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Practice of Screening for Precancerous Cervical Lesions in Koumpentoum Health District (Senegal)

El Hadji Cheikh Abdoulaye Diop[1,2*], Abdoul Aziz Ndiaye[2], Martial Coly Bop[2]

[1]District Sanitaire de Koumpentoum, Ministére de la Santé et l'Action Sociale, Koumpentoum, Sénégal
[2]Unité de Formation et de Recherche en Santé et Développement Durable, Université Alioune DIOP de Bambey, Bambey, Sénégal
Email: *docdiop82@gmail.com

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Abstract

Introduction: Cervical cancer is preventable through vaccination against papillomaviruses and screening for precancerous lesions. The objective of this study was to determine the frequency of screening practice and to identify associated factors. **Methods:** This was a cross-sectional descriptive and analytical study. Data were collected from individual interviews during household surveys. Data collection took place from (1st) to (30th) September (2021). The following were explored: socio-demographic characteristics, knowledge, attitudes and practices of women regarding screening. **Results:** A total of (294) women aged between (18) and (69) years were included. The mean age was (35.79) years (±9.81). The median age was (34) years. The frequency of screening was (16%); that of precancerous lesions was (4.26%). Factors statistically and significantly associated with screening uptake were cervical cancer information (OR = 5.42 (1.27 - 23.16); p = 0.003), knowledge of the availability of screening (ORa = 7.73 (3.01 - 18.51); p < 0.001), knowledge of at least one symptom of the disease (OR = 6.57 (3.23 - 13.39); p < 0.001) and the incentive from a health provider (ORa = 3.03 (1.25 - 7.31); p = 0.014). **Conclusion:** Frequency of pre-cancerous lesions of cervical cancer is high in Koumpentoum health district (4.26%), while the practice of screening is low there (16%). The factors associated with this low performance are related to a lack of adequate knowledge of women about cervical cancer.

Keywords

Screening, Precancerous, Lesions, Cervix, Koumpentoum, Senegal

1. Introduction

Cervical cancer is the fourth most common cancer in women, with (604,000)

new cases and (342,000) deaths worldwide in (2020) [1]. Developing countries, particularly sub-Saharan Africa, pay the highest price with (85%) of new cases and (90%) [2] of deaths worldwide due to the ineffectiveness, or even inexistence of a prevention or an early detection system [3]. In (2020), Senegal recorded (1.937) new cases and (1.312) deaths, *i.e.* a case-fatality rate of (67.73%), placing this disease in first place among all cancers of all sexes [4]. Chronic infection by papillomaviruses (HPV) is involved in the occurrence of more than (90%) of precancerous cervical lesions (PCL) [5]. Modeling studies show that (97%) of cervical cancers could be prevented by HPVs vaccination, screening and treatment of PCLs (2) [6] [7].

Recommandation for the diagnosis of PCLs is the use of HPV molecular testing in combination with cervicovaginal smear and colposcopy. However, these diagnostic tools are expensive or unavailable in developing countries [8] [9]. Visual inspection with acetic acid and Lugol (VIA/VIL), with a sensitivity of (80%) and specificity of (92%), simple to perform and inexpensive, is an alternative for routine screening [10].

In Senegal, despite the integration of PCLs screening into primary health care, screening practice remains low and studies on associated factors are few. Guéye *et al.* found a screening practice of (28.32%) in Joal [11], Faye *et al.* (6.5%) in Kaffrine [12] and Thiam (2%) in Kédougou [13] with the associated factors of having an income-generating activity, education in French school, knowledge of the disease, diagnostic means, knowledge of a person with the disease and knowledge of the possibilities to cure. The objective of this research was to determine the frequency of screening and to identify associated factors in the health district of Koumpentoum in (2021).

2. Methodology

2.1. Framework of the Study

The health district of Koumpentoum is located Koumpentoum department, Tambacounda region. Its population was (164,409) inhabitants in (2020) on a surface area of (7652) Km^2, *i.e.* (21.48) inhabitants/km^2 [14]. The district had (23) health delivery points including a health centre which polarizes (22) health posts. In terms of human resources, the district had (03) physicians, (20) nurses, (10) nurses assistants and (24) midwives. Screening is carried out at all health posts and PCLs treatment at the health centre.

2.2. Type and Period of Study

This was a cross-sectional, descriptive and analytical study during the whole month of September (2020).

2.3. Population of study

Study population consisted of sexually active women aged between (18) and (69) years found in households in Koumpentoum district.

2.4. Pre-Test

The corresponding author designed the questionnaire which included the following items: socio-demographic data, knowledge, attitudes and practices regarding PCLs screening. A pre-test was conducted with (30) women found in the health centre. The reliability and validity of the questionnaire were validated by the author and his collaborators, taking into account the suggestions of the members of the district management team who were responsible for conducting the pre-test surveys. The pre-test data were not included in the analysis.

2.5. Inclusion and Non-Inclusion Criteria

All women aged between (18) and (69) years present in the households and who agreed to participate in the study were included.

Women who refused to participate in the study or who were absent at the time of the survey were not included.

2.6. Sampling

The target of the study was sexually active women aged between (18) and (69) years living in the district. The sample size was calculated using Schwartz's formula [15]:

$$N = Z^2 * p * (1 - p) * d / i^2$$

with:

- p = (90%) as the desired coverage of PCLs screening;
- q = (1) − p = (10%), corresponding to the complementary probability;
- i = (0.05) was the margin of error for precision of (95%);
- d = (1.5) was the effect of the sampling design;

$$N = (1.96)^2 * (0.90) * (0.10) * (1.5)/(0.05)^2 = (207).$$

We added (10%) of the non-respondents to the sample, which gives (228). The sampling was stratified in two stages. The first stage corresponded to villages or neighborhoods with a simple random selection of one village or neighborhood from each area of responsibility, while the second stage corresponded to households. For the selection of concessions, the interviewer stood at sociological centre of the village or neighborhood to determine a direction at random. With a pen thrown in the air, the tip of which indicated the direction of departure, he started with the first concession indicated. An exhaustive census of sexually active women aged between (18) and (69) years found in each compound was carried out. All sexually active women found in the houses who agreed to participate in the study were interviewed, which bringings the final sample size to (294).

2.7. Study Variables

The dependent variable was the practice of PCLs screening. The independent variables were socio-demographics, women's knowledge of cervical cancer, attitudes and practices regarding PCLs screening.

2.8. Data Collection

To collect the data, we used a PCLs screening intake form administered as a closed-ended structured questionnaire directly to sexually active women aged between (18) and (69) years.

2.9. Data Management and Analysis

Epi-Info version (7) was used to create the data entry template and to obtain the database. Epi Info version (7.2.5.0), SPSS version (20) and R version (4.05) softwares was used to analyze the data. Quantitative variables were described in a descriptive analysis using extremes, means and standard deviations, while qualitative variables were described using frequencies with confidence intervals (95% CI). Pearson's chi2 statistical tests and Fisher's test under the conditions of applicability allowed us to verify the existence of a statistically significant relationship in the bivariate analysis. In the multivariate analysis, we used multiple logistic regression and included all independent variables with a $p < (0.25)$ found in the bivariate analysis and those whose literature review had revealed a link with the independent variable. The top-down stepwise method allowed us to retain the variables associated with screening practice at a threshold of $p < (5\%)$. In the second step, these variables were removed one by one with a comparison of the nested models by the Aikake information criterion (AIC) [16]. The process was continued until no improvement was found by the maximum likelihood test. The Hosmer-Lemeshow test [17] verified the adequacy of the final model. The strength of the associations between screening practice and the independent variables was assessed in bivariate with the OR and in multivariate with the adjusted OR, surrounded by their (95%) CIs.

2.10. Ethical Considerations

In order to obtain approval, the study protocol was submitted to the health authorities. With an information letter read in the local language, the survey was explained to all participants. Free consent was collected and documented on a form with the woman's signature of consent to the survey. All data were collected anonymously, stored and used for research purposes only.

3. Results

3.1. Description of the Study Population

We interviewed (294) women aged between (18) and (69) years. The average age was (35.79) ± (9.8) years. Almost three quarters (74.49%) of the women were under the age of (40) years. Among them, (89.79%) were living in a couple, (33.7%) had attended French school and only (24.49%) of them were engaged in an income-generating activity (IGA) (**Table 1**).

3.2 Knowledge and Attitudes about Cervical Cancer

While information about cervical cancer was found in (83%) of the cases, only

Table 1. Distribution of women surveyed by socio-demographic characteristics, Koumpentoum, 2021.

Variables	Modalities	Absolutes frequencies (n)	Relatives frequencies (%)
Age group	≥40 years	75	25.51
	<40 years	219	74.49
Life in a couple	Yes	264	89.79
	No	30	10.21
Attended French school	Yes	99	33.7
	No	195	66.3
Practicing an IGA	Yes	72	24.49
	No	222	75.51

(43.87%) knew the risk factors. Knowledge of the availability of screening was (16.67%); knowledge of the place of screening (16.33%) and knowledge of the possibility to cure (62.59%). If knowledge of at least one symptom suggestive of the disease was found in (15.3%) of cases, recourse to care in case of signs suggestive of the disease was (95.58%). The health channel through the providers and community health workers was the main source of information (48.36%), followed by the radio, particularly Niani FM (community radio) which broadcasts throughout the district (37.7%) (Table 2).

3.3. Practice of Screening

The practice of screening was (16%), clearly dominated by the VIAA/VIL test in (89.36) of cases. More than half of the women (53.2%) were screened during the free campaigns and only (42.52%) of them had received screening advice from a health provider. The main reasons why they didn't do screening were lack of knowledge in (41.3%) and fear of knowing the result in (23.07%) of cases. The frequency of PCLs was (4.26%) (Table 2).

3.4. Bi Variate Analysis

Factors statistically and significantly associated with screening uptake were: information about cervical cancer (OR = 5.42 [1.27 - 23.16]; p = 0.003), knowledge of screening availability (OR = 9.26 [4.57 - 18.76]; p < 0.001), knowledge of at least one symptom suggestive of cervical cancer (6.57 [3.23 - 13.39]; p < 0.001) and prompting by a provider (OR = 4.48 [2.25 - 8.93]; p < 0.001) (Table 3).

3.5. Multi Variate Analysis

In multiple logistic regression, only knowledge of the availability of screening (ORa = 7.73 [3.01 - 18.51], p < 0.001) and incentive from a health provider (ORa = 3.03 [1.25 - 7.31], p = 0.014) were statistically and significantly associated with screening uptake (Table 4).

Table 2. Distribution of women according to knowledge, attitudes, practices on cervical cancer, Koumpentoum, 2021.

Variables	Modalities	Absoutes frequencies (n)	Relatives frequencies (%)
Knowledge, attitudes and practice			
Information on cervical cancer	Yes	244	83
Knowledge of risk factors	Yes	129	43.87
Knowledge of screening availability	Yes	49	16.67
Knowledge of screening location	Yes	48	16.33
Knowledge of possible cure	Yes	184	62.59
Knowledge of suggestive symptoms	Yes	45	15.3
Health consultation if symptoms	Yes	281	95.58
Knowledge of a case	Yes	21	7.14
Prompting by a provider	Yes	125	42.52
Practice of screening	Yes	47	16
Source information			
Health channel	Yes	118	48.36
Radio Niani FM	Yes	92	37.7
Others	Yes	34	13.94
Reasons for not screening			
Lack of knowledge	Yes	102	41.3
Fear of knowing the results	Yes	57	23.07
Others	Yes	88	35.83
Type of screening			
VIAA/VIL screening	Yes	42	89.36
FCV screening	Yes	3	6.38
Colposcopy screening	Yes	2	4.26
Opportunity for screening			
Screening during free campaigns	Yes	25	53.2
Routine gynecological consultations	Yes	11	23.4
Others	Yes	11	23.4
Screening results			
Positive	Yes	2	4.26
Negative	Yes	45	95.74

Table 3. Identification of factors associated with LPC screening practice in bivariate analysis, Koumpentoum, 2021.

Variables	Modalities	Respondents n = 294		p value	OR	$CI_{95\%}$
		Yes	No			
Age group	≥40 years	15	60	0.14	1.46	[0.74 - 2.88]
	<40 years	32	187			

Continued

Life in couple	Yes	43	221	=0.357	1.26	[0.42 - 3.8]
	No	4	26			
Attended French School	Yes	20	79	=0.08	1.57	[0.83 - 2.97]
	No	27	168			
Practicing an IGA	Yes	15	57	=0.103	1.56	[0.79 - 3.08]
	No	32	190			
Information on cervical cancer	Yes	45	199	=0.003	5.42	[1.27 - 23.16]
	No	2	48			
Knowledge of risk factors	Yes	26	103	=0.06	1.73	[0.92 - 3.24]
	No	21	144			
Availability of the screening	Yes	24	25	<0.001	9.26	[4.57 - 18.76]
	No	23	222			
Knowledge of the screening location	Yes	11	37	0.084	1.73	[0.81 - 3.7]
	No	36	210			
Knowledge of the possibility of recovery	Yes	32	152	0.2	1.33	[0.68 - 2.59]
	No	15	95			
At least one suggestive symptom	Yes	20	25	<0.001	6.57	[3.23 - 13.39]
	No	27	222			
Knowledge of a case	Yes	5	16	=0.23	1.71	[0.59 - 4.94]
	No	42	231			
Incentive from a health worker	Yes	34	91	<0.001	4.48	[2.25 - 8.93]
	No	13	156			

Table 4. Identification of factors associated with LPC screening practice in multiple logistic regression, Koumpentoum, 2021.

Variables and modalities	Adjusted OR	$CI_{95\%}$	p
Age ≥ 40 years yes versus no	1.85	[0.8 - 4.26]	0.14
Attended French school yes versus no	0.96	[0.42 - 2.17]	0.93
Practicing an IGA yes versus no	1.86	[0.79 - 4.37]	0.15
Information on cervical cancer yes versus no	1,49	[0.27 - 8.19]	0.64
Information on risk factors yes versus non	0.66	[0.28 - 1.54]	0.33
Availability of the screening yes versus no	7.73	[3.01 - 18.51]	<0.001
Possibility of recovery yes versus no	1.13	[0.46 - 2.74]	0.78
At least one suggestive symptom yes versus no	2.21	[0.88 - 5.57]	0.092
Knowledge of a case yes versus no	1.86	[0.55 - 6.25]	0.31
Incentive from a health worker yes versus no	3.03	[1.25 - 7.31]	0.014

4. Discussions

4.1. Screening Practice

Our study found a screening practice for PCLs of (16%) in the district. This fre-

quency of PLCs screening in the district was higher than those observed by Faye *et al.* in Kaffrine (6.5%) [12] in Senegal, by Cunningham *et al.* in Tanzania (6%) [18], by Adrianampy H.A. *et al.* at the CHU of Fianarantsoa (2.33%) [19] and by Thiam in Kédougou (2%) [13]. However, much higher frequencies of screening were observed in Senegal by Guéye *et al.* in Joal with (28.32%) [11] and by Faye *et al.* in Thiès with (35.1%) [20]. These differences could be explained by the importance of organizing free screening days and by the routinization of screening in these districts [11].

The frequency of PLCs was (4.26%), similar to that found in Cameroon by Ngowa J.D.K. *et al.* with (6.4%) (n = 421) [21], Tebeu P.M. *et al.* with (5.1%) (n = 2485) [22] and Ngekoum B *et al.* with (7.4%) (n = 946) [23] and in Madagascar by Adrianampy H.A. *et al.* with 8.5% (n = 112) [19]. However, higher frequencies were observed in other studies carried out in Africa, notably by Bakhoum A. with (10.2%) (n = 899) [24], Makoussa D. *et al.* with (15.36%) (n = 1437) [25] and Keita M. *et al.* with (38.1%) in Bamako (n = 3302) [26]. The level of training and experience of providers as well as the technical quality of screening could influence the results. Periodic retraining of providers, regular supervision of screening sites and quality control of services are essential.

4.2. Factors Associated with Screening Practice

Factors statistically and significantly associated with participation in screening were: cervical cancer information (OR = 5.42 [1.27 - 23.16]; p = 0.003), knowledge of at least one symptom suggestive of cervical cancer (OR = 6.57 [3.23 - 13.39]; p < 0.001), knowledge of the availability of screening (ORa = 7.73 [3.01 - 18.51]; p < 0.001), and prompting by a health worker (ORa = 3.03 [1.25 - 7.31], p = 0.014). Age was not statistically associated with screening, unlike Cunningham *et al.* [18] in Tanzania and Compaoré *et al.* in Burkina Faso [27]. Indeed, WHO [28] and national programs [29] recommend screening every (3) years for women aged between (30) and (69) years. Women who were informed about cervical cancer were 5.42 times more likely (OR = 5.42 [1.27 - 23.16]; p < 0.001) to be screened than those who were not. Cunningham *et al.* in Tanzania [18], Faye *et al.* in Senegal [20], Guéye *et al.* in Joal [11] and Faye *et al.* [12] in Kaffrine had made the same observation. Similarly, knowledge of the availability of the screening was predictive of screening (ORa = 7.73 [3.01 - 18.51]; p < 0.001). There was also a statistically significant association between knowledge of at least one symptom of cervical cancer and screening uptake (OR = 6.57 [3.23 - 13.39]; p < 0.001), as in the Joal series by Guéye *et al.* [11] and Faye *et al.* [12] [20]. In our study, lack of awareness of the disease was the main obstacle to screening. Informing screening targets about the disease is an essential component of the cervical cancer elimination strategy [30] [31]. Provider prompting was predictive of participation in screening (ORa = 3.03 [1.25 - 7.31]; p = 0.014). Compaoré *et al.* in Burkina Faso [27] and Guéye *et al.* in Joal *et al.* [11] found the same relationship in their samples. Raising awareness of PLCs screening through the health channel in particular could significantly improve screening

practice. Indeed, health facilities should systematize the offer of screening to sexually active women during the different types of consultations that constitute awareness-raising opportunities. This awareness raising should also be reinforced by increased use of community health workers. We did not find any link between the practice of screening and the practice of an IGA, nor between women's education, unlike Faye *et al.* [12] and Compaoré *et al.* [27]. In the district, screening is charged at (1000) FCFA in primary care and this could be an obstacle to screening practice due to the low living standard of the population [14]. A high level of education, among women could facilitate awareness of the disease and systematic screening.

4.3. Study Limitation

The main limitation of our study was the conduct of the survey by the district providers, which could lead to desirability bias. However, the interviewers were deployed outside their area of responsibility and our results are consistent with those found by other authors.

5. Conclusion

Our research revealed a low level of screening practice (16%) in the Koumpentoum health district while PCLs frequence is high there (4.67%). Through this study, factors associated with screening were identified. These were information about cervical cancer, knowledge of the availability of screening, knowledge of at least one symptom suggestive of the disease, and incentive for screening from health providers. Good awareness of key messages among screening targets through the health channel is essential for the success of routine and mass cervical cancer screening programs.

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Conflicts of Interest

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

References

[1] Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R.L., Torre, L.A. and Jemal, A. (2020) Global Cancer Statistics 2018: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA*: *A Cancer Journal for Clinicians*, **68**, 394-424. https://doi.org/10.3322/caac.21492

[2] Bouassa, R.S.M., Prazuck, T., Lethu, T., Meye, J.F. and Bélec, L. (2017) Cervical Cancer in Sub-Saharan Africa: An Emerging and Preventable Human Papillomavirus Oncogenic, Emerging and Preventable Disease. *Médecine et Santé Tropicales*, **27**, 16-22. https://doi.org/10.1684/mst.2017.0648

[3] Lortet-Tieulent, J., Georges, D., Bray, F. and Vaccarella, S. (2020) Profiling Global Cancer Incidence and Mortality by Socioeconomic Development. *International Journal of Cancer*, **147**, 3029-3036. https://doi.org/10.1002/ijc.33114

[4] The Global Cancer Observatory (2020) Senegal. https://gco.iarc.fr/today/data/factsheets/populations/686-senegal-fact-sheets.pdf

[5] Louie, K., Didelot, M.N., Damay, A., Nagot, N., Mayaud, P. and Segondy, M. (2008) Human Papillomavirus (HPV) and Associated Cancers: Epidemiological Aspects. *French Language Journal of Laboratory*, **405**, 27-34. https://doi.org/10.1016/S1773-035X(08)74275-8

[6] World Health Organization (n.d.) Cervical Cancer. https://www.who.int/health-topics/cervical-cancer

[7] Zhang, J., Qin, Z., Lou, C., Huang, J. and Xiong, Y. (2021) The Efficacy of Vaccination to Prevent Human Papilloma Viruses Infection at Anal and Oral: A Systematic Review and Meta-Analysis. *Public Health*, **196**, 165-171. https://doi.org/10.1016/j.puhe.2021.05.012

[8] World Health Organization (2017) La lutte contre le cancer du col de l'utérus: Guide des pratiques essentielles. https://apps.who.int/iris/bitstream/handle/10665/254713/9789242548952-fre.pdf

[9] Keshavarzi, F., Nankali, A., Fakheri, T., Rezaei, M., Khoshay, A., Eslamizadeh, N. and Bookani, S.N. (2013) Cervical Visual Inspection with Acetic Acid as an Alternative Screening Test for Cervical Cancer Detection. *International Journal of Collaborative Research on Internal Medicine and Public Health*, **5**, 60-66.

[10] Sauvaget, C., Fayette, J.M., Muwonge, R., Wesley, R. and Sankaranarayanan, R. (2011) Accuracy of Visual Inspection with Acetic Acid for Cervical Cancer Screening. *International Journal of Gynecology and Obstetrics*, **113**, 14-24. https://doi.org/10.1016/j.ijgo.2010.10.012

[11] Guèye, I., Diallo, I., Sangho, O., Sawadogo, B. and Tine, J.A.D. (2021) Factors Associated to the Practice of Cervical Cancer Screening in the Health District of Joal, Senegal, 2018. *Journal of Interventional Epidemiology and Public Health*, **4**, Article No. 11. https://www.afenet-journal.net/content/series/4/3/11/full

[12] Faye, A., Ndiaye, S., Niang, K., Ndiaye, M. and Tal-Dia, A. (2017) Determinants of Vaccination Coverage against Human Papillomavirus in 10-Year-Old Girls in 2016 in Rural Senegal. *Science Journal of Public Health*, **5**, 464-468. https://doi.org/10.11648/j.sjph.20170506.19

[13] Thiam, H. (2020) Facteurs associés à la vaccination contre le VPH dans la région de Kédougou. Université Cheikh Anta Diop, Dakar, 52 p.

[14] Agence nationale de la démographie et de la statistique (2021) Situation économique et sociale de la région de Tambacounda 2019. Ministère de l'Economie, du Plan et de la Coopération, République du Sénégal, Dakar, 97 p. https://www.ansd.sn/ressources/ses/SES-Tambacounda-2019.pdf

[15] Swartz, D. (1960) The Statistical Method in Medicine: Etiological Surveys. *Journal of Applied Statistics*, **8**, 5-27.

[16] Sakomota, Y., Ishiguro, M. and Kitagawa, G. (1968) Aikake Information Criterion Statistics. D. Reidel, Dordrecht.

[17] Lemeshow, S., Hosmer, J. and May, S. (2008) Applied Survival Analysis: Regression Modeling of Time-to-Event Data. Wiley Series in Probabilities and Statistics, Wiley, Hoboken. https://doi.org/10.1002/9780470258019

[18] Cunningham, M.S., Skrastins, E., Fitzpatrick, R., Jindal, P., Oneko, O., Yeates, K., Booth, C.M., Carpenter, J. and Aronson, K.J. (2015) Cervical Cancer Screening and

HPV Vaccine Acceptability among Rural and Urban Women Kilimanjaro Region, Tanzania. *BMJ Open*, **5**, e005828. https://doi.org/10.1136/bmjopen-2014-005828

[19] Andrianampy, H.A., Rakotomahenina, H., Rakotondraisoa, J.M., Solofomalala, G.D. and Andrinampanalanarivo, H.R. (2014) Cancer du col de l'utérus: état des lieux après lancement d'un programme de lutte. *African Journal of Cancer*, **6**, 85-90. https://doi.org/10.1007/s12558-014-0312-7

[20] Khosravani, M., Abedi, H., Rafiei, F. and Rahzani, K. (2017) The Association between Consciousness Understanding and Clinical Performance among Nurses Working at Education Hospital of Arak. *Annals of Tropical Medicine and Public Health*, **10**, 1587-1590. https://doi.org/10.4103/ATMPH.ATMPH_533_17

[21] Kemfang, J.D.N., Ngassam, A., Meka, E.N., Fouogue, J.T., Tagne, J.C., Sando, Z. and Kasia, J.M. (2015) Screening for Cervical Cancer by Visual Cervical Inspection after Acetic Acid Application in Yaoundé, Cameroon. *Health Sciences Disease*, **16**, No. 4.

[22] Tebeu, P.M., Sando, Z., Ndoumba, A., Sandjong, I., Mawech-Fauceglia, P. and Sama Doh, A. (2013) Prevalence and Geographical Distribution of Precancerous Lesions of the Uterine Cervix in Cameroon. *Journal of Cytology & Histology*, **4**, Article ID: 1000183.

[23] Nkegoum, B., Priso, E.B., Mbakop, A. and Bell, E.G. (2001) Precancerous Lesions of the Uterine Cervix in Cameroonian Woman. Cytological and Epidemiological Aspects of 946 Cases. *Gynécologie Obstétrique & Fertilité*, **29**, 15-20. https://doi.org/10.1016/S1297-9589(00)00024-2

[24] Biaye, B. (2017) Dépistage du cancer du col de l'utérus par la méthode d'inspection visuelle. (IVA) au centre de santé Nabil Choucair de Dakar. Mémoire DES de Gynécologie et d'obstétrique. Université Cheikh Anta Diop, Dakar, 171 p.

[25] Gadducci, A., Barsotti, C., Cosio, S., Domenici, L. and Riccardo, G.A. (2007) Lesions Precancerous Cervical Cancer in Pointe-Noire: Situation Analysis. *Gynecology and Endocrinology*, **67**, 57-60.

[26] Keita, M., Bourama, C., Saoudatou, T., Samaké, A., *et al.* (2020) Screening for Pre-Cancerous and Cancerous Lesions by Visual Tests in Commune VI of the District de Bamako Screening of Precancerous and Cancerous Lesions by Visual Tests at Commune VI of the District of Bamako. *Health Sciences and Disease*, **21**, 84-89.

[27] Compaoré, S., Ouedraogo, C.M.R., Koanda, S.G., Haynatzki, R.M.C. and Soliman, A.S. (2016) Barriers to Cervical Ancer Screening in Burkina Faso: Needs for Patient and Professional Education. *Journal of Cancer Education*, **31**, 760-766. https://doi.org/10.1007/s13187-015-0898-9

[28] World Health Organization (2014) Guidelines for Screening and Treatment of Treatment of Precancerous Lesions for Cervical Cancer Prevention. 44 p.

[29] Division du contrôle des maladies non transmissibles (2016) Plan stratégique national pour le contrôle des maladies non transmissibles 2016-2020. Non Communicable Diseases Control 2016-2020. Ministère de la santé et de l'action sociale, République du Sénégal, Dakar, 226 p.

[30] Ghebreyesus, T.A. (2020) Global Strategy Plan to Accelerate the Elimination of Cervical Cancer. World Health Organization, Genève, 39 p.

[31] World Health Organization (2021) Africa Advances on Goal of Cervical Cancer Elimination across the Continent. https://www.afro.who.int/news/africa-advances-goal-cervical-cancer-elimination-across-continent