

## FATORES ASSOCIADOS AO RISCO DE ALTERAÇÕES NO EXAME CITOPATOLÓGICO DO COLO DO ÚTERO

### FACTORS ASSOCIATED WITH THE RISK OF CHANGES IN CERVICAL CYTOPATHOLOGY EXAMINATION

### FACTORES ASOCIADOS AL RIESGO DE CAMBIOS EN EL EXAMEN CITOPATOLÓGICO DEL CUELLO DEL ÚTERO

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#### RESUMO

**Objetivo:** Analisar os fatores associados ao risco de apresentar alterações no exame citopatológico do colo do útero. **Métodos:** Estudo transversal, que contemplou mulheres entre 25 a 64 anos. O risco para um exame alterado foi calculado a partir de quatro critérios: primeira relação sexual antes dos 18 anos; mais de quatro parceiros sexuais ao longo da vida; história anterior de doença sexualmente transmissível; mais de três partos. As análises foram efetuadas utilizando-se os testes Qui-quadrado de Pearson, razão de prevalência (RP) e Regressão de Poisson com variância robusta e intervalo de confiança (IC) de 95%. **Resultados:** A amostra foi composta por 479 mulheres, das quais 30% apresentaram alto risco para um exame citopatológico alterado. Constatou-se que as mulheres com baixa renda (RP = 1,12; IC95%: 1,04-1,21), com percepção negativa da própria saúde (RP = 1,13; IC95%: 1,06-1,20), que faziam uso de tabaco (RP = 1,14; IC95%: 1,05-1,23) ou álcool (RP = 1,09; IC95%: 1,02-1,18) apresentaram alto risco de apresentar um exame alterado, ao passo que a idade elevada (RP = 0,83; IC95%: 0,73-0,95) associou-se à diminuição desse risco. **Conclusão:** As mulheres jovens, de baixa renda, com percepção negativa da própria saúde e que usavam tabaco ou álcool tinham maior probabilidade de apresentar alterações no exame citopatológico do colo do útero.

**Descritores:** mulheres; neoplasias do colo do útero; grupos de risco; prevenção primária; comportamento sexual.

#### ABSTRACT

**Objective:** To analyze the factors associated with the risk of presenting changes in the cervical cytopathology examination. **Methods:** Cross-sectional study that included women between 25 and 64. The risk for an altered examination was calculated from four criteria: first sexual intercourse before the age of 18; more than four lifetime sexual partners; previous history of sexually transmitted disease; more than three childbirths. The analyses were performed using Pearson's Chi-square test, prevalence ratio (PR) and Poisson Regression with gross variance and confidence interval (CI) of 95%. **Results:** The sample consisted of 479 women, of whom 30% had a high risk for an altered cytopathological examination. The study found that women with low income (PR = 1.12, 95%CI: 1.04-1.21), with a negative perception of their own health (PR = 1.13, 95%CI: 1.06-1.20), who used tobacco (PR = 1.14, CI 95%: 1.05-1.23) or alcohol (PR = 1.09, CI 95%: 1.02-1.18) presented a high risk for an altered cytopathological examination, whereas the high age (PR = 0.83, CI 95%: 0.73-0.95) was associated with decrease in this risk. **Conclusion:** Young, low-income women with a negative perception of their own health, who used tobacco or alcohol, were more likely to present alterations in cervical cytopathology examination.

**Descriptors:** women; uterine cervical neoplasms; risk groups; primary prevention; sexual behavior.

#### RESUMEN

**Objetivo:** Analizar los factores asociados al riesgo de presentar alteraciones en el examen citopatológico del cuello del útero. **Métodos:** Estudio transversal que contempló mujeres entre 25 y 64 años. El riesgo para un examen alterado fue calculado según cuatro criterios: primera relación sexual antes de 18 años; más de cuatro parejas sexuales en la vida; historia de enfermedad de transmisión sexual; más de tres partos. Los análisis se efectuaron utilizando las pruebas Qui-cuadrado de Pearson, razón de prevalencia (RP) y Regresión de Poisson con varianza robusta e Intervalo de Confianza (IC) del 95%. **Resultados:** Participaron 479 mujeres, siendo que 30% presentó alto riesgo para un examen alterado. Se constató que mujeres con bajos ingresos (RP = 1,12, IC 95%: 1,04-1,21), con percepción negativa de la salud (RP = 1,13; IC 95%: 1,01-1,20), que hacían uso de tabaco (RP = 1,14, IC 95%: 1,05-1,23) o alcohol (RP = 1,09, IC95%: 1,02-1,18) presentaron alto riesgo de presentar un examen modificado, mientras que la edad elevada (RP = 0,83, IC 95%: 0,73-0,95) se asoció a la disminución de este riesgo. **Conclusión:** Las mujeres jóvenes, de baja renta, con percepción negativa de la salud, que usaban tabaco o alcohol tenían mayor probabilidad de presentar alteraciones en los exámenes citopatológicos del cuello del útero.

**Descritores:** mujeres; neoplasias del cuello uterino; grupos vulnerables; prevención primaria; conducta sexual.

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## INTRODUCTION

Cancer of the cervix of the uterus occupies the fourth position among the most common types of cancer in the world, being that the majority of cases and deaths resulting from this disease occurs in developing countries, for instance Brazil<sup>(1-2)</sup>. Prevention is closely related to its multifactorial character of development and, therefore, efforts have been focused on early diagnosis and control of modifiable risk factors<sup>(3)</sup>.

The periodical of the cytopathologic examination is a strategy widely adopted for the screening of cervical cancer of the uterus<sup>(2-3)</sup>. In addition, life habits, such as the use of tobacco and hormonal contraceptives, high parity, and risky sexual behaviors - early age of first sexual intercourse, number of sexual partners, positive history of sexually transmitted diseases, unprotected sexual practices - influence on the natural history of the disease, constituting axes of intervention<sup>(2-4)</sup>.

In consequence, to identify women who have a greater probability of presenting alterations on the cytopathologic examination of the cervix of the uterus is of extreme relevance to guide the organization of health services, as well as to guide health professionals regarding preventive efforts of modification of lifestyle and regular Pap test, with an emphasis on the most vulnerable population groups<sup>(5-6)</sup>.

In this context, some instruments estimate the risk of women exhibit alterations in the cytopathologic examination of the cervix of the uterus<sup>(5-7)</sup>, but this analysis is unprecedented in Brazil. Therefore, this study aimed to estimate the prevalence and evaluate the factors associated with high risk of presenting amendments on the cytopathologic examination of the cervix in women covered by the Family Health Strategy.

## METHODS

### Outline of the Study

This was a cross-sectional study included in the cohort entitled "Evaluation of strategies for the screening of cervical cancer in women covered by the Family Health Strategy after five years of follow-up in the city of Juiz de Fora, Minas Gerais". The research was derived from a collaboration between the core of advice, training and studies in health at the Federal University of Juiz de Fora (NATES/UFJF), the Institute of Social Medicine of the University of the State of Rio de

Janeiro (IMS/UERJ) and the National Institute of Cancer José Alencar Gomes da Silva (INCA), whose first phase of data collection was carried out in 2010-2012<sup>(8)</sup>. The current research is on the second stage, conducted in the period from December 2015 to October 2016.

In accordance to ethical issues, it was obtained the approval from the Research Ethics Committee of the IMS/UERJ (Opinion: 1,323,441 - CAAE: 48067815, 2, 0000, 5260), being required the signatures of the participants in the Informed Consent Form.

### Participants' Selection

The sample was selected from 778 women undergoing first follow-up phase, between 20 and 59 years of age, residents in the area of coverage of two units of Primary Health Care (UAPS)<sup>(8)</sup>. For the second phase, there were eligible women between 25 and 64 who still lived in the territory under the area of coverage of the same UAPS, excluding the hysterectomy and those who were pregnant women in the period of data collection. Community Health Agents, together with researchers from the NATES/UFJF, analyzed the list of participants of the first phase of the cohort and managed the steps of identification and eligibility of the sample. Subsequently, by means of telephone contact and/or visits were made to active search, the cognizance of women and the schedules of clinical consultations.

### Data Collection

The interviews were conducted in the UAPS, individually, by a duly trained team, composed of professionals from the Nursing, Medicine and Nutrition. For this reason, it was used electronic forms edited in the ODK Collect application (version 1.5.0; Open Data Kit, USA) and administered by means of tablets with Android operating system (Google, Inc., Mountain View, California, USA).

The questionnaires included questions about sociodemographic profile, self-assessment of health status, and profile of access to health services, style of life, morbidity, women's health and sexual behavior. Aiming at a greater control of quality of information measured, electronic forms were submitted to detailed reviews soon after its transmission.

It should be emphasized that, in the first phase of the cohort, women who agreed to participate in the research were focused on

measures for the prevention of cervical cancer, including in relation to modifiable risk factors. Moreover, in this occasion, all answered a questionnaire and were submitted to anthropometric assessment, the measurements of blood pressure levels and the collection of biological material for the realization of the cytopathologic examination of the cervix of the uterus.

### Variables of the Study

It was established, as the dependent variable, the risk of displaying changes in the cytopathologic examination of the cervix of the uterus. This classification was obtained from the index proposed by Vukovic et al.<sup>(6)</sup>, which are based on the answer of four factors: "First sexual intercourse before the age of 18 years of age?", "More than four sexual partners throughout life?", and "Previous history of sexually transmitted disease?" and "More than three births?" The affirmative answers to these items received the scores 16, 15, 14 and 13, respectively; negative responses have been reset. The participants with scores  $\geq 28.5$  points were classified as having a high risk to present alterations in the cytopathologic examination of the cervix of the uterus. In analysis, adopting the Pap test as the gold standard, Vukovic et al.<sup>(6)</sup> demonstrated that the expiry value obtained the best accuracy, with 60.0% sensitivity and 90.0% specificity.

For the evaluation of the factors associated with high risk of view changes on the cytopathologic examination of the cervix of the uterus, was structured a theoretical model of determination of the disease, comprising three hierarchical blocks of variables, being based on temporal ordering, logical, or conceptual of factors, which allowed to analyze the links in the chain of causation, considering the potential confounding factors<sup>(9)</sup>. Thus, the independent variables were arranged in:

(a) Block distal (sociodemographic profile) - age; marital status; skin color declared; degree of instruction; functional literacy in health; religion; religious attendance; occupational situation; economic status according to the criteria of the Brazilian Association of Research Companies (ABEP)<sup>(10)</sup>; per capita income; be contemplated by the Family Grant.

(b) intermediate block (self-assessment of health status and access to health services) - self-evaluation of health status; access to health services of UAPS in the last 12 months; receiving

visits; possession of private health insurance; participation in group of sexual and reproductive rights; frequency of Pap smear; social support (feel free to chat with at least a friend or family member).

(c) the proximal Block (behavioral profile) - use of tobacco; alcohol abuse; practice of physical activity; regular consumption of fruits; regular consumption of vegetables; consumption of meat with visible fat; use of contraceptive method; use of hormonal contraceptives; use of condoms in sexual relations.

In order to assess the level of functional literacy in health<sup>(11)</sup>, we used the Brief Test of Functional Health Literacy in Adults (B-TOFHLA), translated and validated in Brazil<sup>(12)</sup>. Prior to the application of this questionnaire, checking the following prerequisites: To know how to read or have at least one full year of study; presenting visual acuity intended cod (read the signs of the Scale of the Snellen signals, at least until the line 20/50); not to present any psychiatric or neurological disease that affects the cognition; do not be under the custody of justice<sup>(12)</sup>.

### Statistical Analyses

Statistical analyzes were performed in STATA<sup>®</sup> software (version 13.0; StataCorp. LP, USA). The categorical variables were described by means of absolute and relative frequencies, whereas the continuous variables were presented as mean values  $\pm$  standard deviations.

Aiming to detect the factors associated with the risk of displaying the cytopathologic examination of the cervix of the uterus changed, compared the proportions of independent variables in relation to the outcome through Pearson Chi-square test. To ascertain the magnitude of associations, we calculated the prevalence ratio (PR), with robust variance and confidence interval (CI) of 95%.

At the end, with the aim of checking the permanence of the strength of the association and control potential confounding factors, we used the Poisson Regression. The design of the final model was carried out from the backward method: all the variables with  $p \leq 0.20$  were included, and subsequently disposed of by steps until you reach a combination in which all submit  $p \leq 0.05$ .

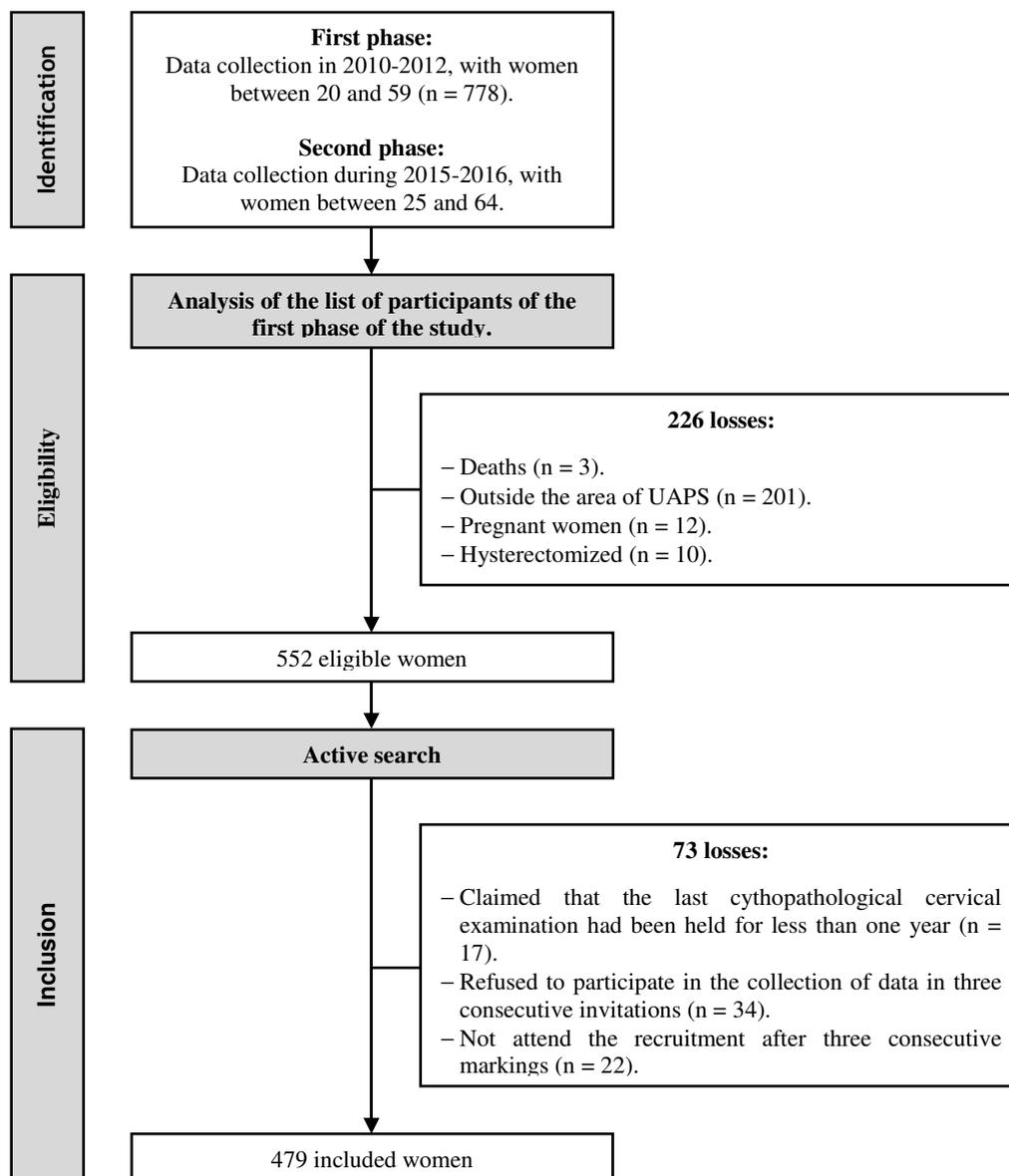
### RESULTS AND DISCUSSION

Figure 1 illustrates the flow diagram about the stages of identification, eligibility and inclusion of participants. Initially, there were 226

losses, because of the 778 women submitted to assessments in 2010-2012, three died, 201 went to reside at addresses outside the coverage area of the UAPS, 12 were pregnant women in the period of data collection and 10 had been hysterectomy in passing from the first to the second phase of the study. They were subsequently entered in the other 73 Losses: (a) 17 claimed that his last cytopathologic

examination of the cervix of the uterus had been carried out less than a year ago, being in line with the precepts of the Ministry of Health<sup>(3)</sup>; (b) after three consecutive invitations performed on alternate days and times, 34 refused to participate in the collection of data and 22 did not attend the recruitment even having confirmed the presence by phone. The final sample was comprised of 479 women.

Figure 1. Flow diagram of the phases of participants' selection in the second phase of the cohort study. Juiz de Fora, MG, 2015-2016.



N: sample size; UAPS, Primary Health Care Unit.

The average age of participants was 43.5 years old ( $\pm 10.7$ ); 52.6% reported degree of education lower than the fundamental education and had, on average, seven complete years of study. A large part of women lived with a partner

(57.9%), worked (59.2%) belonged to the catholic religion (48.8%) and attending religious activities at least once per week (61.8%). The majority self-reported Black or Maroon (62.0%) belonged to the low socioeconomic class (83.5%), with per

capita income  $\geq 0.5$  minimum wage (54.1%). Great part not received Family Grant (78.8%), did not have private health insurance (75.7%) and exhibited low functional literacy in health (53.5%). The participants had, on average, two children ( $\pm 1.5$ ) and three sexual partners throughout life ( $\pm 2.7$ ). The average age of first sexual intercourse was 18 years old ( $\pm 3.4$ ).

The assessment of the risk of presenting the cytopathologic examination changed through the index of Vukovic et al.<sup>(6)</sup> is an alternative simple and low cost, and may be useful for the implementation of actions for prevention of cervical cancer in populations more likely<sup>(3)</sup>. In addition, this method ratifies the initiatives of inversion of the care model of health, once that goes beyond the strictly biomedical character, focused on carrying out the examination, taking into account factors modifiable risk factors that may contribute to change the natural history of the disease<sup>(3)</sup>.

The high risk to the cytopathologic examination changed was detected in 30% of the

sample, being observed a mean score equivalent to 16.0 ( $\pm 14.2$ ), a value slightly above the pioneering study conducted in Serbia, with 525 women, in which the score was 10.3 in the test ( $\pm 13.8$ ) and 9.1 in the retest ( $\pm 13.2$ )<sup>(6)</sup>. The prevalence of risk of presenting an altered tests were 21.6% in a study with 3,661 women from 14 to 72 years of age in the United Kingdom<sup>(7)</sup>, 38.1% in 428 North American women aged 18<sup>(5)</sup> and 30% with Turkish 227 between 35 and 69<sup>(13)</sup>.

Presented a greater risk to the cytopathologic examination changed, women with low income, classified according to the ABEP (PR = 1.12; CI 95%: 1.03-1.21) and per capita income (PR = 1.12; CI 95%: 1.05-1.19), as well as those who received Family Grant (PR = 1.14; CI 95%: 1.06-1.23) and who reported not to follow any religion (PR = 1.20; CI 95%: 1.10-1.37). The older (60 years older) were less prone to risk (PR = 0.85; CI 95%: 0.74-0.98). (Table 1).

Table 1 – Sociodemographic profile of women served by the Family Health Strategy, according to the risk of presenting the cytopathological examination of the cervix changed. Juiz de Fora, MG, 2015-2016.

Variables	Risk of presenting the cytopathological examination of the cervix changed				
	n*	Low risk N (%)	High risk N (%)	PR (IC95%)	p-value
<b>Age</b>					
20 - 29	60	40 (66,7)	58 (45,3)	1	
30 - 39	128	70 (54,7)	58 (45,30)	1,08 (0,97-1,21)	0,117
40 - 49	139	105 (75,5)	34 (24,5)	0,93 (0,83-1,03)	0,205
50 - 59	111	86 (77,5)	25 (22,5)	0,91 (0,82-1,02)	0,131
$\geq 60$ years old	35	30 (85,7)	5 (14,3)	0,85 (0,74-0,98)	0,026
<b>Marital status</b>					
Living with partner	275	191 (69,4)	84 (30,6)	1	
Live alone	197	139 (70,6)	58 (29,4)	0,99 (0,92-1,05)	0,797
<b>Skin color self-reported</b>					
White/yellow/indigenous	180	130 (72,2)	50 (27,8)	1	
Maroon/black	293	201 (68,6)	92 (31,4)	1,02 (0,96-1,09)	0,402
<b>Schooling</b>					
High school complete, incomplete or half	140	98 (70,0)	42 (30,0)	1	
Elementary complete, incomplete or half	204	142 (69,6)	62 (30,4)	1,01 (0,92-1,08)	0,983
Illiterate or incomplete elementary	129	91 (70,5)	38 (29,5)	0,99 (0,91-1,08)	0,923
<b>Functional health literacy</b>					
Adequate	204	137 (67,2)	67 (32,8)	1	
Low	323	169 (72,8)	63 (27,2)	0,95 (0,89-1,02)	0,195
<b>Religion</b>					
Yes	440	316 (71,8)	124 (28,2)	1	
No	24	11 (45,8)	13 (54,2)	1,20 (1,10-1,37)	0,007
<b>Religious attendance</b> <sup>†</sup>					

Yes	291	214 (73,5)	77 (26,5)	1	
No	180	117 (65,0)	63 (35,0)	1,06 (1,01-1,13)	0,050
<b>Profession</b>					
Works	279	204 (73,1)	75 (26,9)	1	
Does not work	188	124 (65,9)	64 (34,1)	1,05 (0,98-1,12)	0,099
<b>Economic situation<sup>§</sup></b>					
Medium/High	78	64 (82,0)	14 (18,0)	1	
Low	395	267 (67,6)	128 (32,4)	1,12 (1,03-1,21)	0,005
<b>Per capita income<sup>¶</sup></b>					
Medium/high	254	196 (77,2)	58 (22,8)	1	
Low	212	131 (61,8)	81 (38,2)	1,12 (1,05-1,19)	<0,001
<b>Covered by the Family Grant Program</b>					
No	371	274 (73,8)	97 (26,2)	1	
Yes	101	56 (55,4)	45 (44,6)	1,14 (1,06-1,23)	<0,001

N: sample size; CI: confidence interval; RP: prevalence ratio.

\* The differences are justified by the lack of information.

† Be present in religious activities at least twice a month.

§ Medium/high income: classes A, B1 and B2; low income: classes C1, C2 and D/E.

¶ Medium/high income: per capita income  $\geq$  0.5 minimum wage.

Women who did not participate in educational groups on sexual and reproductive rights (PR = 0.85; CI 95%: 0.76-0.95) and receiving occasional visits (PR = 0.93; CI 95%: 0.87-0.99) had a lower risk for the cytopathologic

examination of the cervix of the uterus changed. In contrast, negative self-evaluation of health status increased the probability (PR = 1.14; CI 95%: 1.07-1.21). (Table 2).

Table 2-Self-assessment of health status and access to health services of women served by the Family Health Strategy, according to the risk of presenting the cytopathological examination of the cervix changed. Juiz de Fora, MG, 2015-2016.

Variables	Risk of presenting the cytopathological examination of the cervix changed				
	n*	Low risk N (%)	High risk N (%)	PR (IC95%)	p-value
<b>Self-evaluation of health condition</b>					
Positive	252	197 (78,2)	55 (21,8)	1	
Negative	221	134 (60,6)	87 (39,4)	1,14 (1,07-1,21)	<0,001
<b>Access to health services of the PCHU in the last 12 months<sup>†</sup></b>					
Yes	351	240 (68,4)	111 (31,6)	1	
No	120	90 (75,0)	30 (25,0)	0,94 (0,88-1,02)	0,161
<b>Receiving home visit</b>					
Monthly	163	104 (63,8)	59 (36,2)	1	
Occasionally	310	227 (73,2)	83 (26,8)	0,93 (0,87-0,99)	0,035
<b>Possession of private health insurance</b>					
Yes	116	88 (75,9)	28 (24,1)	1	
No	356	243 (68,3)	113 (31,7)	1,06 (0,98-1,14)	0,109
<b>Participation in sexual and reproductive rights group</b>					
Yes	40	20 (50,0)	20 (50,2)	1	
No	432	310 (71,8)	122 (28,2)	0,85 (0,76-0,95)	0,005
<b>Frequency of Smear</b>					
In day	371	261 (70,3)	110 (29,7)	1	
Last for more than 3 years	90	63 (70)	27 (30)	1,01 (0,92-1,08)	0,948
<b>Social support<sup>†</sup></b>					
Yes	408	292 (71,6)	116 (28,4)	1	

No 65 39 (60,0) 26 (40,0) 1,09 (0,99-1,19) 0,065

N: sample size; CI: Confidence Interval; PR: Prevalence Ratio; PHCU: Primary Health Care Unit.

\* The differences are justified by the lack of information.

† Feel free to talk with at least one friend or family member.

There were also more likely to present alterations in the cytopathologic examination, the participants who were using tobacco (PR = 1.16; CI

95%: 1.07-1.27), abusive use of alcohol (PR = 1.7; CI 95%: 1.07-1.27) and who did not consume fruits regularly (PR = 1.08; CI 95%: 1.01-1.15). (Table 3).

Table 3 - Behavioral profile of women served by the Family Health Strategy, according to the risk of presenting the cytopathological examination of the cervix changed. Juiz de Fora, MG, 2015-2016.

Variables	Risk of presenting the cytopathological examination of the cervix changed				
	n*	Low risk N (%)	High risk N (%)	PR (IC95%)	p-value
<b>Use of tobacco</b>					
Positive	252	197 (78,2)	55 (21,8)	1	
Negative	221	134 (60,6)	87 (39,4)	1,14 (1,07-1,21)	<0,001
<b>Abuse of alcohol †</b>					
No	394	290 (73,6)	104 (26,4)	1	
Yes	79	41 (51,9)	38 (48,1)	1,17 (1,07-1,27)	<0,001
<b>Practice of physical activity §</b>					
Yes	43	32 (74,4)	11 (25,6)	1	
No	430	299 (69,5)	131 (30,5)	1,03 (0,93-1,15)	0,493
<b>Regular consumption of fruits ¶</b>					
Yes	291	215 (73,9)	76 (26,1)	1	
No	182	116 (63,7)	66 (36,3)	1,08 (1,01-1,15)	0,020
<b>Regular consumption of vegetables ¯</b>					
Yes	388	277 (71,4)	111 (28,6)	1	
No	31	54 (63,5)	31 (36,5)	1,06 (0,97-1,15)	0,160
<b>Meat with fat apparent consumption ¸</b>					
Yes	388	277 (71,4)	111 (28,6)	1	
No	31	54 (63,5)	31 (36,5)	1,06 (0,97-1,15)	0,160
<b>Use of contraceptive method</b>					
Without fat	254	182 (71,6)	72 (28,4)	1	
With fat	211	142 (67,3)	69 (32,7)	1,03 (0,96-1,10)	0,310
<b>Use of hormonal contraceptive</b>					
No	361	249 (68,9)	112 (31,1)	1	
Yes	112	82 (73,2)	30 (26,8)	0,96 (0,89-1,04)	0,386
<b>Condom use during sexual intercourse</b>					
Yes	58	41 (70,7)	17 (29,3)	1	
No	415	290 (69,9)	125 (30,1)	1,01 (0,91-1,10)	0,899

N: sample size; CI: confidence interval; PR: prevalence ratio.

\* The differences are justified by the lack of information.

† ≥ four doses of alcohol on a single occasion in the last month.

§ ≥ 30 minutes a day of physical activity, five times a week.

¶ At least five portions of fruit (or juice) per week.

¯ At least five servings of raw vegetables or cooked per week.

¸ Chicken meat with skin or meat with fat apparent.

In the multivariate analysis, it was decided not to include the variables “per capita income” and “Bolsa Família” by the fact of being associated with the socioeconomic classification. In addition, the variable “religious” attendance was excluded for being strongly associated with

religion. In the final Poisson Regression, young women, low income, with negative perception of own health, who made use of tobacco and alcohol abuse showed higher probability of presenting the cytopathologic examination changed. (Table 4).

The socioeconomic condition is vital to the health of populations, being associated to the

Table 4 – Final Model of Poisson Regression with gross and adjusted prevalence ratios, 95% confidence intervals and p-values for selected variables, according to the risk of presenting the cytopathological examination of the cervix changed. Juiz de Fora, MG, 2015-2016.

Variables	Risk of presenting the cytopathological examination of the cervix changed					
	PR brute	CI 95%	p-value	PR adjusted	CI 95%	p-value
<b>Age</b>						
20 - 29	1	----		1	----	
30 - 39	1,08	0,97-1,21	0,117	1,08	0,97-1,19	0,122
40 - 49	0,93	0,83-1,03	0,205	0,92	0,83-1,02	0,103
50 - 59	0,91	0,82-1,02	0,131	0,89	0,81-0,99	0,035
≥ 60 years old	0,85	0,74-0,98	0,026	0,83	0,73-0,95	0,006
<b>Socioeconomic situation</b>						
Medium/high	1	----		1	----	
Low	1,14	1,07-1,21	<0,001	1,12	1,04-1,21	0,002
<b>Self-evaluation of health condition</b>						
Positive	1	----		1	----	
Negative	1,14	1,07-1,21	<0,001	1,13	1,06-1,20	<0,001
<b>Use of tobacco</b>						
No	1	----		1	----	
Yes	1,16	1,07-1,27	<0,001	1,14	1,05-1,23	0,001
<b>Abuse of alcohol †</b>						
No	1	----		1	----	
Yes	1,17	1,07-1,27	<0,001	1,09	1,02-1,18	0,016

CI: confidence interval; PR: Prevalence Ratio.

† ≥ four doses of alcohol on a single occasion in the last month.

The participants above 50 had a probability, approximately 20% lower, presenting the cytopathologic examination of the cervix of the uterus changed when compared to women from 20 to 29. Whereas the index used in this study is based primarily on sexual behavior (heavily influenced by cultural issues of different historical moments), young women tend more to the practices of risk, as reported early initiation of sexual activity, greater frequency of sexual activity and higher turnover of partners in relation to older children<sup>(14)</sup>.

The low-income participants showed a 12% greater probability for the cytopathologic examination of the cervix of the uterus changed when compared to middle- and upper-income, corroborating the findings of other studies<sup>(15-16)</sup>.

prevalence of risk factors, the illness, treatment and mortality<sup>(17)</sup>. Specifically in relation to cervical cancer, the socioeconomic level influences the access to diagnosis and treatment of premalignant lesions before its progression<sup>(16)</sup>. These questions reflect the inequity in health is present in various regions of the country, and should be considered for planning/implement actions aiming at the reduction of individual and social vulnerabilities, locoregional<sup>(15-16)</sup>.

Women with negative perception of own health showed a 13% greater probability for the cytopathologic examination changed. Despite its subjective character, self-assessment of health status is considered a valid measure, reliable, sensitive to changes and that reflects the actual state of health<sup>(18)</sup>. In the present study, it is

necessary to consider the fact that the participants had been directed, in the first phase of the cohort, regarding risk factors for the development of cervical cancer of the uterus, which can partially explain this association, once that women with risk behavior are aware of their vulnerability and, therefore, may have a negative perception of health.

Women who were tobacco use showed a 14% greater chance of displaying the cytopathologic examination of the cervix of the uterus changed. The chemicals contained in cigarettes can decrease the immunological response to HPV, besides causing damage to the DNA of cells infected by this virus<sup>(19-20)</sup>. The habit of smoking is a cofactor of interest in cervical carcinogenesis and constitutes a potential target for intervention by means of campaigns to combat smoking<sup>(19)</sup>.

The participants who reported alcohol abuse showed 9% higher probability to the cytopathologic examination changed. The consumption of alcohol contributes toward the reduction of the ability to discern the risks associated with sexual behavior, in addition to reducing the social inhibition. In this way, it ends up favoring inappropriate behaviors and potentially preventable. Moreover, the abusive use of alcohol is a risk factor for the development of cancer in general and, when associated to smoking potentiates the risk<sup>(21)</sup>.

The scientific findings about the relationship between functional literacy in health and sexual behavior are controversial<sup>(22)</sup>, being that some studies found a negative association<sup>(23)</sup> other positive<sup>(24)</sup>. In this study, no association was found between health literacy and risk of changes in the cytopathologic examination of the cervix of the uterus. This result can be attributed to the model of attention of the Family Health Strategy of UAPS submitted to data collection, in which they are valorized and developed activities of health education, favoring the population's access to information and health services; in addition, this model has just adapting the language training at the level of understanding of the patients to consider the social context of the territory in which the individual is inserted.

Finally, emphasizes that the prevalence of risk to the cytopathologic examination of the cervix of the uterus changed in this study may be underestimated, since this is a sample of women who attended to UAPS to the achievement of the cytopathologic examination and who have been

previously sensitized and oriented according to risk factors for cervical cancer, as well as for the need to change the style of life for the prevention of this neoplasm in the first phase of the cohort. In addition, the index used in this research estimates the risk of a woman presenting changes in the examination based on sexual behavior, which can change over time, but does not consider other cofactors that interfere in the natural history of cervical cancer<sup>(2-4)</sup>.

## CONCLUSION

It was found that 30% of women subjected to evaluations showed a high risk to the cytopathologic examination of the cervix of the uterus changed. The outcome was associated with low income, the negative perception of own health, the consumption of tobacco and alcohol abuse. The increased age was associated with a reduced risk. Therefore, such a benchmarking can be useful to guide the professional practice with respect to clinical care and advice to women, as well as to constitute a viable resource for epidemiological control of the disease in question.

It is, therefore, the importance of a broad approach, focused on health promotion and the prevention of cervical cancer from the stimulus to the modification of risk factors and the improvement of life style, which added to an organized screening, would be more effective to reduce the incidence and mortality rates caused by the disease.

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