

**UNIVERSITY OF PÉCS
FACULTY OF HEALTH SCIENCES
DOCTORAL SCHOOL OF HEALTH SCIENCES**

Head of Doctoral School of Health Sciences: Prof. Dr. József Bódis

Program leader: Prof. Dr. Gábor Kovács L.

Supervisor: Prof. Dr. Imre Boncz



**Evaluation of a pilot program on cervical cancer screening carried out by
health visitors and examination the burden of cervical cancer**

Doctoral (Ph.D.) thesis

Réka Vajda

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1. INTRODUCTION

Cancer is a public health problem worldwide. According to the estimation of International Agency for Research on Cancer (IARC) in all diseases many types of tumour, mainly in case of breast-, lung-, prostate-, cervical cancer- incidence and mortality data are determined by geographical localization. More than half of the newly diagnosed cases and two-thirds of deaths caused by diseases occur in countries with low and average income. Regarding the incidence and death data of neoplastic diseases, significant differences are shown. In Western Europe the number of diseases are higher, whereas in Central and Eastern Europe (CEE) it is the deaths caused by diseases that grow higher. At the same time, in Western Europe there is neither any decreasing tendency in the mortality trend of CCE countries, nor any significant increase in life expectancy. From the mid-1960s, the health condition of the late socialist countries had stagnated or declined, while the health condition of the western countries had been improving constantly. Cervical cancer is a significant public health problem among all neoplastic diseases affecting women. In 2015 it caused 526,000 diseases worldwide and 239,000 deaths. Cervical cancer was the most frequently occurrent neoplastic disease in 11 countries and the most common cause of death in 50 countries. In the same year, by guess it caused a loss that is equivalent with 7 million disability-adjusted life years (DALY), out of which 96% are years of life lost (YLL), 4% reported the years lost due to disability (YLD). In Europe, according to the data of GLOBOCAN, in 2012 the crude incidence rate was 11.4 per 100,000 female population. With this, cervical cancer is the fifth most commonly occurrent malign disease. There are significant differences among mortality rates from countries to countries. Mortality rates are the highest in certain easter European countries (above 6.2/100,000 female population), still in Finland it is barely above 1/100,000 female frequency. It is a generally known fact that deaths caused by neoplastic diseases can be decreased with the help of early recognition and treatment as the most effective method. The cervical cancer screening, fulfilling the expectations against screening tests, is a proven screening method for recognizing the disease in the pre-cancer status. In its 46/2003. (IV. 16) regulation, the parliament accepted a strategic program about introducing organised cervical cancer screening. As a result, the program had started with inviting 25-65 year-old women every three years. In 2009 started the pilot program on cervical cancer screening carried out by health visitors. According to the results of the programs, the health visitors are suitable and capable of swabbing and addressing the

inhabitants. The 49/2004. (V.21.) ESZCSM regulation's 3.§ ac paragraph about regional health visitor service says that the health visitors' former women - protecting tasks include the involvement in the residential targeted screen tests, which was completed by „uterine cervical screening with public health target” 28/2013. (IV.5.) EMMI regulation. This regulation defined that only those health visitors are entitled to do the task who take part in a minimum 40 hour-long further specialization or health care technical specialization. Fulfilling this idea, a program called TÁMOP-6.1.3.A-13/1-2013-0001 had started, which aimed to support the preparation for the health visitor cervical cancer screening in a way to prep the health visitors for taking part cervical cancer prevention in a more active way. The organized screening programs require financial resources. As their expense is significant, they mean plus cost for the health insurance and health care. So it follows that the financial allowances need to be used so that they could result in the maximal health profit. Thanks to examinations, according to the expectations the number of early recognized cases is increasing and the number of advanced cases is reducing. By this, the costs of the required treatments may moderate as well as aftercare and mortality may decrease. Simultaneously, the number of the newly diagnosed cases increases, which require treatment. Besides, over diagnosing creates cost raise, too. Since, treating these cases would not have been required without screening. Whether the expense reduction created by the profit from screening test compensate the actuation costs, can be decided only with an overall examination of the certain tumours and screening methods. The evaluation of these results can be done with the help of health economy analysis. In the Central Eastern European countries the burden of the malignant diseases is higher than in Western Europe. It is because in the area of health care there are limited resources, that is why it is especially important to estimate the cost-effectiveness of each actions during the decision processes.

2. AIMS OF THE STUDY

The central topics of my thesis are to overview the cervical cancer morbidity and mortality indicators, to introduce public health care targeted cervical cancer screening that works among domestic and international policies, to estimate disease burden caused by cervical cancer diseases, as well as to evaluate the quality and performance indicators of the pilot program for cervical cancer screening by health visitors.

I summarize the objective of this thesis as follows:

1. To evaluate the epidemiological situation of cervical cancer, in view of the population's health condition.
2. To introduce the characteristics of cervical cancer screening with the overview and analysis of the domestic and international scientific literature as well as the applied domestic and international practice.
3. In the context of the application titled „Maintenance of extending Pilot like screening programmes (cervical cancer screening carried out by health visitors and colonic-screening programmes)” with TÁMOP-6.1.3.A-13/1-2013-0001 identifying mark, the aim is to evaluate the satisfaction of the health visitors' who applied for a one-day frontal theoretical training for public health care cervical cancer screening service, and to evaluate the instructors, as well as the training materials. Additionally, to establish if the training related knowledge and the organization of the further specialization met the requirements.
4. To analyse the pilot program on cervical cancer screening carried out by health visitors (October 2013-September 15, 2015) qualitative indicators (draft call and appearance rate) and accomplishment indicators (positive result occurrence, squamous cell and glandular epithelial cell cases occurrence rate, HPV and CIN occurrence rate, HPV-prevalence) interrogated from the Communication module's data of the Office of the Chief Medical Officer (OCMO) Screening System.
5. To define how much disease burden it causes annually for the National Health Insurance Fund of Hungary (OEP) to treat the cervical cancer according to the financing database of OEP.

3. DETAILED ANALYSIS

3.1. EPIDEMIOLOGICAL OVERVIEW OF UTERINE CERVICAL CANCER

Cervical cancer is a significant public health. Considering the occurrence of all new neoplastic diseases, according to the WHO data, 14,090,149 diseases were diagnosed **worldwide** in 2012, out of these were 6,663,001 women. The malign mutation of the uterine cervical was discovered in 527,624 cases, so it was on the 3rd place among the most frequently occurrent diseases related to women. The incidence of the disease is non-homogenic on the different parts of the world, significant division can be experienced in point of economic development. In the past 30 years, in those countries where the social and economic situation got better, the occurrence and death data of cervical cancer show decline. However, this is not the case in the developing countries, where it is a leading problem today. Nearly 85% of occurrence of cervical cancer diseases happen in the less developed countries.

In 2012, 3,547,898 women were affected by the death of 8,201,030 neoplastic disease worldwide. For the 7% of these deaths the cervical cancer was responsible, that was on the 4th place in the range of tumours affected women that cause mortality. The proportion of death show similar inequalities to the disease data on the different parts of the world. Significant difference can be experienced between the countries with high, average and low income. In 2012, out of nearly 266,000 deaths 231,000 cases, namely 9 out of 10 women were lost in countries with low or average income. Based on the 5 year-old prevalence value, in 2012 there were about 1.5 million women diagnosed with cervical cancer around the world. Most of the cases happened in the regions with low state of development, which nicely illustrates the increase of the case number resulted from the rising of the incidence. The lowest values of cervical cancer cases for year 2012 can be found in the Middle East, Switzerland and Finland. The highest 5 year-old prevalence values of the disease were observed in the same year in Central East Europe following South East Africa and South America, and in the region of Romania.

In *Europe*, according to the GLOBOCAN data, in 2012 more than 1.5 million women were diagnosed with neoplastic disease. Out of this, 58,373 women were diagnosed with cervical cancer that is 11.4 cases standardized for age for 100,000 women. So, cervical cancer is the 5th most frequently occurrent malign disease in Europe. We can talk about favourable values in the wide regions of West, South and North Europe internationally too.

By contrast, on the eastern part of the continent twice of these rates can be measured. Considering the different age groups, in the 15-44 year-old age group, cervical cancer was the 2nd most frequent type of tumour in 2012 among women, in the WHO European Region. Together with this, regarding the same age group's incidence, cervical cancer was the 2nd in central and southern Europe, the 3rd in northern Europe and only the 4th in western Europe. Like the disease data, the death rates are also different in certain European countries, this difference can be even fivefold. The cervical cancer related burden is much higher in the central European countries than in the southern, northern or western regions. The highest mortality data can be noticed in Romania, the lowest in Malta. According to the 5 year-old prevalence value, in 2012 nearly 200,000 women were diagnosed with cervical cancer, that is the 4.3% of all extant neoplastic diseases. The lowest values can be found in Switzerland, Finland and Cyprus, which are the lowest values worldwide. The highest prevalence, like in the case of the incidence trend as well, was observed in Romania, or rather the occurrence is also high in the region of Lithuania, Serbia and Bulgaria.

In **Hungary**, in 2013, 37,209 new neoplastic diseases were discovered among over 20 year-old female population, where after the malign diseases of breast, bronchus, lung, colon, intestinal and anus, womb, pancreas, ovary, skin and kidney, mutations of uterine cervical were reported with 1,114 newly recognised cases, as the 10th most frequently occurrent disease. According to age group division, a sudden rising can be noticed in the 34-44 year-old age group and the involvement of the 45-54, 55-64 and the 65-74 year-olds is permanently high. Slow decrease can be experienced in the over 75 year-old age group. In 2015, 476 women died of cervical cancer in Hungary, which was the 9th most frequent cause of death among women. Out of this, between 15-34 years-old were 8 women, in the 35-64 years-old age group 271 women, over 65 years-old 197 women lost their lives. Mortality shows significant inequalities, its values will be presented with the help of the standardized mortality ratio (SMR). If the SMR value corresponds with 100%, then in the examined population, mortality is equivalent with the standard population (national average), if it is lower then mortality is more favourable, whereas it is higher, mortality is higher. Based on data from 2013, cervical cancer related mortality SMR value is between 41-138% in Hungary. In the region of Komárom-Esztergom county it is 41%, Tolna county 52% and Nógrád county 60%, the situation is the most favorable, the SMR ratio values are below 60%. The highest values are from Budapest (124%), Baranya county (131%), and Zala county (138%), where the value is higher than 117% in all cases. The

regional mortal inequalities rate is characterized by the Gini coefficient. The index value can change between 0 and 100%: 0, namely the equality is absolute when mortality is equivalent in the examined regions, and 100%, namely the inequality is absolute when mortality happened only in one of the examined regions. Scientific literature interprets Gini value with above 30% as a relatively strong inequality. In our country, on the whole in county level (15.2%) inequality is not so strong. However, we need to give a highlighted attention to those regions where mortality is beyond the national average, with special emphasis of counties that have near half as much mortal values.

3.2. THE SITUATION OF CERVICAL CANCER SCREENING PROGRAMMES IN THE INTERNATIONAL PRACTICE

Introduction: Cervical cancer is a significant public health problem. We can find a close correlation between the death rate and the prevalence of cervical cancer screening. It is a well-known fact that the most effective methods involve early recognition and treatment of the disease. International practice applies two models for screening: One of them is the so called opportunistic screening, the other one is the organized population-based screening.

Aims: The aim of our study is to demonstrate the characteristics of cervical cancer screening and the international practice applied during implementation by the overview and analysis of international literature.

Data and methods: Our publication is a systematic literary overview, which aims to describe and compare the European cervical cancer screening programs.

Results: 22 countries among the 28 EU member states implement or plan cervical cancer screening on a regular basis or as a pilot program. The screening interval is 3-5 years according to the European references, aside from the opportune program of Germany, Czech Republic, Austria, Luxemburg and Greece where it is one year. The national recommendations are also different in relation to the starting age of the screening. In most countries screening are accomplished between aged 25-64, in Finland and the Netherlands until aged 30-60. In Austria and Germany it is over age 20, whereas in Luxemburg swabbing is already accomplished from the age of 15. According to the screening intervals and the age of the screened-to-be people, the number of swabbing during a lifetime is 6-8 in the region of Finland, Ireland and the Netherlands, 12-18 in most European countries, but it could be even 50 as it is in Austria, Germany, and Luxemburg. The examination is carried out most frequently with a traditional cytological sampling (Papanicolaou test).

Fluid phase cytology is used only in Denmark, Ireland and the UK. Swabbing is done by nurses, trained surgeon' assistants and health visitors besides medical specialists. Well-organized programs have achieved significant results in the reduction of mortality and morbidity rates of cervical cancer in North and West European countries.

Conclusion: The current gynecological cancer screening in our country reflects the effective functioning of organized screening system, but the introduction of the screening program led by the health visitors may cause significant change in this practice. Health visitors' involvement may approach international practice. Regarding the screening strategy, definition of the age of the target population, the interval and method of screening differs from country to country. According to IARC's view, the HPV-DNA test can be used independently of the cellular assay. It can be regarded as a primary screening feasibility, but the present recommendations of the member states owing screening programs are necessary.

3.3. ASSESSMENT OF THE PILOT PROGRAM FOR CERVICAL CANCER SCREENING BY HEALTH VISITORS

Introduction: Within the tender (6.1.3.A-13/1-2013-0001) supported by the European Union, we wished to involve health visitors into the organized cervical cancer screening program.

Aims: The aim of our survey was to assess the satisfaction of health visitors, instructors, and that of the teaching aids. Furthermore, we wished to assess whether the teaching materials met the expectations.

Data and methods: Satisfaction of the health visitors was assessed by a survey, in four groups of questions. These involved the assessment of the instructors, the teaching aids, evaluation of the further training day, and the compliance with the knowledge of training. Period for completion of the questionnaires lasted from October to December in 2014. We used descriptive statistics for data evaluation.

Results Data of 2,148 health visitors was evaluated. They rated the performance of gynecologist-obstetricians 4.65, that of health visitors 4.61, that of public health professionals 4.56, and that of IT specialists 4.52. (Figure 1) 98% of the teaching aids were useful for them and the acquired knowledge was appropriate with their expectations.

Conclusion: The health visitors were satisfied with the theoretical instruction within the pilot program. The professionally well prepared health visitors may contribute to the success of the cervical cancer screening program.

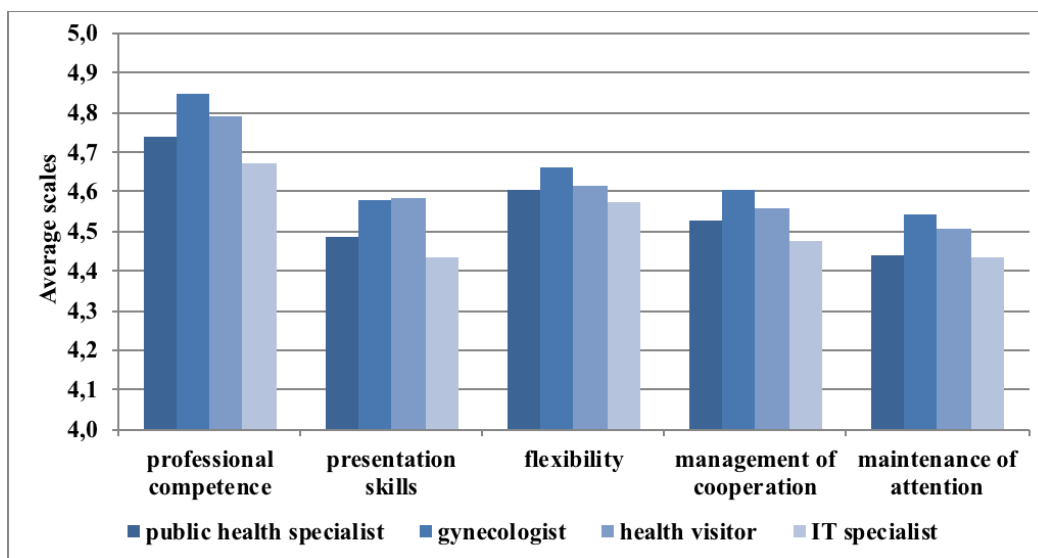


Figure 1. Evaluation of the work of professionals (n=1,927)

3.4. QUALITY AND PERFORMANCE INDICATORS OF THE PILOT PROGRAM FOR CERVICAL CANCER SCREENING BY HEALTH VISITORS

Introduction: Evaluating the performance and effectiveness of the screening activity is particularly important. The performance indicators are provided an indirect evaluation of the effect of the screening program and control of the screening process.

Aims: The aim of our analysis was the assessment of the qualitative and performance indicators of a pilot program for health visitors' cervical cancer screening.

Data and methods: The analysis involved the data from the Communication module of the Office of the National Chief Medical Officer. In the examined period (October, 2013 – September, 2015) the participation indicators of women aged 25–65, the prevalence rates of human papillomavirus and the cervical intraepithelial neoplasia were determined.

Results: In the screening period, the call-in rate was 32.45% nationally, with the compliance of 8.26%. (Table 1) The occurrence of a positive result was 1.85% nationally, with the highest rate in Hajdú-Bihar county (7.24%). HPV infection was detected in 113 cases (0.45%) nationally, HPV prevalence was 37.44/100,000 female. (Figure 2)

Indicator	National values
Target population; aged 25-65 years (2015)	930,058
Number of invitation letters	301,830
<i>Screening invitation rate (%)</i>	32.45
Number of women who participated in screening	24 926
<i>Screening participation rate (%)</i>	8.26
Positive findings (cases)	461
<i>Positive findings rate (positive findings/total screening) (%)</i>	1.85
HPV positive findings (cases)	113
<i>HPV prevalence rate compared to screening (%)</i>	0.45

Table 1. Results of the pilot program for cervical cancer screening by health visitors (2013-2015)

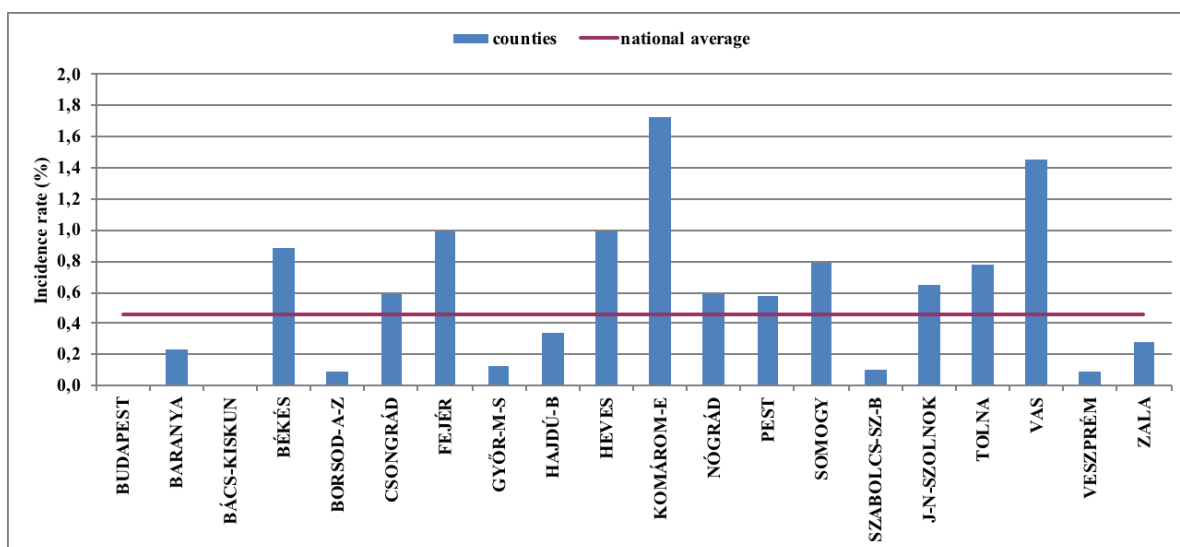


Figure 2. HPV positive findings compared to screening (n=24,926)

Conclusion: The willingness for participation among women was low concerning the indicators. Their raising should be an emphasized task for public health in favor of reducing mortality from morbidities.

3.5. EXAMINATION OF HEALTH INSURANCE DISEASE BURDEN CAUSED BY CERVICAL CANCER IN HUNGARY

Introduction: Malign diseases burden is much higher in the Central Eastern European countries than in Western Europe because there are limited health care sources in the area. That is why it is especially important to evaluate the cost-effectiveness of certain actions during the decision making processes.

Aims: The aim of our analysis is to define the annual cervical tumours disease burden for the National Health Insurance Fund of Hungary.

Data and methods: Our analysis was made according to the National Health Insurance Fund of Hungary (OEP) database, with data from 2014, which covers all service providers and maintenance forms financed by the OEP. We analysed the in situ (D06), the malign (D26.0) and the malign (C53) cervical tumours. Technical costs include the costs of out-patient care, acute and chronic inpatient care, home nursing care, CT/MR, PET, laboratory examinations, transportation, subsidies of medicine prices and medical devices prices.

Results: In 2014 the OEP spent 1.05 billion Hungarian forint on the treatment of cervical tumours. The patients, most of the cases and the financing (96.9%) were paid out in apropos of the people treated with malign cervical tumours. The highest expense item appears in the active hospitalized speciality management, annually 700.9 million HUF (66.6%) (Table 2)

	Cervical cancer (in situ)	Cervical cancer (benign)	Cervical cancer (malign)	TOTAL (HUF)	Distribution (%)
Out-patient care	3,700,352	326,779	54,820,325	58,847,456	6.0
Acute inpatient care	21,644,327	367,319	678,866,214	700,877,859	66.0
Chronic inpatient care	0	0	17,912,881	17,912,881	2.0
CT	3,171,593	597,016	104,824,616	108,593,225	10.0
Lab	373,113	51,280	2,880,879	3,305,272	0.0
Transportation	537,634	28,079	39,681,987	40,247,700	4.0
Home nursing care	0	0	1,270,610	1,270,610	0.0
PET	0	0	84,187	84,187	0.0
Subsidies of medicine	274,251	788,117	91,060,812	92,123,179	9.0
Medical devices	10,150	0	21,719,553	21,729,703	2.0
TOTAL	30,972,718	2,163,356	1,019,942,214	1,053,078,287	100

Table 2. Health insurance treatment cost of cervical cancer (2014)

Conclusion: Comparing the disease burden data of 2001 and 2014, the treatment costs related to cervical cancer tumours increased merely with 1%. At the same time, there were not any significant changes in the number of mortality set between 2000 and 2015.

4. DISCUSSION

The national mortality trend ensuing from tumours is basically unfavorable, in which the regional inequalities somehow have decreased, however, the results call the attention to the necessity of further interventions. Effective improvement can be expected from the proper application level of screening examinations, which is available in Hungary. On the other hand, the participation rate and the trend of the outlet mortality indexes is unfavorable. Even though the case number of mortality is decreasing with a few individuals year by year, it is still very high compared to the European data but our fallback is getting more and more intensive. It is important to emphasize that the merely the assessment of the mortality data is not enough in most cases to create the fund for the actual intervention. Since, this does not provide new knowledge about the etological factors of the disease for the decisionmakers. It is essential to have knowledge about the factors affecting the formation of diseases, as well. Supposedly, in the set of participation rate, women's inadequate health cultivation and their individual responsibility measure as well as their socio-economic situation related to their qualification, and their access to health services' growing differences determine the epidemiological situation. Hence, the wide spread and acceptance of the pilot program on cervical cancer screening carried out by health visitors is an accentuated public health question. Since, escalating the effectiveness of preventive treatment among the socially-economically underprivileged population group, who live in problematic regions, can be carried out with regular participation in screening tests, and the regional health visitors' active work. In view of the data, the regular control, analysis and assessment of the counties with mending tendency can help to develop a good practice nationwide. Its elements can be translated into regions with lower indexes and this could lead to improvement.

Apropos of overviewing the characteristics of the European screening action, it can be stated that the Hungarian screening program comes true tunefully with the European guidelines. At the same time, from the side of effectiveness it would be practical to boost the participation rates. In the northern and western European countries, in relation to the results of the well-organized programs that have been working for a long time, in Hungary they can be reached hard because of the gynecological cancer screening that sets back the effective working of the organized screening system. It is required to refer to the previously mentioned opportunity fully comprehensive use that is the introduction of the health visitor screening program. In relation with improving the effectiveness of the

program, the invited people's knowledge is of high priority. Since, awareness can help the fight against the factors related to the formation of disease or fears about screening, so it can increase the willingness of participation. Besides, it is necessary for the profession to consider the introduction of the new screening methods. As, according to the IARC the HPV-DNA examination can be applied individually as a screening opportunity, without cell examination.

The program with TAMOP-6.1.3.A-13/1-2013-0001 identifying mark aimed to support the preparation for the use of cervical cancer screening carried out by health visitors in a way to prepare the health visitors to take part in the prevention of cervical cancer in a more active form. Connected with this, we carried out the assessment of the shared questionnaires at the further specializations organized by OTH, in which the question groups were related to the assessment of the participated health visitors' satisfaction. On the basis of the results we can talk about an intense satisfaction on their part. On the one hand, it justifies the vocation of experts, their interests towards the improvement of the screening action's results. On the other hand, it exemplifies the skill and enthusiasm of the health visitors referring to the solution of the relevant problem. To reach the result, tendency of the „receiver” and „supply side” are required. Importing the health visitor cervical screening action means a significant help to complete the traditional gynecological cancer screening. With this, it aims to reach the target population's (aged 25-65) part, who did not take part in the screening examination 3 years ago and they live in the health visitor's district. With their action there can be hope for taking people, who live in the underprivileged areas, to the health visitor screening. This can lead to significant decrease in mortality with the access to adequate coverage in the long run.

The assessment of the screening results is unique in a way that we do not have any knowledge about the assessment of so many swab results in domestic reference. 24,926 women were swabbed and their results were assessed. 461 samples were positive, which projects effective curing chances through recognition in time. If we consider that less than 9% of the invited women took part in the screening, and 461 were recognized, their treatment were started, so its significance is unquestionable. In order of magnitude, health visitor screening program could raise so many women as lose their lives yearly because of the disease in Hungary. Among the quality indicators, HPV prevalence comes into analysis and in our investigation its value showed 0.04% (37.44/100,000 female) that is significantly under the previous inland examinations' and worldwide values. One of its reasons can be the different methodology of swabbing process and HPV demonstration.

According to the first HPV centre's results, between 2007 and 2011, 55% of patients applied for polyclinic were shown to have any genotype DNS of the virus. As the results of another domestic examination, in which samples were assessed, three of capital and one from clinic in Szeged, 193 of the 1,100 tested were HPV positive. This occurrence frequency also exceeds values in our survey. The occurrence of infection, among women, without the malign mutation of uterine cervical is 11-12% worldwide. A higher frequency value can be noticed in the regions of Black Africa (24%), Eastern Europe (21%), Korea (16.7%) and Latin America (16%). So, it can be seen well that the burden caused by the occurrence of HPV infection, is significantly different worldwide that can be coherent with the screening programs used in certain regions, the available vaccination programs against HPV and HPV screening. The higher occurrence rates highlight the necessity of such programs and significance of their maintenance in the near future, mainly because the organized cervical screening is not a solved problem in Hungary. The appearance at screening is mainly opportune, vaccination against HPV is voluntary. That is why it is so important that the population have competent information about HPV infection and its potential consequences, prospect of its prevention because low- level knowledge can create an obstacle towards the effectiveness of either vaccination or screening programs.

We do not know anything about whether a summary survey has been made since Imre Boncz and his collaborators' publication appeared in 2003 about the health insurance burden of cervical cancer in Hungary. Then results (2001) said that the treatment costs of cervical tumours were 1 billion HUF. In 2008, in their conference presentation, Ágnes Brandtmüller and her collaborators estimated the health treatment costs an annual 1.44 billion HUF. This estimation was carried out according to the OEP financing database, considering the out-patient care, acute and chronic outpatient-care, diagnostic costs for CT/MRI, besides the reported achievements for the relevant BNO codes, between the period of 1st January 2004 and 31st December 2004. Their analysis did not mention the indirect health and social costs.

5. NOVEL FINDINGS AND PRACTICAL APPLICATIONS

Our investigations presented in this thesis include several new results and practical applications, which are summarized as follows:

New findings:

1. We assessed how the health state of the central and East European citizens changed due to the social changes of the 1990s and between 1999 and 2010 compared to the 15 EU countries and in the view of the prospective lifespan and potentially lost years.
2. We introduced the regional inequalities according to the morbidity of cervical cancer and mortality data, comparing to the results of the health visitor screening actions.
3. We created numerical data on a sample with 1,927 person about the satisfaction of the one day long frontal theoretical training for health visitors who applied for the TÁMOP project, as well as on the assessment of the instructors, and the training materials. Moreover, we defined how the knowledge, given during the training, met the specialists' requirements. Our analysis is unique from the viewpoint that there has never been such an assessment form before evaluating the health visitors' satisfaction who achieved the theoretical training.
4. We defined the achievement of health visitor pilot cervical screening program and its indicators according to the results of 24,926 women swabbing who took part in health visitors cervical screening. As we know now, similar assessment has not been created before in Hungary. We also evaluated the involvement frequency, proportion of positive cases and CIN occurrence as well as HPV prevalence value according to the pilot program results.
5. We analysed how much disease burden the treatment of cervical cancer mean to the OEP.
6. We made the comparative analysis between the yearly health insurance treatment costs for cervical tumours and the previous data.

Practical applications:

1. It has been stated that we recommend the performance of certain screening protocol as a solution for regional inequalities.
2. In Hungary screening program is available for women meeting all requirements, still the appearance tendency is extremely low. To improve this situation, it is necessary to broaden the knowledge for women and their health consciousness must be enhanced
3. In view of health visitors' satisfaction, their active application into screening action can be recommended, elaboration of further specialization program needs to be done for creating up-to-date workmanship with spreading the knowledge.
4. We recommend to create a database for swabbing results with the aim of HPV standardization data collection and to define prevalence values.
5. The calculated disease burden has not changed in essence between 2001 and 2014, which calls attention to the importance of the new health care technological applications.
6. Our investigations' results significantly consent to the overview of the cervical cancer epidemiological references and the organized screening in Hungary, recognizing the extension of the cervical cancer screening by the health visitors, interpreting the qualitative and efficiency indicators, and thereby promoting its further actuation and development.

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