

Screening Methods for Cervical Cancer in China and DR Congo (Africa)

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Abstract—this study is a comparison between the People's Republic of China and the Democratic Republic of Congo with regard to the different methods of screening the cervix cancer in the following cases: High-risk HPV test, Cytology (Pap testing, TSB system), VIA/VILI ,Colposcopy.

The method used was the collection of several scientific publications related to the topic, in the DRC as well as in China mainland. Numerous websites have enabled us to make this collection, such as: PubMed, WHO site, Medscape.

It appears from this study that although China is a developing country, several regions still remain without a good support of this deadly disease for women. Only urban areas can use the earlier detection of this cancer than the rural areas. It has been proved also that despite the incidence of cervical cancer in China is low comparing to that of western countries the mortality rate remains high, mainly in rural areas. In countless developing countries, cervical cancer screenings are unavailable or are poorly accessible. In addition, although China has provided free cervical screening in some rural areas for women from 35 to 59 years old since 2009, the communities still have limited knowledge about cervical cancer [4]. However, there is a great progress in the battle and the discovery of this pathology; all techniques are used: high-risk HPV test; Cytology (Pap testing, TSB system); VILI/VIA; and Colposcopy. The Chinese Government intends to provide more help for the countryside or the rural area. While in Africa the results still remain dark, the pathology of the cervix is still a nightmare in quite a lot of African countries and specifically in the DR Congo. Cervical cancer remains a public health problem in developing countries, due to its late diagnosis and its poor prognosis; with the poverty remaining a very crucial factor for the upkeep of this disease. That is why the WHO recommends firstly the simple use of the VIA/VILI for the detection of precancerous lesions and the fast development of cervical cancer screening program.

Index Terms: China, Congo, HPV, colposcopy, screening, cervix cancer

Introduction

The cervix Cancer has a devastating impact on the women health; it is most frequent cancer type after the world-wide breast cancer. It remains a public health problem in the developing countries, because of its late diagnosis and its poor prognosis [8]. Chronic non-transmissible diseases, including cancers, represent a weight of morbidity more and more important in developing countries [7]. In the Democratic Republic of the Congo, the lack of a national cancer registry is a serious handicap for an effective epidemioclinical evaluation of this group of diseases [7]. However, a few number of researches conducted at the University of Kinshasa clinics ranked this type of cancer as the forefront of gynecological cancers observed in Kinshasa. This has been confirmed also by NGUMA et al. in a research conducted at the above mentioned clinics [50].

In addition, another research has showed that cervical cancer is the second most common cause of cancer-related

deaths and is responsible for approximately 250,000 annual deaths [4]; that is, for the context of Kinshasa with roughly 9 million inhabitants, nearby 800 women die of cervical cancer in Congo's capital[41] . As for China, with the large population and the imbalance of economic development, the disease burden of cervical cancer varies greatly. Women in urban areas may have the opportunity to access cervical screening. Whereas in the rural areas, due to the lack of medical resources, the incidence of cervical cancer is relatively high and has reached 81 per hundred thousand in some areas [1],[5]. Cancer of the uterine cervix is associated with a substantial burden of disease and is a significant cause of death amongst women in the People's Republic of China [5]. It has also been demonstrated that China, with a high incidence of 7.5/100 000 and mortality of 3.4/100 000 for cervical cancer and the human papillomavirus (HPV) infection rate of 16.8%, bears a big burden of gynecological cancer [13]. In addition, China faces a heavy burden with regard to women's health. China accounts for 29% of the

51,000,000 new cases of cervical cancer each year. Cervical cancer ranks as the eighth most common malignant cancer among females in Mainland China, with an age-standardized incidence rate (ASIR) of 5.15 per 100,000 inhabitants. Although the incidence of cervical cancer in China is low in comparison to that of western countries, the mortality rate remains high, especially in rural areas [4]. For the last decade, the number of cases of cervical cancer in China was estimated to increase by 14% over the period from 2000 to 2005. In the absence of substantial intervention, the number of new cases was projected to further increase over the next several decades, due to population ageing [5]. Due to the high risks and all the side effects of the cervical cancer, there had been developed several techniques or methods, since there is no curative medicine for any type of cancer. Among these methods can be mentioned the Pap smears, the visual inspection with Acetic Acid, and Colposcopy. They are currently used in several public health clinics to screen the cervical cancer. And the screening system allows reducing the morbidity and mortality [4],[6],[12]. However, the situation is more complicated in Africa, in general and particularly in the DR Congo. Various researchers have found that the burden of cancer is increasing in Africa because of the aging and growth of the population as well as increased prevalence of risk factors associated with economic transition, including smoking, obesity, physical inactivity, and reproductive behaviors [2],[6],[9]. Catherine Ali-Risasi et al. in their investigation in Kinshasa discovered that the financial difficulty is a great obstacle to the screening for cancer of the cervix in the DRC, Nowadays, the cost of a Pap smear in Kinshasa varies between 30 US\$ and 50 US\$. Most women in an impoverished society who gain 1 US\$ to 2 US\$ a day are unable to afford. Part of this high cost is related to the lack of trained people to read and interpret the Pap smears, the insufficient number of tests performed, and the low appreciation of preventive measures as a profitable strategy at the long end. If screening cost is already an important obstacle, it is then quite difficult to motivate women to pay even more for preventive treatment such as loop electrical excision procedure or cryotherapy [41]. In the DRC, this tumor is often discovered later due to several factors including the lack of infrastructures, the women ignorance, several beliefs or taboos, etc. which do not allow its screening, even less its support early [50].

This paper tries to compare different methods used to screen the cervix cancer, and to sort out the difference between the China and the DRC.

Generality on cancer of the cervix

Prior to the 20th century, cervical cancer was the most common cancer in women and the most common cause of cancer death in women in the United States. Since the advent of the smear (Pap smear), which gained widespread acceptance in the 1950s and 1960s, it has been easier to detect and treat premalignant changes before they develop into cancer. Further advances in detection and screening have resulted from identification of the Human Papilloma Virus (HPV) as the causal agent in the vast majority of Cervical Intraepithelial Neoplasia (CIN) and Cervical cancer [2]. The combination of Pap smear screening and HPV testing reduces women risk of dying of cervical cancer by 90%. Fortunately, vaccines have been developed that protect against HPV infection and reduce the risk of cervical cancer by 70%. Because developing countries often lack available screening, immunization, and treatment modalities, cervical cancer continues to be the second most common cancer in women worldwide and is the number one cancer killer of women in the developing world [13].

Methods

We conducted a comprehensive review of peer-reviewed literature in databases of the World Health Organization with HPV Centre Cervical cancer (www.who.int/hpvcentre), PubMed/MEDLINE by collecting several articles, journal and review, Medscape, reports from the World Health Organization (WHO), and some books. We have focused on the collection and reading blogs, newspapers, reviews relating to cancer of the cervix including terms such as: cancer of the cervix, human papillomavirus, screening for cancer of the cervix in Africa, in Asia especially in China, colposcopy, Pap smear and the methods of using Visual lugol and acid acetic.

Our study has selected recent publications among other systematic reviews, meta-analysis, narrative reviews, epidemiological studies, cohort, cross-sectional and a few guidelines.

Results

Organized screening and early treatment programs have been effective in preventing cervical cancer. The mortality of cervical cancer was significantly reduced in some developed countries by an organized screening method named Pap smear. An estimated number of 70,722 new cases of invasive cervical cancer occur annually in sub-Saharan Africa, and it is responsible for one-quarter of all female cancers. With such estimation, it is one of the highest in the world with an estimated overall age standardized incidence rate (ASR) of 31 per 100,000 women and varied by region with 42.7 in East Africa, 38.2 in Southern Africa, 28 in Central Africa and 29.3 in Western Africa.[12] At present, only a few population-based cancer registries exist in Africa.

In the Democratic Republic of Congo (DRC), the scarcity of pathologists and cytotechnologists has prevented the implementation of cytology-based screening programs, which has contributed to that country's high incidence of invasive cervical cancer and to the fact that most cases (80%) now at advanced stage. It is, therefore, critical to seek feasible and cost-effective screening methods as the primary strategy for cervical cancer control in low resource settings [49]. In Democratic Republic of Congo, the absence of a national cancer registry is a disability serious epidemioclinique evaluation of this group of diseases [7]; in addition, some work at the University of Kinshasa clinics located this cancer to the forefront of gynecological cancers observed in Kinshasa [41]. China faces a heavy burden with regard to women's health. China accounts for 29% of the 51,000,000 new cases of cervical cancer each year. Cervical cancer ranks as the eighth most common malignant cancer among females in Mainland China, with an age-standardized incidence rate (ASIR) of 5.15 per 100,000 inhabitants. Although the incidence of cervical cancer in China is low in comparison to that of western countries, the mortality rate remains high, especially in rural areas [4]. It has been shown in a study carried out in the region of wufeng by Yao Jia et al. that there are several barriers that prevent women in screening for cancer of the cervix. In another part, Catherine Ali-Risasi et al. confirm in their cross-sectional study done in Kinshasa, the city capital of the Democratic Republic of the Congo. The study shows a low level of knowledge, attitude and practice on cervical cancer among women in Kinshasa. Increasing women's awareness would be a first step in the long chain of conditions to attain a lower incidence and mortality [41].

Table 1: Barriers towards participate in cervical cancer screening

Barriers	frequency
Anxious feeling once the disease was diagnosed	2825(47.6%)
No symptoms/discomfort	2023(34.1%)
Do not know the benefit in cervical cancer screening	795(13.4%)
Afraid to be deceived	734(12.4%)
Afraid of pain during screening	673(11.4%)
Cervical cancer is incurable even if screening is effective	660(11.1%)
Husband disapproves of cervical cancer screening	130(2.2%)

The number of cases of cervical cancer in China is estimated to have increased by 14% over the period from 2000 to 2005[1]. In the absence of substantial intervention, the number of new cases is projected to further increase over the next several decades, due to population ageing [2]. There may be considerable heterogeneity in rates of cervical cancer within China, and the evidence is consistent with a higher burden of disease in some rural areas [5]. reason why from 1999, China has set out to great study and put in place a good system and program against cancer of the cervix by the practice of screening as confirmed by multiple publication and we could see the article by Shao Ming and al. makes a great summarizes several important study of screening of this pathology in China from 1999 to 2013[13].

Screening test methods

During a speculum examination, trained gynecologists collected (in order) ecto-and endocervical cells for a Pap smear, cervical exfoliated cells for HPV DNA testing, and evaluated the cervix after acetic acid application (VIA). [6] The colposcopic exam was performed after collection of specimens for Pap smear and HPV DNA testing and after conducting VIA.

Pap smear collection, after removing any obscuring mucus from the cervix with a cotton swab, exfoliated ectocervical cells were collected and smeared onto a glass slide using an Ayres spatula [49]. Endocervical cells were collected by endocervical brush and placed onto the same slide. Cells were fixed by placing the slides in ethanol. The cytologic diagnosis on standardized forms according to the 2001 Bethesda System

HPV collection, Following collection of the Pap smear, a Digene conical brush sampler was placed in the cervical os, rotated 360u three times, removed and placed into 1 ml of Digene standard transport medium (STM), HPV DNA testing was performed locally using the hybrid capture 2 (hc2) IVA/IVL test. It is a vaginal exam with a speculum during which health personnel [2] applies the acetic acid (vinegar) (3-5%) for IVA and lugol for IVL of the cervix [49]. The abnormal tissue is visible temporarily because it whitens when it is exposed to the vinegar. Watch the pass to the naked eye to identify changes in color on the neck. Determine if the test result is positive or negative for any precancerous lesions or a cancer.

HPV infection and cervical cancer-invasive

In 1990, the etiology of HPV and cervical cancer remained controversial in China and no. Population-based cancer screening program existed [5]. Until 1998, Cancer Institute, Chinese Academy of Medical Sciences (CICAMS) collaborated with Cleveland Clinic and conducted the Shanxi Province Cervical Cancer Screening Study (SPOCCS) project. For the first time, Chinese scholars identified women with HPV infection who had > 250 times higher risk for developing cervical intraepithelial neoplasia Grade 2 or worse lesions (CIN2+) than those who are HPV negative, with an attributable risk of 98% [13]. More effort and improvement have been made in China for the cervix cancer screening. Ju Fang Shi et al. revealed that: given the critical nature of the role of human papillomavirus (HPV) infection in the causation of cervical cancer, a potential screening strategy is to perform primary testing for infection with high risk types of HPV. However, to date, the higher cost of HPV DNA testing has precluded its use as part of large scale screening programs in low resource settings. More recently, efforts have been made to develop a lower cost rapid throughput test. Care HPV is a new technology which has been developed through a

public/private partnership between Qiagen Inc. (Gaithersburg, MD) and PATH (Seattle, WA, USA), which has been shown to have high sensitivity for detection of cervical intraepithelial neoplasia grade 2 and above (CIN2+) in rural China. The only realistic currently available screening alternatives to care HPV in this setting are visual inspection; cytology-based approaches are difficult to implement due to the need for high levels of quality assurance and ongoing training, and HPV screening with technologies used in developed countries, such as Hybrid Capture 2 (HC2, Qiagen, Gaithersberg, MD), is likely to be too expensive to implement on a large scale [5]. We simulated screening with care HPV at 0.5 pg/ml and 1.0 pg/ml thresholds, and compared the findings to those for screening with visual inspection using acetic acid, when used alone (VIA) or in combination with Lugol's iodine (VIA / VILI). Two such assays have been widely promoted: visual inspection of the cervix following acetic acid application (VIA) and molecular tests for the presence of high risk human papillomavirus (HR - HPV) infection [6].

VIA offers important potential advantages because the procedure is easy and results are available immediately and in many instances, HPV DNA testing offers the advantage of an objective assay for the presence of the viruses which are responsible for cervical cancer [6].

Three groups of viruses defined by the viral typing:

- Virus at low risk (6, 11, 30, 42-44): viral subtypes found in benign genital lesions and not associated with the development of a cervical neoplastic process.
- Intermediate-risk group (31, 33, 35, 39, 51, 52, 58, 61)
- High risk group (16, 18, 45, and 56): in case of positivity even normal smear: risk of later development of CIN in a woman multiplied by a factor of 100.

The human Papilloma viruses 16 and 18 (HPV 16 and HPV 18) are present in 80% of cancers of the cervix and cervical lesions in situ of high-grade, the so called oncogene viruses are [35].

Table 2: HPV16/18 in prevalence cases of invasive cervical cancer (ICC) from published studies in sub-Saharan Africa, according to HIV status [12]

Country	No. of women with ICC tested	HPV16/18 Prevalence, % (95% CI*)
HIV-negative women		
Benin	6	66.7 (28.9–100.0)
Guinea	18	44.4 (21.5–67.4)
Ethiopia	163	90.2 (85.6–94.8)
Kenya	261	60.9 (55.0–66.8)
Mozambique	302	79.1 (74.6–83.7)
Mali	123	54.5 (45.7–63.3)
Senegal	71	43.7 (32.1–55.2)
South Africa	307	62.9 (57.5–68.3)
Tanzania	102	72.6 (63.9–81.2)
Uganda	154	74.0 (67.1–81.0)
Zimbabwe	98	79.6 (71.6–87.6)
Total	1605	69.2 (66.9–71.4)
HIV-positive women		
Kenya	51	68.6 (55.9–81.4)
Zambia	28	53.6 (35.1–72.0)
Total	79	63.3 (52.7–73.9)

A cross-sectional study of 1,528 women examined the determinants of HR - HPV infection among women in Kinshasa, Democratic Republic of Congo; cervical samples were tested for HPV - DNA by Hybrid Capture 2: HR - HPV prevalence was 12.5% in all women and 8.7% in women with normal cytology. Prevalence was highest (18.3%) in individuals < 35 years of age and gradually decreased with age. Excess HR - HPV infection risk was observed in women who were smokers (odds ratio [OR] = 1.60; 95% confidence interval [CI]: 1.11 - 2.31), divorced/separated (OR = 1.60; 95% CI: 1.11 - 2.32), in polygamous marriages (OR = 1.28; 95% CI: 0.90 - 1.82), using birth control medical (OR = 2.40; 95% CI: 1.20 - 4.80), and who preferred male physicians (OR = 1.90; 95% CI: 1.20 - 3.05). A statistically marginal increase was found in women whose partners had sex with prostitutes (OR = 2.40; 95% CI: 0.72 - 8.01). A higher standard of living was associated with reduced risk [49]. In 2007, a nationwide multicenter study was conducted to investigate the HPV prevalence and type distribution in tissue samples from hospital-based patients with invasive cervical cancer (ICC) and CIN2 + in different geographical regions of China. HPV 16, 18, 31, 52 and 58 were identified as predominate HPV types in ICC, among which HPV 16 and 18 accounted for 84.5 per cent of the squamous cervical cancer [13]

Population-based cervical cancer screening

A variety of studies were conducted to evaluate different screening methods among Chinese women in different geographic areas and races. In 2010, CICAMS performed pooled analysis for 17 studies which were conducted from 1999 to 2008, and made systematic evaluations for the accuracy of HPV testing, LBC and VIA. The results showed that the sensitivity of detecting CIN3 + for LBC, HPV testing and VIA was 87.9, 97.5 and 54.6%, respectively. The specificity of detecting CIN3 + for LBC, HPV testing and VIA was 94.7, 85.1 and 89.9%, respectively. The confirmation also comes from the study of Fang Ju et al who stated that this modeled analysis suggests that primary care HPV screening compares favorably to visual inspection screening methodologies in rural China, particularly if used as part of a regular screening program[5] and with regard to the colposcopy, Fang Ju Shi et al. in their study revealed that the number of colposcopic performed is related to the specificity of the screening test , and in this setting we found that approximately 6% of screened women would be referred to colposcopy after VIA screening, compared to approximately 8% of women after self-sampling with careHPV testing. The predicted number of biopsies and treatments takes into account the mix of natural underlying stories referred to colposcopy by the screening test, the accuracy of colposcopy for each natural history state, and compliance with follow-up for additional visits. The colposcopy/treatment ratio, when considered in conjunction with the lifetime effects on cancer incidence and mortality, provides a measure of the efficiency of the screening and diagnostic process. CareHPV testing results in a colposcopy/treatment ratio of approximately 5 for either test threshold, whereas this is increased by 50% for VIA only (7.7) and over 300% for VIA / VILI testing (17.3), showing that fewer women are receiving unnecessary colposcopy in the case of careHPV. If the sensitivity of careHPV testing for detection of CIN2 + were reduced to 60%, the estimated reduction in cancer incidence and mortality would decrease to between 8-45% (depending on the screening frequency).

Table 3: Summary of important cervical cancer screening studies in china from 1999 to 2013

study	Design study	Study year	Study size	Age	Screening tests	Results
SPOCCS I	Population based	1999	1997	35-45	HPV test (self and physician-collected samples, fluorescent spectroscopy, LBC, VIA, Colposcopy)	HPV - DNA detection rate in the population was 20.8%. Comparing with the normal subjects, the risk odds ratio of HPV infection with CIN2 + was 254.2, with attributable risk Proportion 98.1%. The sensitivity and specificity for the detection of CIN2 + were 95 and 85% for the HPV test, 94 and 78% for the Thin Prep Pap, 71 and 74% for VIA, respectively
SPOCCS II	Population based	2001-2002	8497	35-50	HPV test (self-and physician-collected samples), LBC,VIA the Ampersand fluorescent bio-molecular markers	Self-sampling for HPV is less sensitive for CIN2 + than the Physician-sampling test, purpose similar to liquid based cytology.
WHO/IARC-three studies	Population based	2004-2005	2601	15-59	VIA, VILI, LBC. HC2; fluorescence test	The most commonly HPV type was HPV16, 58, 52, 33 and in 18 rural women, and HPV16, 52 and 58 in urban women.
SPOCCS III-five studies	Population based	2006-2007	4215	16-54	HPV test (self-and physician-collected samples), LBC, VIA	Overall HPV prevalence in China was 16.8%. HPV prevalence was similar in rural and urban areas but showed dips in different age Groups: at age 25-29 (11.3%) in rural and at age 35-39 (11.3%) in urban women. The unique 'double peak' age distributions of HPV infection were found among Chinese women
Chen et al.	Hospital based	2007	1233	20-80	Generic HPV - DNA amplification products were detected by DEIA. HPV-positive specimens were typed by reverse hybridization line probe assay SPF10 LiPA25 (version 1)	HPV 16 (76.7%) and HPV 18 (7.8%) were the most common, together accounting for 84.5 per cent of CSC, followed by HPV 31 (3.2%), HPV 52 (2.2%) and HPV 58 (2.2%).
Zhao and al.	Pool analysis	1999-2008	30371	15-59	HC2, LBC, VIA	HPV - DNA testing is highly sensitive (97.5%) and moderately specific (85.1%) for CIN Grade 3 or worse, with consistent results across study sites and groups including women age < 35 years. A rise in the cutoff point might be beneficial for future screening programs in China, especially when screening women < 35 years.
START-five studies	Population based	2003-2007	11587	30-54	HC2 (physician collected samples), LBC, VIA, VILI,colposcopy, HPV care	The sensitivities and specificities of detecting CIN2 + were 90.0 and 84.2% for care HPV test, 41.4 and 94.5 per cent for VIA and 97.1 and 85.6% for HC2 test, respectively. The HPV test is care promising as a primary screening method for cervical cancer prevention in low-resource regions
START-UP	Population based	2010	7541	25-65	Care HPV HC2, 45-18-HPV16 E6 protein, HPV16/18.45 DNA, VIA, colposcopy	The percent positive yard ranges were 14.8 - 17.4% for VIA,17.8 - 20.9% for an abnormal colposcopic impression; 7.9- 10.5% for 45-18-HPV16 E6; 23.4 - 28.4% for HPV16/18/45 DNA; HPV16/18/45 DNA detection was ~70% sensitive and had positive predictive values of ~ 25% for CIN3 +. HPV16/18 /45 E6 detection was ~ 50% sensitive with a PPV of nearly 50% for CIN3 +.

Chronic non-communicable diseases, including cancers, represent a weight of morbidity and mortality increasingly important in developing countries. In the Democratic Republic of Congo, the lack of a screening and the national cancer registry program is a serious handicap. Mashinda and al in their study confirm that the DRC does not have any cancer registry for several years, i.e. from 1969 to 2008's (40 years) and this research was conducted only in two

great institutions of the Republic, namely: Cliniques universitaires de Kinshasa (CUK) as well as the Provincial Reference of Kinshasa General Hospital (HPGRK). This survey, like the data from other African countries, reveals the preponderance of the female sex and the early occurrence of cancers in this group. Cancer of the cervix and breast are the most frequent forms [7].

Cytology screening programs have been successful in curbing the incidence of ICC in developed countries, but they have largely failed in most developing countries due to competing health priorities and lack of resources including health infrastructure (trained cytotechnologists, laboratories and services for diagnosis and treatment), human and financial resources. According to population based surveys conducted by WHO in 2001 and 2002, cervical screening coverage was at best 20.2% of urban and 14.0 per cent of rural areas in the Congo, and at worst, 1.6% of urban and 0.4% of rural areas in Ethiopia (WHO 2002). South Africa is the only country in sub-Saharan Africa to have established national cytology-based cervical screening program in 2001. However, coverage remains poor and the impact on ICC rates is unknown. VIA (visual inspection with acetic acid) or VILI (visual inspection with Lugol's iodine) are less dependent strategies and laboratories have been advocated as alternatives screening in developing countries, in various evaluation studies. Mutombo and al in their cross-sectional study performed at the University of Kinshasa clinics from July 2009 to April 2010 confirm that IVA appears as a reliable technique and suitable for the detection of cervical-uterine cancer. [8] However Sangwa-Lugoma et al in their study mentioned that, all the visual inspection methods tended to be less specific than cytology. These findings were also observed by others. [16] The latter

test also performed with substantially better sensitivity (and acceptable specificity) at the lower thresholds of ASCUS and LSIL. Given that VIA and VILI identify most cervical precursor and cancerous lesions, these methods have the potential to be effective screening methods to reduce cervical cancer incidence and mortality rates in resource-poor countries.

In 2012, the American Cancer society (ACS) guidelines for cervical dysplasia and cancer were updated after a systemic review of the evidence and contributions from the American society of Colposcopy (ASCCP), the American Society for Clinical Pathology, among other major professional organizations. The findings are supported by the American College of Obstetrics and Gynecology (ACOG). The new guidelines recommend that all women should begin cervical cancer screening at age 21 regardless of risk factors, including age of onset of sexual activity. Women aged 21 to 29 should have Pap testing every 3 years. The preferred option for women aged 30 and above is to screen with both a Pap test and an HPV test, and if both are negative, to re-screen no sooner than every 5 years. Co-testing with a Pap and HPV test is 95% to 100% sensitive for CIN III. If HPV testing is unavailable, screening with Pap smear alone every 3 years is acceptable for women of 30 and over.

Table 4: summary of a few studies made in Kinshasa in the DRC

study	Study year	Place of study	Screening test	Conclusion
Sangwa-Lugoma et Col	2006	Kinshasa,DRC	Visual inspection as a cervical cancer screening method in a primary health care setting in Africa	Our results show that VIA and VILI performed by nurses and physicians are slightly more sensitive but less specific than Pap cytology across multiple combinations of test and lesion thresholds. Given their lower cost and easy deployment, visual inspection methods merit further assessment as cervical cancer screening methods for low-resource countries
Mutombo, B. A et	2011	Kinshasa,DRC	Evaluation of precancerous and cancerous cervical lesions uterine by	Taking into account excellent sensitivity and specificity, IVA appears as a reliable and suitable technique for screening for cancer of the cervix

col			Visual methods (IVA, colposcopy) to the Clinical University of Kinshasa	in precarious situations
Mashinda, K. D et col	2012	Kinshasa,DRC	Prevalence of cancer in the Democratic Republic of the Congo: Clinical pathology data Academic and Reference of Kinshasa General Hospital	This survey, like the data from other African countries, reveals the preponderance of female and the early occurrence of cancers in this group. Cancer of the cervix and breast are the most frequent forms.
Catherine Ali-Risasi et col	2014	Kinshasa,DRC	Knowledge, attitude and practice about cancer of the uterine cervix among women living in Kinshasa, the Democratic Republic of Congo	This study shows a low level of knowledge, attitude and practice on cervical cancer among women in Kinshasa. Increasing women's awareness would be a first step in the long chain of conditions to attain a lower incidence and mortality.
Praet, M. et col	2015	Kinshasa,DRC	Diagnosis of cervical dysplasia associated with HIV infection: loss of efficiency of conventional cytology	Sensitivity, efficiency diagnosis of CF, on the one hand, the rate of concordance (Kappa between the CF and the FCM, on the other hand, were collapsed in presence of the HIV infection, causing a high rate false negative and a low predictive value negative, probably through the intensification of reactions inflammatory. The frequency of check-ups should be closer in case of HIV infection. the absence of a national screening program cancer of the cervix in the Democratic Republic of the Congo not allow to efficiently support this pathology whose risk is moreover amplified by HIV infection
Catherine Ali-Risasi and col	2015	Kinshasa,DRC	Prevalence and risk factors for cancer of the uterine cervix among women living in Kinshasa, the Democratic Republic of the Congo: a cross-sectional study	LSIL+ lesions are frequent among women in Kinshasa. The use of plants for vaginal care deserves attention as a possible risk factor for LSIL+. In this setting, HPV16 is not the most frequent genotype in samples of LSIL+ lesions.

Discussion

Cervical cancer can be prevented either by focusing on primary prevention of human papilloma virus (HPV) infection and/or secondary prevention based on the early detection and treatment of precancerous lesions before they progress to invasive cancer [41]. The challenges and resources required in introducing cytology or VIA / VILI screening and its sub-optimal performance in China have prompted evaluation of alternative screening methods such as HPV testing in large-scale cervical cancer screening project Chinese government further expanded screening coverage to 30 million rural women from 2012 to 2014. Therefore, Chinese government announced the addition of HPV testing to the current cytology 546,000 Gold VIA-based screening program in 2014 and the Chinese ambitious goal of Women and Children Health Plan aim to screen and treat 70 percent of 270 million women (once every 5 years) by 2015. Because, despite covering only 7% of women who are 35-59 years old are screening, a previous study of the cost-effectiveness of cervical screening in five developing countries (not including China) concluded that once-lifetime screening at age 35 years could reduce the cumulative lifetime risk of invasive cervical cancer in screened women by between 25-36%, depending on the screening strategy and technology used [5]. Irrespective of changing risk, population growth and ageing, the likely

future burden of cervical cancer in sub-Saharan Africa will rise to about 118 000 new cases in 2025.

HR-HPV positivity was associated with behavioral and sexual characteristics thought to affect risk of new infections and immune function. However, HPV prevalence did not correlate with numbers of sex partners, possibly because of a high HPV infection rate per sexual contact or because subjects were older than 30 years. Despite the considerable success of cytological screening for cancer of the cervix in the developed countries, in Africa, it has not yet reached the expectation threshold. The hope is still allowed as alternative methods of screening such as Visual inspection after the application of acetic acid (VIA) and the solution of lugol's iodine (VILI) experienced for many years have demonstrated their effectiveness. Visual inspection methods have been proposed as low-cost screening solutions in less developed countries [5]. The test sensitivity ranged from 79 to 97% and specificity between 87 and 96% were observed in various African studies making this test a simple tool, sensitive, specific and cheap prices. It has been also confirmed in a study conducted in Asia [2]. This modeled analysis suggests that primary HPV screening with careHPV would be an effective and cost-effective method of primary screening in rural China, and that it compares favorably to visual inspection methods in terms of increased effectiveness [5]. Numerous studies have

emphasized the knowledge levels and possible factors that affect screening behaviors among women in different countries around the world. The results have shown that not only demographic characteristics but also knowledge about cervical cancer can affect cervical cancer screening participation [4]. Strong implications (> 40/100000) of cervical cancer are observed in some countries in the African region where the disease affects women from 30 years; the diagnosis is made in approximately 90% of cases at very advanced stages. Cancer of the cervix is now a problem of public health in the sub-Saharan Africa and therefore deserves special attention. Efforts are needed to increase women's knowledge about cervical cancer, especially the screening methods, and to improve their perceptions of the screening process for early detection to reduce cervical cancer incidence and mortality rates [4]. Cervical cancer education is needed to provide accurate information and to raise public awareness about cervical cancer screenings. Health providers should assume an active role in the provision of appropriate information about the importance of screenings to women's health.

CONCLUSION

At the end of this study the conclusions can be drawn.

- The cancer of the cervix is the most common cancer of women in both countries; it remains a deadly disease for Congolese women and Chinese;
- The random care due the late consultation by the patients, lack of infrastructure and lack of testing policy make very hard the prognosis of this pathology.

There is a great progress in the fight and the discovery of this pathology, all techniques are used (high-risk HPV test; Cytology: Pap testing, TSB system; VIA/VILI; Colposcopy) and the Chinese Government intends to provide more help for the remote areas. While in Africa the results still remain dark, cervix pathology is still an ordeal in several African countries and especially in the DR Congo. Cervical cancer remains a public health problem in developing countries, due to its late diagnosis and its poor prognosis. Poverty is a very crucial factor for the maintenance of this disease. The WHO recommends the simple use of the VIA/VILI for the

precancerous lesions detection and develop cervical cancer screening program.

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