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Evaluation of women knowledge and attitude regarding cervical cancer early detection

FL. BĂDULESCU[1)], ILEANA PREJBEANU[2)], CORNELIA RADA[3)], ANCA PĂTRAŞCU[4)], MANUELA DRAGOMIR[5)], FLORINA CARMEN POPESCU[6)]

[1)] *Department of Oncology*
[2)] *Department of Environmental Health*
University of Medicine and Pharmacy of Craiova
[3)] *"Francisc I. Rainer" Institute of Anthropology, Romanian Academy, Bucharest*
[4)] *Department of Obstetrics & Gynecology*
[5)] *Department of Public Health*
University of Medicine and Pharmacy of Craiova
[6)] *Department of Pathology and Cytology, Emergency County Hospital, Craiova*

Abstract

At European level, Romania unfortunately comes first as far as mortality due to cervical cancer is concerned, mortality rate recording a continuous increase due to disease detection in advanced stages. In this context, we followed an assessment of women's cognitive and attitudinal fund in relation to early detection of cervical cancer, through the application of a questionnaire on a batch of 617 women with ages from 18 to 75-year-old, with various levels of education, residents of Craiova City and communes from Dolj County. Statistic processing of their answers indicates that 43.3% of the inquired subjects have not had a routine gynecological exam for at least seven years (or even never), which is more often found in the subgroup of women from the rural environment, with ages over 35 years and with an elementary educational level ($p<0.001$). 65.8% of the women have not done a Babes–Papanicolau test for seven years or even never, residence area, age and education level being once again discrimination factors between the subgroups. The reasons usually put forward as a justification for the failure to do the cytological test for the past three years are negligence (23.8%), the lack of information on the existence of such an investigation (18.2%), the absence of a genital pathology (12.8%) or of a medical recommendation (11.8%). Results suggest the need to provide uniform accessibility of the population to health services, by developing and implementing new strategies of educational and sanitary intervention mainly in rural communities.

***Keywords*:** cervical cancer, early detection, Babeş–Papanicolau test, rural communities, socio-demographic factors.

Introduction

About 7.6 million people die every year because of cancer, which is 13% of total deaths, percentage that exceeds deaths caused by HIV–AIDS, tuberculosis and malaria combined. *WHO* draws attention on the increasing tendency of people falling ill because of cancer – from 10 million new cases in 2000 to 16 million in 2020; 70% of the cases will be recorded in developing countries, where the number of new cases will increase from 5.2 million to 8.8 million during this period [1].

In 2006, in Romania there were 77 847 new cases of cancer, of which 37 150 in women, where the most frequent locations are in the mammary gland, uterine cervix, colon, lung and stomach. In the same year, our country recorded 45 679 deaths because of cancer, which is 17.5% of total deaths. Cervical cancer incidence has increased to 27.65 new cases in 100 000 women (3059 as a total), with two-incidence peaks: 35–39 years and 60–64 years [2].

Cervical cancer is a real problem of public health, being the number one "killer" of the female population in less developed countries. In 2008, 275 000 worldwide deaths were due to it, of which 88% in developing countries. In Europe, the differences between countries are significant; therefore, Romania reports the highest incidence – 23.9 cases in 100 000 women, while Finland – only 3.7 cases in 100 000 women, according to 2008 estimates of *International Agency for Research on Cancer* (*IARC*).

Cervical cancer is a disease that has a large potential of prevention, for which incidence and mortality can significantly decrease through population screening. Cervical cancer incidence and mortality increase in the countries where national prevention programs are missing, while in other countries prevention programs have already showed their results; therefore, Finland, Luxemburg, USA, France are only some of the countries that record an incidence below 10 cases in 100 000 women [3].

National screening programs attendance is very different from one country to another, with various addressability criteria among the population or screening period. Participation rates recorded at national tests organized in different countries vary from over 80% in Finland, New Zealand and Denmark [4–6], to 70–80% in Norway and Great Britain [7, 8], 60–70% in Holland and Australia [9, 10], 50–60% in Sweden and 37.7% in Italy (at program development in proportion of 76%) [11, 12].

Many authors suggest a decrease of mortality up to 80% and a significant decrease of incidence due to the development of efficient screening programs [13].

It is estimated that 6.4 million women are annually tested in Italy, with a cost of 181.5 million euro [14]. Other examples of countries with efficient screening programs are Australia and Great Britain, where national programs have developed since 1991, 1988 respectively; test repetition period is two years in Australia, addressing to women between 18 and 69-year-old, and three years in Great Britain, for women between 20 and 64-year-old. Significant decreases of incidence and mortality due to cervical cancer have been recorded in both countries [15].

In this context, this study has proposed to make an assessment of the knowledge level and attitude of women from the south-western part of the country (Dolj County) in relation to early detection of cervical cancer, as well as knowledge of cytological interpretation of the smears collected during the Babeş–Papanicolau test (Pap test) by some of the participants in the research.

Materials and Methods

This study is part of a larger research, which refers to the sexual-reproductive health of the population from Dolj County. The research included 1200 subjects, men and women; this study includes a number of 617 participants – women that had begun their sexual life when this analysis started. Three hundred and thirteen women (50.7%) resided in Craiova City and the other 304 (49.3%) – in communes from Dolj County. Participants' selection was random, aiming to create a balanced structure of the group from the point of view of their educational level (elementary, post-secondary and high) and age groups (18–25, 26–35, 36–45, 46–55, 56–65, and 66–75 years).

Subjects were asked to answer a questionnaire that included 111 items (for both sexes), plus other eight specific items for female persons; the questionnaire included mainly precoded items, as well as free-response items. Subjects were informed about the objectives and questionnaire application methods. Their participation in the research was made as a follow-up of their consent expressed freely, in full awareness, in permanent compliance with the principles of anonymity and confidentiality. Depending on the age, training level and subjects' availability, questionnaires application in the field was made by the interview operators (having the same sex as the participants in the study) in the case of older persons and/or with an elementary training level, or through by self-filling-in – in the case of young persons, with secondary or higher studies. Questionnaires application took place during 2009.

This study analyzes the answers given by the participating women to questions regarding early detection of cervical cancer: the year of their last visit to a physician in order to do a routine gynecological exam and a Pap test, as well as the reasons for their failure to do the test for the last three years (2006, 2007 and 2008): lack of information on the existence of this test; lack of medical recommendations for performing the test; good health state of the subject, who does not require any laboratory investigations; negligence; embarrassment in relation to a gynecological examination; lack of sexual activity; other reasons. This analysis considered also the question regarding the existence of abortions caused by the personal antecedents of the subjects.

Of the participating women in the study, 152 did the Pap test using the traditional method – collection of two smears in specialized consulting rooms, which were then fixed in absolute ethylic alcohol for 10 minutes and stained using the Papanicolaou method within the Laboratory of Pathological Anatomy and Cytology, Emergency County Hospital of Craiova. For cytological interpretation purposes, the assessment criteria described in the *Bethesda System for Reporting Cervical Cytology* were used in the 2001 format.

Study results were statistically processed using the SPSS program. The assessment of the statistic meaning of the differences of subgroups was made using the Pearson test (χ^2-test). Through binary logistic regression, we wanted to learn whether subjects' attitude towards the Pap test (dependent variable) can be statistically explained through the intervention of some independent variables like the residence environment, educational level, abortion history and age group.

Results

Routine gynecological examination

Study results indicate that a number of 287 women (46.5% of the group) have done a routine gynecological exam for the last three years, 63 (10.2%) – for the last 4–7 years and 267 (43.3%) – seven years ago or never.

Considering the period of time passed since the last routine gynecological exam, the data from Table 1 indicate significant statistic differences ($p<0.001$) between the subgroups of women depending on their residence environment, age group and training level. Therefore, the routine gynecological exam has been done for the last three years by 61% of the women from the urban environment, as compared to only 31.6% of the women from the rural environment. The situation is similar for women with ages of maximum 35-year-old as compared to those over 35-year-old (63% *vs.* 37.4%), as well as in the case of subjects with higher educational level (73.1%) *vs.* subjects with elementary educational level (26.5%).

Babeş–Papanicolau test

Statistic processing of the answers given to the

questionnaires indicates that only 171 women (27.7% of the group) have done a Pap test for the last three years; 40 women (6.5%) have done the test for the last 4–7 years, while most of them (406 women, which is 65.8% of the sample batch) did it more than seven years ago or never.

Table 1 – ***Statistic distribution [%] of subjects depending on the time passed from their last routine gynecological exam in relation to their residence environment, age group and educational level***

	Last routine gynecological exam [%]		
	For the last three years	*4–7 years*	*>7 years or never*
Residence environment			
Urban	61	10.9	28.1
Rural	31.6	9.5	58.9
Age group			
≤35 years	63.0	5.9	31.1
>35 years	37.4	12.6	50.0
Educational level			
Elementary	26.5	8.8	64.7
Secondary	54.6	13.5	31.9
High	73.1	5.6	21.3

The results presented in Table 2 indicate that that the higher educational level seems to be the most important factor that determines women's positive attitude towards early detection of cervical cancer (χ^2=95.9, p<0.001), followed by residence in the urban environment (χ^2=84.3, p<0.001) and, to a lesser extent, by the age below 35 years (χ^2=8.46, p=0.015).

A number of 345 women (55.9%) declared the existence of at least one abortion in their personal antecedents.

Table 2 – ***Statistic distribution [%] of subjects based on the time passed from the last Pap test, in relation to the residence environment, age group and educational level***

	Last Babeş–Papanicolau test [%]		
	For the last three years	*4–7 years*	*>7 years or never*
Residence environment			
Urban	43.1	8	48.9
Rural	11.8	4.9	83.2
Age group			
≤35 years	33.3	3.7	63
>35 years	24.6	8	67.3
Educational level			
Elementary	10	5.6	84.3
Secondary	31.9	7.7	60.4
High	58.3	5.6	36.1

In order to reveal the factors that significantly influence a women's chance to take a Pap test, the equation of the model proposed within the binary logistic regretssion was:

$$\ln(\text{odds(PAP)}) = B_0 + B_1 \times \text{ENVIRONMENT} + B_2 \times \text{EDUCATION} + B_3 \times \text{ABORTION} + B_4 \times \text{GROUP35}$$

where the variables of the model are: ▪ PAP (Pap test history), with possible values "Yes" and "No", ▪ ENVIRONMENT (residence environment), with two values "Urban" and "Rural", ▪ EDUCATION (training level), with three categories "Elementary", "Secondary" and "High", ▪ ABORTION (history of abortions), with two values "Yes" and "No" and ▪ GROUP35 (age group) with two values ≤35 years and >35 years.

B-coefficients of the logistic model indicate three factors than can significantly influence the chance to do a Pap test (Table 3): residence environment, education and age group (p<0.05 for the Wald test).

Table 3 – ***B-coefficients and odds Exp(B) for the Pap test binary logistic model***

Variables	B	Standard error	Wald test	Degrees of freedom	*p*	Exp(B)	Confidence interval 95% for Exp(B)	
							Lower	*Upper*
Environment								
▪ Rural	-1.015	0.213	22.773	1	0.000	**0.362**	0.239	0.550
Education			33.271	2	0.000			
▪ Secondary	0.764	0.224	11.663	1	0.001	**2.148**	1.385	3.331
▪ High	1.801	0.313	33.106	1	0.000	**6.056**	3.279	11.184
Abortion								
▪ Yes	0.216	0.200	1.1.68	1	0.280	1.241	0.839	1.836
Group35								
▪ Over 35-year-old	0.464	0.207	5.010	1	0.025	**1.590**	1.059	2.386
Constant	-1.026	0.291	12.396	1	0.000	0.358		

We could notice from the table, looking to the exp (B) values, that the odds of the woman to receive the Pap test are decreased (the corresponding B coefficient is negative) by a factor of 0.362 (the 95% confidence interval [0.239; 0.550]), by being a woman from rural environment rather than the women resident in urban areas.

The model also indicated an increase by a factor of 2.148 of the odds to receive a Pap test by being a woman with a secondary level of education rather than a woman with an elementary level of education and an increase by a factor of 6.056 of the odds to receive a Pap test by being a woman with a high level of education rather than a woman with an elementary level of education.

We can notice that the odds of receiving a Pap test are increased by a factor of 1.590 by being a woman at an age of over 35 years, rather than being under 35 years.

In this study, the abortion history does not have a significant influence (p>0.05 for the Wald test) on the women attitude regarding the Pap test.

Statistically, the two events, the routine medical exam and the Pap test were not independent (p<0.01), meaning that 93.5% of the women who had their gynecological exam more than seven years ago or never also did the last Pap test for the last seven years or never.

As far as the reasons for the failure to do the Pap test for the last three years (Figure 1) are concerned,

we notice that the subjects often indicated negligence (23.8% of the batch), lack of information regarding the existence of the test (18.2%), good health status (12.8%) and the lack of medical recommendation for doing this test (11.8%).

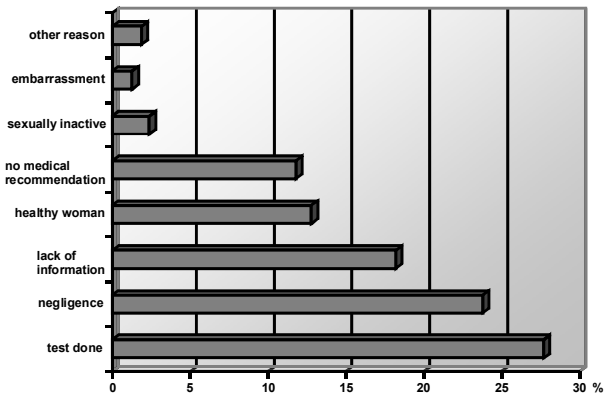

Figure 1 – ***Statistic distribution [%] of the subjects depending on the reason for the failure to do the Pap test for the last three years.***

Of the 152 women who had done the Pap test within the Laboratory of Pathological Anatomy and Cytology, Emergency County Hospital of Craiova, 120 women (78.95%) came from urban areas, and the rest – from the rural areas (21.05%).

As a result of smears cytological assessment, we distributed the cases according to the following diagnosis groups: smears within normal limits, with or without atrophy (depending on the age); smears with inflammation aspect, not otherwise specified – NOS or with the presence of *Candida*, *Trichomonas* and/or *Gardnerella* microorganisms; smears with reactive benign cellular alterations of various causes and smears with squamous epithelial lesions (low-grade squamous intraepithelial lesion LSIL or high-grade squamous intraepithelial lesion HSIL) (Table 4).

Table 4 – ***Women's distribution depending on the cytological diagnosis***

Cytological diagnosis	No. of cases	%
Within normal limits	66	43.42
Within normal limits – atrophy	4	2.63
Inflammatory smear – NOS	52	34.21
Inflammatory smear with Candida	12	7.89
Inflammatory smear with Trichomonas	4	2.63
Inflammatory smear with Gardnerella	7	4.61
Benign cellular changes (of various causes)	5	3.29
Low Squamous Intraepithelial Lesion (LSIL) – HPV-induced atypia	1	0.66
High Squamous Intraepithelial Lesion (HSIL)	1	0.66
TOTAL	152	100

We notice that the distribution of women with cyto-test within normal limits (Figure 2) and with inflammation smears was almost equal, 46.05% and 49.34% respectively.

Four women over 60-year-old also had smears within normal cytological limits, with various grades of atrophy (Figure 3), corresponding to their age. The assessment of inflammation smears revealed that most of the women had a related inflammation, not otherwise specified (34.21%), while in the case of the other 23 women (15.13%) the inflammation was caused by the presence of fungi microorganisms (Figure 4), *Gardnerella coco-bacillus* and *Trichomonas* parasite (Figure 5).

In a small number of women, the smears revealed reactive benign cellular alterations at the level of the squamous cells, induced by the inflammation, consisting in nuclei hypertrophy and binucleation, on a rich inflammation exudates background.

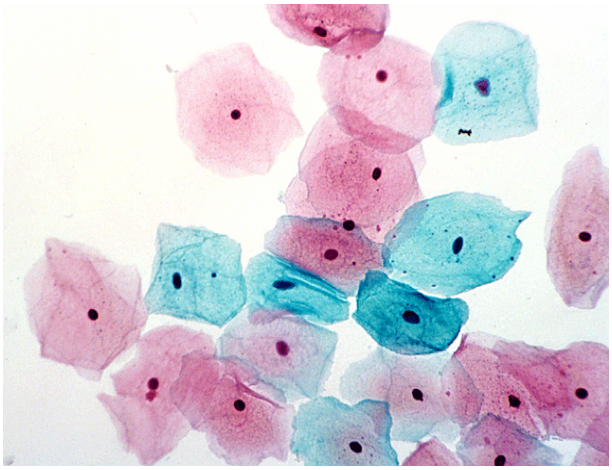

Figure 2 – ***Conventional smear: within normal limits smear (Papanicolaou stain, ×200).***

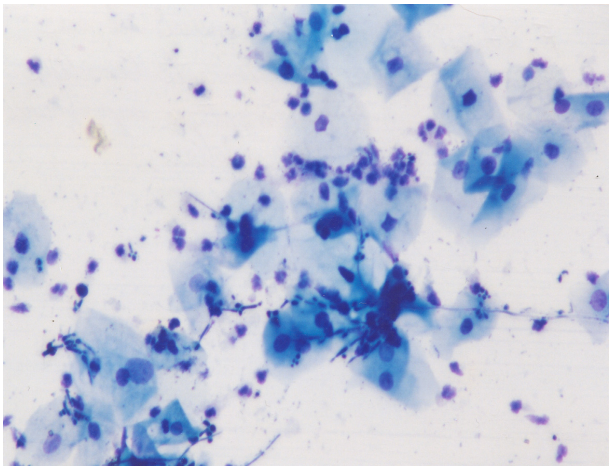

Figure 3 – ***Conventional smear: fungi infection (Papanicolaou stain, ×200).***

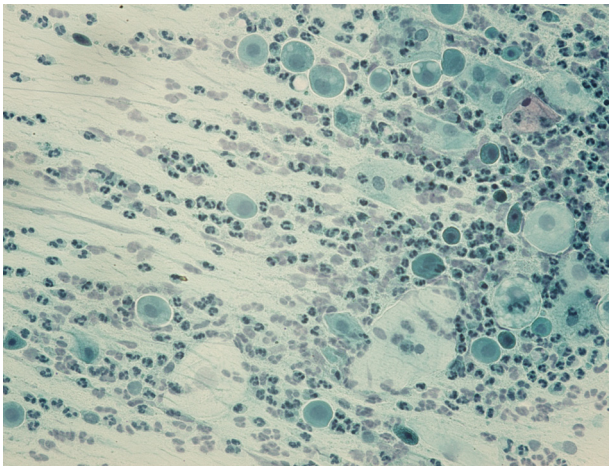

Figure 4 – ***Conventional smear: atrophic smear (Papanicolaou smear, ×200).***

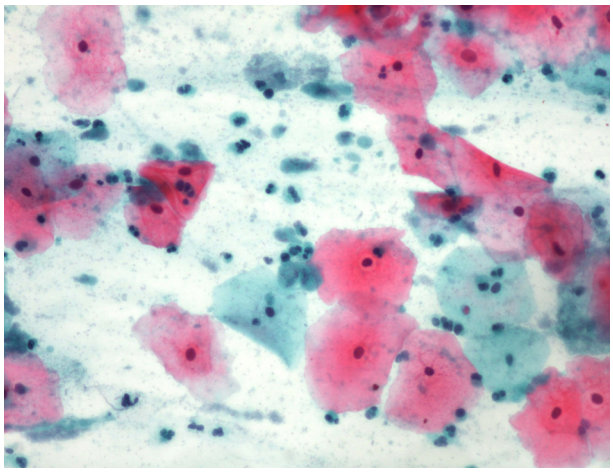

Figure 5 – ***Conventional smear: Trichomonas infection (Papanicolaou stain, ×200).***

Only two women participating in the study revealed squamous epithelial cells lesions on the smears. Therefore, in one patient, the squamous cells revealed alterations induced by HPV infection, consisting of the presence of intermediary squamous cells with dyskaryotic nuclei and the presence of perinuclear clear halo, called koilocytes (Figure 6); in this case, the cytological diagnosis was LSIL–HPV induced atypia. Later on, HPV infection was confirmed through HPV–NA testing, and the patient followed a corresponding antiviral treatment. In the other case, squamous cells alterations were more severe, consisting of the presence of cells coming from marked dyskaryosis deep layers on the smears, on a clean background of the smear, without inflammation exudates, the cytological diagnosis being HSIL. In this case, the woman was sent to a specialized examination for biopsy colposcopy.

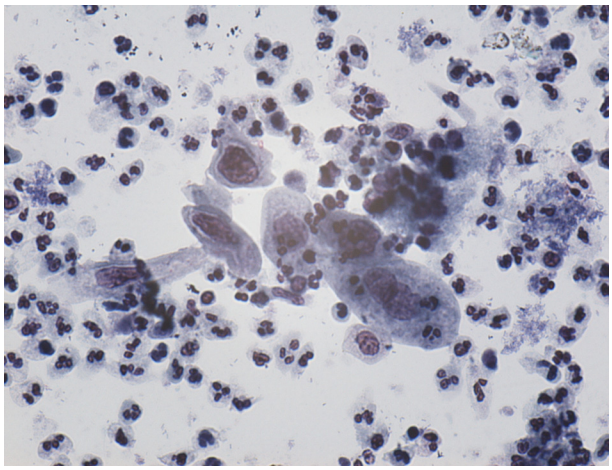

Figure 6 – ***Conventional smear: LSIL–HPV induced atypia (koilocytes) (Papanicolaou stain, ×200).***

Discussion

Perceiving the importance that one's health caring, understanding the fact that a disease diagnosis is possible even in the absence of obvious clinical expressions and acknowledging the efficacy of preventive medical measures are factors that significantly influence population's addressability towards prophylactic medical services and screening tests. In this sense, it is very known that the role the Pap test (a simple, safe and economic test [16]) plays in the early detection of cervical cancer, in improving the prognosis and in reducing mortality caused by this illness [17]. Screening program role in cervical cancer is identifying the women at risk, their periodical examination, at well defined periods of time and providing a suitable treatment for those in which anomalies of the cytological exam were found [18, 19].

Nonetheless, only 27.7% of the women included in this study have done the Pap test for the last three years. The percentage is lower than the ones mentioned in studies performed in Germany (where almost all the 532 questioned women had done at least one test during their life [20]), Italy (70% of the women taking part in the research had done the Pap test for the last three years [14]) or Great Britain, where 80% of the questioned women reported regular performance of the screening test. In this last study, only 2.6% of the participants had never done the test [17], while in the group of this research, the percentage reaches 65.8%; this value exceeds the one mentioned in a research developed in Columbia, where only 13.7% of the questioned women had never done a Pap test [21].

Just like in the case of the routine gynecological exam, the addressability of the women from our sample group for doing a Pap test was significantly influenced by their residence environment, age group and subjects' educational level. Therefore, residing in urban areas (often correlated with a high level of incomes), higher educational level and age below 35-year-old seem to "open" the way for women towards the consulting room for periodic performance of prophylactic medical exams.

These social and economic factors influence detection and evolution of cervical cancer in other European countries as well. In Lithuania, where just like in Romania, mortality because of cervical cancer records high values as compared to the other countries of the European Union, the illness incidence is higher in women from rural areas, as a result of screening programs, inadequate diagnosis and treatment [22]. In England, as well we notice that cervical cancer incidence is maximum among women coming from the poorest layers of the society [23–25]. In Spain (Barcelona), the risk of women without education not to periodically do a routine gynecological exam is three times higher than in the case of women with higher education; in the same sample group, the most important social and demographic variable associated with the periodical performance of a gynecological exam and a Pap test is age, meaning that along with aging, the number of women performing the aforementioned exams decreases [17].

In the USA as well, women's participation in screening programs for early detection of cervical cancer is influenced by social and economic factors [26, 27]; together with these, other barriers are psycho-affective, namely: negative feelings regarding the image of one's body, sexuality and mortality; fear towards a possible positive result of the examination (described by some persons as being bigger than the fear towards a major surgical intervention or a screening test for the Down syndrome performed during the pregnancy);

fear caused by the examination; the feeling of embarrassment, discomfort especially when the physician is a man [19, 28, 29].

The cytological analysis of the smears collected during the Pap test indicated the presence of *Trichomonas* infection especially in women residing in rural areas, while women diagnosed with fungi infection or *Gardnerella* came from urban areas and from rural areas as well. It is known that *Candida* fungi microorganisms are part of the vagina pathogen flora, and the infection is clinically expressed through a characteristic secretion (white secretion, of cheesy aspect) only in some circumstances (depending on the season, in case of body immunity decrease, depending on the related therapy), 40% from women being asimptomatic [30]. *Gardnerella vaginosis* is also frequent in women with full active sexual life, manifesting by vaginitis and cervicitis in one of them [30, 31].

Conclusions

This study has revealed significant differences in relation to women's knowledge fund and attitude towards early detection of cervical cancer through Babeş–Papanicolau test depending on the residence environment, educational level and age.

The differences found between population groups, which are different from social and economic point of view, have to draw attention of the decisional factors from public health field on the need to reduce these inequalities by providing equal accessibility to health services, by developing and implementing new strategies of educational and sanitary intervention in rural communities. Having such small incomes, being poorer, less educated and with no immediate access to specialized medical services because of the distance to them, the lack of transportation means or the services cost, the population from rural areas has a higher risk of failure to take part in preventive medical exams. This is why it has to become the target for the development of efficient prevention and early detection of malign illnesses.

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References

[1] Kerr DJ, Midgley R, *Can we treat cancer for a dollar a day? Guidelines for low-income countries*, N Engl J Med, 2010, 363(9):801–803.

[2] ***, *Anuar de statistică sanitară 2008*, Ministerul Sănătății, Centrul Național pentru Organizarea şi Asigurarea Sistemului Informațional şi Informatic în Domeniul Sănătății, Bucureşti, 2009.

[3] Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM, *GLOBOCAN 2008*, Cancer Incidence and Mortality Worldwide, IARC Cancer Base No. 10, Lyon, France, 2010.

[4] Anttila A, Nieminen P, *Cervical cancer screening programme in Finland with an example on implementing alternative screening methods*, Coll Antropol, 2007, 31 Suppl 2:17–22.

[5] ***, *Cervix cancer screening*, IARC Handbooks of Cancer Prevention, Vol. 10, International Agency for Research on Cancer, World Health Organization, IARC Press, Lyon, 2005.

[6] Hoelund B, *Implementation of liquid-based cytology in the screening programme against cervical cancer in the County of Funen, Denmark, and status for the first year*, Cytopathology, 2003, 14(5):269–274.

[7] Nygård JF, Skare GB, Thoresen SØ, *The cervical cancer screening programme in Norway, 1992–2000: changes in Pap smear coverage and incidence of cervical cancer*, J Med Screen, 2002, 9(2):86–91.

[8] ***, *Annual Review 2007*, NHS Cervical Screening Programme, National Health Service, 2008.

[9] Rebolj M, van Ballegooijen M, Berkers LM, Habbema D, *Monitoring a national cancer prevention program: successful changes in cervical cancer screening in the Netherlands*, Int J Cancer, 2007, 120(4):806–812.

[10] ***, *Cervical screening in Australia 2003–2004*, Cancer Series No. 33, Australian Institute of Health and Welfare, Australian Government Department of Health and Ageing, National Cervical Screening Program, Canberra, 2006.

[11] Dillner J, *Cervical cancer screening in Sweden*, Eur J Cancer, 2000, 36(17):2255–2259.

[12] Ronco G, Giubilato P, Naldoni C, Zorzi M, Anghinoni E, Scalisi A, Dalla Palma P, Zanier L, Barca A, Gaimo MD, Maglietta R, Mancini E, Pizzuti R, Iossa A, Segnan N, Zappa M, *Extension of organised cervical cancer screening programmes in Italy and their process indicators: 2007 activity*, Epidemiol Prev, 2009, 33(3 Suppl 2):41–56.

[13] ***, *European Guidelines for quality assurance in cervical cancer screening*, 2nd edition, International Agency for Research on Cancer, Office for Official Publications of the European Communities, Luxembourg, 2008.

[14] Giorgi Rossi P, Ricciardi A, Cohet C, Palazzo F, Furnari G, Valle S, Largeron N, Federici A, *Epidemiology and costs of cervical cancer screening and cervical dysplasia in Italy*, BMC Public Health, 2009, 9:71.

[15] Canfell K, Sitas F, Beral V, *Cervical cancer in Australia and the United Kingdom: comparison of screening policy and uptake, and cancer incidence and mortality*, Med J Aust, 2006, 185(9):482–486.

[16] Jhala D, Eltoum I, *Barriers to adoption of recent technology in cervical screening*, CytoJournal, 2007, 4:16.

[17] Rohlfs I, Borrell C, Pasarín MI, Plasència A, *The role of sociodemographic factors in preventive practices. The case of cervical and breast cancer*, Eur J Public Health, 1999, 9(4):278–284.

[18] Sriamporn S, Khuhaprema T, Parkin M, *Cervical cancer screening in Thailand: an overview*, J Med Screen, 2006, 13 Suppl 1:S39–S43.

[19] Rieck GC, Tristram A, Hauke A, Fielder H, Fiander AN, *Cervical screening in 20–24-year olds*, J Med Screen, 2006, 13(2):64–71; discussion 62–63.

[20] Klug SJ, Hetzer M, Blettner M, *Screening for breast and cervical cancer in a large German city: participation, motivation and knowledge of risk factors*, Eur J Public Health, 2005, 15(1):70–77.

[21] Chocontá-Piraquive LA, Alvis-Guzman N, De la Hoz-Restrepo F, *How protective is cervical cancer screening against cervical cancer mortality in developing countries? The Colombian case*, BMC Health Serv Res, 2010, 10:270.

[22] Smailyte G, Kurtinaitis J, *Cancer mortality differences among urban and rural residents in Lithuania*, BMC Public Health, 2008, 8:56.

[23] Shack L, Jordan C, Thomson CS, Mak V, Møller H; UK Association of Cancer Registries, *Variation in incidence of breast, lung and cervical cancer and malignant melanoma of skin by socioeconomic group in England*, BMC Cancer, 2008, 8:271.

[24] Currin LG, Jack RH, Linklater KM, Mak V, Møller H, Davies EA, *Inequalities in the incidence of cervical cancer in South East England 2001–2005: an investigation of population risk factors*, BMC Public Health, 2009, 9:62.

[25] Hilton S, Hunt K, *Coverage of Jade Goody's cervical cancer in UK newspapers: a missed opportunity for health promotion?* BMC Public Health, 2010, 10:368.

[26] Ross JS, Nuñez-Smith M, Forsyth BA, Rosenbaum JR, *Racial and ethnic differences in personal cervical cancer screening amongst post-graduate physicians: results from a cross-sectional survey*, BMC Public Health, 2008, 8:378.

[27] Coughlin SS, King J, *Breast and cervical cancer screening among women in metropolitan areas of the United States by county-level commuting time to work and use of public transportation, 2004 and 2006*, BMC Public Health, 2010, 10:146.

[28] Waller J, Bartoszek M, Marlow L, Wardle J, *Barriers to cervical cancer screening attendance in England: a population-based survey*, J Med Screen, 2009, 16(4):199–204.

[29] Samuel PS, Pringle JP, James NW 4th, Fielding SJ, Fairfield KM, *Breast, cervical, and colorectal cancer screening rates amongst female Cambodian, Somali, and Vietnamese immigrants in the USA*, Int J Equity Health, 2009, 8:30.

[30] Ramzy I, Gynecologic infections. In: Ramzy I (ed), *Clinical cytopathology and aspiration biopsy: fundamental principles and practice*, 2nd edition, McGraw–Hill Medical Publishing Division, 2001, 53–72.

[31] Koss LG, Melamed MR, Benign disorders of the uterine cervix and vagina – inflammatory processes of the female genital tract. In: Koss LG, Melamed MR (eds), *Koss' diagnostic cytology and its histopathologic bases*, 5th edition, Lippincott Williams & Wilkins, 2006, 254–281.

Corresponding author

Ileana Prejbeanu, Professor, MD, PhD, Department of Environmental Health, University of Medicine and Pharmacy of Craiova, 2–4 Petru Rareş Street, 200349 Craiova, Romania; Phone +40720–737 153, e-mail: ileana.manuela@yahoo.com

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