks dan vaksinasi HPV.

Kata kunci: vaksinasi HPV, kanser serviks, pendidikan kesihatan, pengetahuan, sikap, pelajar perempuan

ABSTRACT

THE EFFECTIVENESS OF HEALTH EDUCATION PROGRAM ON KNOWLEDGE AND ATTITUDE ON CERVICAL CANCER PREVENTION AND HUMAN PAPILLOMAVIRUS VACCINATION AMONG SECONDARY SCHOOL GIRLS IN KOTA BHARU, KELANTAN

Introduction: Cervical cancer ranks as the third most frequent cancer among women in Asia and second in Malaysia after breast cancer. Malaysia introduced school-based National HPV prophylaxis vaccination programme started in 2010 to the girls aged 13 years old. However, many studies reported that adolescents had poor knowledge about cervical cancer and HPV vaccination with no standardised education module provided. The aim of our study is to determine the effectiveness of health education intervention in increasing the knowledge and attitude on cervical cancer prevention and HPV vaccination among students in Kelantan.

Methodology: This is an open, non-randomised interventional study with control performed between April and August 2015 using multi-stage cluster sampling among female students in two secondary schools in Kota Bharu, Kelantan. The intervention group received health education programme about HPV vaccination and cervical cancer. It was delivered in Malay language by a trained-personnel consists of health talk with PowerPoint presentation, video show, flip chart and interactive presentation as well as equipped with related references. The students from control group received the standard education materials. A self-administered validated questionnaire was used for evaluation of the effectiveness of intervention on knowledge and attitude score at the baseline and at 3 months. Data were analyzed using SPSS version 22.

Results: A total of 198 Malay female students was involved with equal number of subjects. Of those, 176 of them responded to post-test evaluation with 88.8% response rate. At the baseline, the mean (SD) of knowledge percentage score in intervention group was 44.9 (18.66) and for control group was 47.2 (15.29). Attitude mean (SD) percentage score in intervention group was 69.86 (10.43) and 66.37 (9.18) in control group. Mean knowledge percentage score within each group based on time at baseline and 3 months shows the mean difference (95% CI) was 12.23 (16.48,7.98) for intervention group and 3.80 (0.77,6.83) for control group. Post intervention, the estimated marginal mean (EMM) (95% CI) for knowledge percentage score was 57.6 (49.12,60.71) in the intervention group and 50.63 (47.81,53.47) in the control group. Respectively, the EMM (95% CI) for attitude percentage score was 70.3 (68.32,72.70) in the intervention group and 66.3 (64.09,68.59) in the control group. The mean difference between groups at baseline and 3 months was statistically significant for knowledge ($P=0.001$) but not for attitude ($P=0.870$).

Conclusion: The new health education intervention has been shown to increase the knowledge on cervical cancer and HPV vaccination among the girls. However, it is not effective in increasing the attitude score when compared to the current standard health education practice. This new health education intervention could be used as culturally-competent intervention and as the standard education module to improve the current education practice by school health unit. In addition, this could assist the health staff and paramedics in delivering health education to the students about cervical cancer and HPV vaccination.

Keywords: HPV vaccination, cervical cervix, health education, intervention, female students, knowledge, attitude

CHAPTER 1

INTRODUCTION

1.1 Introduction

Cervical cancer is one of the most common cancer among women worldwide. Currently it is fourth common cancer in women. In 2012, 527,624 new cases was reported with a total of 265,672 deaths (GLOBOCAN). It is gynaecological cancer. Persistent infection of Human Papillomavirus (HPV) drives development of precancerous lesion to cervical cancer. Squamous cell carcinoma is the most common cell type and adenocarcinomas after that. International Agency for Research on Cancer (IARC) initiated a project named GLOBOCAN, this project provides estimates of cancer cases based on cancer site and also gender. They used available data from each country and make an estimation based on that. In Asia especially in Malaysia, it is in the second rank after breast cancer in women aged 15 to 44 years. Colorectal cancer is at the third (Bruni et al., 2017). Malaysia population has around 12 million women age from 15 and older, this group have a risk for developing cervical cancer. By statistic, there was 2,145 number of cervical cancer cases with 621 deaths recorded annually as estimated in 2012 (Bruni et al., 2017)

Human Papillomavirus (HPV) as one of the causative pathogen of cervical cancer has been established and being the relevant factors for anogenital cancers such as vagina, anus, genital cancer, and head and neck cancers. About 70% of cervical cancer cases worldwide was due to two oncogenic types of HPV particularly Type 16 and 18.

In the past few decades, cervical cancer prevention is more focused on secondary prevention via Pap smear screening among adult women. However, with the establishment of the causative role of cervical cancer and the increasing rate of HPV infection among young females, this underline to include the adolescent to be involved in promotion of primary prevention of cervical cancer.

We are not left far from other developed countries in introducing the HPV vaccination programme since by 2010, 18 European countries had instituted HPV vaccination (Hopkins & Wood, 2013). In order to reduce the future burden of cervical cancer mortality and morbidity, Malaysia started the implementation of free HPV vaccination programme in 2010 via school health programme and in 2012 the policy was extended to other eligible woman (Bruni et al., 2017).

Official portal of Malaysia Ministry of Health reported that in 2013, the HPV Vaccination Coverage (3rd dose) was 94.33% (Official Portal for Ministry of Health Malaysia, 2013). The coverage of (2nd dose) reduced to 83.02% in 2016 as reported in Malaysia Health Facts Sheet 2017. With the implementation of HPV vaccination under school health program, Kelantan state shows good actual uptake of HPV vaccination. In 2017, about seven years after the national HPV vaccination programme started, there were improvements of parental consent towards HPV vaccination about 95.21 to 100%. Furthermore, the first dose of HPV vaccine covered 99.2 to 100 % of students and for the second dose, 99.8 to 100% of students in Kelantan was covered (School Health Unit, 2017). No data at the national level was available

for the same year. The data suggests that good vaccine uptake can be achieved similar to other developed countries. The highest rates of vaccine coverage are seen when vaccination is delivered through school-based programme as carried out in Spain and Scotland (Hopkins & Wood, 2013). In addition to the strengthen strategies of the cervical cancer prevention through HPV vaccination and cervical cancer screening, public specifically the adolescent should know that there are other risk factors that contribute to cervical cancer such as smoking, early sexual activities, multiple sexual partners and having HIV. However, studies worldwide and in Malaysia show that the public including adolescent has deficient knowledge about cervical cancer and its prevention (Al-Dubai et al., 2009; Cooper Robbins et al., 2010; Rashwan, Lubis and Ni, 2011; Rashwan, Ishak and Sawalludin, 2013). Deficient in knowledge about HPV prevalence and its prevention might affect the adolescents' future health practices including adolescent sexual behaviour, condom use and their future participation in cervical cancer screening (Marek et al., 2011)

In response to that, education intervention can be as one of initial strategies to increase the adolescents understanding about HPV infections, to correct the misconception about HPV vaccination and to provide the important information to the adolescent as they are the prime candidates for this programme and thus resulted in a positive impact on the uptake of the HPV vaccine.

1.2 Justification of study

Even though school based programmes have contributed to the increase uptake of the HPV vaccination, multiple surveys that were done in Malaysia demonstrated that the public including the adolescents have low level of understanding about HPV vaccination, cervical cancer and its prevention. Having injection through parental consents with lack of knowledge might lead to the students' right on getting detailed information on the treatment given to them being denied. School students nowadays are exposed to many forms of social interaction using the information technologies which might give wrong messages to them. They are also at risk of early sexual activity, sexual transmitted diseases, teenage pregnancy and other risk-taking behaviours. Through education intervention perhaps it will benefit the students who are adolescents in improving their understanding in various aspects about HPV itself, vaccination, and cervical cancer prevention with some important issue related to adolescents such as safe sexual practices.

It is pertinent to mention that the objectives of this study are to evaluate the effectiveness of the health education intervention that can be delivered to the school students at their adolescents' age. Perhaps, the health education could streamline the understanding and perception about HPV vaccination and cervical cancer, which will improve their later adult life. The intervention structure also can be used as an education aid or source of reference in school health unit to educate the vaccination candidates during National HPV vaccination programme. Furthermore, it can contribute some ideas to implement an organised and structured health education programme that is culturally-competent to our Malaysian students.

CHAPTER 2

LITERATURE REVIEW

2.1 Cervical cancer and Human Papillomavirus

Statistically, 284,823 new cervical cancer cases are diagnosed annually in Asia (estimates for 2012). Cervical cancer is the second most common female cancer in women aged 15 to 44 years in Asia (Bruni et al.,2017). According to Bruni et al. (2017), 12 million women in Malaysia population ages 15 years and older are at risk of developing cervical cancer (Bruni et al., 2017). According to National Cancer Registry 2007, Indians has highest chance of developing cervical cancer (10.3/100,00) and then Chinese (9.5/100,000) and lastly Malays (5.3/100,000). After the age of 30 years-old, the risk starts to increase and at the age 65-69 years the risk peaked. Most of patients presented no symptoms. Symptoms suggestive of cervical cancer are, the most common is post-menopausal bleeding (84%), followed by vaginal discharge (72%), then post-coital bleeding (63.9%) and abdominal pain (56.2%). Most patients (89.3%) of them present at the late stage, with an advanced disease, 97.3% of this patients were referred for radiotherapy straight away (Ikechebelu, Onyiaorah, Ugboaja, Anyiam, & Eleje, 2010).

HPV is a sexually transmitted infection that causes 99% of all cervical cancer cases. There are more than 130 sub-types of HPV and, around 70 sub-types known to infect the human. Out of these, 40 different genotypes are detected to cause anogenital infection in both men and women. These genotypes are further classified into high risk and low risk genotypes indicating

their level of association to cervical cancer. The high-risk genotypes are 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58 and 59. Whereas the low risk genotypes detected are 6, 11, 40, 42, 43, 44, 54, 61, 70, 72, 81 and CP6108. HPV-16 and HPV-18, are found in 60–78% of cervical squamous cell carcinomas whereas in adenomas they are found in 72–94% of the cases (Vaccine, 2011). Besides causing anogenital infection, this high risk types are also detected in oropharyngeal cancers (Bruni et al., 2014).

The high-risk genotypes are detected in almost all cervical cancer cases. However, apart from HPV infection, there are other significant risk factors that can modify the natural history of HPV and cervical carcinogenesis such as use of smoking, parity, and contraceptive and also co-infection of HIV (Bruni et al., 2017). Other risk factors are having more than three sexual partners, early sexual intercourse (less than 17 years old), first delivery before the age of 17 years old, high parity (seven or more full-term pregnancies), and lower socio-economic status (Ministry of Health, 2015).

HPV infection is very common and most of it clears spontaneously. However, only persistent infection can lead to pre-cancerous lesion which can evolve to invasive cervical cancer. The younger the women started sexual activity, the higher the risk for them to get cervical cancer. The risk is much higher when they are involved in multiple sexual partners or their male partners are involved in multiple sexual partners. If any of the male partners have had sexual intercourse with women known to have who died of cervical cancer, the risk seems to be higher. HPV infection is very common, but then not every woman who get infected develops cervical dysplasia or progress to invasive cancer. Most of the infection managed to be cleared

spontaneously. Presence of co-factors or co-carcinogens needed to change the infected cells to neoplastic form.

Therefore, Papanicolaou smear (Pap smear) for cervical cancer is still the main screening form of detection of pre-cancerous and cancerous cervical lesion as it is already proven to reduce the incidence of cervical cancer by 43%. But, the sensitivity of Pap smear varies from 30 to 87% and the coverage of Pap smear among adult female is still unsatisfactory since it is voluntary screening and involves multiple logistics problem. Additionally, it is not cost effective to screen cervical cancer among the female population below the age of 30 (Vaccine, 2011). The coverage of cervical cancer screening in Malaysia is around 22.2 to 47.3% (Bruni et al., 2017)

HPV vaccination becomes a vital part of cervical cancer prevention strategies due to low cervical smear uptake among high risk women and delay in seeking treatment, as well as WHO has endorsed on safe HPV vaccine to prevent cervical cancer (Lokman Hakim Sulaiman, 2016). Furthermore, the HPV vaccination gives better net cost effectiveness compared to burden of cervical cancer treatment itself. As reported (Aljunid, Zafar, Saperi, & Amrizal, 2010), it is estimated 4,696 cases of cervical cancer per-year and cases of pre-cancerous lesions of 1,372. Health burden for these figures will cause a total direct cost of RM 39.2 million. Indirect cause of RM 12.4 million due to loss of productivity.

2.2 HPV vaccination

The primary target population for HPV vaccination are female adolescents before the initiation of sexual activity. The recommendation target age for HPV vaccination is 9 to 13 years old. HPV prophylaxis vaccination programme was introduced in 2010 to the girls of 13 years old attending school under National HPV Vaccination Programme. In 2012, the policy is extended to girls at the age of 13 who are not attending school and to eligible women in a clinic based in promoting cervical cancer prevention.

In Malaysia, school-based immunisation is part of a comprehensive School Health Programme (SHP) that was established in 1967. It was a joint programme between the Ministry of Health and the Ministry of Education following some pilot testing. It was merged into the Maternal and Child Health (MCH) Programme in 1971, and eventually, a joint committee between the Ministry of Health and the Ministry of Education was established. In 1995, WHO introduced the Health-Promoting School concept, based on the Ottawa Charter for Health Promotion (1986). Then, it was adopted by the Ministry of Health. Some amendments of the concept were done to reinforce the existing SHP, and the "Program Bersepadu Sekolah Sihat" (PBSS) was officially launched in September 1997. PBSS aimed to create healthy school residents within a safe, healthy and quality environment towards achieving Malaysia's Health Vision 2020. Six main cores have been developed consisting of school health policy, school physical environment, school social environment, community involvement, self-health skills, and SHP. Family Health Development Division, Ministry of Health; staff at the School Health Unit including a public health physician, and paramedics are the responsible parties for implementation of the SHP.

Under SHP, the HPV vaccination scheduled are three doses given at 0 month, first month and sixth month. The schedule was changed to two doses at 0 and sixth month in 2015 and this amendment by Ministry of Health is as recommended by WHO. The primary target in most of the countries recommending HPV vaccination is young adolescent girls, aged 9-14 where the vaccine schedule depends on the age of the vaccine recipient. For females less than 15 years at the time of first dose, a two-dose schedule is recommended whereas for females 15 years old onwards, three-dose schedule is recommended (World Health Organization, 2011). The key performance indicator (KPI) of National HPV vaccination programme are; achieve written parental consent of more than 95% and complete second dose or complete two doses of HPV vaccine at 95% and more. Simple schedules for HPV vaccines could improve vaccine effectiveness and a two-dose HPV vaccine schedule in adolescent girls is no inferior to a three-dose schedule (D'Addario et al., 2017).

There are two types of HPV vaccine available in Malaysia which is Cervarix[®] and Gardasil[®], and both are directed at the prevention of cervical cancer. The bivalent type (Cervarix[®]) from GlaxoSmith Klein (GSK) Biological manufacturer (was chosen based on tender system) to prevent HPV type 16 and 18 and was used in hospitals and clinics under Ministry of Health in 2010 till 2012. The Gardasil[®], the quadrivalent type 16/18/6/11 which covers cervical cancer and genital warts is also available especially in private practices (Vaccine, 2011). In year 2012 to 2017, Gardasil[®] was used in hospitals and clinics under Ministry of Health and the tender returns back to Cervarix[®] in 2017 till 2020.

Most of the intervention methods to increase vaccination coverage are based on evidence based vaccination intervention categories as recommended by ‘Community Guide’ (Smulian, Mitchell, & Stokley, 2016). The Community Preventive Services Task Force (CPSTF) has released the following findings on what works for public health to improve vaccination. The first category is to increase community demands for HPV vaccination. The recommended interventions are client-family incentives rewards, client reminder and recall systems, vaccination requirement for child care or school attendance, and community-based intervention in combinations of other interventions. The second category is to enhance access to vaccination services. The recommended interventions are vaccination in women, infant and child care setting especially for childhood vaccination, home visits to increase vaccination rates, reducing client out-of-pocket cost and vaccination programmes in schools. Third is provider or system-based interventions to increase HPV vaccination via provider assessment and feedback, provider reminder, or combination of healthcare system-based intervention. Malaysia has implemented several recommended interventions which are suitable, cost-effective and practical with our population to improve the vaccination coverage among population especially childhood vaccination and HPV vaccination. Some initiatives adopted by Malaysia are combining intervention of subsidising the cost of vaccination, and establishing policy that paramedics are able to administer vaccines via school-based intervention. There is a strong evidence that combining interventions can increase targeted vaccination rates for Hepatitis B, influenza and pneumococcal disease in at risk populations (Smulian, Mitchell, & Stokley, 2016)

2.3 Knowledge and attitude of adolescent about HPV vaccination and cervical cancer prevention

The information about HPV, vaccination and cervical cancer are very extensive and wide. The knowledge assessment are from the existence of the HPV itself, about HPV as risk for cervical cancer, about the symptoms of HPV infection and cervical cancer, and about the HPV transmission (Klug, Hukelmann, & Blettner, 2008). The focus and extension of knowledge assessment also depend on the subgroups of population. To be tailored to the level of understanding of the students, the assessment tools used should be direct, focus and valuable for them to be manifested in their lifetime. Furthermore, the knowledge about vaccine and its action, is also important because adolescents have already received multiple childhood vaccines (e.g. Hepatitis B vaccine, Bacillus Calmette-Guerin vaccine, Hemophilus Influenza B vaccine, Diphteria, Tetanus, Pertussis (DPT) vaccine, Measles, Mumps and Rubella (MMR) vaccine) via parental consent without proper understanding of that procedure.

During early implementation of HPV vaccination, multiple studies have shown similar finding of poor knowledge on HPV vaccination and cervical cancer prevention in the Asian region (Cooper Robbins et al., 2010; Wong, 2011) as well as in Malaysia (Al-dubai et al., 2009). The lack of knowledge are in three common areas including what is HPV, how HPV is transmitted, and what is the connection between HPV and cervical cancer. These findings reflected in what the vaccine protects against, how the vaccine works, the recommendations for HPV vaccination, the vaccine and Pap smear connection, and the myths about HPV vaccination (Cooper Robbins et al., 2010). Studies among adolescents in rural Malaysia have shown that

61.8% of secondary school student in Sarawak had poor knowledge level on cervical cancer and its prevention (Rashwan et al., 2011). Nonetheless, in the urban area such as Malacca (Al-dubai et al., 2009) and Kuala Lumpur, the majority of the students (80.4%) had heard about the disease. Marek et al., (2011) studied the level of awareness on HPV and cervical cancer for three years in Hungary, where the authors found that the adolescents' awareness of HPV infections relatively was still low where only 35% of the participants reported they had heard about HPV prior to the survey. One in five students (19.2%) did not believe that vaccination against HPV can prevent cervical cancer.

A systematic review by Kessels et al., (2012) on HPV uptake and factors related to it, shows that girls who had been vaccinated had a significantly higher knowledge score about HPV, HPV vaccination and cervical cancer, compared to non-vaccinated girls in three studies. There is a correlation between vaccine uptake, HPV disease and vaccine knowledge, attitudes regarding vaccination and having a healthcare provider as a source of information. Low levels of knowledge and understanding about HPV vaccination among adolescents and parents have implications for adolescents' future health practices, including sexual risk behaviour, condom usage, and cervical screening (Cooper Robbins et al., 2010). As reported by Marek et al., (2011), greater exposure to health information comes with better knowledge and more positive attitudes towards vaccination.

2.4 Health education intervention

Health education is defined as an activity that seeks to inform the individual on the nature and causes of health or illness and that individuals personal level of risk associated with their lifestyle-related behaviour. Health education seeks to motivate the individual to accept a process of behavioural change through directly influencing their value, belief and attitude systems, where it is deemed that the individual is particularly at risk or has already been affected by illness/disease or disability (Whitehead, 2004).

Health Belief Model (HBM) is a commonly used theory in health education and health promotion (Donadiki et al.,2014; Juraskova et al.,2011). This old theory was developed in 1950's and the underlying concept is, the health belief is determined by personal beliefs or perception about the disease and the strategies available to decrease its occurrence. Four major principles constructed this HBM: perceived seriousness, perceived susceptibility, perceived benefits and perceived barriers. By imparting the theoretical framework of HBM in health education about cervical cancer prevention via HPV vaccination among young generation could improve their knowledge and health belief and reduce their susceptibility of getting the cervical cancer in life (Juraskova, Bari, O'Brien, & McCaffery, 2011)

A study by Friedman and Sheppard (2007) on development of a comprehensive, evidence-based HPV educational protocol for adolescents, shows the protocol significantly increased knowledge scores about HPV in adolescents, regardless of their socio-demographic

characteristics and risk behaviours. The content and format of the protocol was reviewed by a group of experts and it includes information about the virology and natural history of HPV infection and abnormal Pap tests, transmission of HPV, clinical sequelae of HPV, and prevention of HPV infection and HPV- related diseases.

Linda Y. Fu et al. (2014) did a systematic reviews of education interventions and analysed 33 studies on HPV vaccination. From there, eight studies were performed among adolescents or young adult with different outcome measures. In one of the studies, by giving intervene 10-min educational video to school girls age 12-13, the outcome of desire to receive HPV vaccine increases in intervention group up to 90% compared to control group at about 83% with a p-value of 0.015. Whereas, by one-hour lesson about HPV and preventive methods focusing on vaccination and condom use, the authors reported HPV vaccination rates in intervention group is 16% which was an increment of just 2% from the control group. In addition to one-hour education session, included a question-and-answer session conducted by a gynaecologist which reported the intention to vaccinate increases from 74.9% at pre-intervention to 86.2% just after the intervention. Another study among young adults who received a free first dose of HPV vaccine in Appalachian, Kentucky reported that by giving 13-minutes educational video about HPV and vaccination as well as Center for Disease Control (CDC) HPV information sheet and a free t-shirt (as for control group), the outcome shows 43.3% of the intervention group and 31.9% of the control group completed the three-dose series. However, their reviews did not identify any superior interventions to recommend for wide-spread implementations (Fu, Bonhomme, Cooper, Joseph, & Zimet, 2014).

In further years after the implementation of HPV vaccination, Marek et al. (2012), confirms that brief interventions provided in one or two lessons in a school environment appear to be effective in raising awareness in both female and male adolescents and in enhancing their belief as also found by Kwan et al., (2011). The education programme was held by a trained health educator during students' regular classes for about 45 minutes consisting of didactic presentation and was followed by question-and-answer session, and the students also were provided with handouts containing key messages (Marek et al., 2012). However, the authors demonstrated that, it has little impact on attitudes towards prevention. They highlighted that Hungarian adolescents have been practising extremely risky sexual behaviour. Nearly half of the sexually active adolescents had engaged in 'one-night relationship' (41.1%) as well as having sexual intercourse without any contraceptive safety measures (44.3%).

Concerning to the methods of health education intervention, there was no significant difference between two health education teaching methods - HPV lecture and HPV website, nor there was a significant difference found in the pre-test and post-tests scores for both teaching methods on HPV knowledge and belief among university students (Park, 2010). However, this study was small with total participants of 58 university students. In contrast, larger study among 1146 employed women and 557 female undergraduate students found that lecture-based education initiative into a government-sponsored or school-based programme improve HPV-related knowledge and HPV vaccine acceptability (Chang et al., 2013). Another study by Paul et al (2011), supported that lecture method of education session also effective in increasing awareness on HPV vaccination among influential groups of female adolescents especially parent, school staff members and health staffs. School staff members (more than

90%) believed HPV and HPV vaccine education is worthwhile for school personnel and middle schools were an appropriate venue for that education. Most parents (97%) and school staff members (85%) indicated they would be supportive of school-based vaccination clinics. In this study, school websites and voicemail systems helped notify and remind parents about the education sessions. Web-based intervention increased the knowledge on HPV were greater in men, while changes in attitudes toward vaccination were larger in women (Doherty & Low, 2008). Nevertheless, in term of cost the electronic medium for HPV vaccine education about 23% was more costly than the standard low-tech print based approach (Karanth et al., 2017).

However, evidence suggests that interventions to promote sexual and reproductive health, mental health and wellbeing, over weight and obesity, and minimising exposure to substance abuse can improve health outcomes in young adolescents (Ajie & Chapman-Novakofski, 2014; Das, Salam, Arshad, Finkelstein, & Bhutta, 2016; Peirson, Ali, Kenny, Raina, & Sherifali, 2016; Salam et al., 2016). Ajie and Chapman-Novakofski (2014) found that computer-mediated nutrition education programs for adolescents show small, mainly short-term, changes in obesity outcomes, for example, body mass index (BMI), diet, nutrition knowledge, and physical activity. Whereas, Das et al (2016) suggested that sexual and reproductive health education, counseling, and contraceptive provision are effective in increasing sexual knowledge, contraceptive use, and decreasing adolescent pregnancy.

Health education intervention proven to improve the knowledge and awareness in many issues and population. It can be delivered via many approach and methods but need to consider the impact to the targeted population and cost effectiveness to the providers.

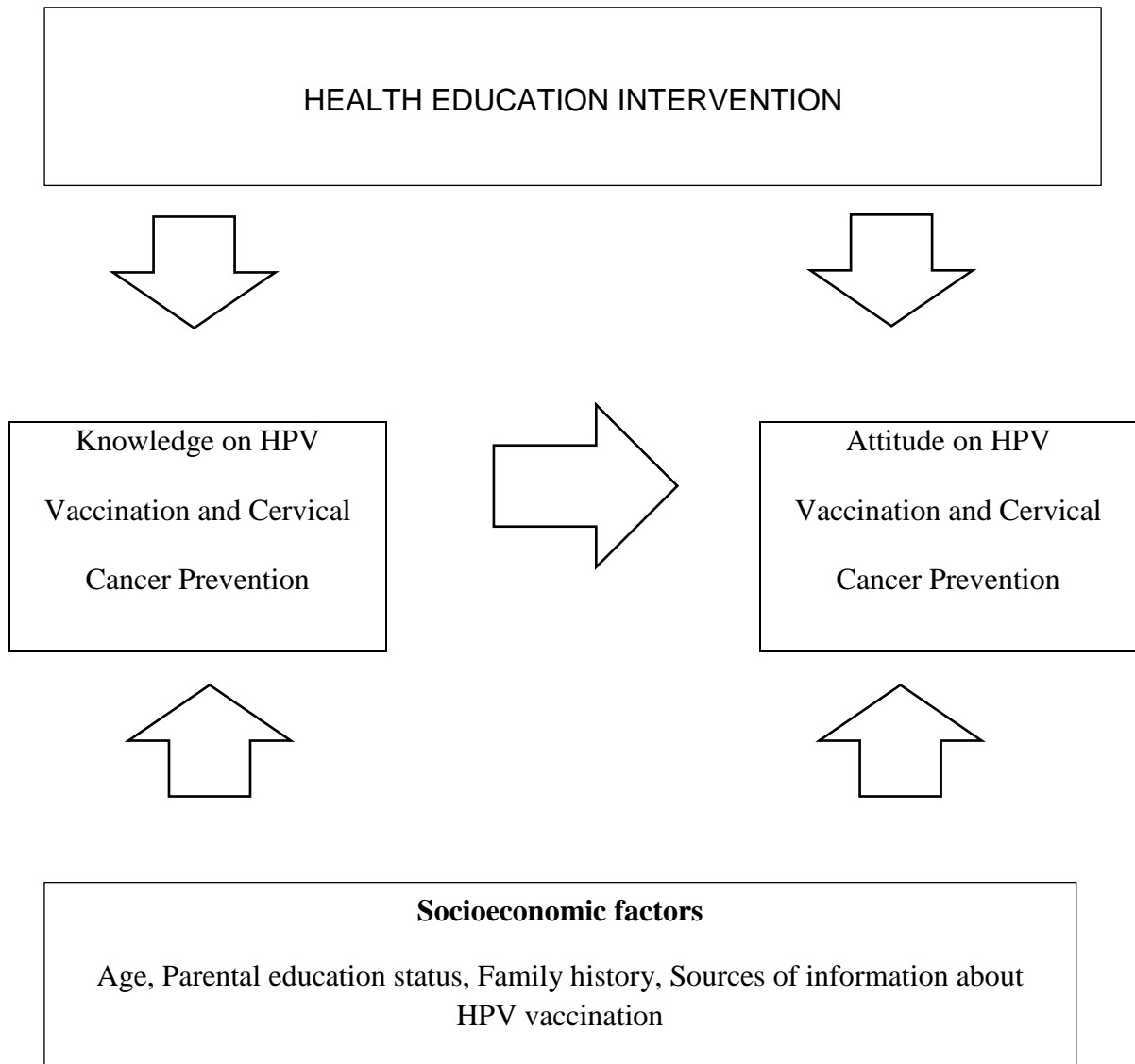


Figure 1 Conceptual framework

CHAPTER 3

OBJECTIVE AND RESEARCH HYPOTHESIS

3.1 General Objective

To determine the effectiveness of health education programme on knowledge and attitude on cervical cancer prevention and HPV vaccination among secondary school girls in Kota Bharu, Kelantan.

3.2 Specific Objectives

1. To compare the knowledge score between intervention and control groups at three month following health education programme among female secondary school students in Kota Bharu.
2. To compare the attitude score between intervention and control groups at three month following health education programme among female secondary school students in Kota Bharu.

3.3 Research hypothesis

1. There is a significant mean difference of knowledge percentage score between intervention group and control group at baseline and three months following health education programme.
2. There is a significant mean difference of attitude percentage score between intervention group and control group at baseline and three months following health education programme.

3.4 Operational definitions

1. Standard educational materials are defined as three pamphlets produced by Ministry of Health containing information about HPV vaccination.
2. Cervical cancer is a gynaecological cancer where persistent HPV infection drives cervical cancer from pre-cancerous lesions.
3. HPV vaccination schedule is defined as three-dose injections at 0, first and sixth month if before 2015, and two-dose injection at 0 and sixth month starting in year 2015 onwards.
4. Completed vaccination is defined as completed three doses of HPV vaccination for Form two and three students and completed two doses for Form 1 students.
5. Health education is defined as an activity that seeks to inform the individual on the nature and causes of health or illness and that individual's personal level of risk associated with their lifestyle-related behaviour. Health education seeks to motivate the individual to accept a process of behavioural change through directly influencing their value, belief and attitude systems, where it is deemed that the individual is particularly at risk or has already been affected by illness/disease or disability (Whitehead, 2004).

CHAPTER 4

METHODOLOGY

4.1 Study Design

This is an open, non-randomised interventional study with control.

4.2 Reference population

The reference population is all adolescent girls in Kota Bharu.

4.3 Source population

The source population is all female students in secondary schools in Kota Bharu.

4.4 Inclusion criteria

1. Girls in secondary schools in Kota Bharu in Form 1, 2, and 4

4.5 Exclusion criteria

1. Illiterate
2. Unable to understand Malay language.

4.6 Sample size calculation

The sample size calculations were performed for all objectives of the study and the biggest calculation sample size was chosen as the sample size of study.

Objective 1 was to compare the knowledge score between intervention and control groups at three month following health education programme among female secondary school students in Kota Bharu. The t-test with independent sample formula was used to calculate the sample size. Based on a study by Kwan et al., (2011) using PS software 13;

$$\alpha = 0.05$$

$$\text{Power} = 0.8$$

$$\delta = \text{difference in mean, adjusted based on expert opinion}$$

$$\sigma = \text{standard deviation of 3.21}$$

$$m = 1$$

For knowledge score on HPV vaccination, if $\delta=2$, with the non-response rate of 20%, and multiply with two for cluster effect the calculated sample size was 103 per group.

For comparing mean score of knowledge within the group, t-test with paired sample was used.

Based on the study by Kwan et al., (2011) using PS software 13.

$$\alpha = 0.05$$

$$\text{power} = 0.8$$

$$\delta = \text{difference in mean, adjusted based on expert opinion}$$

$$\sigma = \text{standard deviation of 3.21}$$

For knowledge score on HPV vaccination, if $\delta=2$, with the non-response rate of 20%, and multiply with 2 for cluster effect the calculated sample size is 55 per group.

Objective 2 was to compare the attitude score between intervention and control groups at three month following health education programme among female secondary school students in Kota Bharu.

For comparing the mean score of attitude score between the group t-test with independent samples was used. Based on the study by (Kwan et al., 2011), by using PS software 13.

$$\alpha = 0.05$$

$$\text{Power} = 0.8$$

$$\delta = \text{difference in mean, adjusted based on expert opinion}$$

$$\sigma = \text{standard deviation of 4.00}$$

$$m = 1$$

For comparing the mean score of attitude between the group towards HPV vaccination, if $\delta=3$, and $\sigma= 4.00$, with the non-response rate of 20%, and multiply with 2 for cluster effect, the calculated sample size was 72.5 per group.

For comparing mean score of attitude within the group, t-test with paired sample was used. Based on study from Kwan et al. (2011), by using PS software 13.

For comparing mean score of attitude within the group towards HPV vaccination, if $\delta=3$, and $\sigma= 4.00$, with the non-response rate of 20%, and multiply with 2 for cluster effect, the calculated sample size is 40 per group.

Therefore, the sample size for the study was obtained from the biggest sample size calculation (objective 1) which was 103 subjects per group.

4.7 Sampling methods and recruitment

The recruitment process started once we received the approval letter from the Ministry of Health and followed by permission letter from the Department of Education of Kelantan State. Form three and five students were not selected because Ministry of Education Malaysia did not encourage research to be conducted on students who are taking National exams (appendix). By the time the study began, the form one students have already received the first dose, and form two and four had all three doses of the vaccine. This study involved students from two government schools which were in Kota Bharu district of Kelantan, about 4 km from the main town. The schools were matched by profile, students' population and age-composition with almost similar characteristics in term of their students' achievements and social background. This method was used to increase the chance of homogeneity between both groups of samples. Students from Sekolah Menengah Pengkalan Chepa (2) was chosen to be interventional group just by chance as we first received the approval letter from the school. Whereas those from Sekolah Menengah Kebangsaan Penampang were in the control group.

A multistage cluster sampling method was implemented to select participants. First, three forms were selected at each level of education which were form one, two and form four. Second, from each form, first three classes were selected as suggested by the teachers in order to encourage students' participation in this programme. The parental consent and youth assent forms (appendix) were distributed several days earlier to the students with a brief explanation about the study by the investigator. All students from each selected classroom (three classes in each forms) were invited by teachers to voluntarily participate and those who consented were included in study.