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Prevention of Cervical Cancer

Literature Review for MaZaFi3-project

Helsinki Metropolia University of Applied Sciences

Bachelor of Nursing

Degree Program in Nursing

Final Project

19.5.2015

Authors Title	Laura Mattila and Henna Huuhtanen Prevention of Cervical Cancer
Number of Pages Date	27 pages + 26 pages appendices 21 May 2015
Degree	Bachelor of Nursing
Degree Programme	Degree Program in Nursing
Specialisation option	Nursing
Instructor(s)	Eila-Sisko Korhonen, (Senior Lecturer) Kirsi Talman, (Senior Lecturer)
<p>Cervical cancer is a serious health burden worldwide, approximately 528 000 new cases and 266 000 deaths occurred in 2012. Despite the high mortality rate cervical cancer is highly preventable and treatable. The prevalence of cervical cancer in developed countries has decreased due to effective screening and vaccination programs, while the prevalence and mortality remains high in low- and middle- income countries due to the shortage of prevention services and limited knowledge. The purpose of the final project is to describe evidence-based knowledge about the prevention of cervical cancer. The aim of the literature review is to promote high quality care and health care education. The study question of the final project is: What are the best practices for the prevention of cervical cancer?</p> <p>This final project is an application of a systematic literature review, performed systematically by identifying, evaluating and summarizing the findings of 19 relevant evidence based studies of the topic.</p> <p>Vaccination and screening are the two most effective methods for decreasing the incidence and mortality of cervical cancer. An effective prevention strategy combines vaccination with well-organized national screening program. Vaccination programs have been proven to be cost-effective and potential to achieve high coverage. However, countries which have the highest burden of cervical cancer are dependent financial assistance in order to sustain a vaccination program. In many countries, significant cultural, ethical, social, infrastructural or/and practical barriers exist. These obstacles should be taken into account in order to implement a successful cervical cancer prevention. Additionally, several studies have noted that women generally have poor knowledge of risk factors and the causative relationship of HPV and cervical cancer. Providing education for women is essential for increasing the knowledge, and screening and vaccination attendance. Nurses play an important role in promoting sexual health and providing the necessary education.</p>	
Keywords	Cervical cancer, health promotion, nursing, screening, vaccination, best practices

Tekijät Otsikko	Laura Mattila ja Henna Huuhtanen Prevention of Cervical Cancer
Sivumäärä Päivämäärä	27 sivua + 26 sivua liitteinä 21.05.2015
Tutkinto	Sairaanhoitaja (AMK)
Koulutusohjelma	Degree Program in Nursing
Suuntautumisvaihtoehto	Sairaanhoitaja
Ohjaajat	Eila-Sisko Korhonen, (Senior Lecturer) Kirsi Talman, (Senior Lecturer)
<p>Kohdunkaulan syöpä on maailmanlaajuisesti valtava terveysongelma. Arvioiden mukaan vuonna 2012 ilmeni 528 000 uutta tapausta ja 266 000 kuolemaa. Korkeasta kuolleisuusluvusta huolimatta, kohdunkaulan syöpää on suhteellisen helppo ennalta-ehkäistä ja hoitaa. Kehittyneissä maissa kohdunkaulan syövän esiintyvyys on laskenut merkittävästi tehokkaiden seulonta ja HPV-rokotusohjelmien myötä, kun taas samaan aikaan keski- ja matalan tulon maissa kuolleisuus ja esiintyvyys luvut ovat edelleen korkeita. Tämän lopputyön tarkoitus on kuvata kohdunkaulan syövän ennalta-ehkäisyä tutkimukseen perustuvan tietoon nojaten. Tavoitteena on tuoda tutkittua tietoa kohdunkaulan syövän ennalta-ehkäisyn tueksi.</p> <p>Tutkimuskysymys on: mitkä ovat parhaat näyttöön perustavat hoitokäytännöt kohdunkaulan syövän ennaltaehkäisyssä? Tämä työ on sovellettu systemaattinen kirjallisuuskatsaus, jonka aineisto on kerätty elektronisista tietokannoista (CINAH and MEDLINE). Kirjallisuuskatsaus tarkastelee 19 tieteellistä artikkelia.</p> <p>Rokottaminen ja seulonta ovat tutkimustulostemme mukaan kaksi tehokkainta tapaa vähentää kohdunkaulan syövän esiintyvyyttä ja kuolleisuutta. Tehokas ennalta-ehkäisy strategia on yhdistää rokottaminen ja hyvin organisoitua kansalliseen seulontaohjelmaan. Maat, joissa kohdunkaulan syöpä on suurin ongelma, tarvitsevat taloudellista tukea pystyäkseen ylläpitämään rokotusohjelman.</p> <p>Monissa maissa on myös todettu erilaisia kulttuurisia, eettisiä, sosiaalisia ja infrastruktuuriin liittyviä esteitä ennaltaehkäisylle. Jotta kohdunkaulan syövän ehkäisy voisi olla tehokasta, nämä esteet tulisi huomioida.</p> <p>Tutkimustulostemme mukaan naisilla on yleisesti puutteita riskitekijöiden ja kohdunkaulan syövän ja HPV infektion välisestä yhteydestä. Sairaanhoitajalla on tärkeä rooli kohdunkaulan syöpään liittyvän tietoisuuden kasvattamisessa. Sairaanhoitaja voi työssään mahdollisuus kertoa rokottamisen ja seulonnan hyödyistä ja näin ollen lisätä osallistujalukuja</p>	
Avainsanat	Kohdunkaulansyöpä, terveyden edistäminen, sairaanhoito, seulonta, rokotus, parhaat hoitokäytännöt

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1 Introduction

Cervical cancer is a serious health problem worldwide, approximately 528 000 new cases and 266 000 deaths occurred during 2012. Cervical cancer is one of the most common cancers among women and the fourth leading cause of the cancer death in women worldwide. High-risk regions of cervical cancer are Eastern Africa, Melanesia, Southern and Middle Africa. (Globocan 2012.) Approximately 88% of cervical cancer related deaths appear in developing countries (Singht, Azuine & Siahpush 2012:18). Differences in prevalence's and mortality rates between countries are shown in appendix 1. Despite the high mortality rate, cervical cancer is highly preventable and treatable. The shortage of knowledge, access, resources and prevention services for cervical cancer are the main reasons for mortality and incidence rates are significantly greater in low- and middle- income countries than in high income countries. (SALC 2012; WHO 2014:25.)

The primary cause of cervical cancer is a human papillomavirus (HPV) infection. The infection is passed from one person to another through sexual contact (National Cancer Institute 2014). According to WHO (2014:7), incorporating HPV vaccinations into a national immunization program is an effective long-term plan in reducing cervical cancer prevalence and mortality; especially in developing countries. In many developed countries, the cervical cancer rate has decreased remarkably, in response to the cervical screening and treatment programs (WHO 2014:7). Since, the HPV vaccination cannot provide a protection against all HPV infections, nor treat pre-existing HPV infection it is essential to continue to vaccinate women and encourage them to undergo regular cervical cancer screening (National Cancer Institute 2014). According to an estimation, the vaccination prevents 70% of infections and screening more than 80% of cervical cancer cases and deaths (Duodecim 2013). Screening is an early detection method that can prevent a majority of cervical cancers. Recommended screening tests are visual inspections using acetic acid (VIA), cytology and HPV tests. In order to provide an effective cervical cancer prevention, women who test positive have to receive appropriate treatment. (WHO 2014:10)

Since HPV epidemics have a major public health influence, it is essential to screen and vaccinate the population from papillomaviruses (Vesterinen 2004:75). Nurses have a

significant role in providing information to women about cervical cancer and demonstrating the importance of the screenings and vaccinations (Schwaiger, Aruda, La Coursiere & Rubin 2011:417).

This final project is a part of the MaZaFi network project between Malawi, Zambia and Finland. The project has existed since 2004 and it has expanded to become the MaZaFi3 project in 2013. The primary objective of the MaZaFi3 project is to promote high quality health care and education through active collaboration between Malawi, Zambia and Finland. The project emphasises theoretical understanding of the professional nursing and clinical nursing skills. The aim of the project is to promote the knowledge and use of evidence-based practice research among nursing students and clinical staff by modern teaching methods. (CIMO 2013.)

The purpose of the final project is to describe evidence-based knowledge about the prevention of cervical cancer and the aim of the literature review is to promote high quality care and health care education. The study question is: What are the best practices of cervical cancer prevention?

Best practice refers to commercial or professional procedures which are accepted or prescribed to be most the correct or the most effective (Oxford Dictionaries 2015). In nursing care best practices are described to be evidence based recommendations accommodated into practice. In nursing care specific best practices are essential to standardize care and direct nurses to identify solution and problems. Although, when implementing best practice into nursing care it is important to acknowledge that the implementation involves more than just using evidence-based practice as a base of clinical decision. Considering patient's preferences and values as a part of care is as well an essential part of implementing best practice. Thus, nursing care can be evidence-based but it cannot be the best practice, if the needs and values of individuals are not noted. (Nelson 2014:1507-1516.)

2 Prevention of cervical cancer

The prevention of cervical cancer can be classified to primary prevention and secondary prevention. Primary prevention refers to preventing HPV infection and secondary refers

to detecting HPV infection and treating precursors of cervical cancer. Primary and secondary do not refer to ranking order or supremacy over one another.

2.1 Prevention in nursing care

Prevention in nursing care can be defined as an action targeted to prevent illness and promote health. Prevention is an essential part of cervical cancer nursing care, since cervical cancer is a highly preventable disease. Many lives and a lot of health care resources can be saved by well targeted preventive care. In cervical cancer prevention, a nurse's primary role is to raise cervical cancer awareness and educate people. A nurse's responsibility is to encourage patients to utilize preventive care services such as screening and vaccination. (WHO 2014:85.)

Women's knowledge of cervical cancer, risks, and their access to primary and secondary services in communities correlates with the success of the prevention of cervical cancer (SALC 2012:10). Each year, millions of people die due to preventable illnesses as a result of inadequate knowledge about the risk factors and preventive methods. Although many women have access to screenings they do not attend since they are unaware that cervical cancer is vastly preventable by screening and early treatment. (WHO 2014:84.) In prevention, nurses and other healthcare providers are in a first-hand position to provide knowledge to people (WHO 1946).

2.1.1 Preventive health education

Despite the high incidence of cervical cancer, there is limited awareness of the HPV infection, cervical cancer, risk factors and prevention throughout the world (SALC 2012:3). According to Ports et al. (2013:630-645) and Francis et al. (2011:8760–8764) increasing the public's knowledge towards cervical cancer should be one of major aims of the prevention. Greater knowledge enables women to make more informed decisions about their health. Health education provided to women should include the natural history of cervical cancer, information about HPV infection and its relation to cervical cancer, common risk factors and methods of control and the availability of prevention and early treatment (WHO 2014:66).

A nurse's role is to provide quality health education to patients. Quality health education contains accurate information and its aim is to increase awareness, change attitudes and behaviors, and reduce incidence and mortality. Since, cervical cancer can be a delicate matter for women, it is important that nurses are able to provide information in a non-judgemental way, with clear and sensitive language. Moreover, it is essential that the material provided is appropriate to the audience and tailored to local culture. (WHO 2014:84-85.) According to Flores (2011:49) culturally tailored care can hinder the stress of a patient and their family improving the quality of care.

Furthermore, one aspect of health education is to correct misbeliefs, reduce concerns and address the barriers that prevent women and families from acquiring preventive services. The barriers can vary from fear of detection of the infection, shame of an intimate examination, pain or adverse effects to the cost of preventive interventions. To reduce concerns, nurses should educate parents about the safety and importance of the vaccination and screenings. Nurses should be aware that in some cultures family members, men or leaders of communities have a strong influence on the women's health behavior. Men's support or permission may be required when women and daughters attend to preventive services. Thus, health education should not only be targeted for women and girls, but also aimed to increase men's knowledge as well. (WHO 2014: 81.)

A nurse's responsibility is to recognize the challenges, offer support and help women and families overcome them. (WHO 2014:79). Addressing ignorance, fears, embarrassment and possible stigma may be crucial in order to provide effective health education. (WHO 2014:84-85.) Women's role in society can also be utilized to promote cervical cancer education action. Ports et al. (2013:630-645) suggest that women could be educated as peer health leaders who could demystify cervical cancer, promote HPV vaccinations and provide a cost-effective means for health education delivery. Community leaders, teachers and traditional healers can also be trained to deliver information (WHO 2014:87).

2.2 Primary prevention; Vaccination

The management of primary prevention can be performed in two ways, either through vaccination or controlling the risk factors. The risk factors can be controlled by educating women in how they can decrease the risk of transmission of the HPV infection. Reducing the risk of transmission involves reducing the number of sexual partners, vaccination and

condom usage. HPV vaccines provide a protection against specific types of human papillomaviruses. Currently there are two HPV vaccines in the market: the quadrivalent vaccine Gardasil and the bivalent vaccine Cervarix. Gardasil builds a protection against four high-risk HPV types: 6, 11, 16 and 18, while Cervarix protects against two high-risk type HPVs; 16 and 18. According to estimations 70% of all cervical cancers root from types 16 and 18. (National Cancer Institute 2014.)

Based on current knowledge, the most effective primary prevention method for HPV infection is vaccination (SALC 2012:10). The National Cancer Institute (2014) states that HPV vaccination has the potential to reduce cervical cancer deaths among women around the world by as much as two-thirds, assuming that all women would be vaccinated and the protection would be long-term. Vaccination would be beneficial financially in most of the countries, since high vaccination rates can reduce healthcare costs and reduce the need for medical care, biopsies and invasive procedures associated with follow-up from abnormal screening tests. (National Cancer Institute 2014.) Furthermore, in areas where women have a limited access to screenings, vaccination alone can significantly reduce the cervical cancer rates (Lehtinen, Namujju, Sellors and Lehtinen 2011).

Different approaches for initiating vaccination programmes have been conducted in different countries. In 2013, the HPV vaccination was included in the national vaccination programme in Finland. All girls aged 11-13 were vaccinated and “catch-up” vaccinations were performed for girls aged 12-16 in 2013-2014. (THL 2013.) To standardize the vaccination programmes WHO has developed a comprehensive cervical cancer prevention and control programme, which is recommended to be used as a base of any national or regional prevention plan. According to WHO (2014:99) the recommended age for vaccination is between ages 9-13, prior to a girl’s sexual debut. Two doses would be sufficient for girls under 15 years, three for those older than 15.

Although, vaccination is a cost-effective method to prevent cervical cancer, some of the middle and low-income countries are not financially capable to provide a vaccination program to their citizens (Van Krieking, Castellsague, Cibula & Demarteau 2014:733; Kim, Campos, O’Shea, Diaz & Mutyaba 2013:60-72). To decrease the burden of cervical cancer the Global Alliance of Vaccination and Immunization (GAVI) financially supports HPV vaccinations for certain countries with the lowest income (Ports, Reddy and Rameshbabu 2013:630-645).

2.3 Secondary prevention; Screening

Half a century ago, cervical cancer caused the most cancer deaths in women in United States. The initiation of the Pap smear screening program in 1945 reduced the women's cervical cancer mortality by 70%. (Schwaiger et al 2011:417.) In Finland screening prevents more than 80% of cervical cancer cases and deaths when treated appropriately. (Käypä hoito 2010)

Secondary prevention strategies of cervical cancer includes screening, early detection and treatment of precancerous lesions. Screening and early detection should be closely related to the treatment, since screening or early detection alone do not have preventive value. By screening, cervical cancer and pre-cancer stages can be detected. When cancer is detected in its early stages, effective treatment can be initiated. (WHO 2014:124.) Available screening methods for women are Papanicolaou (Pap) smear screening (cytology), visual inspection and HPV testing. The Pap smear is a conventional method which diagnoses cancer and pre-cancer by examining changes of cervical cells (SALC 2012:11.) Liquid-based cytology is an alternate option to conventional methods. The sample provides a lower rate of unsatisfactory specimens, it is quicker and it can be used to test for HPV DNA and other STIs. However, cytology-based screening tests are expensive, technical to implement and require a second visit in case the test is positive. (WHO 2014:133.) Based on solid evidence, screening via regular gynecologic examinations and cytological testing with treatment of precancerous abnormalities decreases the incidence and mortality of cervical cancer (National Cancer Institute 2014).

Screening with visual inspection can be done with acetic acid (white vinegar) or with Lugol's iodine in order to identify the diseased area. When acetic acid interacts with the infected area, the area appears whiter than the rest of the cervix. As this method is not laboratory dependent and does not require expensive infrastructure, it is a good and feasible alternative for most developing countries. (SALC 2012:11.)

Molecular HPV DNA testing detects high-risk types of human papillomaviruses. HPV testing requires good infrastructure and is relatively expensive. However, a new technique which does not require electricity and is non-technical is emerging. The new technique may become a good option in low-resource settings. In future it is likely that testing

samples are self-collected by women themselves, which would ease the access of cervical screening for women who are unwilling to participate in cervical examination by health care professionals and as well decrease the need for medical personnel. (SALC 2013:14; WHO 2014:130)

The frequency of screenings and age of onset varies in different countries. According to WHO (2014:207) it is recommended women to be screened at least once between the ages 30 and 49 (see figure 1). Usually the initiation age is between 21 and 25 (35 in developing countries) and the frequency of the interval should be less than five years until the age of 60. Women under 25-years old should be screened only if they have had previous abnormal screening results, multiple partners, early sexual exposure or have been diagnosed as HIV-positive. (FIGO 2009.)

Screening programmes have a potential to decrease cervical cancer incidence and mortality significantly if implemented correctly. Women who do not have access to cervical cancer screenings have a significantly higher risk of developing cervical cancer (Francis et al. 2011:8760–8764; WHO 2014:3). Additionally, as the vaccines do not protect against all of the high-risk HPV infections, it is important for vaccinated women to continue undergoing regular cervical cancer screening (National Cancer Institute 2014).

2.4 Barriers to prevention

Despite the prosperous outcomes of the primary and secondary prevention strategies, there are many limitations for prevention, which affect women's screening and vaccination behavior. Barriers to prevention include limited access to medical care, (especially in rural areas); cultural beliefs and expectations; foreign or formal language; limited knowledge; fear; embarrassment; ignorance and the lack of the financial resources (Ersin and Bahar 2013:4977-829; Francis et al. 2011; Ports et al. 2013:630-645; SALC 2012; Natunen et. al 2011). Also the lack of infrastructure, laboratories, healthcare professionals, health insurance, transportation, female doctors and concerns related to the safety and side-effects of vaccination and screening were noted as barriers to prevention (Chan, Chan, Ng & Wong 2012:481-485; Ersin & Bahar 2013:4977-4982; Sadler, Albrow, Shelton, Kitchener & Brabin 2011:41-45; Kane 2012:24-29). In addition, SALC (2012:8) states that, in some region and in patriarchal cultures, women's position in a society is limited and women may not be on charge of their health behavior. Women's sex related

decisions may be significantly influenced by their parents, family, culture, husbands and other authorities. (Ersin & Bahar 2013:4977-4829) When planning prevention strategies, these attributes needs to be considered. In addition, the prevention strategies should always be adjusted to correspond the regional and cultural special demands. (Lehtinen, Namujju, Sellors & Lehtinen 2011)

3 Background

3.1 Relationship between cervical cancer and human papillomavirus

Cervical cancer is a slow-growing cancer, which forms in a tissues of a woman's cervix. The primary cause of cervical cancer is a human papillomavirus (HPV) infection. (SALC 2012:8; WHO 2014:23.) According to current knowledge, there are more than 200 different types of human papillomaviruses, of which more than 40 types have potential to cause infection, warts or papillomas in the anogenital region. 14 types of HPV have been associated with certain types of cancer. Numerous studies have detected that 70% of cervical cancers worldwide have been caused either by HPV type 16 or 18. (Greener 2014:378; National Cancer Institute 2014.)

HPV infection is a common sexually transmitted infection worldwide (WHO 2014:23). Approximately all women and men are infected by HPV at least once in their life span. However, most infections never develop to the cancer stage (WHO 2014:37) as approximately 80-90% HPV infections heal spontaneously by immune system suppression within two years (Reunala et al. 2003:65; Teitelman, Stringer, Averbutch & Witkoski 2009:70; WHO 2014:37).

3.2 Risk factors for cervical cancer

According to several studies there are certain risk factors that can be associated with cervical cancer. Risk factors that increase the risk the of a woman to develop cervical cancer include: an early sexual life, unprotected sex, multiple partners, HIV, a weak immune system, smoking, genes (type HLA), other concurrent sexually transmitted diseases, breakage of the skin, multiple labors, chronic inflammation and long term contra-

ceptive use. (Joensuu, Roberts & Teppo 1999:387; National Cancer Institute 2014; Reunala et al. 2003:65; SALC 2012:8.) Most of the risk factors can be linked to the immune suppression, however it is still unclear why the use of contraceptives increases the cervical cancer risk. Some researchers believe that the effect is indirect, an average woman who is on the pill goes to screenings more often and they are more sexually active. (Cancer Research UK 2014.)

3.3 Symptoms of HPV infection and cervical cancer

Generally the progress of developing cervical cancer is slow and takes approximately 10 to 20 years (WHO 2014:23). Women in early phases of cervical cancer are usually asymptomatic. Typically the first symptoms appear after the cancer has reached the invasive stage. Early symptoms include: abnormal discharge from vagina, bleeding after intercourse, pain during the intercourse and increased bleeding during periods. (American Cancer Society 2014.) Some women experience lower abdominal pain, lower back pain or problems to urinate during the later stages of cervical cancer (Duodecim 2014).

4 Purpose, aim and the study question of the final project

The purpose of the final project is to describe evidence-based knowledge of the prevention of cervical cancer and the aim of the literature review is to promote high quality care and health care education. The study question is: What are the best practices of the prevention of cervical cancer?

5 Methodology

5.1 Literature review

The literature review is an organized, comprehensive and systematically written interpretation of existing literature that addresses a specific topic (Aveyar 2014:15; LoBiondo-Wood & Haber 2006:79; Burns & Grove 2005:93). The primary aim of a literature review is to present a reliable evidential summary of past research (Holly, Salmond & Saimbert

2011:16). In health science the object of a literature review is to present knowledge which promotes nursing practice and evidence-based care in nursing research. Currently, evidence-based practice within social and health care has a growing demand, since it has been proven to increase the quality of clinical decision making and outcomes of the health care of patients. (Aveyar 2014:15; Holly et al. 2011:5.)

The process of this literature review starts from the identification of the study question. After the study question is identified, the question is answered by analysing collected data, using a systematic approach (Aveyar 2010:6). In order to make the database search, concepts and keywords are identified. Sources gathered from a database search are assessed against the inclusion criterias and accepted or discarded accordingly. Then the relevancy of the references are assessed and chosen material organised, coded and analysed (See figure 2). (Polit & Becks 2004:111.) Finally, the literature review is written in a systematic and coherent manner. The results are compared and the similarities and disparities are outlined. In addition the limitations, incoherence and variables of the studies are acknowledged and rational given where possible. (Cronin, Ryan & Coughlan 2008:43.) In this final project the principles of a systematic literature review were applied.

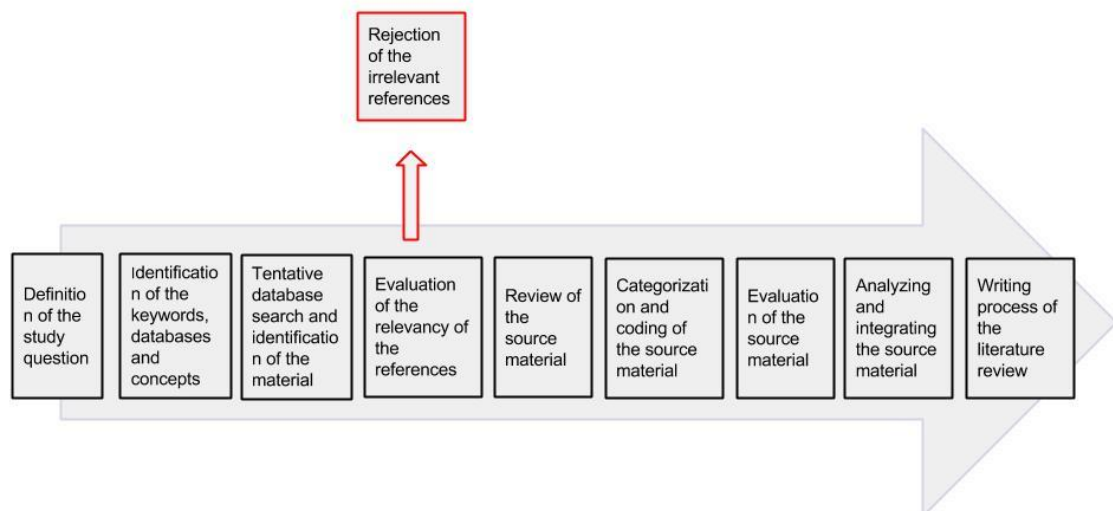


Figure 2. Flow of tasks in a literature review applied from Polit & Beck 2004:108

5.2 Database search

We aimed to implement a database search throughout the process. A tentative search was carried out at the beginning of the process in order to gain sufficient information for creating an overall picture of the topic. The framework of the topic made forming the aim, purpose and study question possible. Keywords utilised in a first search were cervical cancer, HPV, HPV vaccination, cervical screening, Pap smear, prevention, screening guidelines, Africa, cervical cancer prevention, Malawi, Zambia and Sub-Saharan Africa. Searches made in first phase were restricted to results with 'abstracts available' in the years between 2009 and 2014. The search engines that were used were: CINAHL and MEDLINE. In addition, articles, brochures and news from the internet were used to gather background information.

The aim of the second phase "Designing the plan for the final project" was to specify the search to be more specific. The specification was implemented by redefining the keywords. After first phase, the study question and the purpose of the final project was expanded to include the English speaking world. At the beginning the focus was only within MaZaFi countries. Thus, keywords concerning African countries were excluded and keywords, such as nursing and health promotion, were added. Search engines that were employed in this phase include CINAHL, MEDLINE, TERKKO, MEDIC, PUBMED and SCIENCE DIRECT. Searches in the second phase were limited to the past five years (2009-2014), abstract available and empirical studies.

During the third phase "Implementing the final project" literature reviews were included to the research. This decision was made because most of the empirical studies that were found, focused only on a specific region or country rather than on the global prevention of cervical cancer. At this phase article analyses were carried out and the forming of a

theory for the results initiated. Findings of the articles were categorized and coded and the similarities and inconsistencies were recognized. The search engines MEDLINE and CINAHL were utilized in this stage because using all the search engines mentioned in second phase gave a vast amount of hits and, considering the limited time given, it would have been impossible to analyse those properly. Keywords used in the search were cervical cancer, prevention, nursing, health promotion, screening, vaccination and best practice. Limitations were for English language articles from the past five years with abstract available.

5.3 Database search

The following inclusion criterias were used:

- The article answers the study question
- The article had a relevant heading and abstract
- It was published during the past five -years (2009-2014)
- The language of the articles were in English
- The articles are journal articles published in MEDLINE or CINAHL
- The authority of the articles available from the internet are analysed in order to provide the validity

The database search table presents the amount of articles found and selected according to the databases. Articles found matching the keywords were recorded as hits. The number of articles remained after limitations mentioned earlier, are shown in column "limitations" in database search table. The headings and abstracts of these articles were read and if considered relevant and answering the study question, recorded as articles retrieved. Finally these articles were read through and if still regarded as suitable, were noted as articles used. In total of 19 articles were chosen to this literature review. The articles are listed in the database search table in appendix 2.

5.4 Data analysis

Content analysis is broadly used as an analysis method in health science. The purpose of the analysis is to conceptualise, summarise and generalise the phenomenon in order

to aid conclusion making. In a literature review content analysis can be used as a supportive method. (Latvala & Vanhanen 2001:23; Kyngäs & Vanhanen 1999:3–4.) Content analysis is a qualitative method. Within qualitative research the phenomenon is examined holistically. A life is seen as a diverse phenomenon where different incidences affect each other's. For that reason reality cannot be divided into different parts. In a qualitative method the approach is either inductive or deductive. The main difference between these methods, is how tentative codes and categories are formed. An inductive approach moves always from specific to general when deductive moves from general to specific. This final project follows the principles of the inductive content analysis method. (Cho & Lee 2014:4.)

At the beginning of the process, the authors of this final project collected relevant data, which answered to the study question. The research process was initiated by reading and evaluating the material. After reading the material the authors analyzed and categorized the data. Soon after the initiation of the analysis the authors of this final project acknowledged, that two major categories stood out from the findings: vaccination and screening. Sub-categories also rose up from these findings which include: knowledge, education, attitudes and beliefs, accessibility, feasibility, financial aspects, competing health needs, cultural aspects, infrastructural need and health care needs. The sub-categories did not directly answer the study question, but were closely related to the results. Sub-categories are included in the discussion. Categorisation was done in order to identify the key terms and to identify the sub-categories that formed the main factors influencing prevention. A coding sheet is supplied in appendix 3 and an analysis of the articles in appendix 4.

6 Findings

The findings of this final project emphasise the importance of both primary and secondary prevention. The vaccinations have a great potential to reduce cervical cancer incidence worldwide, however, screening programmes still remain as an important prevention methods as current vaccines cannot provide total immunization for women. According to one study conducted in France vaccination along with the screening have a higher impact on reducing cervical cancer incidence than vaccination or screening alone (El Hasnaoui, Demarteau, Granados, Standaert & Detournay 2012:149).

6.1 Best practice for primary prevention

Vaccination is profitable at any age, but the best results are gained when the vaccination is completed at the age of 11-13 years. (El Hasnaoui et al. 2012:149) Almonte, Sasieni & Cuzick (2011:626) also highlight the importance of the vaccination at young age. According to Van Krieking et al. (2014:773) if 70% of young girls would be vaccinated in low- and middle- income countries, after 10 years, cervical cancer related death of four million women could be prevented. Cervical cancer mortality could be largely reduced by vaccinating young girls with bivalent vaccine (HPV 16, 18). In case; the vaccination would be performed with the quadrivalent vaccine (HPV 6, 11, 16, 18) the decrease of the mortality and incidence of cervical cancer would be 18% higher. (Van Krieking et al. 2014:773.)

Kane (2012:27), Fu et al. (2014:1902) and Chan et al. (2012:481-486) state that immunisation programmes have a potential to achieve high coverage, when the price of the vaccine is reasonable and the vaccination programme is feasible to a country's region and infrastructure. Van Krieking et al. (2014:733) claims that vaccination is a cost-effective primary prevention method in most of the countries, hence it saves money by decreasing the need of treatment interventions. Countries which have school based programme have the highest vaccination rates worldwide. (Fu et al. 2014:1901) According to Binagwaho et al. (2012:625) high vaccination coverage is maintained most effectively when the vaccination is supported by the government. A good example of well a structured and planned vaccination programme comes from Rwanda. The country achieved remarkable improvement to vaccination coverage just in five years. The key to the success in Rwanda was down to a well-planned delivery strategy and a human resource framework. The findings of the study suggest that for gaining most benefits, the vaccination program should be tailored to the countries special characteristics and needs. (Binagwaho et al. 2012:624-625.) Vaccination programmes have a great potential to reduce mortality and increase the life expectancy. Vaccination can subsequently promote the quality of life of the future generations. (Peate 2009:86.) Similarly, Almonte et al. (2011:626-627) states that the universal HPV vaccination for girls provides the best probability to control cervical cancer in future. After analyzing 72 countries with the highest prevalence of cervical cancer Fonseca, Ferreira and Neto (2013:448) also addressed that the vaccination would have a potential to significantly cut down the incidence and mortality of cervical cancer. Furthermore, their study found that, the effect was especially high in areas which did not have effective and well-structured screening programmes.

The results of the article by Monsonego, Cortes, Greppe, Hampl, Joura and Singer (2010:8070) and Kane (2012:24) noted that women with limited access to screening would benefit most from the vaccination.

6.2 Best practice for secondary prevention

Screening programmes should be performed worldwide, in order to lower the incidence of the cervical cancer and improving the early treatment rates (Hughes 2009:56). Screening programmes along with vaccination, are important firstly because vaccination cannot protect women who have had previous HPV infection; secondly, the vaccination programmes only cover certain age groups; and thirdly, because the vaccination can only protect women from cervical cancer that is caused by types 6, 11, 16 and 18. (Kim et al. 2013: 60; Kling & Zeichner 2010: 377; Peate 2009:86; Teitelman et al 2009:69-73.) Results for this final project did not clearly state what is the best practice for the prevention of cervical cancer is globally however, certain methods were the most effective in specific regions.

6.2.1 Cytology

Cytology-based screening tests have been proven to be a successful prevention method that significantly reduces cervical cancer incidence and mortality in countries which have strong healthcare infrastructure and well established and sustained screening programmes (Almonte et al. 2011: 626-627; Denny 2012:189; Hughes 2009:56; Wright & Kuhn 2011:18, Sankaranarayanan, Nessa, Esmay & Dangou 2012:222). Liquid-based cytology has replaced conventional cytology in many countries (Almonte et al. 2011:618). In 2011, more than 90% of Pap smears which were performed in the USA and UK were liquid-based (Denny 2012:193). Almonte et al. (2011:618) and Denny (2012:193) both emphasize that even though the liquid-based cytology is a more expensive method than conventional cytology based screening, has great advantages; as it has lower rates of unsatisfactory smears and more rapid interpretation compared to conventional cytology. Although cytology-based screening is simple in concept, it requires a functioning health care infrastructure which is able to provide consistent repetitive screening tests, referral for colposcopy, treatment of precursors, follow-up to detect failures of treatment, quality assurance and established registries. Since many middle- and low- income countries lack functioning health care infrastructure they face difficulties to maintain these requirements. (Wright et al. 2011:198; Denny 2012:189; Almonte et al. 2011:618).

6.2.2 Visual inspection with acetic acid

Visual inspection with acetic acid (VIA) is used in several developing countries as it needs minimal infrastructure, is affordable and gives immediate test results. The disadvantages of VIA are subjective nature of the technique, low specificity and high false positivity as many women without lesions have acetowhitening of the cervix in areas of immature squamous metaplasia or reparative conditions. According to the article this inevitably leads to over-referral, over-treatment and unnecessary anxiety. (Sankaranarayanan et al. 2012:226; Wright et al. 2011:200). Furthermore, Sankaranarayanan et al. (2012:226) claims that the low cost of VIA may be outweighed by the cost of over-treatment and over-investigations. However, Kim et al. (2013:60-72), Sankaranarayanan et al. 2013:51 and Ardahan & Temel (2011:158) state that VIA is an effective option to reduce cervical cancer incidence and diminish the probability of mortality in low-resource countries.

6.2.3 Human papillomavirus test

Human papillomavirus testing (HPV) combined to appropriate treatment has been proven to decrease the incidence and the mortality of cervical cancer (Almonte et al. 2011:627; Denny 2012:194; Wright et al. 2011:202). According to these articles, several studies (in Europe, US, India, China, Mexico, Vanuatu) present overwhelming evidence that HPV test screening is frequently more sensitive, but less specific than cytological screening and VIA for detecting pre-cancer. Another, advantage of HPV is that it provides a long-term protective effect when women test negative. (Wright et al. 2011:197-208; Almonte et al. 2011:619-620; Denny 2012:194.) Therefore, Almonte et al. (2011:623) as well as Wright et al. (2011:197-208) emphasise that the intervals of testing could be prolonged. Along with this Almonte et al. (2011:626) states that women who are vaccinated at a young age would require only three HPV tests during their lifetime, and the cancer rate would be reduced by 90%.

Women aged 30 or over are more likely to have persistent infection, when young women's HPV infection generally heals spontaneously (Almonte et al. 2011:624-625). Therefore screening with a HPV test is suitable for women aged 30 and over. The current HPV test is costly, needs well-equipped laboratories and a "screen-and-treat" version is not yet available. However, a potential advantage of HPV testing over other screening methods is the possibility of self-collection of the test by vaginal swabs. In 2011, many

European countries began to change a cytology-based screenings to a HPV-based one either as an adjunct to cervical cytology or as a total replacement. (Wright et al. 2011:197-208.) In the USA, the HPV test with cytology (co-test) is approved as a primary screening method and in Mexico is implemented as one (Almonte et al. 2011:619). Almonte et al. (2011:625) also clearly state that HPV test should be used in regions where the quality of screening cannot be maintained or where screenings do not exist.

6.2.4 'Screen-and-treat'

Studies have shown that 'screen-and-treat'- method prevents cervical cancer most effectively when screening is linked to treatment in a same visit without colposcopy. The advantages are the need of a single visit, treatment on time and it does not require a tracking and recall system for untreated women. Since, in this method women are treated without double checking the positive result and the specificity of tests varies, 5-20% of women will be treated unnecessary. (Wright et al. 2011:200-203; Sankaranarayanan et al. 2012:222.) Almonte et al. (2011:625) notes that VIA combined with cryotherapy has been a common 'screen-and-treat'- approach in low-resource areas because it can be performed by a non-physician and is low-cost. If a HPV screening test is available and coupled with cryotherapy in screen-positive women, moderate and severe cervical dysplasia would be reduced about 72% (Wright et al. 2011:203).

In conclusion cervical cancer is largely preventable when an adequate services and prevention methods are available and they are realistic for the country's infrastructure and health care resources. (Sankaranarayanan et al. 2013:51)

7 Validity

Validity is an essential tool in research to assess and interpret the quality of collected data and the study findings. Validity considers, whether the findings are convincing, well-grounded and unbiased (Polit & Beck 2004:36). However, measuring the validity is challenging and the neutrality of findings is difficult to measure (Burns & Grove 2005: 383).

Articles used in this final project were published in academic journals. In addition, the authority of the articles available from the internet are analysed in order to provide the validity. The articles from web-sites, such as Wikipedia.org with no known authors, were not used in the literature review. Data is considered valid when it is ensured that its

answers the study question and remains within the inclusion criteria (Trochim 2006). When assessing validity of a qualitative study, two strategies are recommended to use: internal and external criticism. By external criticism, a reader finds out why, where and how an empirical study is conducted then through an internal criticism bias of the author is evaluated and the results and the statements of the research are considered carefully. (Burns & Grove 2007:74-75.) These interventions were done to all chosen articles. The two authors of this final project separately considered and evaluated through internal and external criticism the validity of each chosen article. Before including an article to the literature review, both authors shared the same views and insight and considered it worth for the literature review. The chosen articles were gathered from around the world to provide a large scope for interpretation. The research findings were presented as they are in the articles to support conformability (Polit & Beck 2004:36).

The Metropolia University of Applied Sciences guidelines for literature review were followed throughout the final project process. This final project was given to instructors and presented on seminars regularly for follow-up. The suggestions for quality improvements were then followed. In addition, the quality of academic language was checked by an English teacher.

Validity of the results can be affected by misunderstandings of translation, a reviewer's subjective view on the topic and articles which reviewers choose to be included as most valid in this final project. As an objective view should be maintained through the research project (Tuomi & Sarajärvi 2009), researchers are aiming not to involve their own views, opinions or interpretations in the process.

8 Ethical considerations

The ethical awareness of sensibility is important to maintain all the way from the beginning of the process until the end (Kjellström & Fidlund 2010:383). When performing an analysis process of the articles is essential to consider the accuracy of the researches (Burns & Grove 2003:430). A code of ethics, ethical review boards and governmental regulations are institutions that regulate ethical violations and misbehavior in research. To regulate ethical violations in research today many medical journals use ethical guidelines' requirements approved by the ethical review boards. When performing a literature review it is important to check whether an article has any mentions of ethical considera-

tions and if not, the ethical competency of an article should be considered carefully (Kjellström & Fidlund 2010:384.) According to Kjellström and Fidlund (2010) inadequate reporting about the research ethics in a long period may harm the status and the role of the research in health care and society. (Kjellström & Fidlund 2010:391) To ensure the objectivity and accuracy of the research is recommended that an external person evaluates the ethical legitimacy of the research and gives their opinion and guidance (Polit & Beck 2004: 159).

Misconduct and fraud are two major ethical issues in a research. Misconduct emphasizes an ignorance and carelessness during a research process, including inadequate referencing of previous findings, not giving credibility to other authors, inaccurate reporting of methods and research and publishing old results as a new. (Academy of Finland 2003:22.) Scientific fraud is a serious ethical issue which includes intentional or unintentional misleading of scientific communities. Scientific fraud includes fabrication, plagiarism, falsification and misappropriation. Fabrication occurs when false perceptions or results are conducted to the study or observations are made in a different manner or method than mentioned in a study. Falsification means that original references are mis-conducted and a content is changed or the result of the research is selected or changed without any scientific argumentation. In addition, leaving out relevant conclusion for the results can be seen as falsification. Plagiarism is borrowing or copying someone else's text without permission and giving credibility. Finally, misappropriation means stealing author's idea, plan or findings. (Academy of Finland 2003:7, 22.)

The authors of this final project have acknowledged the risk of bias, fraud and misconduct and are prevalent and these have been considered throughout the process. In addition, objective guidance from an external person was utilized. Personal opinions and interpretations were acknowledged and avoided by double checking of both authors. At the beginning of the process, an official contract with the school, committing to follow the ethical principles of the research. When performing the data analysis, it was checked if the article mentions the ethical consideration and limitations of the study. To avoid plagiarism, the results of the studies were paraphrased without misconducting or converting the statements of the original author. Finally the final project was run through the "Turnitin" programme which have been designed to reveal the plagiarism. The sources utilized in this literature review are accurately cited and all the references were listed according to Metropolia University of Applied Sciences Guidelines for Writing Papers.

9 Limitations of the literature review

A literature review of prevention of cervical cancer is a vast area to cover thoroughly. Database searches gave huge amount of articles to cover in a limited time. As the authors of this final project were student nurses who had no previous experience of research or writing literature review, the lack of experience may have been affected on validity and consistency of the database search and analyzing process.

To minimize the risks, the authors familiarized themselves with the literature review process and carefully followed the principles of the literature review with a guidance of the school senior lecturer.

10 Discussion

The purpose of the final project was to describe evidence based knowledge of the prevention of cervical cancer and to describe the best practices of the prevention of cervical cancer. Professional literature regarding the subject is vast, however, all the articles which were read to this literature review shared similar views and no disparities were found. Vaccination and screening were the two main themes. To be able to implement these effectively cervical cancer prevention requires sufficient infrastructure and financing, appropriate health education to increase knowledge and guarantee of access to preventive services.

10.1 Screening as a primary prevention method

The study findings did not clearly show which of the screening options is the most effective for the prevention of cervical cancer, as all three have their own advantages and disadvantages. However, findings note that certain types of screening are more suitable to certain regions. Thus, in reducing cervical cancer incidence and mortality in low-resource setting, the most suitable screening method may be VIA and in high-resource countries, cytology-based screenings (conventional and liquid-based) may be used as secondary prevention methods. Currently LBC offers advantages over conventional cytology, after all both of them require complex infrastructure. In the future, a cytology-based screening test might gradually change to HPV screening as the vast evidence favours its superiority. However, cytology or VIA can be used as a valuable triage to avoid an increase in the referral rates to colposcopy (Almonte et al. 2012:625). VIA might also be replaced by HPV test that are shown to be simple, rapid and suitable for 'screen-

and-treat' HPV testing and will soon be available. According to study findings the 'screen-and-treat'-method seems to be appropriate approach especially to developing countries. Over-detection is a disadvantage of all screening tests which leads to overtreatment of women. Nevertheless, the benefit of detecting pre-cancerous lesions early outweighs the relatively small consequences of unnecessary treatments and above all more cervical cancer will be prevented than in the presence of non-existence of screenings (WHO 2014:124).

10.2 Vaccination as a secondary prevention method

In 2006 the HPV vaccination was introduced, after which countries started to integrate it into their vaccination programmes. The findings of this final project clearly state that the vaccination is the best practice for primary prevention of HPV, since it is relatively cost-effective and has potential to reach large number of girls. Vaccination programmes could provide a solution to low- and middle- income countries which have had difficulties to initiate and sustain screening programmes. In addition since most of the countries already have an existing vaccination programme, HPV vaccinations could be integrated into the existing vaccination programmes. Vaccinations are relatively common procedures all over the world and it is generally highly accepted. Hence, it could be assumed that women and men would have less fears and misbeliefs as well as individual and cultural barriers against vaccination than screenings. However, as the vaccination neither provides 100% protection nor cures the already existing infection, screenings are still as a valuable prevention methods as vaccination. Thus, the results of this final project state that the most effective method to manage the cervical cancer prevention is to combine screening and vaccination.

10.3 Nurses role in prevention

Poor knowledge of HPV and cervical cancer was stated as a major barrier to prevention in several articles (Chan et al. 2012:481-482; Natunen et al. 2011; Tu & Wang 2013:330; Kessler 2012:61). Nurses and other health care providers are in an essential role in promoting sexual health and providing education (Boyce & Holmes 2012:43416; Donati et al. 2012:2081; Gulhane, Akyuz & Yenen 2013:146-157; Teitelman et al. 2009:76; Wamai et al. 2013:1399-1406; Chan et al. 2012:485). From education, nurses are able to increase knowledge, and change attitudes and misbeliefs.

Current, accurate and relevant information for women, girls and men is valuable as it affects screening and vaccination attendance as well as reducing fears and concerns (Chan et al. 2012:484-485; Tu & Wang 2013:330). Education should be targeted mostly at women and girls however, as a woman's risk of being infected of HPV does not depend only on her own sexual behavior but also on her partner's behaviour, educating males about HPV infection would also be beneficial. Additionally, because attendance to programmes is partly dependent on attitudes of parents, spouses, relatives, politicians or other influential people of community (Natonen et al. 2011), education should be provided to them as well.

Studies have shown that health care professional's attitudes and knowledge of the preventive services influence on uptake rates (Fonseca et al. 2013:448; Chan et al. 2012:485; Peate 2009:86-89). Therefore, an adequate training and education concerning HPV and cervical cancer should be provided for nurses and health-care providers so that they are able to educate people appropriately. Nurse should acknowledge that cancer and sexually transmitted infections may be associated with fears, misconceptions or stigma. In order to overcome these issues and building a trust with patient, a nurse should be able to respond accurately and share information in a respectful and sensitive manner.

10.4 Factors affecting prevention

There are several other factors, which influence cervical cancer prevention as noted in reviewed literature. We will discuss briefly of the barriers, school-based vaccination, media's role and the impact of male vaccination.

10.4.1 Barriers

According to findings of this study cervical cancer prevention services are best organized in areas with well-structured infrastructure and functioning health care services. Areas with poor infrastructure, low income and low acceptance are struggling in providing cervical cancer services. Enabling women's access to preventative health care and providing education is crucial to decrease the incidence of cervical cancer. According to our findings, prevention strategies are most effective when they are adjusted to regional and cultural needs. The preventative methods used should be tailored for local practice and

women's needs. Thus, in order to maintain a well-established prevention program ethical, cultural, social and practical factors must be acknowledged. Furthermore, Natunen et al. (2011) emphasises that adjusting prevention strategies to local needs would improve the feasibility and increase the access, coverage and acceptability. When considering the local needs several issues need to be taken into account, such as: the language used, the readability, structural format and the content of the educational material. Ideally, the educational material should meet women's/men's ages, status, educational levels, cultural/ethical backgrounds and beliefs and misconceptions. (Maree & Wright 2011:118–122.)

10.4.2 School- based vaccination program

Our findings suggest that the vaccination and screening are most effective when funded by government. Thus, governments should be encouraged to include a HPV vaccine into an immunisation program and support regular screenings. (Perkins, Langrish, Cotton & Simon 2011:85-90; Kwan et al. 2011:118-122.) Furthermore, our findings demonstrate that countries which have school-based vaccination programmes generally have the best coverage and compliance of HPV vaccination (Kane 2012:26; Natunen et al. 2011). Also, the health education of HPV could easily be related to a school's sexual education program, which would increase the knowledge of preventative services and methods.

School vaccination would be profitable since our finding states that the best age to vaccinate is at an age of 11-13. However, since girls are under-aged when vaccinated parental approval is required. By providing information to parents, school nurses ensure that the parents have adequate knowledge and are able to make informed decisions. In order to diminish the fears and doubts of the parents, it is essential that school nurses are well educated and able to utilize and cite evidence-based knowledge as a basis of education. (Kwan et al. 2011:118-122; Lockwood-Rayermann & McIntyre 261-268; Teitelman et al. 2009:69-76.) Some parents express that vaccinating young girls will imply risky sexual behaviour (Lockwood-Rayermann & McIntyre 2009:267; Chan et al. 2012:485). The information shared about HPV vaccinations would be more profitable if it focuses more on self-protection than sexual behaviour and STD's, since this would ease the concerns about vaccination causing adolescent promiscuity (Maree & Wright 2011:122; Kwan et al. 2011:118-122; Markovitz, Song, Paustian & Reda 2014:34). This would apply to both schools and in general. Maree and Wright (2011:118-123) noted that

education material highlighting sexual behavior, multiple partners and sexually transmitted disease has been linked to promiscuity, stigma and labeled women as a “bad women”. This is especially seen in cultures where attendance to vaccination and gynecologic exams before marriage can be related to unaccepted premarital sexual behavior (Ersin & Bahar 2013:4977-4829; Gu, Chan & Twinn 2010:445-453). Stigma was shown to be a powerful barrier to vaccination, screening and treatment therefore nurses should present information in a culturally competent and non-stigmatising way.

10.4.3 Quadrivalent vaccination for males

Quadrivalent vaccines protect from type 11, 6, 16, 18 HPV strands, when bivalent protects only from types 16 and 18. Types 11 and 6 are responsible for most of the genital warts and condylomas (WHO 2014:99; SALC 2012:10.) Quadrivalent HPV vaccination is also available for males with the potential to reduce HPV transmission, genital warts, oral, anal and penile cancer. As the incidence of HPV related non-cervical cancer is relatively low and the high coverage of female-only vaccination have potential to reduce HPV incidence markedly. Since the incidence of other HPV-related cancers at such a low in this sense vaccinating males is not cost-effective. (Kim et al. 2013:60-72.) Although Peate (2009:89) states that if the vaccination would also cover males, the mass immunity effect would be greater which would decrease the chance of the transmission. Similarly, the result of this study suggest that cervical cancer mortality and incidence could be reduced by 18%, if the vaccination used would be quadrivalent instead of bivalent. According to this theory a vaccinated male would prevent a female from getting HPV-infection. However, the benefits of cervical cancer prevention by male vaccination is still unclear. Further studies are needed (Lockwood-Rayermann & McIntyre 2009:261-269).

10.4.4 Strategies to improve attendance

As mentioned before knowledge and attitudes have a major influence on people’s cervical cancer prevention attendance. In order to change attitudes and awareness is important to increase people’s level of knowledge of the disease. These days, media has an important role as an information channel and it can affect highly on attitudes. According to studies, positive media attention can increase uptake and acceptance of the vaccine and screening programmes. (Hilton, Kunt, Langan, Bedford & Petticrew 2010:942-

950.) Thus, in order to maintain better cervical cancer prevention attendance rates educational interventions and media campaigns should be used.

Several countries have used different approaches to increase the level of knowledge and use of preventive services. In Zambia, traditional marriage counselors have been educating women and their families about cervical cancer (Kapambwe, Parham, Mwanahamuntu, Chirwa, Mwanza & Amuyunzu-Nyamongo 2013:57-64). In South Korea increased cervical cancer awareness has come from several campaigns on TV, radio, buses, the subway and, social media. As a result of these campaigns screening rates were duplicated and vaccination rates were significantly increased. (Perspectives in Public Health 2013.) Gulhane, Akyuz and Yenen's research in Turkey (2013) demonstrated that educational brochures were effective in providing information to large number of women who have little or no knowledge of cervical cancer.

10.5 Suggestions

Based on the findings and all the articles read, some suggestion can be made. Education concerning HPV and cervical cancer could be added to public education of women's health worldwide as it has been stated that through better knowledge people are empowered to make more consensual health decisions (Hunter & Kelly 2012). As stated before education should be provided to vast range of people. Additionally health providers should be adequately trained and national guidelines provided. Since preventive services are effective only when they are accessible, strategies should be developed to guarantee women's access. This should not be dependent on distance to facilities, women's social or economic status or local culture. Especially, low- and middle income countries' health care systems should be strengthened to make preventive services feasible and affordable.

11 Conclusion

As noted earlier cervical cancer is generally a well preventable and treatable cancer. The incidence of cervical cancer has reduced significantly in developed countries as a result

of well-established screening and treatment programmes. However, cervical cancer continues to be one of the most common cancers affecting women in developing countries, causing high mortality. Approximately, 85% of all cervical cancer cases occur in developing countries. Global disparities are mainly caused by shortage of prevention services, accessibility, lack of knowledge and the high incidence of competing health needs. (Wright et al. 2011; Saraiya, Steben, Watson & Markowitz 2013:426-33.)

The findings of this project suggest that the most effective prevention strategy is to combine vaccination with well-organized national screening program. Vaccination has a potential to reduce significantly HPV infections, as it can achieve high coverage and acceptance levels. However, screening programmes remain valuable prevention method as vaccination cannot protect women from all HPV infections. Hence, people generally have poor knowledge of HPV infection and it's relation to cervical cancer, nurses play an important role in providing education and promoting sexual health. Increased knowledge positively correlates with screening and vaccination attendance, as it decreases fears and misbeliefs. In many countries cultural, ethical, social, infrastructural or/and practical barriers exist. In order to maintain an effective cervical cancer prevention it is essential to acknowledge the existing barriers of the region. Nurses should be trained to provide health education that is tailored for to a local cultures and needs. Education should be targeted to women and girls who are eligible for preventative services as well as to their family members and authorities who might have influence on their vaccination and screening behavior. Nurses can ensure that women, families and communities understand that cervical cancer is preventable and curable (WHO 2014:5).

As more research is continually done and new approaches are developed for both primary and secondary prevention, recommendations and best practices are likely to change in the near future (Almonte et al. 2011). These have the potential to confront cervical cancer in a more comprehensive way and make a healthier future for girls and women.

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First Invitation: a Qualitative Study of UK Parents and Girls of Vaccination Age. *Journal of Medical Screening* 18 (1), 41-45.

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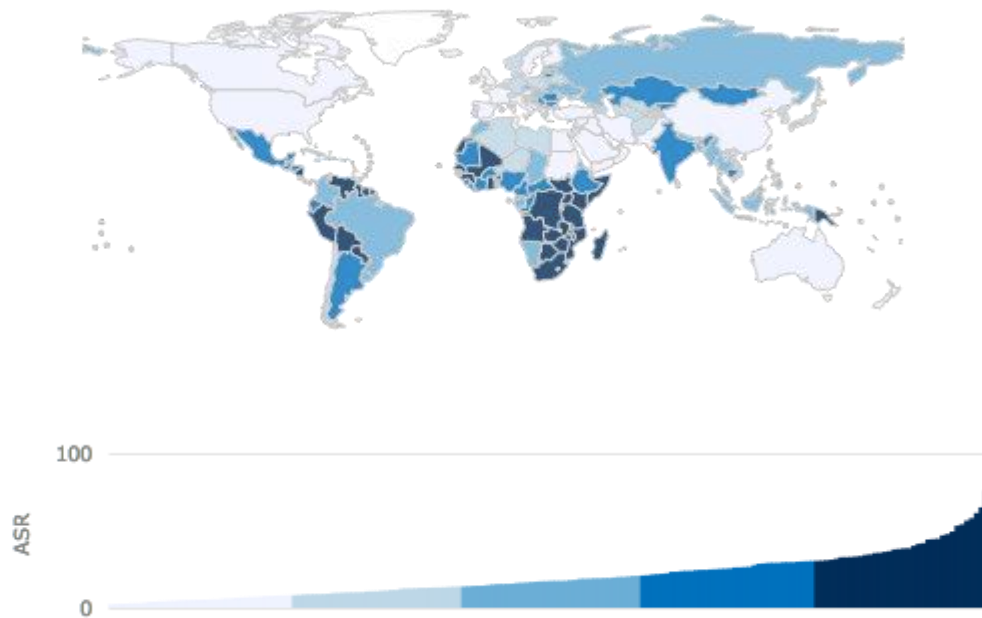
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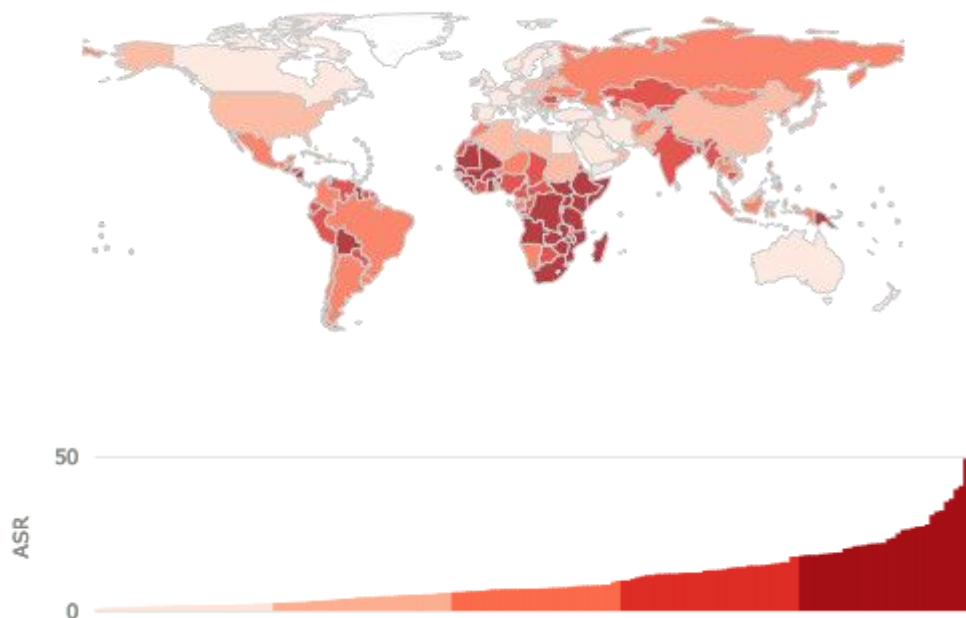
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Cervical cancer incidence and mortality



Kuvio 1. Incidence of cervical cancer, 2012 (Globocan 2012)



Kuvio 2. Mortality of cervical cancer, 2012

Database search table

Data-base	Keywords	Hits	Limitations	Articles Retrieved	Articles Used
CINAHL	cervical cancer+ prevention+ vaccination	234	144	98	1
CINAHL	cervical cancer+ prevention+ health promotion	133	45	30	0
CINAHL	cervical cancer+ nursing	261	68	43	1
CINAHL	cervical cancer+ nursing+ screening	148	41	24	0
CINAHL	cervical cancer+ prevention+ best practice	4	2	2	0
MED-LINE	cervical cancer+ prevention+ vaccination	780	482	213	9
MED-LINE	cervical cancer+ prevention+ health promotion	229	98	53	0
MED-LINE	cervical cancer+ nursing	555	211	90	7
MED-LINE	cervical cancer+ nursing+ screening	324	120	94	1
MED-LINE	cervical cancer+ prevention+ best practice	11	6	5	4

Coding sheet

	Meaning Unit	Condensed Meaning Unit	Sub-categories
<p>Article 1 Chan, Z., Chan, T., Ng, K. and Wong, M.(2012). A Systematic Review of Literature about Women's Knowledge and Attitudes Toward Human Papillomavirus (HPV) Vaccination. <i>Public Health Nursing</i> 29 (6), 481-489</p>	<p>"Factors affecting women's acceptance of HPV vaccination include knowledge, safety, cost and the efficacy of the vaccine."</p>	<p>Knowledge, safety, cost and efficacy affect the acceptance of the vaccine</p>	<p>Acceptance, knowledge, safety, cost, efficacy</p>
<p>Article 2 Kim, J., Campos, N., O'Shea, M., Diaz, M., and Mutyaba, I. (2013). Model-Based Impact and Cost-Effectiveness of Cervical Cancer Prevention in Sub-Saharan Africa. <i>Vaccine</i> 31 (5), 60-72</p>	<p>HPV DNA testing and visual inspection of the cervix using acetic acid (VIA), have been demonstrated to be effective and potentially cost-effective in low-resource settings</p>	<p>HPV DNA testing and VIA are effective and potentially cost effective in low resource countries.</p>	<p>HPV-testing, VIA, effective, cost-effective</p>
	<p>Assuming 70% vaccination coverage, over 670,000 cervical cancer cases would be prevented among women in five consecutive birth cohorts vaccinated as young adolescents; over 90% of cases averted were projected to occur in countries eligible for GAVI Alliance support</p>	<p>High vaccination coverage would reduce significantly cervical cancer cases, especially in GAVI eligible countries</p>	<p>Vaccination, High coverage, cervical cancer, GAVI</p>
<p>Article 3 Kling, M. and Zeichner, J. (2011) The Role of the Human Papillomavirus (HPV) Vaccine in Developing Countries. <i>International</i></p>	<p>An HPV vaccine program in underdeveloped nations would reduce the spread of HPV 16 and 18, and thereby significantly lower the incidence of the associated cervical cancer.</p>	<p>HPV vaccination program would significantly reduce the cervical</p>	<p>HPV vaccination, cervical cancer, developing countries, incidence</p>

<i>Journal of Dermatology</i> 49 (4), 377-379		cancer incidence in developing countries	
Article 4 Peate, I. (2009) The Introduction of the Human Papillomavirus Vaccine - Key Issues. <i>British Journal of Nursing</i> 18 (2), 86-89	It takes many years for cervical cancer to develop following HPV infection. Therefore, it will take many years before the introduction of a vaccine has any major effect on the number of cases of cervical cancer. It is vital in the interim that women continue to be screened for cervical cancer risk.	cervical cancer develop slowly, hence the effect of vaccination introduction is slow, therefore is vital for women to continue to be screened	cervical cancer, screening, vaccination
	Vaccines are responsible for an increase in life expectancy and quality of life – the HPV vaccine and its introduction is likely to contribute to a significant increase in life expectancy as well as quality of life for future generations.	HPV vaccination can increase the life expectancy and quality of life	HPV vaccination, quality of life, life expectancy
Article 5 Teitelman, A., Stringer, M., Averbutch, T. and Witkoski, A. (2009). Human Papillomavirus, Current Vaccines, and Cervical Cancer Prevention. <i>Journal of Obstetric, Gynecologic & Neonatal Nursing</i> 38 (1), 69-80	The new human papillomavirus vaccine advances cervical cancer prevention; however, provider-recommended screening with Papanicolaou tests and lifestyle modifications are still needed	Vaccine advantage cc prevention, however pap-test and lifestyle modifications are needed	vaccine, prevention, cervical cancer, pap-test, lifestyle
	The currently approved vaccine does not provide immunity to all strains of HPV. Therefore, reducing the risk of exposure to the virus as well as other STIs remains an important component of prevention. Also, wo-	Vaccination does not provide full protection against HPV infection, therefore is important women to reduce to risk of	Vaccination, protection, risk of exposure, screening

	men still need to receive regular Pap tests and subsequent follow-up care for abnormal results in order to promote early detection and treatment of cervical cancer.	exposure and undergo regular screening and follow up	
	Currently, the HPV vaccine is not recommended for older women	HPV vaccine is not recommended for older women	HPV vaccine, recommendation, older women
Article 6 El Hasnaoui, A., Demarteau, N., Granados, D., Standaert, B and Detournay, B. (2012). Public Health Impact of Human Papillomavirus Vaccination on Prevention of Cervical Cancer in France. <i>International Journal of Public Health</i> 57 (1), 149-158	Vaccination was beneficial regardless of the age, but the clinical results were the best for vaccination at 11-13 years when lifetime horizon was considered, and for vaccination at 15-17 years for shorter observation period.	The clinical results were the best for vaccination at ages 11-13 years old.	Vaccination, effective, 11-13 years old
	Vaccination combined with screening substantially reduced the incidence of precancerous lesions and CC compared with screening alone.	Vaccination combined with screening reduced more cervical cancer cases than screening alone	Vaccination, screening, cervical cancer
Article 7 Fonseca, A., Ferreira, L. and Neto, G.(2013).Cost-effectiveness of the vaccine against human papillomavirus in the Brazilian Amazon region. <i>Revista Da Associaçao Medica Brasileira</i> 59 (5), 442-451	The analysis also showed the favorable cost-effectiveness profile of the vaccine in regions where CC was not controlled by conventional screening programs. Conversely, in developed countries that succeeded in controlling CC incidence and CC-related mortality with solid gynecological screening programs, the HPV	Vaccine were cost-effective in regions not controlled by conventional screening programs.	Vaccine, cost effectiveness, screening program

	vaccine is not as favorable from a cost-effectiveness standpoint (Ireland, UK, Switzerland, and Finland).		
Article 8 Monsonogo J., Cortes., Greppe., Hampl., Joura, E and Singer, A. (2010). Benefits of Vaccinating Young Adult Women With a Prophylactic Quadrivalent Human Papillomavirus (types 6, 11, 16 and 18) Vaccine. <i>Vaccine</i> 28 (51), 8065-8072	Finally, from an ethical perspective, women with poor access to screening or low compliance could potentially get even more benefit from vaccination.	women with poor access to screening or low compliance could benefit from vaccination	access, screening vaccination
Article 9 Kane, M. (2012) Preventing Cancer with Vaccines: Progress in the Global Control of Cancer. <i>Cancer Prevention Research</i> ; 5(1) 24-29	Immunization is even more important in countries with poor screening programs because even the poorest developing countries generally do well at immunizing children	Immunization is more important in countries with poor screening programs	Immunization, screening
	Inclusion of HPV vaccine in national immunization programs is not just a financial issue but will require changes in vaccine delivery infrastructure.	Inclusion of HPV vaccine requires changes in vaccine delivery and infrastructure	HPV vaccine, infrastructure, delivery
Article 10 Van Krieking, G., Castellsague, X., Cibula, D. and Demarteau, N. (2014). Estimation of the potential overall impact of human papillomavirus vaccination on cervical cancer cases and deaths. <i>Vaccine</i> 32 (6), 733-739	HPV-16/18 vaccine could reduce the number of CC cases and deaths in countries worldwide, with associated cost-offsets due to reduced CC treatment. When protection of more than two HPV types was considered, the number of CC cases and deaths potentially prevented by vaccination was at least 18% larger.	HPV-16/18 vaccine can reduce the cost-offsets due to reduced CC treatment. Protection more than two types can prevent 18% more cases	Vaccine, cost-offsets, cervical cancer treatment

<p>Article 11 Almonte, M., Sasieni, P. and Cuzick J. (2011). Incorporating Human Papillomavirus Testing into Cytological Screening in the Era of Prophylactic Vaccines. <i>Best Practice & Research in Clinical Obstetrics & Gynaecology</i> 25(5), 617-629</p>	<p>Women vaccinated at ages 11–14 years could almost certainly have greatly reduced screening.</p>	<p>Vaccination at age 11-14 years old will reduce screening.</p>	<p>Vaccination, ages 11-14.</p>
	<p>Cytology screening has been successful in countries with organised screening programmes and in those with high-coverage opportunistic screening.</p>	<p>Cytology-based screening has been successful in countries with organised screening programmes and with high-coverage.</p>	<p>CBS, successful, organised screening program, high-coverage</p>
	<p>LBC has advantages (rapid interpretation, lower rate of unsatisfactory smears, and the possibility of ancillary molecular testing using remnant fluid) but it is more expensive (per sample).</p>	<p>LBC has advantages; rapid interpretation, lower rate of unsatisfactory smears and the possibility of ancillary molecular testing but it is expensive.</p>	<p>LBC, rapid interpretation, lower rate of unsatisfactory smears, more expensive</p>
	<p>LBC has replaced conventional cytology in several countries.</p>	<p>LBC is used in several countries.</p>	<p>LBC, several countries</p>
	<p>It (CBS) has had no major effect, however, on reducing incidence and mortality rates in the developing world where appropriate resources and infrastructure are not available or difficult to maintain.</p>	<p>CBS hasn't really reduced incidence or mortality in the developing world where appropriate re-</p>	<p>CBS, developing world, not effective</p>

		sources and infrastructure are not available maintained.	
	There is increasing evidence that HPV testing results in a subsequent decrease in incidence of and morbidity from cervical cancer.	HPV testing decrease incidence of and morbidity from cervical cancer.	HPV test, incidence, mortality
	HPV testing, however, is being used for primary screening nationally in Mexico, and it is approved to be used in combination with cytology (co-testing) in primary screening in the USA	HPV testing is primary screening in Mexico and it is approved in combination with cytology (co-testing) in the USA	HPV test, primary screening test
	The overwhelming evidence from cross-sectional studies, longitudinal studies and randomised clinical trials show that screening with HPV testing is substantially more sensitive but less specific than cytological screening and VIA for detecting high-grade CIN.	Screening with HPV testing is more sensitive but less specific than cytological screening and VIA for detecting high-grade CIN.	HPV test, sensitive, less specific
	Several studies have shown that a woman who tests negative for HPV has a low risk of developing cervical disease for at least 6 years.	Woman who tests negative for HPV has a low risk of developing cervical disease for at least 6 years.	HPV test, 6years
	Women aged 30–35 years or older, who test positive for HPV, are more likely to have persistent	HPV testing should currently not start before age 30 years.	HPV test, 30 years

	infections that require further evaluation and follow up, thus, HPV testing should currently not start before age 30 years.		
	Screening with HPV testing just three times over a lifetime at ages 30, 40 and 55 years (in vaccinated women) would reduce the risk of cervical cancer by over 90%.	HPV testing three times over a lifetime at ages 30, 40 and 55 years (in vaccinated women) would reduce the risk of cervical cancer by over 90%.	HPV test, ages 30, 40, 55 year, reduce the risk of cervical cancer
	Women vaccinated against HPV 16 and 18 could be safely screened at greatly extended intervals.	Vaccinated women could be screened at greatly extended intervals.	Vaccination, extended intervals
	The implementation of universal HPV vaccination of adolescent girls is the best prospect to control cervical cancer	The universal HPV vaccination of girls is the best prospect to control cervical cancer.	HPV vaccination, universal
	It is clear that HPV testing should be used in places where no screening is available or where the quality of cytology cannot be guaranteed.	HPV testing should be used if screening isn't available or the quality of cytology isn't guaranteed.	HPV test, places without screening, quality
Article 12 Fu, L., Bonhomme, L., Cooper, S., Joseph, J. and Zimet G.(2014). Educational interventions to increase HPV vaccination	Studies have found that individuals' knowledge and attitudes toward the vaccine are associated with immunization uptake.	Individual knowledge and attitudes impact on immunization uptake.	knowledge, attitudes, immunization

<p>acceptance: a systematic review. <i>Vaccine</i> 32 (17), 1901-1920</p>	<p>Overall, countries that have school-based vaccination programs, such as Australia, Great Britain and Portugal, have achieved the highest (80% or greater) female vaccination coverage rates</p>	<p>Countries that have school-based vaccination programs have achieved the highest vaccination coverage rates.</p>	<p>School-based vaccination, high coverage</p>
	<p>Overall, countries that have school-based vaccination programs, such as Australia, Great Britain and Portugal, have achieved the highest (80% or greater) female vaccination coverage rates though Denmark has reached very high vaccination rates</p>	<p>Countries with school-based vaccination programs have achieved highest vaccination coverage</p>	<p>School-based, vaccination, coverage</p>
<p>Article 13 Binagwaho, A., Wagner, C., Gatera, M, Karema, C., Nutt, C and Ngabo, F. (2012). Achieving High Coverage in Rwanda's National Human Papillomavirus Vaccination Programme. <i>Bulletin of the World Health Organ</i> 90 (80), 623–628</p>	<p>High coverage rates were achieved due to a delivery strategy that built on Rwanda's strong vaccination system and human resources framework. Implementation must be tailored to the local context.</p>	<p>High coverage rates were achieved due to a delivery strategy and human resources framework. Implementation have to be suitable to the local context.</p>	<p>High coverage rates, delivery strategy and human resources framework. Implementation, local context.</p>
<p>Article 14 Sankaranarayanan, R., Anorlu, R., Sangwa-Lugoma, G and Denny, L. (2013). Infrastructure Requirements for Human Papillomavirus Vaccination and Cervical Cancer Screening in Sub-Saharan Africa. <i>Vaccine</i> 31 (5), 47-52</p>	<p>VIA is particularly suitable to low-resource settings; however, its efficacy in reducing cervical cancer is likely to be significantly lower than HPV testing.</p>	<p>VIA is suitable to low-resource settings. HPV testing will be even more effective. Cervical cancer can be prevented</p>	<p>VIA, low-resource settings HPV test, more effective, low-resource settings</p>

	Research and experience show that cervical cancer can be prevented when strategies and services are provided in the context of adequate infrastructure and well-trained human resources and when attention is paid to programme monitoring and evaluation.	when strategies and services are provided in the context of infrastructure and trained human resources and when programme monitoring and evaluation is valued.	Strategies, services, infrastructure, human resource, monitoring
Article 15 Hughes, C. (2009) Cervical cancer: prevention, diagnosis, treatment and nursing care. Review. <i>Nursing Standard</i> . 23(27):48-56	Cervical screening has significantly reduced the number of women who develop or die from the disease but only in countries where there is easy access to cervical cytology or an organised cervical screening programme	Cervical screening has significantly reduced the incidence and mortality in countries where there is easy access to cervical cytology or an organised cervical screening programme	Screening, effective, easy access, organised programme
	Cervical screening programmes should be implemented worldwide to improve the detection of women at risk of developing cervical cancer and promote early treatment of the disease. However, in countries where this is unlikely to happen, HPV vaccination may offer a solution for the future	Screening programme should be implemented worldwide to reduce incidence of cervical cancer. Vaccination may be an option.	Screening, worldwide. Vaccination, future
Article 16 Denny, L. (2012) Cytological screening for cervical cancer prevention. <i>Best Practice & Research in Clinical Obstetrics & Gynaecology</i> . 26(2):189-96.	Historically, the incidence and mortality of cervical cancer has declined in countries that have instituted and sustained mass-organised cytology-based screening programmes.	Incidence and mortality of cervical cancer is declined in countries that have effective cytology-based	Cytology- based screening, effective, countries with programmes

		screening programmes	
	Liquid-based cytology currently accounts for more than 90% of Pap smears carried out in the USA and UK (is widely used throughout the developed)	LBC is most used in USA and UK (developed countries)	LBC, the most used, developed countries
	LBC is reported to have a number of advantage: more representative transfer of cells; reduction in the number of unsatisfactory cells; higher detection rates of cellular abnormalities; availability for molecular testing; reduction of screening time and greater ease of screening; and possibility for automated interpretation.	LBC has many advantages	LBC, advantages
	(CBS) also require a functioning healthcare infrastructure, with laboratories for smear processing and interpretation, mechanisms for quality control, referral for colposcopy, treatment of precursors, and follow-up to detect failures of treatment. Although this approach has been successful in preventing cervical cancer where implemented correctly, it has proved inordinately complex and expensive for developing countries.	CBS require a functioning healthcare infrastructure. Approach has been successful in preventing cervical cancer where implemented correctly but has been complex and expensive for developing countries	CBS, successful, complex, expensive
	HPV testing has been subjected to numerous clinical trials and has been shown to be superior in sensitivity to cytology, although less specific.	HPV testing has been shown to be superior in sensitivity to cytology,	HPV test superior

		although less specific.	
	Large randomised-controlled trials have shown significantly improved detection of cervical cancer precursors and reduction in cervical cancer in women tested with HPV and treated appropriately.	Women tested with HPV and treated appropriately have significantly improved detection of cervical cancer precursors and reduction in cervical cancer.	HPV, appropriately treatment
Article 17 Wright TC Jr and Kuhn L (2011). Alternative approaches to cervical cancer screening for developing countries. <i>Best Practice & Research in Clinical Obstetrics & Gynaecology</i> . 26(2):197-208	Cytology as a screening test, linked with a robust healthcare infrastructure, has significantly affected cervical cancer prevention in countries that have had sufficient resources to establish and sustain well-conducted programmes.	Cytology has significantly affected cervical cancer prevention in countries that have well-conducted and sustained programmes.	Cytology, countries with programmes
	It has also been clearly shown that linking testing or screening to treatment (so-called 'screen and treat') without the intervention of colposcopy or the need for sophisticated laboratories may potentially prevent cervical cancer in large numbers of women.	'Screen and treat' may potentially prevent cervical cancer in large numbers of women.	'Screen-and-treat', potentially effective
	Although simple in concept, cytology-based prevention programmes have proven extremely difficult to implement in low-resource settings.	Cytology-based prevention programmes are simple but difficult to implement in low-resource settings.	CBS, simple, complex

	Visual inspection with acetic acid is the simplest, and the low unit cost and the cost of the test itself makes it the least inexpensive screening test.	VIA is the simplest and the least inexpensive screening test	VIA, simple, low-cost
	Many women without CIN 2 and 3 lesions have acetowhitening of the cervix owing to areas of immature squamous metaplasia or reparative conditions. This can lead to a considerable degree of over-referral and over-treatment of women who do not have CIN2+ lesions	Many women without CIN 2 and 3 lesions have acetowhitening of the cervix leading to a considerable over-referral and over-treatment.	over-referral and over-treatment (VIA)
	Although it is difficult to know what the real performance will be of VIA when used in a developing country screening programme, considerable evidence currently shows that VIA should be considered as a reasonable alternative to cervical cytology.	Considerable evidence currently shows that VIA should be considered as a reasonable alternative to cervical cytology in developing countries.	VIA, alternative to cervical cytology, developing countries
	Multiple studies have convincingly shown that hrHPV testing is more sensitive and more reproducible than cervical cytology. Moreover, because of the high negative predictive value of hrHPV testing, women who are hrHPV negative do not need to be rescreened before 6 years.	HPV testing is more sensitive and more reproducible than cervical cytology. HPV testing has high negative predictive, thus HPV negative women can be rescreened in 6 year interval	HPV test, sensitive, reproducible high negative predictive value, screening interval 6years

	Currently, several European countries are beginning to transition from a cytology-based screening programme to a hrHPV-based one. A potential advantage of hrHPV testing over other screening methods for developing countries is that testing can be done on self-collected vaginal swabs.	Many European countries begin to replace cytology-based screening to a HPV-based one. HPV testing can be done on self-collected vaginal swabs.	HPV, European countries Self-collected
	The greatest issues in hrHPV testing for developing countries are the unit cost of the test, the sophistication of the laboratories that are needed for carrying out current versions of the test, and the fact that a point-of-care hrHPV test is not yet available	The issues in HPV testing for developing countries are the cost, the need of sophisticated laboratories and that a point-of-care HPV test is not yet available	HPV, cost, laboratories, no point-of-care test, developing countries
	The major disadvantage of 'screen-and-treat' is that, depending on the specificity of the screening test, 5–20% of all women without CIN 2 and 3 lesions will undergo unnecessary treatment.	Disadvantage of 'screen-and-treat' is that, 5–20% of all women without CIN 2 and 3 lesions will undergo unnecessary treatment.	'screen-and-treat', unnecessary treatment
	Another advantage of 'screen-and-treat' is that, if a point-of-care screening test is used, the entire process can be completed in a single visit and there is no need to establish a track and recall system for patients.	'Screen-and-treat' process can be done in a single visit and there is no need to establish a track and recall system for patients.	'Screen-and-treat', single visit, no track and recall system

	<p>if a highly sensitive screening test such as hrHPV testing is used that has a sensitivity of 90% for CIN 2 and 3 lesions, and this test is coupled with cryotherapy to ablate the transformation zone in all screen-positive women (which eliminates about 80% of CIN 2 and 3 lesions), the overall reduction in CIN 2 and 3 achieved with the programme would be about 72%.</p>	<p>If HPV test is used with a sensitivity of 90% for CIN 2 and 3 lesions, and it is coupled with cryotherapy (which eliminates about 80% of CIN 2 and 3 lesions), the overall reduction in CIN 2 and 3 would be about 72%.</p>	<p>HPV, cryotherapy,</p>
<p>Article 18 Sankaranarayanan, R., Nessa, A., Esmey, PO. and Dangou JM. (2012). Visual Inspection Methods for Cervical Cancer Prevention. <i>Best Practice & Research in Clinical Obstetrics & Gynaecology</i> 26 (2), 221-232</p>	<p>Regularly repeated Pap smear screening linked with treatment has prevented millions of women from developing cervical cancer in high-income countries with well-equipped and resourced healthcare services.</p>	<p>Pap smear screening has decreased incidence of cervical cancer in high-income countries</p>	<p>Cytology (Pap smear), high-income countries</p>
	<p>'Screen-and-treat' eliminates investigations to confirm a diagnosis before treatment and minimises loss to follow up, delay in treatment and missed disease. A major concern is that a large number of women without precursor lesions will undergo cryotherapy.. .. effective in preventing cervical neoplasia</p>	<p>'Screen-and-treat' does not need complex infrastructure. Concern is that many women will undergo treatment unnecessarily .. effective in preventing cervical cancer</p>	<p>'Screen-and-treat', low-resource countries</p>
	<p>The major strengths of VIA include its affordability and feasibility in LMIC, possibility for repeating the test and to train screeners quite rapidly, wide availability of</p>	<p>VIA has many advantages as well as disadvantages in LMIC.</p>	<p>VIA, low-and-middle income countries. Over-investigations and over-treatment.</p>

	<p>dilute acetic acid, immediate test results, high potential for linkage with diagnosis and treatment and minimal infrastructure needs. The limitations include the subjective nature of the test, poor accuracy in postmenopausal and old women, low reproducibility, low specificity and high false positivity, leading to unnecessary anxiety, over-investigation and over-treatment and lack of standardised methods for training, competency evaluation and quality assurance. The possibility that cost savings from low-test costs may be offset by excess expenditures caused by over-investigations and over-treatment cannot be ruled out.</p>	<p>Cost savings from low-test costs may be outweighed by excess expenditures caused by over-investigations and over-treatment.</p>	
<p>Article 19 Ardahan, M. & Temel, AB. (2011) Visual inspection with acetic acid in cervical cancer screening. <i>Cancer Nursing</i>. 34(2):158-63.</p>	<p>Data show that VIA is an acceptable diagnostic tool for dysplasia and cervical cancer in underdeveloped countries</p>	<p>VIA is acceptable method in developing countries</p>	<p>VIA, developing countries</p>

Analysis of journal articles

Author, year, country	Purpose of the Study	Sample Size (participants)	Type of study	Data Collection and analysis	Main Findings
Almonte, M., Sasieni, P. and Cuzick J. (2011) Incorporating human papillomavirus testing into cytological screening in the era of prophylactic vaccines. <i>Best Practice & Research in Clinical Obstetrics & Gynaecology</i> . 25 (5), 617-29.	To describe the current and potential use of HPV testing for vaccinated populations in countries with cytology-based screening programmes.	26 cross-sectional studies, 8 randomised trials	Review	Not mentioned	Cytology-based screening programmes have been successful in reducing cervical cancer in developed countries. HPV testing could be safely used in primary cervical screening. HPV tests and vaccines are expensive for less developed countries. The use of HPV test and cryotherapy might be the best option in women over 30–35 years of age.
Ardahan, M. & Temel, AB. (2011) Visual inspection with acetic acid in cervical cancer screening. <i>Cancer Nursing</i> . 34(2):158-63. United States	To address the validity of VIA in cervical cancer screening by comparing results with colposcopy findings.	Visual inspection with acetic acid and Papanicolaou test was administered to 350 women, colposcopy was administered to 50 women.	Comparative study	Two questionnaires, Papanicolaou and VIA tests, software package program.	VIA findings were compared with Pap test findings: the sensitivity of VIA was 82.14%, specificity was 50.00%, positive predictive value was 67.64% and negative predictive value was 68.75%. When the method of VIA was compared with colposcopy, VIA had a sensitivity of 85.29%, specificity of 68.75%, PPV of 85.29% and NPV of 68.75%.
Binagwaho, A., Wagner, C.,	To describe the effect of	19 references	Review based	Not mentioned	The School based vaccination and community involve-

<p>Gatera, M, Karama, C., Nutt, C and Ngabo, F.(2012). Achieving high coverage in Rwanda's national human papillomavirus vaccination programme. <i>Bulletin of the World Health Organ</i> ;90:623–628</p>	<p>the vaccination in RWANDA</p>		<p>on regional longitudinal study</p>		<p>ment improved the vaccination coverage</p>
<p>Chan, Z., Chan, T., Ng, K. and Wong, M.(2012). A Systematic Review of Literature about Women's Knowledge and Attitudes Toward Human Papillomavirus (HPV) Vaccination. <i>Public Health Nursing</i> 29 (6), 481-489</p>	<p>To study and describe womens knowledge and attitudes toward HPV vaccination</p>	<p>36 articles</p>	<p>A Systematic Review</p>	<p>Databases: MEDLINE, CINAHL, the ISI Web of Science and the British Nursing Index.</p>	<p>Attitudes and intentions toward HPV vaccination are generally positive. Knowledge, safety, cost and the efficacy of the vaccine. Many women lack knowledge about HPV and cervical cancer have an impact on acceptance of the vaccine</p>
<p>Denny, L. (2012) Cytological screening for cervical cancer prevention. <i>Best Practice & Research in Clinical Obstetrics & Gynaecology</i>. 26(2):189-96.</p>	<p>To review the history of cytological screening and the challenges of secondary prevention strategies</p>	<p>Articles</p>	<p>Review</p>	<p>Not mentioned</p>	<p>Well- implemented cytology-based screening programmes have reduced cervical cancer incidence and mortality. LBC and especially HPV have advantages over conventional cytology. HPV test and appropriate treatment significantly improve detection of cervical cancer</p>

Netherlands					precursors and reduce cervical cancer. Cytology is currently recommended for use as a triage for HPV positive women or as a co-test with HPV testing for women over the age of 30 years.
Fonseca, A., Ferreira, L. and Neto, G.(2013).Cost-effectiveness of the vaccine against human papillomavirus in the Brazilian Amazon region. <i>Revista Da Associacao Medica Brasileira</i> 59 (5), 442-451 Brazilia	To assess the cost-utility of the human papillomavirus (HPV) vaccination on the prevention of cervical cancer in the Brazilian Amazon region	The target population was preteen girls (12 years of age), independent of previous sexual contact or HPV infection. The cohort time horizon was lifetime.	Literature Review mainly based on empirical data of local and national studies	A Markov cohort model was utilized as a decision analysis tool for the evaluation of cost-effectiveness and cost-utility in preventive vaccination.	The scenario of three Pap tests resulted in satisfactory calibration (base case). The addition of HPV vaccination would reduce by 35% the incidence of cervical cancer (70% vaccination coverage). Vaccination has a favorable profile in terms of cost-utility, and its inclusion in the immunization schedule would result in a substantial reduction in incidence and mortality of invasive cervical cancer in the Brazilian Amazon region
Hughes, C (2009) Cervical cancer: prevention, diagnosis, treatment and nursing care. <i>Nursing Standard</i> . 23(27):48-56	Update of cervical cancer; covering aspects of disease, prevention and treatment.	Not mentioned	Review	Keywords are based on the subject headings from the British Nursing Index.	The prevention, diagnosis and treatment of cervical cancer needs primary and acute services. Women need health education of a vaccination programme, cervical screening and treatment. Cervical screening programmes should be implemented worldwide to decrease the incidence of

					cervical cancer and promote early treatment.
El Hasnaoui, Demarteau, Grana-dos, Standaert and Detournay (2012)Public health impact of human papilloma-virus vaccination on prevention of cervical cancer in France. <i>International Journal of Public Health</i> . 57 (1), 149-58	To evaluate the cervical cancer re-duction at in-dividual and population level follow-ing different prevention strategies (age-specific vaccination and/or screening) in France.	Every year during 95 year period cohorts of 11 year old girls in France were par-ticipating to study	Longitu-dinal Study	A lifetime Markov model, with 11 health states, A screening module took into account the effects of detection and early treatment.	Vaccination combined with screening substantially re-duced the incidence of pre-cancerous lesions and CC compared with screening alone. Vaccination was beneficial regardless of age at vaccina-tion, but the greatest benefit was obtained with an early vaccination. The clinical results were the best for vaccination at 11-13 years when lifetime horizon was considered, and for vac-cination at 15-17 years for shorter observation period.
Fu, L., Bon-homme, L., Cooper, S., Joseph, J. and Zimet G.(2014). Educa-tional interven-tions to increase HPV vaccination acceptance: a systematic review. <i>Vaccine</i> 32 (17), 1901-1920	To describe educational interventions to increase HPV vaccina-tion ac-ceptance	33 studies of HPV	Review	PubMed and Web of Science Databases. Random-ized and nonran-domized and quasi-experi-mental de-signs were included	Well-designed studies ade-quately powered to detect change in vaccine uptake were rare and generally did not demonstrate effective-ness of the tested interven-tion. There is not strong evidence to recommend any specific educational intervention for widespread implementation. Future studies are required to determine the effective-ness of culturally- competent interventions reaching di-verse populations.

<p>Kane, M. (2012) Preventing Cancer with Vaccines: Progress in the Global Control of Cancer. <i>Cancer Prevention Research</i>; 5(1) 24-29 United States</p>	<p>To describe the effectiveness of HPV vaccine</p>	<p>66 references</p>	<p>Review article</p>	<p>Not mentioned</p>	<p>HPV vaccines are highly effective in preventing HPV infection and precancerous lesions in women, and the quadrivalent vaccine also prevents genital warts in men and women and precancerous anal lesions in men. HPV is causing a growing proportion of oropharyngeal cancers, and HPV-related non cervical cancers</p>
<p>Kim, Campos, O'Shea, Diaz and Mutyaba (2013) Model-Based Impact and Cost-Effectiveness of Cervical Cancer Prevention in Sub-Saharan Africa. <i>Vaccine</i>.31 (5), 60-72</p>	<p>To estimate the population-level health and economic impact of HPV vaccination of pre-adolescent girls</p>	<p>Population and epidemiologic data from 48 countries in sub-Saharan Africa</p>	<p>Quantitative, a model-based approach</p>	<p>An existing individual-based microsimulation model, In addition empirically-calibrated models for Uganda and South Africa were used to observe data from Uganda and South Africa</p>	<p>HPV vaccination was cost-effective when cost per vaccinated girl was below I\$50. Vaccine prices may need to be even lower for vaccination programs to be affordable. Assuming 70% vaccination coverage, over 670,000 cervical cancer cases would be prevented among women in five consecutive birth cohorts vaccinated as young adolescents; over 90% of cases averted were projected to occur in countries eligible for GAVI Alliance support.</p>
<p>Kling, M. and Zeichner, J. (2011) The Role of the Human Papillomavirus (HPV)</p>	<p>Not mentioned</p>	<p>20 articles</p>	<p>Literature Review</p>	<p>Not mentioned</p>	<p>A worldwide HPV vaccine program would significantly reduce the spread of HPV 16 and 18 and lower the incidence of cervical cancer. For every five-year delay in a</p>

<p>Vaccine in Developing Countries. International Journal of Dermatology 49 (4), 377-379</p>					<p>cervical cancer prevention/detection program, there will be an additional 1.5–2.0 million deaths.</p> <p>A global effort will be required to eliminate cervical cancer from developing countries.</p>
<p>Monsonogo J., Cortes., Greppe., Hampl., Joura, E and Singer, A. (2010). Benefits of Vaccinating Young Adult Women With a Prophylactic Quadrivalent Human Papilloma-virus (types 6, 11, 16 and 18) Vaccine. <i>Vaccine</i> 28 (51), 8065-8072</p>	<p>To describe the benefit of vaccinating young girls with quadrivalent HPV vaccine</p>	<p>66 publication</p>	<p>Literature Review of 66 reveals</p>	<p>Not mentioned</p>	<p>There is strong epidemiological and clinical support for vaccination programmes that target sexually active women in this age group to prevent HPV infection, and thus avert the development of HPV-related disease.</p> <p>The implementation of HPV vaccination programmes may benefit the development or awareness of cervical cancer prevention strategies and ultimately reduce the burden of cervical cancer and improve cervical cancer control.</p>

<p>Peate, I. (2009) The introduction of the human papillomavirus vaccine - key issues. <i>British Journal of Nursing</i> 18 (2), 86-89</p>	<p>To provide insight into some of the issues surrounding the introduction of the HPV vaccine into the national immunization programme.</p>	<p>30 articles</p>	<p>Literature Review</p>	<p>Not mentioned</p>	<p>It is estimated that with the introduction of the HPV vaccination programme the lives of over 400 women per year will be saved in the UK.</p> <p>Vaccines are responsible for an increase in life expectancy and quality of life – the HPV vaccine and its introduction is likely to contribute to a significant increase in life expectancy as well as quality of life for future generations.</p>
<p>Sankaranarayanan, R., Anorlu, R., Sangwa-Lugoma, G and Denny, L.(2013). Infrastructure Requirements for Human Papillomavirus Vaccination and Cervical Cancer Screening in Sub-Saharan Africa. <i>Vaccine</i> 31 (5), 47-52</p>	<p>To update and describe the knowledge regarding the infrastructure requirements for HPV Vaccination and Cervical Cancer Screening in Sub-Saharan Africa</p>	<p>48 references</p>	<p>Review</p>	<p>Not mentioned</p>	<p>Vaccination along with the screening has made possible to reducing the high burden of cervical cancer in low- countries Political commitment, creative sources of financing and good planning in developing and augmentation of infrastructure and human resources for an integrated approach of vaccination, screening and treatment of women with cervical lesions is critically important for cost-efficient delivery of the above-mentioned preventive interventions.</p>

<p>Van Kriekinge, G., Castellsague, X., Cibula, D. and Demarteau, N.(2014). Estimation of the potential overall impact of human papillomavirus vaccination on cervical cancer cases and deaths. <i>Vaccine</i> 32 (6), 733-739</p>	<p>To estimate the effect of bivalent HPV-vaccine capability to reduce the incidence of cervical cancer</p>	<p>Estimations of the incidence and mortality of cervical cancer from each country</p>	<p>Review</p>	<p>Estimation based on clinical trial and country-specific incidence data. Data on vaccine efficacy: PATRICIA trial of the AS04-adjuvanted HPV-16/18 vaccine. Cost-offsets: 5 countries using country-specific unit cost data.</p>	<p>HPV vaccination has a potential to CC cases and deaths in countries worldwide, with associated cost-offsets due to reduced CC treatment. Cross-protection increased the estimated potential number of CC cases and deaths prevented by 34 and 18% in Africa and Oceania.</p>
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<p>Sankaranarayanan, R., Nessa, A., Esmey, PO. and Dangou JM. (2012) Visual inspection methods for cervical cancer prevention. <i>Best Practice & Research in Clinical Obstetrics & Gynaecology</i>. 26(2):221-32. Netherlands</p>	<p>To study whether visual screening is an effective approach for cervical cancer prevention in low-and-middle-income-countries by reviewing the feasibility, acceptability, safety, accuracy, efficacy and cost-effectiveness.</p>	<p>Not mentioned</p>	<p>Review</p>	<p>Not mentioned</p>	<p>Visual inspection with acetic acid is a suitable screening test for premenopausal women in low-resource settings. Health care providers should use VIA and VILI for screening women aged 30-59. VIA is the only feasible test in most sub-Saharan countries. Countries without cytology programmes can use VIA screening in demonstration programmes so that resources and infrastructure for screening can be developed in health services.</p>
<p>Teitelman A-M., Stringer, M., Averbuch, T and Witkoski, A. (2009). Human papillomavirus, current vaccines, and cervical cancer prevention. <i>Journal of Obstetric, Gynecologic, & Neonatal Nursing</i> 38 (1), 69-80</p>	<p>Not mentioned</p>	<p>86 releases</p>	<p>Review article</p>	<p>Not mentioned</p>	<p>The new human papillomavirus vaccine advances cervical cancer prevention; however, provider-recommended screening with Papanicolaou tests and lifestyle modifications are still needed.</p>
<p>Wright TC Jr and Kuhn L (2011). Alternative approaches to cervical</p>	<p>To compare alternative approaches to cervical</p>	<p>Articles and three large screening trials. 1: 57 study clusters randomised to a single</p>	<p>Review</p>	<p>Not mentioned</p>	<p>Randomised-controlled trials conducted in developing countries clearly show decrease in CIN2+ prevalence and incidence, with both</p>

<p>cal cancer screening for developing countries. <i>Best Practice & Research in Clinical Obstetrics & Gynaecology</i>. 26(2):197-208. Netherlands</p>	<p>cancer prevention and state outcomes of three large screening trials</p>	<p>round of VIA carried out by trained nurses and 57 study clusters randomised to a control group. 2: cluster-randomised screening trial included 131,746 women aged 30–59 years of age. 3: Three years' follow up of three-arm randomised 'screen-and-treat' trial, 6,637 women aged 35–65 years of age</p>			<p>VIA-based and hr HPV-based screening programmes. The benefits of hr HPV-based programmes seem to be greatly greater than the benefits of VIA-based programmes. An inexpensive, point-of-care hr HPV diagnostic test should be developed and introduced widely.</p>
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