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## Acceptance of digital cervicography complementary to Papanicolaou cytology: a descriptive-exploratory study

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### ABSTRACT

**Aim:** Analyze the acceptability of digital cervicography as a complementary method to Papanicolaou cytology for diagnosing cervical cancer. **Method:** An exploratory-descriptive study, quantitative approach. The survey had 63 participants and data was collected between June and August 2012. For data evaluation we used the results of cytologic collection and digital cervicography. **Result:** 100% of acceptance verified within participants. Regarding the Papanicolaou cytology, 96.8% of glandular, 8% of metaplastic, and 100% of squamous epithelium were found. Inflammation was found in 58.6% of the sample and malignant cell alterations in 1.6%. **Discussion:** The low sensitivity level of Papanicolaou cytology and the good acceptability rates of digital cervicography suggest the complementarity of these for cancer diagnosis. **Conclusion:** The implementation of digital cervicography as an exam complementary to Papanicolaou cytology is of great importance in order to increase the sensitivity level at cervical cancer detection.

**Descriptors:** Women's Health; Vaginal Smears; Cervix Uteri; Gynecological Examination.

## INTRODUCTION

Despite the efforts by cervical cancer control programs — this cancer being one of the cancer types of which the prevention and cure is possible with early detection — year after year, the morbidity and mortality rates from this disease have increased<sup>(1)</sup>.

Cervical cancer is a disease of slow and quiet progress, which has among its main risk factors the Human Papillomavirus (HPV) infection, since it is present in virtually every patient diagnosed with cervical cancer. Furthermore, from the more than 100 subtypes of HPV, approximately 40 affect the genital area<sup>(2)</sup>.

For the Brazilian Cancer National Institute, curing cervical cancer is possible with its early detection, before the tumor reaches its attacker stage<sup>(3)</sup>. The Ministry of Health recommends that early detection methods are implemented in order to identify the population of women affected by this pathology and treat them early to reduce morbimortality and minimize the costs related to this disease. As such, the Papanicolaou test is offered to all women who are sexually active<sup>(4)</sup>, this being the main strategy in Brazil in the fight against mortality by cervical cancer. This exam is systematically offered to women aged between 25 and 64 years<sup>(4)</sup>. At the Family Health Strategy program, the test is mostly performed by nurses, and this enables a significant increase in the nationwide coverage of the cervical cancer prevention program<sup>(5)</sup>.

Despite the recommendations from the Ministry of Health, which has adopted the Papanicolaou test as the main strategy for detecting cervical cancer even in its early stages, due to its high specificity level, it is known that it may present some false-negative results percentages, which compromises its sensitivity and confirms the need for comple-

mentary tests for a better diagnosis<sup>(6-7)</sup>. Most of the factors related to false-negative results depend on the conditions and methods for collecting the material<sup>(8)</sup>, since in many cases the lesion may not be properly shown in the smear, which corroborates the high rates of false-negative results<sup>(9-10)</sup>.

Given these facts, it is noted that using just the Papanicolaou test as the only method for detection used has not proved effective<sup>(9-10)</sup>, raising questions about the need for adopting other complementary methods. Different options have been presented, some not being applicable due to the great complexity of their implementation, and also due to costs that just do not match the reality of most of the developing countries.

In this perspective, another proven method with greater sensitivity than the Papanicolaou test alone was used<sup>(6)</sup>. A study performed in Fortaleza confirmed that Papanicolaou had a 22% detection sensitivity level, while digital cervicography detected 99.1% of women with cervical cancer and its precursory lesions<sup>(6)</sup>. The specificity of digital cervicography using the positivity criteria reached 81.3%<sup>(6)</sup>.

In this perspective, despite the demonstrated sensitivity, digital cervicography, since it is an innovative method for the early detection of cervical cancer and since it captures images from cervix uteri using a digital camera, could trigger some resistance from women looking for gynecological consultation. It is still necessary to check if the different cultural conditions, especially for the population at the rural areas of the state, will not interfere with the acceptability of the new exam. Thus, the aim of this study was to investigate the acceptability of digital cervicography, using it as a complementary exam to Papanicolaou cytology.

## METHOD

This is a descriptive-exploratory study, with a quantitative approach, performed between June to August 2011, at a Child-Motherhood Health Center in the city of Barbalha, in the Cariri region, south of Ceará State.

The sample is formed by the women treated at the center within the time frame for data collection, with a total of 63 women under the following inclusion criteria: visiting the Child-Motherhood Health Center seeking a gynecological consultation. Exclusion criteria adopted were: hysterectomized women and patients who refused to participate in the study.

For data collection, a socioeconomic and clinic structured questionnaire about the cytological collection was followed by a visual inspection with 5% acetic acid and a digital cervicography application, as well as the recording of the Papanicolaou test result from each participant.

The digital cervicography exam captures digital pictures from cervix uteri, which are analyzed under a computer zoom and according to positivity criteria that are: the presence of any white lesion before acetic acid application; the presence of any white lesion, plain or in relief, on cervix uteri, vaginal walls and fornix; lesions with a rough aspect, differing from the normal epithelium after the acetic acid application, and; the presence of ulcerated forms on cervix uteri, vaginal walls, and uterine fornix<sup>(6)</sup>.

The data was organized and tabulated using the *Statistical Package for the Social Sciences* (SPSS® 18.0) software, generating an exploratory and descriptive (average, standard deviation, relative and absolute values) analysis, through a likelihood ratio test (maximum likelihood rate), establishing the significance level at 0.05.

It is relevant to add that the Ceará population is formed by many races and the women are from different ethnic groups. Therefore, any ethnic-related variables were not considered relevant.

The research project was submitted to the Ethics in Research Committee from Cariri Regional University (Universidade Regional do Cariri – URCA, in Portuguese) and approved according to legal report number 65/2011 on February 12, 2012. It is important to stress that the approval from the research subjects was requested via Clear and Free Consent Term (Termo de Consentimento Livre e Esclarecido – TCLE, in Portuguese) and, for teenager subjects, a parent/responsible person's authorization was also requested via TCLE. This document explained the research itself, its goals, methods and benefits, and discussed volunteer participation and the right to drop out from the research process whenever it was desired.

## RESULTS

The sample was composed of 63 women, from 14 to 78 years of age; the average age being 38.4-years-old (standard deviation = 15.5). An age group of women from 25 to 44 years (55.5%) was predominant, followed by the group aged between 15 to 24 years (15.9%). Regarding family and family income, the predominant group was formed by women whose family income was the minimum wage (47.6%), was married (61.9%), and had up to two children (53.9%). As for obstetric history, most had had vaginal delivery (77.7%) and 6.1% had had at least one abortion. Tubal ligation was the main contraception method reported by the participants (30.8%), followed by the use of oral contraceptives (15.4%) (Table 1).

Digital cervicography was accepted and performed in 100% of the sample and no discomfort during the exam was reported. The extra five minutes added to the traditional screening test time was also not considered excessive by any of the women, and none of them reported any discomfort.

Only 30% of the sample was interested in seeing the visualization of digital cervicography of their own cervix. When asked if they would recommend the test to other women in the community, they responded positively, since the exam posed no threat to their privacy and they did not even feel any discomfort beyond that already caused by the prevention examination.

**Table 1** - Distribution of women who had Papanicolaou test according to sociodemographic and obstetric-gynecological data. Barba-lha, CE, Brazil, June to August 2012.

Variables	N	%
<b>Age (years)</b>		
14 – 24	11	17,5
25 – 34	23	36,5
35 – 44	12	19
45 – 54	6	9,5
55 – 64	8	12,7
≥ 65	3	4,8
<b>Family Income (Minimum Wage)</b>		
≤ 1	30	47,6
2 – 3	24	38,1
> 3	9	14,3
<b>Marital status</b>		
Married	41	65
Single	14	22,2
Common-law relationship	5	8
Widow	3	4,8
<b>Children Quantity</b>		
≤ 2	34	53,9
3 – 5	19	30,2
≥ 6	10	15,9
<b>Childbirth type</b>		
Vaginal	49	77,7
Caesarean	10	16,2
Aborption	4	6,1
<b>Contraceptive Method</b>		
tubal ligation	19	30,8
male condom	9	13,8

oral contraceptive (pill)	10	15,4
injectable contraceptive	4	6,1
Emergency contraceptive pill	1	1,5
None	9	13,8
Not applicable (menopause)	11	18,5

Source: Developed by the authors, 2013

Regarding the analysis of the epithelia examined through the Papanicolaou exam, squamous epithelium were found in 100% of the slides, followed by glandular with 96.8%, mostly in the 25 to 34 years age group, while the metaplastic epithelium was noted in 8% of the exams, mostly among women aged over 65 years.

In relation to the microbiological analysis, the cocci were prevalent in 57.1% of the studied women, by observing vaginal flora. *Candida sp* was present in 7.9% of the studied slides. As for benign cellular alterations, it became evident that inflammation alone was the most observed cell alteration, shown in 58.6% of reports. Atrophy with inflammation in women over 55 years of age accounted for 6.4% of the results. It is worth mentioning that a high-grade lesion, invasive squamous cell carcinoma, in which one could not rule out microinvasion, infected a woman between 55 and 64 years, representing 1.6% of the study population (Table 2).

The visual inspection with acetic acid detected 13 (20.6%) women with acetic-white lesion, while cytopathological screening confirmed only one result (1.6%) of a high-level lesion, not excluding microinvasion or invasive squamous cell carcinoma; these women were recommended for further and more specific tests.

From the 13 women with a positive result for the visual inspection, six (46.2%) had attended a previous medical exam one year ago or less; three (23.1%) in the last two years; two (15.4%) in the last 10 years, and; two (15.4%)

**Table 2** – Distribution of women according to Papanicolaou test results. Barbalha, CE, Brazil, July to August, 2012.

	Age (years)													p
	14– 24		25 –34		35 – 44		45-54		55– 64		≥65			
	N	%	N	%	N	%	N	%	N	%	N	%		
<b>Epithelium</b>														
Squamous	11	18	23	37	12	19	6	9,5	8	12,7	3	4,8	0,096	
Glandular	11	18	22	35	12	19	5	7,9	8	12,7	3	4,8		
Metaplastic	-	-	-	-	1	1,6	1	1,6	1	1,6	2	3,2		
<b>Microbiology</b>														
Cocci	8	13	12	19	7	11,1	2	3,2	5	8	2	3,2	0,372	
Bacilli	6	9,6	10	16	5	8	2	3,2	1	1,6	1	1,6		
Lactobacillus SP	1	1,6	3	4,8	1	1,6	-	-	-	-	-	-		
Suggestive	1	1,6	2	3,2	1	1,6	-	-	-	-	-	-		
<b>Gardnerella / Mobiluncus</b>														
Cândida sp	-	-	2	3,2	2	3,2	-	-	-	-	1	1,6		
<b>Benign cell alterations</b>														
Inflammation	8	13	14	22	8	12,6	3	4,8	3	4,8	1	1,6	0,047	
Atrophy with inflammation	-	-	-	-	-	-	-	-	2	3,2	2	3,2		

Source: Developed by the authors, 2013

had never had a Papanicolaou test. From these, two (15.4%) had positive results in digital cervicography with relevant cell alterations of first and second positivity criteria, beside the acetic-whitening.

This result reinforces the need of adopting additional methods to Papanicolaou cytology tests for screening cervical cancer and its precursor lesions. In the remaining patients with a positive result for visual inspection with acid, the whitening did not objectively represent alterations that met the positivity criteria, due to traces being found to be too weak, or that vanished too quickly, or due to their location. It is known that structures commonly found in the uterine cervix caused by physiological processes may also exhibit glycogen concentrations differing from the expected for healthy squamous tissue, including immature or interrupted metaplastic processes, with their characteristic geographical aspect.

The referred patients were sent to a secondary assistance unit, for further diagnosis, colposcopy, and biopsy if necessary, according to medical advice.

## DISCUSSION

A majority of women under 35 years was noted, which resembles a study conducted in the city of São Paulo where the age group from 25 to 34 years was more consistent in attending Papanicolaou tests<sup>(11)</sup>.

Furthermore, it was observed that women who were identified as older than 55 years were the least likely to have undergone the examination; however, the demand for care should also occur in this age group because it is a known fact that women over 60 years are more susceptible to developing cervical cancer<sup>(1)</sup>.

In Florianópolis (Santa Catarina), the biggest proportion of delayed exams was found in those women aged from 20 to 29 years (18.7%) and between 50 and 59 years (13.4%); for the younger group, the delay was mainly related to never having taken the exam, while for the older group, it was caused by an interval of more than three years for a new examination<sup>(12)</sup>.

Despite the data found, it is known that the Health Ministry advises that all women from 25 (or earlier if she is already sexually active) to 64

years of age should undergo a preventive examination, initially on a year-by-year basis. After two consecutive exams with a negative result for cervical dysplasia or neoplasia, the exam may be repeated every three years<sup>(4)</sup>.

In this study, most of the participants had family incomes up to the minimum wage, and were married and had up to two children. This data was similar to the study in a city in Rio Grande do Norte, where the majority (58.4%) of the studied women were less than 40 years of age, were married or in a common-law union with their partner, did not work outside home, had family income up to the minimum wage, and had one to six children<sup>(13)</sup>. In Teresina, Piauí, it was also noted that most of the women studied were married (65.5%), had more than seven years of education (64%), and did not participate in paid activity (72.2%)<sup>(14)</sup>.

Since it is a pathology with slow progress, in which the attacker process may take more than 15 years to be completed, it is possible to detect the HPV infection and disease's early stages through simple and effective measures, if properly taken<sup>(11)</sup>.

Inflammatory benign cell alterations were detected in about half of the participants, mostly in the 25 to 34 years age group, with fewer incidences in the older groups. This finding contradicts the results of another study, in a review of the importance of oncotic cytology, which observed the predominance of the inflammatory process in climacteric women<sup>(15)</sup>.

The reduction of hormone levels, especially the estrogen and progesterone deficit, can be attributed to alterations on the vaginal epithelium that cause the inflammatory processes; senile vaginosis being common in this age group. Besides the epithelium alterations already described, the metabolism, psyche, and woman's behavior are also affected by ovarian failure<sup>(16)</sup>.

A 55 year old patient with a high-level lesion, with microinvasion risk not discarded, was

detected in digital cervicography as suspect and confirmed by a Papanicolaou test and a pathological examination. In Brazil, high-level lesions that may point to microinvasion are present in approximately 0.025% of the valid Papanicolaou tests. These are slides containing representative cell elements from the cervix, endocervix (glandular and squamous epithelia), and metaplastic. Diagnosis of suspect lesions is confirmed by a histopathologic study<sup>(4)</sup>.

Regarding the usage of digital cervicography as a complementary method to Papanicolaou cytology, the acceptance from all the women participating in the study was verified, and this result, despite being performed in the state countryside area, corroborates another study performed in the state capital, Fortaleza, where 100% of acceptance was confirmed by the participants<sup>(6)</sup>. It is known that the strong religious character and the different myths and old taboos present in this population could be the reason for refusing the examination, as it might be seen as an excessive exposure of their privacy.

The Papanicolaou test itself has many meanings among the women, differing even within the same population and in the same age group, rooted in the cultural characteristics and biopsychic-social role of each individual, as well as the old established taboos in society<sup>(17)</sup>.

However, there was no reported resistance from the participants against digital cervicography, since during the invitation to participate in the research all the women were informed about the examination and assured that no identification of them could be taken — the only information being taken was the cervix uterine image and number marked onto each exam. The fact that the exam has no side effect or additional discomfort to the traditional gynecological examination was also relevant to its acceptance.

A crucial factor for the early detection and treatment of cervical cancer is health education,

and, through this strategy, any block against undergoing examination is broken, any insecure feeling is eased, and the women become knowledge multipliers and bring others, who are close to them, to participate, too.

## CONCLUSION

The implementation of complementary exams to the cervical cancer prevention examination is of great importance in order to increase its sensitivity of detection, since among all the women that presented visual alterations on the 5% acetic acid test, only one presented alterations in the laboratory results.

In this way, adopting an exam (digital cervicography) that has been showing great acceptance by all the users of the public health system and accordance regarding its efficiency that is presented in different studies demonstrates the viability of using the method as another propaedeutic possibility against cervical cancer.

The 100% acceptance by the examined women suggests that the experiment should be performed in other populations to highlight its use as a viable strategy to be adopted in a health unit's routine.

Also, it is important to highlight the relevance of executing health education strategies by nurses in what is related to the exam's explanation, carrying out interventions in order to minimize any anxiety in these women about the Papanicolaou or digital cervicography tests.

Study limitations were found in intrinsic and extrinsic factors to the exam. Intrinsic factors were those related to the patient herself, in cases when anatomical variation and/or vaginal canal atrophy or dryness made it difficult to visualize the cervix. Inadequate lighting, which occurred a few times during the procedure, due to the light source in the health unit being an incandescent

light of low power when the best option would be a fluorescent light of high luminosity level, though not compromising the exam, is a classic extrinsic factor.

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