

# Cervical cancer prevention in Senegal: an International Cooperation Project Report

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**Abstract.** *Background:* Cervical cancer is the second most common women's cancer in less developed regions and it is the leading cause of cancer mortality among women in Senegal. Because of the high costs, cervical cancer prevention is very rare in developing countries and it is often based on visual inspection methods. The University of Parma (CUCI) and the MANI association have developed a cervical cancer screening project addressed to rural Senegal communities. The aim of the project was to disseminate the cytocervical sampling technique among Senegalese nurses and midwives, as a completion to the local visual inspection method. Other objectives were to verify the prevalence of precancerous lesions and to evaluate cervical cancer knowledge and attitudes among women who participated at the screening campaign. *Interventions:* A theoretical and practical training plan on cervical cancer screening was provided to the local health workers at various levels. The screening was performed through a first step visual inspection exam to 203 women, followed by a Pap smear in case of positive outcome. 20 women participated also to a structured interview. *Results:* The Pap smear material was adequate in all the samples collected where this indicates that the objective to disseminate cervical cancer screening techniques has been achieved. Of the 203 women involved in the screening project, 68 were tested positive at the first step and 38 of them were submitted to Pap tests. *Conclusion:* The difficulties encountered confirm how Pap tests have overall proved inordinately complex and expensive for developing countries. It seems more sensible to deal first with global health in terms of basic hygienic sanitation, including an educational component in screening programs in order to sensitize women to the risk factors of cervical cancer.

**Key words:** cervical cancer, prevention, screening, cervix, pap test, pap smear, international cooperation, Senegal, global health

## Background

Cancer of the cervix uteri is the 4th most common cancer among women worldwide, with an estimated of 527,624 new cases and 265,672 deaths in 2012 (1). In particular, it is the second most common cancer in women living in developing regions with an estimated 445,000 new cases in 2012 (84% of the new cases worldwide) (2). The spread of Papanicolau (Pap)

screening test has progressively reduced the mortality of cervical cancer disease in middle- and high-income countries.

Cervical cancer is the first cancer, recognized by the World Health Organization, attributed to an infection: HPV infection. The development of Papillomavirus vaccines can effectively contribute to reduce the incidence of cervical cancer through primary prevention, by interrupting the origin of the chain from

infection to cancer. While incidence and mortality rates have fallen significantly in developed countries, cervical cancer still remains the leading cause of cancer deaths in limited resource countries. It is estimated that the prevalence of genital infections due to HPV ranges from 2% to 44% all over the world, with the highest percentage in Senegal.

In developing countries, due to socio-economic conditions and a poor health system, cervical cancer prevention is very rare due to the high costs and it is often based, according to WHO guidelines, on visual inspection methods using acetic acid (VIA) or Lugol's iodine (VILI) without the use of the colposcope; the so-called "see-and-treat" approach is the only one used in the most equipped sites (3). VIA, with or without VILI, is a good screening, simple test, has low cost and high sensitivity in comparison to Pap smear. Visual inspection methods appear overall effective for primary screening but they are still prone to subjectivity, requiring well trained staff (3, 4). Furthermore, as far as low-cost, point-of-care, relying on low technology, they have a poor positive predictive value, leading to significant over-treatment or over-referral of women with positive tests. Finally, establishing reliable quality control is just as difficult (5-7). Despite these limits, the opportunity to introduce cytology screening programs has largely been considered in the last decades, but it has failed in most developing countries. Due to competing health priorities and lack of resources, including health infrastructure (trained cytotechnologists, diagnosis and treatment facilities), human and financial resources (8), the implementation of new strategies to improve cervical cancer prevention is required (9). Factors associated with peculiar attitudes towards cervical cancer screening can constitute an additional barrier to the spread of the screening in limited resources countries (10, 11).

Cervical cancer is the most common cancer in Senegal in women between 15 and 44 years of age; 4.43 million is the number of the female population aged over 15 who is at risk of contracting this tumor. Current estimates indicate that 1,482 women develop cervical cancer every year and 858 die from the disease (12). About 2.3% of women in the Senegalese general population are estimated to harbour cervical HPV-16/18 infection at a given time, and 44.6% of invasive

cervical cancers are attributed to HPVs 16 or 18 (12). Most of these women have not been diagnosed, nor do they have access to treatment that could cure them or prolong their lives (13).

Considering the scale of the problem and its burden, the University of Parma (CUCI)<sup>1</sup> and the MANI<sup>2</sup> association have developed the project *Doors open to women's health: Organization of a screening program for the prevention of female tumors*, funded by the Emilia Romagna Region (Italy), on the prevention of cervical cancer in a Senegal rural area as part of the international cooperation initiatives ongoing since 2010. The project was developed starting from Senegalese nurses and midwives, who expressed their training need for the Pap test technique.

### Objectives of the project

This international cooperation project had three main objectives. The first one was to disseminate cervical cancer screening, in particular the cytocervical sampling technique as a completion to current visual inspection methods, in five rural villages of Senegal, as requested. The second objective was to verify the prevalence of precancerous lesions and the last one aimed at evaluating cervical cancer knowledge and attitudes towards screening tests among women belonging to these villages.

The project was carried out with the collaboration of the FEEDA<sup>3</sup> association in five "Center de Santé" in Thiés region (Senegal).

### Interventions

A theoretical and practical training plan on cervical cancer screening was provided to the local health workers at various levels.

<sup>1</sup>CUCI: Centro Universitario per la Cooperazione Internazionale (University Centre for International Cooperation)

<sup>2</sup>MANI: association promoting cooperation initiatives in countries with limited resources

<sup>3</sup>FEEDA: Femme, Education, Eau et Développement en Afrique

The training has been designed in 3 steps:

- 1) targeted training to ASC<sup>4</sup>, relais<sup>5</sup>, bajenu gox<sup>6</sup>, matrone<sup>7</sup> on the genital infection due to human papilloma virus (HPV) and on the preventive approach; information and awareness-raising campaigns to the women of the villages;
- 2) theoretical training of midwives and nurses on screening methods conducted by two experienced Italian midwives: both meetings, lasting 4 hours each, have taken place with the support of the cultural mediation of the head nurse;
- 3) screening under the supervision of Italian midwives as part of the "Open doors to health" campaign in the rural areas of Pire, Thienaba, Dioll Kad (Kombole), Keur Bakar (Fondionge), Sokone. The screening, offered free of charge, has been divided in three phases: visual inspection using acetic acid and Lugol's iodine addressed to all female population without any restriction; selection of positive cases to be submitted to Pap-test; execution of Pap-test after 48 hours. The Pap-test material adequacy was used as an indicator to verify the achievement of this goal.

The activity took place from March 26th 2016 to April 5th 2016.

Women involved in the screening were 203. They were also invited to participate in a structured interview and 20 of them agreed. The questionnaire took approximately 15 minutes to complete and was designed in French, translated and interviewer-administered in Wolof, the language spoken in Senegal, by a trained research assistant. Participants did not receive any incentive to participate. This oral survey comprised thirty multiple-choices that covered three sections: socio-demographic factors; health factors; cervical cancer knowledge.

<sup>4</sup> ASC (agent de santé communautaire): Community Health Workers

<sup>5</sup> Relais: she has the task to inform and sensitize the community in order to prevent the most widespread diseases

<sup>6</sup> Bajenu gox: she promotes maternal, newborn and child health at the individual, family and community level

<sup>7</sup> Matrone: she helps the mother during pregnancy, labor, delivery and puerperium

## Results

203 women underwent the visual inspection: 119 in Pire, 57 in Keur Amath Seune (Sokone) and 27 in Nioro Alassane Tall (Sokone). Every women joined the first step of the screening campaign, that is visual inspection using acetic acid and Lugol's iodine, upon collecting personal data and anamnesis (parity, methods contraceptives and previous gynecological interventions). 40 women were tested positive in Pire, 20 in Keur Amath Seune and 8 in Nioro Alassane Tall. Unfortunately the second phase (Pap-test) was held only in Pire due to poor agreement among the parts. Of the 40 women that were tested positive in Pire, 38 of them were submitted to the Pap test on March 29, 2016. Two women were excluded for bleeding.

The Pap smear material was adequate in all the samples collected in Pire where this indicates that the objective to disseminate cervical cancer screening techniques has been achieved.

Speaking of numbers, 45 was the medium age of the women submitted to the visual inspection who resulted to be positive and 37 was the medium age of the ones who resulted negative. All women, either positive or negative, had their first pregnancy at the middle age of 20. But what makes the difference are gravidity and parity. The negative ones had an average of 4,5 pregnancies and 3,9 deliveries. The positive ones had 6,1 pregnancies and 5 deliveries. As for family planning there has not been significant difference: the 54% of the negative ones took some contraceptives against the 52% of the positive ones.

Of the 38 women who were Pap-tested, one of them was diagnosed with epidermoid carcinoma, 13 had to undergo a biopsy for further investigation and 6 were scheduled for another check-up within six months.

Regarding follow-up no data have been accessible, except for 4 women who have undergone surgery, without further specification.

Of the 20 women included in the interview, all were married or had been married, 70% had polygamous marriage contract, 90% were illiterate, 50% had their first sexual intercourse before fifteen years of age. The 60% had received information about the screening program from their family or friends but only 2

**Table 1.** Participants characteristics and screening results

Age	Job	Age of first pregnancy	Gravidity	Family planning	Visual inspections results	Pap-test results
ND	Housewife	25	8	No	Positive	Negative
ND	Housewife	17	10	Pill and injection	Positive	LSIL. Colposcopy-directed biopsy recommended
50	Housewife	16	9	No	Positive	HSIL. Colposcopy-directed biopsy recommended
51	Seller	ND	5	ND	Positive	Negative
54	Housewife	22	8	No	Positive	Negative
32	Housewife	ND	5	Injection	Positive	ASC-US. Pap-test or HPV-DNA test within 6 months necessary
38	ND	25	5	No	Positive	Negative
64	Housewife	25	11	ND	Positive	Check after anti-inflammatory treatment necessary
52	ND	19	11	Injection	Positive	ASC-H. Colposcopy-directed biopsy recommended
38	Housewife	20	11	Pill	Positive	Negative
64	Housewife	44	11	ND	Positive	Negative
52	Matron	22	5	Injection	Positive	Negative
20	Housewife	15	2	Injection	Positive	Negative
69	ND	30	8	No	Positive	Negative
42	ND	20	7	ND	Positive	HSIL. Colposcopy-directed biopsy recommended
69	ND	15	7	ND	Positive	HSIL. Colposcopy-directed biopsy recommended
25	Housewife	ND	2	No	Positive	Check after anti-inflammatory treatment necessary
57	Housewife	18	7	No	Positive	HSIL. Colposcopy-directed biopsy recommended
41	ASC	27	6	ND	Positive	ASC-US. Pap-test or HPV-DNA test within 6 months necessary
ND	Housewife	18	5	No	Positive	ASC-US. Pap-test or HPV-DNA test within 6 months necessary
49	Matron	20	2	No	Positive	Epidermoid carcinoma
32	Trader	18	4	Injection	Positive	Negative
26	ND	22	2	Injection	Positive	Negative
20	Housewife	19	1	Yes	Positive	Negative
29	ASC	18	3	Injection	Positive	ASC-US. Pap-test or HPV-DNA test within 6 months necessary
42	Trader	15	8	Injection	Positive	LSIL. Colposcopy-directed biopsy recommended
35	ND	18	4	Injection	Positive	HSIL. Colposcopy-directed biopsy recommended
44	Housewife	15	5	No	Positive	ASC-H. Pap-test or HPV-DNA test within 6 months necessary
46	Farmer	17	7	No	Positive	ASC-H. Pap-test or HPV-DNA test within 6 months necessary
60	ND	18	9	ND	Positive	Check after anti-inflammatory treatment necessary
41	ND	20	4	ND	Positive	Negative
66	ND	24	9	ND	Positive	Negative
36	ND	20	6	Yes	Positive	ASC-US. Pap-test or HPV-DNA test within 6 months necessary
55	Housewife	18	5	ND	Positive	Check after anti-inflammatory treatment necessary
44	Housewife	No	0	ND	Positive	Cell atypia. Colposcopy-directed biopsy recommended
42	Trader	18	7	No	Positive	ASC-H. Pap-test or HPV-DNA test within 6 months necessary
34	Trader	15	4	Injection	Positive	ASC-US. Pap-test or HPV-DNA test within 6 months necessary
54	Trader	15	12	No	Positive	Cell atypia. Colposcopy-directed biopsy recommended
54	ND	25	5	No	Positive	Not done because of bleeding
61	Trader	15	7	Pill and injection	Positive	Not done because of bleeding
45,62		<b>20,22</b>	<b>6,175</b>			

of them had already been screened before because of lack of information. The interviews show that women wouldn't feel ashamed if they had a cervical cancer and the majority of them would talk to someone about this problem (14 of them with their own mother and 4 of them with their own husband). The limited number of interviews collected and communication difficulties did not make possible the complete collection of all the information required for an assessment of attitudes towards screening in the group of women interviewed.

## Discussion

The collected data confirm the prevalence of cervical cancer among Senegalese women. The use of Pap-test screening, in addition to the visual method, has allowed to enroll women with precancerous lesions into a diagnostic and therapeutic path. Unfortunately, the difficulties in communication and in material transport, together with the lack of means of travel and travel arrangements for women, as well as the underlying cultural clash made it possible to carry out the Pap smears only in the village of Pire. This shows how such a project requires to be supported by a well-organized and detailed plan and confirms how pap smear-based prevention approaches, as far as successful in preventing cervical cancer where implemented correctly, have overall proved inordinately complex and expensive for developing countries (14). It's important to point out that in order to undergo a surgical procedure, women must find money inside the families, through a sort of charity collection, which is not often enough either.

Many of the factors that increase HPV acquisition and promote the oncogenic effect of the virus are largely widespread in Senegal. These include: polygamous marriages, high parity, the early age of first sexual intercourse and early pregnancies. Polygamy is accepted in many societies in Africa and this may increase the probability for a girl to catch HPV infection at first intercourse with her husband. Polygamy is reported to increase the risk of cervical cancer two-fold and the risk increases with increasing number of wives (15). High parity, which is the norm in some cultures in Africa, is also a recognized, independent, HPV-related co-factor for the development of cervical

cancer (16). The only protective factor is circumcision as applicable to the majority of Senegalese men (17).

The early age of first sexual intercourse and early pregnancy have been as well identified as risk factors for invasive cervical cancer in developing countries and our data confirm previous studies (18, 19). These factors are closely linked to both low education, socio-cultural level and widespread illiteracy.

It's indispensable to include an educational component in screening programs for women in the reproductive age in order to sensitize women to the risk factors of cervical cancer. Considering the early age of first pregnancy, the educational program should start at the primary school.

A different approach to the problem should consider the introduction of anti-HPV vaccination, but the assessment of the cost/benefit ratio of a vaccination campaign is outside the competences of the project participants. Moreover, if on the one hand the vaccine offers an immediate solution, on the other hand it exposes to the risk of missing proper information about sexually transmitted infections.

## Conclusions

The absence of a health system that guarantees access to treatment and the lack of health care impose some considerations: it seems more sensible to deal first with global health in terms of basic hygienic sanitation, especially aiming at education as a whole, before applying methods which, as much as really effective tailored to our context, might turn out to be useless in contests with limited resources and striking cultural and health-care inequalities (19).

As a matter of fact, to properly legitimize a prevention project in such contests with limited resources, it is a priority to dwell on the anthropological study of the population considered. It is necessary to start from a deep insight into the targeted context, not just to ensure its overall understanding, but to guarantee the respect for the local hierarchies. This is meant both in terms of regard for the local culture and mentality and in terms of effectiveness. To be effective, any planned intervention needs to be first agreed with the people at the top of a certain healthcare setting. We



had proof of it throughout the whole project. Along the way we also got to learn the will of local midwives belonging to different villages to receive the training in one unique centre, separate from their work setting, in order to bring the acquired know-how into their villages at a later stage. These midwives are really proud to implement new skills, once acquired, however it is just as important for them to avoid prejudices, feeling subordinate to western midwives in front of their local people. In this respect, it is therefore essential to guarantee expenses and logistics for the transports from their villages to the training centre as part of the project budget.

In conclusion, we believe our project could be expanded taking into account school education, sexual education, as well as hygiene and health promotion, both among the local health workforce and in the general population, in order to ensure a collective improvement in assistance and support.

## References

1. Ferlay J, Soerjomataram I, Dikshit R, et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *Int J Cancer* 2015; 136: E359-E386.
2. World Health Organization. Human papillomavirus (HPV) and cervical cancer Fact sheet N°380: World Health Organization; 2016 [accessed 2 February 2018]. Available from: <http://www.who.int/mediacentre/factsheets/fs380/en/>.
3. Cunningham MS, Skrastins E, Fitzpatrick R, Jindal P, Onoko O, Yeates K, et al. Cervical cancer screening and HPV vaccine acceptability among rural and urban women in Kilimanjaro Region, Tanzania. *BMJ open* 2015; 5(3): e005828. PMID: 25757944.
4. Sankaranarayanan R, Esmy PO, Rajkumar R, Muwonge R, Swaminathan R, et al. Effect of visual screening on cervical cancer incidence and mortality in Tamil Nadu, India: A cluster-randomised trial. *Lancet* 2007; 370: 398-406.
5. Wright TC Jr, Kuhn L. Alternative approaches to cervical cancer screening for developing countries. *Best Pract Res Clin Obstet Gynaecol* 2012; 26: 197-208.
6. Sauvaget C, Fayette J-M, Muwonge R, Wesley R, Sankaranarayanan R. Accuracy of visual inspection with acetic acid for cervical cancer screening. *Int J Gynaecol Obstet* 2011; 113(1): 14-24.
7. Forhan SE, Godfrey CC, Watts DH, et al. A systematic review of the effects of visual inspection with acetic acid, cryotherapy, and loop electrosurgical excision procedures for cervical dysplasia in HIV-infected women in low- and middle-income countries. *J Acquir Immune Defic Syndr* 2015; 68(suppl 3): S350-S356.
8. Denny L, Quinn M, Sankaranarayanan R. Chapter 8: Screening for cervical cancer in developing countries. *Vaccine* 2006; 24(Suppl 3): S71-S77.
9. Johnson LG, Armstrong A, et al. Implementation strategies to improve cervical cancer prevention in sub-Saharan Africa: a systematic review in *Implementation science*. 2018.
10. De Abreu, Chantelle, Hannah Horsfall, Despina Learmonth. Adherence barriers and facilitators for cervical screening amongst currently disadvantaged women in the greater Cape Town region of South Africa. *African Journal of Primary Health Care and Family Medicine* 5.1 (2013): 1-10.
11. McFarland, Ditsapelo M, Sarah M. Gueldner, Keitshokile D. Mogobe. Integrated Review of Barriers to Cervical Cancer Screening in Sub-Saharan Africa. *Journal of Nursing Scholarship* 48.5 (2016): 490-498.
12. Bruni L, Barrionuevo R. ICO Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in the World. Summary Report 2017. <http://www.hpvcentre.net/statistics/reports/XWX.pdf>.
13. World Health Organization. *Comprehensive Cervical Cancer Control: A Guide to Essential Practice*. Geneva, Switzerland: World Health Organization; 2014.
14. Denny L. Cytological screening for cervical cancer prevention. Best practice & research. *Clinical obstetrics & gynaecology* 2012; 26: 189-96.
15. Bayo S, Bosch FX, de Sanjose S, et al. Risk factors of invasive cervical cancer in Mali. *Int J Epidemiol* 2002; 31: 202-209.
16. Anorlu RI. Cervical cancer: the sub-Saharan African perspective. *Reprod Health Matters* 2008; 16: 41-49.
17. Tobian, AA, Kacker, S, and Quinn, TC. Male circumcision: a globally relevant but under-utilized method for the prevention of HIV and other sexually transmitted infections. *Ann Rev Med* 2014; 65: 293-306.
18. Louie KS, De Sanjose S, Diaz M, et al. Early age at first sexual intercourse and early pregnancy are risk factors for cervical cancer in developing countries. *British Journal of Cancer* 2009; 100: 1191-1197.
19. International Collaboration of Epidemiological Studies of Cervical Cancer. Comparison of risk factors for invasive squamous cell carcinoma and adenocarcinoma of the cervix: Collaborative reanalysis of individual data on 8,097 women with squamous cell carcinoma and 1,374 women with adenocarcinoma from 12 epidemiological studies. *Int J Cancer* 2006; 120: 885-891.

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