

SHORT THESIS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (PhD)

Role of primary health care in increasing the effectiveness of cervical screening

Written by: Anikó Gyulai

Supervisor:

Zoltán Vokó MD PhD DSc



UNIVERSITY OF DEBRECEN
DOCTORAL SCHOOL OF HEALTH SCIENCES

DEBRECEN, 2019

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By Anikó Gyulai

Supervisor: Prof. Zoltán Vokó MD PhD DSc

Doctoral School of Health Sciences, University of Debrecen

Head of the **Examination Committee**: Prof. Margit Balázs MSc, PhD, DSc

Members of the Examination Committee: Prof. Róbert Póka MD, PhD, DSc
András Terebessy MD, PhD

The Examination takes place at the 2nd floor room 205. of the Public Health Research Institute, University of Debrecen, 11:00 AM, July 16, 2020.

Head of the **Defence Committee**: Prof. Margit Balázs MSc, PhD, DSc

Reviewers: Prof. Imre Boncz MD, PhD
Prof. Imre Rurik MD, PhD, DSc

Members of the Defence Committee: Prof. Róbert Póka MD, PhD, DSc
András Terebessy MD, PhD

The PhD Defence takes place at In Vitro Diagnostic Centre, Faculty of Medicine, University of Debrecen, 13:00, July 16, 2020.

1. INTRODUCTION

Cervical cancer mortality is a disease that can be prevented by public health interventions. In international comparison cervical cancer mortality is very high in Hungary. The relative risk of cervical cancer deaths of is twice in Hungarian women as the average in the 28 countries of the European Union. In Hungary, the organized population-based screening program which was introduced in 2003 was not able to significantly improve the disease specific mortality. So far the experience of organized screening shows that the participation of the Hungarian female population in cervical screening is inadequate. Primary health care historically plays an important role in public health. Its tasks include health education, health communication, prevention and control. In Hungary, the practice of cervical cancer prevention has been done by gynecologists, and the primary care was less involved in it. As general practitioners are closer to the population and they are respected, trustworthy members of the local community they can have a key role in health communication, including mobilization of the population to participate in screening programs.

In order to increase access to cervical cancer screening, the inclusion of primary care, including health visitors in the screening process has begun in recent years as well as nationwide extension of cervical cancer screening has been also done by health visitors. Not every health visitor accepts this new competency. Only 23% of the trained health visitors (326 trained health visitors out of 1383) participated in the screening, two years after the establishment of the conditions of the national extension according to the information that was provided by the National Health Insurance Fund (NHIF) in July 2017. Cervical cancer screening is a new service which has not been inserted in the working time of the health visitors.

2. AIMS

The dissertation was based on three research project, the first examined the target population of cervical cancer screening and the other two investigated those who work in primary care, one of them was about general practitioners and the other was about health visitors.

- Aim of the survey, which was based on the population, was to explore the knowledge about cervical cancer and prevention, as well as attitudes and practices related to the screening of women who are about 25-65 years old and who belong to the target age group. Our goal was to gain information about the factors that determine the participation in screening of the Hungarian female population. This will make it possible to identify those population groups that are less likely to or do not use screening at all.
- In our study we developed a screening model program, and implemented it in order to examine to what extent the motivation of the female population for cervical cancer screening could be increased when general practitioners were involved in health communications that was related to screening.
- The aim of the health visitors' study was to explore the motivation and opinion of health visitors who were involved in the preparation (training) in cervical screening. Our further aim was to find out the time and work schedule of screening activity among health visitors who has some experiences in screening and to identify factors that influence the effectiveness and efficiency of cervical cancer screening.

3. METHODS

Design of the studies:

1. Questionnaire health survey that is based on a representative sample of 25-65-year-old women in general practitioners' practices who participate in the General Practitioners' Morbidity Sentinel Station Program (GPMSSP).
2. Screening pilot program in Zala County.
3. Questionnaire survey conducted among health visitors who took part in preparation for public health cervical cancer screening.

Methodology of the Population Survey and Screening Model Program in Zala County

Study population, sampling: The target population the survey was the female population of age between 25-65 years of the 11 Hungarian counties (Baranya, Bács-Kiskun, Borsod-Abaúj-Zemplén, Győr-Moson-Sopron, Hajdú-Bihar, Heves, Jász-Nagykun-Szolnok, Komárom-Esztergom, Nógrád, Szabolcs-Szatmár-Bereg and Zala County). Its source population was the female population who were at age 25-65 years old from 11 counties and belonged to 96 practices of General Practitioners Morbidity Sentinel Station Program (89 from 10 counties and 7 from Zala County).

The study population was randomly selected from the source population. The sampling frame of the study was made up a total of 54 562 women in the practice of 89 family doctors from 10 counties (all of them are GPMSSP counties with the exception of Zala County). In the first step of the multi-stage sampling we have established the size of samples as per county on the basis of the female population of age between 25-65 years of the counties initiated in the assessment. In the second stage we have determined in a given county – on the basis of the number of women of 25-65 years of age belonging to the practice of the GP implied in the GPMSSP – the practice-specific sample size. In the third step we have selected by circular random sampling 1,306 people.

Sampling of the intervention model program: The sub-sample of the intervention model program of 2000 women has been selected from women aged 25-65 years, registered in participating GP practices in Zala county. Thus the total sample of the survey had a sample size of 3306 women selected from 11 GPMSSP counties.

As women who live in Zala County were overrepresented in the sample population, we made correction during the analysis and calculated weighted estimates for the age distribution of women in the 11 counties.

The questionnaire tool

Data collection was made by using a self-completed questionnaire in the survey that we ourselves developed and were sent to all participants through their general practitioners.

The data collection covered the following topics:

- demographic and economic characteristics: age, education, type of settlement, income, employment
- health: perceived health status, functionality, gynaecological diseases
- lifestyle: exercise, nutritional status, smoking habits, sexual behaviour
- information and knowledge of the symptoms, treatment and prevention of cervical cancer
- taking part in gynaecological care: frequency of taking part in gynaecological care whether they are informed about the results of the screening tests that was carried out
- taking part in the organized cervical screening: if they received an invitation letter to cervical screening, participated in it, got the result of the test, why they did not participate, who they ask and received information from about the screening
- opinion about vaccination: whether they ask about cervical cancer vaccination, and if yes under what conditions

The screening model program

The screening model program had two parts. In the first part we used that questionnaire which had been used in the national survey. After getting them back we processed the data and selected those women, who had not participated in cervical cancer screening in three years before our study and who lived in Zala County. At the time of sample selection, we selected 88 women out of the 634 women who had agreed to take part in the screening model program in Zala County and who had not participated in a cervical cancer screening in the previous three years or who had never ever had a cervical screening test.

In the second part of the model program, data were collected about GPs' activity (how the GP tried to previously non-participating women to participate in the screening). The women's participation in the screening program was monitored by the registries of the cytological laboratories in the county.

In the course of the implementation of the screening model program, the same methodology was used for all the 88 people as it is defined in the protocol.

Statistical and analytical methods

In our studies, univariate analyses were performed to estimate the population values of the parameters under study. We calculated the weighted estimates according to the age distribution of women in the 11 counties. In addition to population estimates, we used Pearson's chi square test to examine the strength of relationships between some categorical variables. The result was considered statistically significant at $p < 0.05$. Using a logistic regression model, association analysis was performed. We examined the association between taking part in screening, socio-economic factors (age, family status, education, employment, equivalent income of households, size of the settlement) and lifestyle (smoking, exercise, nutritional status, number of sexual partners). In the course of the analysis, the STATA statistical package was used to determine the 95% confidence interval (CI) of the prevalence estimates.

Methodology of the health visitor study

Sample of health visitor survey

The source population of the survey were health visitors. According to medical records of health workers, the number of graduated health visitors was 5290 in Hungary in 2015. In the sample of the survey we selected those nurses who took part in the training that title was “Preparing Health Visitors for Taking Smear Test” (there were 2380 people from the country). The survey was complete, all 2380 health visitors were involved, who had the above mentioned selection criteria.

Method and questionnaire tool of the health visitor survey

In our study an online questionnaire survey was carried out among the health visitors (2380 people) who had already participated in the preparation (training) of cervical cancer screening. The questionnaire was self-developed, and it had two parts and it branched in one place. The intention to participate in the screening was asked for all respondents but data about how much time it took and how it fitted to the work schedule and the attitude and their opinion about how to perform screening, were only asked from those health visitors who had already had screening experience.

Data were collected about the following topics:

For all respondents:

- Demographic characteristics, characteristics of the health visitor's district: age, years they worked as health visitors, how many people they were taking care of, the type of their districts, number of attached settlements, substitution.
- Practical experience of cervical cancer screening as a health visitor: if she has ever been involved in it, or she is currently participating, if not, whether she is planning to enter in the program. If she does not want to enter in it in the future, what were the reasons for it.

Only for those who had had screening experience:

- How much time was spent on cervical cancer screening: how much time is spent on all the duties about a woman to screen (visiting, counselling, documentation, etc.), how much time women counselling take, and how many smear tests are done per month, how she fitted the screening activity into her work schedule
- In the case of questions about the professional attitude and opinion on cervical screening, the following groups of questions were included:
 - Motivational Factors: Which factors motivated you to apply for cervical screening?
 - The effectiveness of the cervical cancer screening activity of the health visitor, and the factors that affect the effectiveness that were based on the opinion of the health visitors who took part in the screening.
 - Support: Who and to what extent are you supported in the screening activities?
 - Positive experiences: The development of personal effectiveness. What kind of positive experiences have you had during the screening activity?

Statistical methods

Descriptive epidemiology method was used in the data processing, frequency estimates, averages, standard deviation, etc. were calculated. In case of frequency values, the 95% confidence interval (CI) was estimated, as well. The distribution of categorical variables were compared with a chi-square test, whereas continuous variables by two sample t tests.

A factor analysis of attitudinal data was performed to reduce the number of variables. We characterized the interdependencies and relationships between the original variables with complex indicators (factors), and to identify the non-measurable background variables. In order to examine the participation of the health visitors in the screening, the differences between the factor averages of the health visitors who previously had done screening and those who were doing it at the time of the survey were also examined with two sample t tests. Factors that influence the positive experiences of health visitors for screening were analysed by linear regression.

The analysis of the health visitors' examined data was performed by SPSS (SPSS Statistical Package for the Social Sciences, 22.0 IBM Corp., Armonk, NY, USA).

4. RESULTS

Results of the population survey

Regarding the effectiveness of data collection, it can be stated that Of the 3306 questionnaires 1539 pieces (47%) were returned.

Estimated characteristics of the target population

Univariate analyses were performed to estimate the population value of the tested characteristics. The average age of women in the target population was 45.6 years (SD: 11.4), 76% of the population of the 11 examined counties lived in partnership (CI: 73-79). In terms of their education it can be said that the majority of women (72%) had at most a high school education, many of them (21% CI: 18-24) performed only up to primary school. 59% (CI: 55-63) of women worked or studied, 22 % of women were pensioners or disabled pensioners and 5% of them were unemployed, others lived on social and other benefits. More than half of the target population (63%) lived in settlements with fewer than 10,000 inhabitants, many of them in settlements with fewer than 1,000 a population of 14% (CI:12-17). In terms of lifestyle factors, almost every third woman (29%) smoked, from them, 21% (CI: 18-25) smoked 20

cigarettes a day, another 8% (CI: 6-10) smoked more, so they were heavy smokers. 40% of women did less than 150 minutes exercises in a week (CI: 36-44). According to their body mass index, 56% of them were overweight (33% CI: 30-37) or obese (23% CI: 20-26). Most women (79% CI: 76-81) had sexual relationship with one partner within a year before the study, 19% of them did not have sexual relationship and 3% had two or more sexual relationships within a year (CI: 2-4).

Characteristics of the female population's participation in screening

We examined the participation rate of the female population in cervical screening in the 11 counties and found that the screening coverage within one year was 45% (CI: 42-47). 29% of them participated in screening more than a year before but within three years (CI: 26-31). Based on these, it can be stated that 74% of the target population (CI: 70-77) had a cytology (within or outside organized screening) within 3 years before data collection (three-year coverage). 19% of women were screened more than 3 years before (CI: 17-20) and 6% were never screened (CI: 5-7). 35% (CI: 32-37) of 25-65 years old women in 11 counties received invitations for organized cervical cancer screening, from whom 54% (CI: 49-57) took part in the free screening test. One-third (32% CI: 23-43) of those participated in organized cervical cancer screening of who had never had a screening had before 15% (CI: 5.4-35) and of those who did not see gynaecologists within two years. In contrast, 80% of women (CI: 70-86) participated in organized screening, who regularly (annually) attend a gynaecologist. The difference was statistically significant ($p < 10^{-3}$).

The relationship between participating in screening and socio-economic and lifestyle factors

Using a logistic regression model, an association analysis was performed. The multivariate analysis made it possible to analyze the impact of several explanatory features on a given factor by separating their effects on each other. In the estimation of the odds ratio of the effect of an explanatory factor, the effect of the other factors in the model was eliminated by the applied logistic regression. We examined the relationship between participation in screening (3-year coverage) and socio-economic factors and lifestyle. Among socio-economic factors, the effect of age, marital status, education, employment, household equivalent income and settlement size, lifestyle factors including smoking, exercise, nutrition (BMI), and sexual activity (number of sexual partners within a year) were tested.

After correcting each of the factors for each others, we found that age over 45 years significantly reduced the rate of participating in screening ($p < 0.05$). Eliminating the effects of other factors, higher household equivalents significantly increased their willingness to participate in screening. There was a double chance of appearing in screening of those who belonged to the two middle income category (adjusted odds ratio: 2.13 CI: 1,19-3,80, and 1.93 CI: 1,08-3,44), while those with the highest quartile had almost four times more chance (3.76 CI: 1.86-7.61) than those in the lowest income category (<70 656 HUF). In the case of employment, we found that pensioners had 60% less chance (adjusted odds ratio 0.41 (CI: 0.20-0.84) than the active workers and students. In terms of settlement size, people living in a county seat had greater chance of being screened than those who lived in smaller settlements. Those who lived in settlements with less than 10,000 inhabitants had nearly 40% less (adjusted odds ratio of 0.58 CI: 0.33-1.00) chance to participate in the screening ($p = 0.04$) than in the county seats.

In case of the lifestyle factors, only heavy smoking reduced (adjusted odds ratio: 0.39 CI: 0.20-0.78) ($p = 0.01$) the willingness to participate in screening compared to non-smokers. We examined how the general opinion of the female population about screening was related to their participation in screening.

The results showed that nearly every 5th women (22% CI: 18-26) were left out of cervical cancer screening among those who generally considered it important to participate in screening tests, at the same time, two thirds (66% CI: 60-72) of women who took part in the screening did not consider it was necessary to participate in screening.

About 42% (95% CI: 38-46%) of the target population asked or looked for information about the screening. We examined whether they talked to their gynaecologists, general practitioners and nurses about cervical screening. During the analysis, we reduced the number of respondents to those who had seen a gynaecologist, a general practitioner, and knew her health visitor. According to the results, most of the women talked to the gynaecologist (54% CI: 50-58) about screening, that was followed by the health visitor who informed 28% of women (CI: 22-34) without being asked, and additionally 12% (CI: 9-18) were informed when they asked for information from the health visitor. General practitioners took part the least in health-related communication about screening. 70% of women did not talk to their GP about cervical screening (70% CI: 66-73). In the analysis of the opinion of the population about the cervical smear taking by health visitors, we found that 39% of the target population (CI: 36-43) would make the cytology smear test if it was done by their health visitors. 36% of women (CI: 33-40) preferred her own private gynaecologist and 20% of women (CI: 17-23) would see a gynaecologist in the hospital.

Results of the screening model program

The questionnaire that was used in the national survey was also applied among the respondents in Zala County (634 persons). After processing the questionnaires, we selected those who did not participate in the screening test (88 persons) within 3 years before the study. In Zala County, the average age of participants in screening within 3 years was 8 years younger, the household income was significantly higher, and typically there was also a higher rate of education and employment among them than among those who did not take part in the screening. As a result of the screening model program, 88 people (27%, CI: 18-38) participated in the cytology examination at the end of the program of those who otherwise would not have utilized it. In 17 cases the GP's personal invitation letter was enough to motivate them, and in 7 more cases, the GP reminded and convinced women by phone or personally to take part in the screening.

Results of the health visitor's survey

All together 485 questionnaires were returned, that represents 20% of 2380 people.

General characteristics of respondents

The average age of the participating health visitors was 43 years (SD: 8.8), and they had worked as health visitor on average for 20 years (SD: 9.7). More than one-third (151 people) of them did replacement work from which 76% (CI: 69-82) served as long-term substitution that was for more than a month. 87% of the participants worked on fields, while others (13% CI: 10-17) in schools, hospitals or they were leaders. 47% of the health visitors (CI: 43-51) worked in villages or in smaller settlements during data collection. A health visitor took care on average of 160 people (SD: 3.4). Of these 142 (SD: 3,0) were 0-7 years old and almost one third of them (29,5 SD: 1,3) required special care.

Study of the willingness of the health visitors to perform cervical screening

The study was performed with the involvement of health visitors who worked on fields at the time of data collection (416 people). 57% of them did not take part in the screening (CI: 53-62) when the data were collected, and were not considering it, 20% currently was were not involved in the screening, but was planning to do it (CI: 16-24) and 23% (CI: 19-28) participated in the screening.

In further analysis, we merged the group of health visitors who performed and those who planned to enter the programme (n=178 people). Those who did not want to take part in the screening program was called screening rejecting health visitors (n=238 people). We found that screening willingness was the highest (69%) among health visitors who worked in a small village and the lowest was the acceptance of screening activity among those who worked in the capital (1.7%).

We also tested the acceptance of screening as a function of the demographic characteristics of the health visitors (age, number of years they worked as health visitors), as well as some of the characteristics of the area where they worked (number of connected settlements, number people who belong to one health visitor). We found that there was no difference between the average age of the health visitors and the average number of years they spent in this profession between health visitors who accepted and rejected participating in the screening. However, the numbers of fields of those health visitors who accepted taking part in screening was significantly higher ($p < 10^{-2}$), and the number of caregivers (all people, pregnant, 0-7 years old) with which they have been admitted is significantly lower ($p < 10^{-2}$).

We studied the reasons of rejecting the participation in screening among those health visitors who did not participate in the program during the data collection (n=319 people). Three quarter of them (73% CI: 70-79) fully agreed with the statement that they did not participate in screening because of the low financial compensation and it was followed by nearly 60% (57% CI: 50-63) who said low reputation. More than half of the respondents (56% CI: 50-61) completed the training for screening only due to the change in legislation and almost the same number (55% CI: 49-61) believed that their participation in screening is not justified, as the screening that is provided by gynaecological clinics is easily accessible for the population they serve. More than one third of respondent health visitors (35% CI: 39-41) said they would consider leaving their career if they were forced to take smear tests.

Time use of the cervical screening activity of the health visitor and fit it into their work

Health visitors who took part in screening did 7.5 (SD: 6.0) screening (198 persons) per month and on average, about one and a half hours (98 minutes (SD: 49)) were spent on carrying out all the tasks with a woman to be screened for cervical screening (female visitation, consulting, documentation).

60% of health visitors who took part in screening did the female visitation (95% CI: 54-67) after their working hours among those women who had got invitation for screening. 13% of health visitors could do the smear test (95% CI: 8-18) during their working hours and 50%

(95% CI: 43-57) mainly did it in other time but during their working hours and 37% did the screening after their working hours and they adjusted to the schedule of the women to be screened.

Studying the factors influencing participation in screening

Nearly half (100 people) of health visitors with screening experience who were in the study (100 persons) had previously participated in the screening program (under the Pilot Protection Cervical Screening Programs and / or TÁMOP program) and the other part (98 people) did screening at the time of the survey. In our further analysis, we examined whether there was a difference between the average behaviour of the new components generated during the factor analysis in the two groups of health visitors. We wanted to find out the reasons of the dropout from the screening program.

Among the motivational factors, internal motivation, namely professional openness, showed a significant difference ($p = 0.03$) between the two groups and those had a higher value who did screening. Among the averages of certain factors in the group of factors influencing efficiency and effectiveness, problems related to tangible assets (such as consulting room, the quality of disposable devices) appeared more in case of non-screening health visitors than in the case of health visitors who did screening ($p = 0.03$). In addition, non-screening health visitors indicated less problematic time constraints (women from different district would also like to use screening) than health visitors who did screening ($p = 0.01$). According to the opinion of the health visitors participating in the screening, the professional organizations (MAVE), the Hungarian Health Care Professional Chamber (MESZK), are less supportive of the cervical screening activities than according to those health visitors who did not participate in the screening ($p = 0.02$). With regard to positive experiences, it was clearly established that significantly higher ($p < 0.001$) development of personal efficacy was detected by health visitors who did screening than those who did not.

Examining the positive experiences of screening activity

Our analysis showed that the development of personal effectiveness perceived by the the health visitor was the most important factor in participating in screening so we carried out further analysis in this line.

Factors influencing positive experiences were investigated using a linear regression model. We have found that motivational (external and internal) factors (both $p < 0.01$) and participating in screening ($p = 0.006$) positively influence the screening experience of the health visitors, while the low screening activity and reduced financial and moral appreciation negatively influence it ($p = 0.003$).

5. DISCUSSION

In the dissertation I presented three studies, in which we tried to reveal certain factors that influence the effectiveness of cervical cancer prevention practice in our country. The studies focused on the 25-65-year-old female population, the screening target group, on the one hand, and on the primary health care providers like GPs and health visitors, on the second hand. We used a complex, multilateral approach. The purpose of the survey among the female population was to explore the knowledge about cervical cancer and their attitudes and practices regarding screening. The success of screening programs depends primarily on the appropriate participation of the population in it. It can be concluded, based on the results of our survey, that the 3-year coverage in Hungary, is not low. 74% of women from in 11 examined counties participated in cervical screening within three years before the study. Actual coverage is likely to be lower, when interpreting the results we need to consider the selection bias due to the relatively low response rate (47%). In order to reduce the impact of this bias, we used weighted estimates for each county and demographic category. However, it is reasonable to assume that respondents were more health conscious than the members of the target group in general.

Overall, the three-year coverage of cervical screening is likely to be lower than the results of self-reported surveys (including our own study) and presumably it is higher than the proportion of cytological studies that were recorded for screening purposes. From this we conclude that in Hungary, that 30-40% of the 25-65-year-old female population participates had a cervical screening test within the recommended 3 year interval. Using a multiple logistic regression model, we found that women who belong to the highest social economic status are 4 times more likely to be involved in screening more than those who belong to the lowest income category. In addition, the age over 45 years, retirement, and residence in a settlement with less than 10,000 inhabitants significantly reduce the participation in screening. Among the examined lifestyle factors, heavy smoking reduces the willingness to participate in this kind of screening.

We found that women who regularly visit gynaecologists are more likely to go for organized screening, as 80% of them had participated in organized screening, while only 15% of those who do not usually visit gynaecologists lived with this opportunity. Knowledge of cervical screening in the female population is insufficient. It is worth mentioning that every fourth of women did not participate in organized screening because they had not got any complaints. Ineffectiveness of health communication is illustrated by the fact that 43% of the target group did not know that every 25-65 year-old woman in Hungary was eligible for cervical screening that is free in every 3 year. Only 42% of the target population requested or asked for information

about screening. One of the most important tasks of general practitioner is the preventive services, which includes health promotion and efforts to increase the effectiveness of screening. According to the results of our study, women primarily asked and received information on cervical screening from gynecologists, typically not before the screening but at the time of the examination. So information about screening, preparing to take part in screening was less pronounced, and those women who did not visit the gynecologist regularly, did not know about this. Based on the results of the screening model program, it can be concluded that GPs' participation in health communication about screening was effective and more than a quarter of women who had not been screened previously took part in the cytology smear test after having been contacted by her GP. In our opinion, the significance of the result is that a simple and cost-effective intervention can increase the willingness to participate in the screening by 27% among those women who had not participated in screening and belong to the risk group.

In many cases, GPs' health promotion activities are hampered by lack of time, administrative burdens, acute patient care, and often have little time to encourage participation in public health screening. In addition to improving their financial interest, the solution can be to support the establishment and operation of the community practices, in which several practitioners are able to employ several professionals, who help the work of GPs in prevention.

On the basis of the data of the health visitors' survey, it was established that 57% of those who work on fields and were involved in the preparation of cervical screening for public health purposes did not plan to enter the screening program. At the same time, there is a significantly higher willingness to take part in the screening program among those health visitors who work in a village, small settlements and districts. Most of the health visitors did not participate in the program due to low financial and moral assessment. More than half of the respondents thought that performing cervical screening by health visitors was unjustified because gynecological examination among the 25-65-year-old women in the area was well organised easy to access. On the other hand, they took part in the free training to extend their statutory competence. So participation in the training did not necessarily mean a commitment to take part in screening. One-third of the trained health visitors who took part in the training would consider leaving this profession if they are forced to participate in the screening.

The above results show that the acceptance of the new competence among the health visitors who work in the fields is not complete and at the same time, in the districts that operating in the villages and small settlements, where the number of people aged 0-7 is typically lower, the screening willingness of the health visitors is significantly higher than in urban districts with a higher number of patients.

Cervical screening is carried out by health visitors in the framework of “women protection tasks”, that was based on the results of our study, the time which was spent on screening activities required an average of 17 hours per month. In connection with fitting the screening activity into the work schedules of health visitors, we found that they often did screening, smear tests outside the official working hours. Presumably, they adjusted to the schedule of the screened women. The operating license required for performing the screening activity requires a special counselling time of the health visitor but in practice, it was not always possible to observe the time. This cannot be a solution in the long run. If the participation of the population in screening can be increased by screening outside the formal counselling and / or working hours, then the possibility and the legal framework of it should be created.

Involving health visitors in cervical screening clearly increases the participation of women living in small villages in screening, so there is a need for counselling by health visitors to reduce geographical inequalities of access to cervical screening. For the quality renewal of primary health care, cooperation between actors, task sharing, the involvement of well-trained professionals, the expansion of professional competences and the more flexible and efficient use of available resources are essential. We recommend reorganizing the cervical screening activity of the health visitors in such a way that it does not endanger the provision of additional basic tasks of them especially in the areas where the number of caregivers is high. In settlements where there is a need for it, but the health visitor is unable to participate in screening because of overload, access to the service can be in a form that is operated by a community of practice and / or applying a health visitor for screening in full time.

Our results regarding the attitudes of the health visitors showed that those health visitors, who have a higher motivational factor, including the internal motivation factor, had a greater role in the screening. This is probably due to the fact that currently screening health visitors have significantly higher levels of perceived personal efficacy development, more positive experiences in performing cervical screening activities than those who previously screened and do not perform screening currently. According to our results, the development of personal efficiency related to screening was influenced by motivation factors and the participants in screening as a supporting factor, while the low financial and moral appreciation significantly reduced the screening activity. Therefore, interventions that strengthen internal motivation factors are needed to increase the screening willingness of health visitors. So the recognition of cervical screening activity among the health visitors and their co-workers as well as the general public needs to be increased. Supporting general practitioners who work in primary

health care could not only increase the willingness of the population to participate in screening, but it would also increase the recognition of cervical screening by the health visitor.

The elimination of existing geographical inequalities in the availability of cervical screening services is of paramount importance to public health, therefore, in order to increase efficiency, there is a need for cooperation and further consultation among the participants in national coordination of public health screening, health policy, experts involved in professional guidance of the health service, the professional advocacy of the health visitors, and health visitors who work in the field.

6. MAIN FINDINGS, NEW RESULTS

1. In Hungary, the coverage of cervical screening of the 25-65-year-old female population is not low (74%), however, organized screening failed to adequately involve women who do not regularly attend their gynecologists and have low socio-economic status, live in small settlements.
2. Health communication about cervical cancer prevention is inadequate, and primary health care practitioners (GPs and health visitors) are not adequately involved in health communication about screening.
3. The results of the intervention model program implemented in Zala County show that the participation of the female population in cervical screening could be improved if GPs would also participate in the communication of the screening, and would motivate women to participate in it.
4. The acceptance of cervical screening competencies among health visitors is low. On the other hand health visitors who serve in villages and small settlements, where the number of children aged 0-7 is typically lower, the screening willingness of the health visitors is significantly more favourable than in urban districts where there are a higher number of patients.
5. Health visitors who do cervical screening spend about four times more on women's protection tasks than nurses who do not do screening. Many of them who do screening are unable to fit the cervical screening into their work schedule.
6. The positive experiences of the health visitors in performing the screening activity are influenced positively by the support of external and internal motivation factors and the

participation in the screening activity itself, while the low financial and moral value of the screening activity significantly reduces their willingness to be involved.

7. SUMMARY

In Hungary, reducing cervical cancer mortality is a major public health task. The role of primary health care in the health promotion of local communities is indisputable, therefore, in the dissertation we reported the results of three researches and we tried to identify problems with the function of the cervical cancer screening program from the point of view of the female population and general practitioners and health visitors. The aim of the questionnaire survey among the general population was to explore the cervical cancer prevention and prevention skills of women aged 25-65 in the target group of cervical screening and their attitudes and practices regarding to screening. This was accompanied by a screening model program in Zala County, where we examined the extent to which women were more willing to participate in cervical screening if GPs were involved in health communication about screening. In the third study, we conducted a questionnaire survey among health visitors who had been prepared for cervical screening for public health purposes with a view to revealing the willingness, motivation, opinion, and experience of the health visitors to perform for this new service. Based on the results of the survey, we found that the target population's screening is not low, however, organized screening failed to adequately involve women who do not regularly visit the gynecologist, and who live in small settlements with lower socio-economic status. In the Intervention Model Program in Zala County, GPs successfully mobilized the quarter of women who did not participate in cervical screening in the previous three years. Health visitors who participated in training related to willingness to participate in screening activity is low, while who accepted the screening significantly work in small places, and those health visitors participated in the screening program who had higher motivation, including the internal motivation factor and who were greater open-minded for the professional role. In order to prevent cervical cancer, the implementation and communication about the screening program should be improved, and general practitioners should be involved in the promotion of screening. The participation of health visitors in the screening is essential to the successful implementation of the program, which requires that acknowledgement of new competencies would be increased. Efforts to renew basic health care should also include increasing participation in cervical screening for public health purposes, in order to ensure equal access for those who have low socio-economic status, live in small settlements and belong to different ethnic groups.



Registry number: DEENK/179/2020.PL
Subject: PhD Publikációs Lista

Candidate: Anikó Gyulai
Neptun ID: CL4P2L
Doctoral School: Doctoral School of Health Sciences

List of publications related to the dissertation

1. **Gyulai, A.**, Nagy, A. C., Pataki, V., Tonté, D., Ádány, R., Vokó, Z.: General practitioners can increase participation in cervical cancer screening - a model program in Hungary. *BMC Fam Pract.* 19 (1), 1-8, 2018.
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DOI: <http://dx.doi.org/10.21101/cejph.a4068>
IF: 0.525

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3. Rákóczi, I., Sárváry, A., **Gyulai, A.**, Takács, P., Jávorné Erdei, R.: A felnőtt lakosság dohányzási szokásai Nyíregyházán = Smoking habits among adult population in Nyíregyháza. *Egészségfejl.* 60 (5), 76-86, 2019.
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Total IF of journals (all publications): 4,478

Total IF of journals (publications related to the dissertation): 2,956

The Candidate's publication data submitted to the iDEa Tudóstér have been validated by DEENK on the basis of the Journal Citation Report (Impact Factor) database.

08 June, 2020

