Risk factors for uterine cervical cancer according to results of VIA, cytology and cervicography*

FATORES DE RISCO PARA CÂNCER DE COLO DO ÚTERO SEGUNDO RESULTADOS DE IVA, CITOLOGIA E CERVICOGRAFIA

FACTORES DE RIESGO PARA CÁNCER DE CUELLO UTERINO SEGÚN RESULTADOS DE IVA, CITOLOGÍA Y CERVICOGRAFÍA

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ABSTRACT

This study aimed to evaluate the association between risk factors for uterine cervical neoplasms and cervical lesions by HPV by comparison of the visual inspection with acetic acid (VIA), cytology and cervicography results. A prevalence research was made with 157 women in a health center of Fortaleza in the period of June to September 2006. The SPSS program was used to codify the data. Inferences were made through statistical tests (χ^2= chi square and LR= likelihood ratio). The VIA, cervicography and cytology obtained 43.3%, 10.19% and 3.2% of altered results. The variables with important association to cervical lesions in the VIA were: aged less than 20 years old (p= 0.0001); one or more partners in the last three months (p= 0.015); use of contraceptives (p = 0.0008); presence of vaginal discharge (p= 0.0001) and moderate or accentuated inflammatory process (p= 0.0001). In the cytology: low instructional level (p= 0.0001) and high pH (p= 0.001). It wasn't found any significant association in the cervicography.

KEY WORDS

Uterine cervical neoplasms.
Papillomavirus infections.
Risk factors.

RESUMO

Este estudo objetivou avaliar a associação entre fatores de risco para câncer de colo do útero e lesões cervicais por HPV comparando-se os resultados da inspeção visual com o ácido acético (IVA), a citologia e a cervicografia. Realizou-se pesquisa de prevalência com 157 mulheres de um centro de saúde de Fortaleza, no período de junho a setembro de 2006. Utilizou-se o SPSS para codificar os dados. Realizaram-se inferências por meio de testes estatísticos (χ^2= quiquadrado e RV= razão de verossimilhança). IVA, cervicografia e citologia obtiveram 43,3%, 10,19% e 3,2% de resultados alterados, respectivamente. As variáveis com importante associação às lesões cervicais na IVA foram: idade menor de 20 anos (p= 0,0001); um ou mais parceiros nos últimos três meses (p= 0,015); uso de contraceptivos (p= 0,0008); presença de corrimento vaginal (p= 0,0001); e processo inflamatório moderado ou acentuado (p= 0,0001). Na citologia: baixa escolaridade (p= 0,0001) e elevado pH (p= 0,001). Não se encontrou associação significante na cervicografia.

DESCRITORES

Neoplasias do colo do útero.
Infecções por papilomavirus.
Fatores de risco.

RESUMEN

Este estudio objetivó evaluar la asociación entre factores de riesgo para cáncer de cuello de útero y lesiones cervicales por HPV, según comparación entre los resultados de la inspección visual con ácido acético (IVA), citología y cervicografía. Se realizó investigación de prevalencia, con 157 mujeres en un centro de salud de Fortaleza-CE-Brasil, en el período de junio a setiembre de 2006. Se utilizó el SPSS para codificar los datos. Se realizaron inferencias a través de tests estadísticos (χ^2 = Qui-cuadrado y RV= razón de verosimilitud). La IVA, cervicografía y citología obtuvieron 43,3%, 10,19% y 3,2% de resultados alterados. Las variables con importante asociación a lesiones cervicales en la IVA fueron: edad menor a 20 años (p=0,0001), uno o más parejas en los últimos tres meses (p=0,015), uso de anti-conceptivos (p=0,0008), presencia de vaginitis (p=0,0001) y pH elevado (p=0,001). No se encontró asociación significativa en la cervicografía.

DESCRIPTORES

Neoplasias del cuello uterino.
Infecciones por papilomavirus.
Factores de riesgo.

INTRODUCTION

Despite global scientific and technological advances, long-term public health problems still persist, such as uterine cervical cancer (UCC), one of the few preventable and curable cancer types when diagnosed early. With a view to decreasing the epidemiological dimensions of this disease, public actions and policies are needed to create precursor lesion and initial cancer detection programs in places where these do not exist yet, as well as programs to improve care quality and existing service accessibility.

UCC is the second most common cancer type among women around the world. Every year, about 470 thousand new cases are registered. For 2008, uterine cervical cancer estimates appoint 18,680 new cases in Brazil. In the Northeast, this cancer type shows the second highest incidence rate (17.58/100,000). In Ceará, the estimated rate is 17.80/100,000[1].

This cancer was responsible for more than 250,000 deaths in 2005, 80% of which in developing countries[2]. To minimize this high mortality rate, the organization, comprehensiveness and quality of the screening program need to be guaranteed, as well as patient monitoring. Nowadays, the first vaccine to prevent the most common infections causing genital warts (HPV 6 and 11) and uterine cervical cancer (HPV 16 and 18) is already commercially available. This vaccine represents an important tool for uterine cervical cancer control[1].

Cervical oncogenic risk factors can be divided in two large groups: experimentally documented and clinical or epidemiological factors. Among those classified in the first group, immunological factors can be mentioned (local and humoral immune response), as well as the association with the Acquired Immunodeficiency Syndrome (Aids), genetic factors (like p53 protein polymorphism), smoking and prolonged use of oral contraception. Regarding clinical or epidemiological risk factors, the early start of sexual activity, multiple partners, low education and income levels, multiparity and history of STD stand out[3].

Tumor progression, starting from normal cells' infection by human papillomavirus (HPV), seems to be conditioned by virus-related (virus subtype, simultaneous infection by various oncogenic types and viral load), host-related (immunity and number of deliveries) and exogenous co-factors (smoking, co-infection by HIV or other sexual transmission agents and prolonged use of oral contraceptives)[2].

Today, these factors cannot be directly related with cervical lesions, as some women present uterine cervical abnormalities but not necessarily the described risks. This fact raises doubts in therapeutics, case forwarding and control.

As a result of modern lifestyle, women generally acquire life habits that often represent risks for certain illnesses, which they do not even suspect being subject to. Their presence at the health unit is health professionals' best opportunity to get to know the clients and offer orientations on different risk factors for cervical cancer.

This kind of studies help nurses and primary woman's health care professionals to recognize risk factors for uterine cervical cancer, with a view to improving orientations, treatment and forwarding to the specialized service for clients with a greater potential of developing UCC. They are also relevant to contribute to the definition of adequate public health policies to reduce this illness, as its morbidity shows high vulnerability levels.

OBJECTIVE

Assess the association between risk factors for uterine cervical cancer and cervical lesions by HPV.

METHOD

A prevalence study with a quantitative approach was carried out, structured to assess the association between presence/absence of cervical lesions and risk factors for uterine cervical cancer.

It is hypothesized that a higher frequency of risk factors for cervical cancer in women with cervical lesion would be a sign of an association between these factors and the occurrence of precursor lesions of uterine cervical cancer and the disease itself.

The research was carried out at a health center that receives women for prenatal consultations and UCC prevention, a public institution located in Fortaleza-CE, affiliated with the Federal University of Ceará, which is responsible for daily care.

The research population comprised the universe of women attended at the unit. The sample size was calculated through a formula for finite population samples. Data were collected between June and September 2006, with a view to reaching the sample size, considered significant for the population attended by the service.

The study comprised women with the following criteria: being older than 18 years and having started sexual activities. In compliance with these criteria, 157 subjects participated.

Cytology was collected from all sample members, followed by visual inspection with 5% acetic acid (VIA). In case of positive VIA, Digital Uterine Cervicography (DC) was performed, which is the digital capturing of images from the colon, on which positivity criteria were assessed afterwards.

> Despite global scientific and technological advances, long-term public health problems still persist, such as uterine cervical cancer (UCC), one of the few preventable and curable cancer types when diagnosed early.

These criteria were based on a study carried out in 2005. The first criterion involves non-reactive colorimetric alterations that take the form of a white lesion detected before the acetic acid test. The second criterion are reactive colorimetric alterations, white lesion, in high relief or flat, evidenced after the application of the acetic acid. The third refers to positive projections, lesions in relief with a harsh and distinguished surface pattern. The fourth criterion relates to negative projection of ulcerated forms[4].

A microbiological study of the vaginal cavity was also performed by determining the pH, using specific reagent tapes. To assess the risk factor smoking, Fagerström's Tolerance Questionnaire (FTQ) was inserted in the script, a useful instrument to determine the user's degree of nicotine dependence, showing a reliable relation with the actual nicotine levels the individual absorbed[5].

The data, organized through tables and graphs, were stratified in the study variables: sample characterization with VIA, cytology and digital uterine cervicography results; experimental risk factors; clinical/epidemiological risk factors; not well-clarified factors.

Statistical Package for the Social Sciences (SPSS) software was used for data storage and coding. Inferential analyses were used for data comparisons in order to check for associations between the variables through statistical tests (χ^2= chi-square and LR= likelihood ratio), with significance set at 5%. Approval for the project was obtained from the Research Ethics Committee at the Federal University of Ceará under protocol No. 101/06 on June 9th 2006.

RESULTS

The VIA tracked a large number of women with positive results, 68 (43.3%), while cytopathology diagnoses two tests (1.3%) with squamous cell alterations of undetermined meaning (ASCUS) and three tests (1.9%) with low-grade intraepithelial lesions (NIC I + HPV).

Women with cervical lesions identified on the VIA test and/or on the cytopathology test, totaling 70 people (44.5%), submitted to digital uterine cervicography. Sixteen were considered positive for acetowhite cervical lesions after analysis of the cervicogram. A positive cervicogram was found for 20.5% of women with positive VIA and 100.0% of women with positive oncotic cytology.

On the VIA, most women with acetowhite lesion visible to the naked eye belonged to the youngest age range; more than half of the sample belonged to the groups aged 18-19 (63.0%) and 20-29 years (59.0%), with a decrease in the groups aged 40-49 (23.0%) and 50-67 years (14.3%) (Table 1). The chi-square test proved a significant association between age range and VIA (p= 0.0001).

Table 1 - Distribution of women according to age range and VIA, cervicography and cytology results - Fortaleza, CE, Brazil - 2007

Age range	VIA				Cervicography						Cytology			
	Positive		Negative		Positive		Inconclusive		Negative		Altered		Normal	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
18-19	10	63.0	6	37.0	3	30.0	2	20.0	5	50.0	-		16	100.0
20-29	30	59.0	21	41.0	8	25.8	-		23	74.2	3	5.9	48	94.1
30-39	18	46.0	21	54.0	3	16.7	4	22.2	11	61.1	1	2.6	38	97.4
40-49	7	23.0	23	77.0	2	25.0	2	25.0	4	50.0	1	2.0	29	98.0
50-67	3	14.3	18	85.7	-		1	33.0	2	67.0	-		21	100.0
TOTAL	68	43.3	89	56.7	16	22.9	9	12.9	45	64.3	5	3.2	152	96.8
χ^2	19.19				9.11						4.61			
p	0.0001				0.167						0.594			

Out of 70 women submitted to digital uterine cervicography, 16 showed positive results for acetowhite lesions, most of whom were between 18 and 19 years old (30.0%). Cytology tests with altered results were more frequent in the range from 20 to 29 years (5.9%).

Clinical/epidemiological risk factors

Considering the participants in terms of VIA results and start of sexual life, 29 (51.0%) subjects with altered tests started their sexual life between 8 and 15 years of age. On the cytology tests, the highest altered test percentages were distributed between 16 and 20 years, with 28.0% and 5.0%, respectively.

Less positive VIAs were found for women who reported no partners in the last three months than for those with one partner, with 48% in the positive VIA group. Cervicography and cytology results were positive for clients who mentioned one single partner only (Table 2).

Education was a significant factor for oncotic cytology. Altered results were found among women with a higher education degree (100.0%), followed by illiterate women (13.0%) and those with a secondary education degree (5.0%). Regarding VIA, altered tests were more frequent among women with secondary and primary education, while prevalence levels of altered cervicography results were higher among illiterate women and those with a higher education degree.

The Brazilian Economic Classification Criteria (CCEB) were applied, which serve to estimate people and urban families' purchasing power, considering not only income,

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but also other factors like the family head's education level, number of vehicles and other goods and services. Thus, the former classification in terms of social classes (low, middle and high) was abandoned and groups were divided into strata, as follows: A1, A2, B1, B2, C, D, E (with a family income of 14,250, 7,557, 3,944, 2,256, 861, 573, 329, respectively).

Thus, one representative from class B1 was classified as positive VIA, as one of the most economically favored participants. The classes with the second and third highest positive VIA percentage were C (58.0%) and E (42.0%); prevalence of positive cervicograms was higher in classes B2 (50.0%) and D (36.0%); while positive cytology results were more prevalent in classes D (4.0%) and C (2.0%).

Table 2 - Distribution of women according to test results and clinical-epidemiological risk factors - Fortaleza, CE, Brazil - 2007

Factor	VIA				Cervicography						Cytology			
	Positive		Negative		Positive		Inconclus.		Negative		Alterade		Normal	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
No partners														
0	2	12.0	15	88.0	-	-	-	-	2	100.0	-	-	17	100.0
1	66	48.0	71	52.0	16	24.0	9	13.0	43	63.0	5	4.0	132	96.0
2-4	-	-	3	100.0	-	-	-	-	-	-	-	-	5	100.0
	χ^2 = 10.50 p=0.015				RV= 1.800 p = 0.407						RV= 1.16 p=0.558			
Education														
Illiterate	1	12,0	7	88.0	1	50.0	-	-	1	50.0	1	13.0	7	87.0
Primary	38	42,0	52	58.0	9	24.0	5	13.0	24	63.0	-	-	90	100.0
Secondary	29	50,0	29	50.0	5	17.0	4	14.0	20	69.0	3	5.0	55	95.0
Higher	-	-	1	100.0	1	100.0	-	-	-	-	1	100.0	-	-
	χ^2 = 4.95 p= 0.175				χ^2 = 4.881 p= 0.559						χ^2 = 86.16 p= 0.0001			
Class														
B1	1	100.0	-	-	-	-	-	-	1	100.0	-	-	1	100.0
B2	2	25.0	6	75.0	1	50.0	-	-	1	50.0	-	-	8	100.0
C	26	58.0	19	42.0	2	8.0	5	19.0	19	73.0	1	2.0	44	98.0
D	34	37.0	57	63.0	13	36.0	3	8.0	20	56.0	4	4.0	87	96.0
E	5	42.0	7	58.0	-	-	1	20.0	4	80.0	-	-	12	100.0
	χ^2 = 7.562 p= 0.109				χ^2 = 10.57 p= 0.227						χ^2 = 1,95 p= 0,982			
Pregnancies														
0	10	53.0	9	47.0	3	27.0	2	18,0	6	55.0	1	5.0	18	95.0
1	16	55.0	13	45.0	4	25.0	1	6.0	11	69.0	1	3.0	28	97.0
2	19	47.0	21	53.0	3	16.0	1	5.0	15	79.0	1	2.5	39	97.5
3	10	36.0	18	64.0	2	20.0	3	30.0	5	50.0	1	4.0	27	96.0
4-18	13	32.0	28	68.0	4	29.0	2	14.0	8	57.0	1	2.0	40	98.0
	χ^2 = 5.526 p= 0.237				RV= 5.742 p= 0.676						RV= 7.119 p= 0.524			
Deliveries														
0	10	48.0	11	52.0	3	27.0	2	18.0	6	55.0	1	5.0	20	95.0
1	21	50.0	21	50.0	5	24.0	2	9.0	14	67.0	1	2.0	41	98.0
2	18	50.0	18	50.0	3	17.0	1	6.0	14	78.0	1	3.0	35	97.0
3	11	41.0	16	59.0	2	18.0	3	27.0	6	55.0	1	4.0	26	96.0
4-11	8	26.0	23	74.0	3	33.0	1	11.0	5	56.0	1	3.0	30	97.0
	χ^2 = 5.521 p= 0.238				RV = 4.599 p= 0.799						RV= 7.017 p= 0.535			

Regarding test results and number of pregnancies, it was observed that, independently of cervicography and cytology results, the number of pregnancies was equally distributed, averaging at 25.0% and between 2.0% and 5.0%, respectively. This was not the case for VIA, as a higher percentage of altered results (around 50%) was found among women with 0 to 2 pregnancies, and a lower percentage (around 35.0%) for women with more than 3 pregnancies.

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The number of positive VIA tests was similar among women with 0 to 2 deliveries (around 50.0%), decreasing with the number of deliveries, with 41.0% for clients with 3 deliveries and 26.0% for clients with 4 or more deliveries. As for cytology and cervicography, the distribution of altered tests varied in terms of number of deliveries.

Among the 5 women with altered cytology results, one (7.0%) had never been tested before; one (8.0%) had tested thrice; one (6.0%) four times and yet another one (14.0%) ten times. Prevalence levels for positive cervicography were higher in the group that had never been tested before, with 4 (40.0%). Regarding VIA, the longer the time since the cytopathology test, the higher the incidence of positive results (33.4%).

The number of positive cervicograms was higher, 11 (24.4%), in the group of women who used condoms when compared with the 5 (20.0%) women who did not. Among those who indicated using condoms, 25 (51.0%) showed positive VIA results, against 43 (39.8%) for those who did not use condoms. In the group that mentioned condom use, one (2.0%) showed an altered cytology diagnosis, against 4 (4.0%) in the non-use group.

Among research subjects who mentioned some type of STD, 18 (50.0%) presented a positive VIA and 18 (50.0%) negative. As for the STD type, higher positive VIA frequencies were found for women with gonorrhea, 2 (100.0%); trichomoniasis, 3 (60.0%) and HPV/condyloma, 12 (52.2%). A large number of inconclusive cervicograms was found, 3 (17.0%), and a small number of positive cervicograms, 1 (6.0%) in the STD group.

Among women who mentioned a current or past STD, 36 (100.0%) presented normal cytology results, against 5 (4.0%) with altered results out of 121 (100.0%) women who mentioned no STD.

Experimental risk factors

The association between test results and smoking showed a higher frequency of positive VIA among non-smoking women (47.0%). The same was the case for cytology results with 4.0%. As for cervicography, however, a higher percentage of altered results were found in the smoking group (33.0%) (Table 3).

The FTQ uses closed questions, scoring each answer to verify the person's nicotine dependence level. Scores are added up and, the higher the score, the higher the dependence level, described as light, medium and high.

The frequency of positive VIA results increased with the nicotine dependence level (light, medium and high FTQ; 26.0%, 43.0% and 100.0%, respectively). Higher altered cervicography and cytology percentages were found for medium FTQ scores, with 75.0% and 14.0%, respectively. Women with a high FTQ were not considered patients with cervical lesions according to the cytology and cervicography results (Table 3).

Women who smoked between 11 and 30 cigarettes per day showed 44% of altered VIA results. These women's cervicography and cytology results showed the same pattern: the more cigarettes smoked, the higher the number of women with altered results, with 0 and 33.0 and 60.0% for cervicography and 0 and 11.0% for cytology.

The use of oral contraceptives showed a statistically relevant association with positive VIA results. The cervicography results showed more positive results among women who took contraceptives. The opposite was found for cytology results, with more positive results in the group that did not use contraceptives (Table 3).

Table 3 - Distribution of women according to test results and experimental risk factors - Fortaleza, CE, Brazil - 2007

Factor	VIA				Cervicography						Cytology			
	Positive		Negative		Positive		Inconclus.		Negative		Altered		Normal	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Smoker														
Yes	11	31.0	24	69.0	4	33.0	1	9.0	7	58.0	1	3.0	34	97.0
No	57	47.0	65	53.0	12	21.0	8	14.0	38	65.0	4	4.0	118	96.0
	χ^2 = 2.59 p= 0.108				χ^2 = 1.006 p= 0.605						χ^2 = 0.785 p= 0.675			
FTQ *														
Low	7	26.0	20	74.0	1	14.0	-	-	6	86.0	-	-	27	100.0
Medium	3	43.0	4	57.0	3	75.0	1	25.0	-	-	1	14.0	6	86.0
High	1	100.0	-	-	-	-	-	-	1	100.0	-	-	1	100.0
	χ^2 = 2.98 p= 0.225				RV = 11.064 p= 0.026						RV= 3.340 p= 0.188			
Cigarettes/day														
1-4	4	29.0	10	71.0	-	-	-	-	4	100.0	-	-	14	100.0
5-10	3	25.0	9	75.0	1	33.0	-	-	2	67.0	-	-	12	100.0
11-30	4	44.0	5	56.0	3	60.0	1	20.0	1	20.0	1	11.0	8	89.0
	χ^2 = 0.991 p= 0.609				RV = 7.983 p= 0.092						RV = 2.803 p= 0.246			
Contraception														
Yes	22	63.0	13	37.0	6	27.0	2	9.0	14	64.0	1	3.0	34	97.0
No	46	38.0	76	62.0	10	21.0	7	14.0	31	65.0	4	4.0	118	96.0
	χ^2 = 7.008 p= 0.0008				χ^2 = 0.630 p= 0.730						χ^2 = 0.785 p= 0.675			

*FTQ: Fagerström Tolerance Questionnaire, an instrument that determines the degree of dependence on smoking, with a reliable relation with the true nicotine levels the individual absorbs.

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When analyzing contraceptive usage time in months, a large number of women (83.0%) with positive VIA results was found who took contraceptives for at least two years, against a small number for women who used this medication between 8 and 12 years (40.0%). The only woman with altered cytology results who mentioned using contraceptives (20.0%) had been doing this for more than 10 years.

Not well-clarified factors

It was observed that, the lower the alcohol consumption, the more women showed positive VIA results (53%). Cervicography and cytology showed higher percentages of

altered results in the group that mentioned more than two drinks per day, with 50 and 14%, respectively.

The VIA test showed a large number of positive results (53.5%) among women with vaginal discharge, with a significant association. The opposite occurred for cervicography and cytology results, with more altered results among women without discharge (Table 4).

The type of inflammatory process also showed to be a statistically significant variable, with a higher concentration of positive VIA results among women with moderate (56.0%) and considerable (49.0%) inflammatory processes.

Table 4 - Distribution of women according to test results and not well-clarified risk factors - Fortaleza, CE, Brazil - 2007

Factor	VIA				Cervicography						Cytology			
	Positive		Negative		Positive		Inconclus.		Negative		Altered		Normal	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Dose/day														
1 or less	17	53.0	15	47.0	5	28.0	1	6.0	12	66.0	1	3.0	31	97.0
2-5	1	14.0	6	86.0	1	50.0	-	-	1	50.0	1	14.0	6	86.0
	$\chi^2 = 3.486\ p = 0.062$				RV= 0.546 p= 0.761						RV= 3.908 p= 0.142			
Discharge														
Yes	61	53.5	53	46.5	13	21.0	9	14.0	41	65.0	3	3.0	111	97.0
No	7	16.0	36	84.0	3	43.0	-		4	57.0	2	5.0	41	95.0
	$\chi^2 = 17.62\ p = 0.0001$				$\chi^2 = 2.42\ p = 0.298$						$\chi^2 = 0.581\ p = 0.748$			
Inflammatory process														
Light	7	16.0	36	84.0	-	-	2	29.0	5	71.0	-	-	43	100.0
Moderate	40	56.0	31	44.0	10	25.0	6	15.0	24	60.0	3	5.2	68	95.8
Considerable	21	49.0	22	51.0	6	26.0	1	4.0	16	70.0	2	4.7	41	95.3
	$\chi^2 = 18.24\ p = 0.0001$				$\chi^2 = 4.83\ p = 0.304$						$\chi^2 = 2.15\ p = 0.707$			

The number of women with pH >4.5 and positive VIA results was: 60 (57.0%); cytology: 3 (3.0%) and cervicography: 12 (25.5%). For women with pH <4.5, the numbers for positive VIA were: 29 (55.8%) women; cytology: 2 (4.0%) and cervicography: 4 (17.0%) representatives.

The pH measure was equally distributed for VIA and cervicography results, without any statistical association. The opposite occurred for cytology, with women showing pH levels of 4.0; 5.0 and 6.0 showing altered cytology in 2 (4.0%), 2 (2.0%) and 1 (33.0%) case, respectively ($\chi^2 = 26.2$; p= 0.001).

DISCUSSION

The high percentage of altered VIA results, 68 (43.3%) in this study is in line with the fact that between 10.0 and 40.0% of sexually active women are infected by one or more types of HPV, although most of these are transitory[6]. Oncotic cytology distinguished only few women, 5 (3.2%), raising questions on its sensitivity.

The frequency of positive VIA (43.3%) in comparison with altered cytology (3.2%) in the study population greatly

varies among studies. In one of the studies under analysis, 32.7% and 0.7% were found, respectively, for VIA and cytology[7], against 8.0% and 10.4% in another study[8]. Phase I of the Zimbabwe Project research, carried out in 15 primary health care institutions, based on a sample of 8,731 women, found 20.2% with a positive VIA. Phase II, involving 2,203, was carried out approximately one year after the start of phase I, after providing training on VIA and cytology reading to the involved professionals, and found 39.8% of altered VIA results. The specificities of VIA and cytology, however, corresponded to 64.1% and 90.6%[9]. The low specificity of the VIA means that many women with a positive VIA are not sick, like in the present study.

The prevalence of positive cervicography results was similar to positive cytology results, ranging from 10.0 to 19.0%[8].

As VIA is a not so specific test, many women are selected. Due to its low sensitivity, cytology can present some false-negative cases. Cervicography supports cytology and aims to capture non-screened positive cases, and also VIA, with a view to discarding false-positive cases[4].

With a statistically significant association, a large number of positive VIA results was found among women be-

tween 18 and 29 years, with a decreasing percentage as age ranges rise (p= 0.0001). Acetowhite lesions visible to the naked eye on the VIA suggest subclinical infection by HPV. The young group seems to contain the largest number of infected patients, reaching 46.0% for women between 20 and 30 years of age. These rates decrease with age, to 10.0% in women aged 40 years and 5.0% in women older than 55 years[6].

HPV infection decreases with age, while cancer incidence levels increase, suggesting that persistent HPV infection produces high-level injuries. High-level intra-epithelial cervical neoplasm, when untreated, can evolve to invasive carcinoma in 30.0% to 40.0% of cases[10].

When crossing variables related to clinical-epidemiological factors, it was observed that the first sexual relation showed to be a relevant factors in comparison with the VIA only, with more altered exams the lower the start age of sexual activity. It is known that early sexual practices can constitute a risk factor due to the incomplete maturity of the uterine cervix. Early sexual activity (14 years) and pregnancy (20 years) are risk factors, perhaps because, during adolescence, metaplasia is identified and the coitus increases the probability of an atypical transformation[11].

In a study that involved 222 adolescents in São Paulo state, the largest proportion of adolescents who had already started sexual activities were those absent from the school system and living in invaded homes, showing that this event is also socially determined by unfavorable conditions[12].

Women without a partner in the last three months showed a lower percentage of positive VIA (12.0%), with a statistically relevant association. A study reinforces the association between cervical cancer and women's sexual activity, mentioning high levels in women with multiple sexual partners, who started sexual activities very early, had many children or their partners had multiple sexual partners[13].

Larger proportions of altered cytology and cervicography results were found at the extreme ends of formal education. Even though the presented data go against the literature, culture and education are considered to be direct and deeply related with the search for health or its maintenance. People or groups often determine their choices in the health-disease-care process based on their cultural precepts[14].

In general, the most representative classes among altered results were B2, C, D and E, considered economically less favored. Risk factors are connected with characteristics of poverty, disinformation and little access to periodical controls[11].

The number of pregnancies variable did not show a statistically significant correlation, with equal distribution among the tests. The same occurred when analyzed the number of deliveries, except for VIA, which showed a higher percentage of women with more than three deliveries (33.0%). Epidemiological studies have demonstrated a strong association between multiparity and high-level cancer lesions, as opposed to observations in this study. In a study on 1,853 pregnant women and 255 controls, the International Agency for Research on Cancer (IARC) observed that women with seven or more full-term pregnancies had a four times higher risk of cervical cancer development in comparison with nulliparous women. Hormonal, traumatic and immunological factors seem to be biological mechanisms that justify this association[15].

The number of previous cytology tests among women with altered cytology results was equally distributed among the proposed classes, although a larger proportion (40.0%) of positive cervicograms was observed in the group that had never undergone the test before. This is a source of concern, as one of the greatest risks of developing UCC is not undergoing cytopathological tests routinely[10].

In studies by Lima, Palmeira and Cipolotti, only 30% of women from the case group (patients with the disease) indicated having undergone the prevention test, but neither had the result nor remembered when they had done the test. On the opposite, 83.7% of women in the control groups indicated previous tests and presented negative results for cancer or pre-invasive lesion[13].

In the present study, the longer the time since the last cytopathological test (more than 3 years), the lower the number of women with altered results.

Positive result percentages among women who did not use condoms were higher on the cervicography and cytology, with 24.4% and 4.0%, in comparison with women who mentioned condom use. The opposite occurred on the VIA, with a larger proportion of positive results among women who used condoms.

A larger part of women with altered cervicography results was found in the group that mentioned smoking (33.0%) and a small difference between VIA and cytology tests. Among smokers, a question was asked about the number of cigarettes smoked per day, in relation with the VIA, cervicography and cytology tests, showing that, the more cigarettes were smoked per day, the more women showed positive results. Smoking is an important risk factor, mainly among long-time users and those smoking cigarettes without filter[11].

A research involving 438 sex professionals showed data similar to the present study. Women who smoked more than 20 cigarettes per day and who had smoked for more than 20 years showed increased risk for NIC and UCC (LR= 1.27 and LR= 1.37, respectively)[16].

The FTQ showed high levels in case of positive VIA results (100.0%) and medium levels for the cervicography (75.0%) and cytology (14.0%). A study confirms these findings, with a significantly higher FTQ in cancer patients (7.5) when compared with controls (6.3). An FTQ > 7 (high) was found in 73.2% of cancer cases, against 43.5% in the control group[17].

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Contraceptive use showed a positive association with VIA, with a large group of women with positive VIA taking contraceptives (63.0%); for the cervicography and cytology, results were similar in both groups. This relation may seem controversial, as most women who take oral contraceptives, due to the safety of the contraceptive method, stop using condoms, which is an important barrier against STD, including HPV.

Usage time of oral contraceptives for the occurrence of cervical lesion, according to studies, ranged from five to nine years. It seems that mechanisms related with the hormonal component facilitate viral persistence and promotion of the episomal form of DNA-HPV with a view to its integration in the host's genome[15].

Women who mentioned having more than two alcoholic drinks per day showed high percentages of altered cervicography (50.0%) and cytology (14.0%) results in comparison with women who mentioned only one or less drinks.

The presence of vaginal discharge was statistically significant when associated with positive VIA (p= 0.0001), but the same did not occur for cervicography and cytology. As for the type of inflammatory process, the association also showed statistical relevance regarding positive VIA in moderate (56.0%) and considerable (49.0%) inflammatory processes.

As for pH, it was observed that, the higher the level, the large the number of women with altered cytology results, with a statistically significant association, although the same was not found for VIA and cervicography. A study involving 110 women with intra-epithelial lesions, compared with a control group of 110 women without lesions, detected higher levels for bacterial vaginosis (33.0%) among women with a high-level lesion than in the control group (12.0%)[18].

CONCLUSION

At the end of this study, it could be determined that the following variables were associated with cervical injuries on the VIA: age younger than 20 years (p= 0.0001); one or more partners in the last three months (p= 0.015); contraceptive use (p= 0.0008); presence of vaginal discharge (p= 0.0001) and moderate or considerable inflammatory process (p= 0.0001).

The following factors were associated with positive cervicography results: no condom use (0.052) and large number of cigarettes/day (p= 0.092). On the cytology results, the following associated factors were identified: pH higher than 4.5(0.067) and high pH (p= 0.001).

In conclusion, some risk factors for uterine cervical cancer were more frequent among women with cervical lesions, with indicates a strong association between these factors and the occurrence of precursor lesions of uterine cervical cancer and the disease itself. Relevant results were found for the development of cervical cancer, revealing that some risk factors implied in cancer development and addressed in literature were underlined based on this assessment.

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