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# Screening with Mammography Organized by Family Physicians Teams: What Have We Learnt?

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## ABSTRACT

*The mammography, recommended as standard method for screening on breast cancer, can reveal suspicious lesions early enough to enable cancer elimination in entirety. Experience with women of the target population, 50–69 years old, included in the mass screening programs, show the reduction in the specific mortality by 30%. One of the main problem in organizing the preventive programs is how to increase responsiveness of subjects to screening. In the study, based on the large sample of over 1000 of subjects and 20 family medicine practices, included in the investigation, we showed that it is possible, by a pro-active involvement of family physicians teams and intensive educational and motivational activities, to achieve high level of over 80% of responsiveness to mammography screening. Analysis of the reasons of nonresponsiveness can contribute to better understanding of the mental processes included in a self-decision making. This, as the final aim, can help family physicians in their efforts to overcome many hidden barriers which obstruct their patients to accept the mammography screening.*

**Key words:** mammography, breast cancer, preventive programs

## Introduction

Detection of breast cancer in its initial stage enables the treatment early enough not only to stop the neoplastic spreading, but also to eliminate the cancer entirely. Fortunately, simple and inexpensive methods are available to allow an efficient screening. Mammography, recommended standard method, for instance, can reveal breast cancer even two years before it becomes palpable<sup>1</sup>. Experience with women of the target population (50–69 years old) included in the mass screening programs show the reduction in the specific mortality by 30%<sup>2</sup>. If breast cancer is diagnosed and treated at this early stage, high 5-year survival of 75–80% is likely to be expected<sup>3</sup>. Younger women, 40–49 years old, can also benefit from the systematically performed mammographic examination, although data on the cost-effectiveness of such procedure in that age group are still contradictory<sup>4</sup>.

Good therapeutic results, however, are not easily achieved and require a multidisciplinary approach and elaborate programs of early cancer detection. These programs usually include an invitation for screening, a test for the detection of a suspicious lesion, as well as the con-

firmation of the diagnosis, followed by an appropriate treatment and extensive subsequent check-ups<sup>5</sup>. While in some countries, screening programs are performed only on a regional level, in many European countries, including Sweden, Finland, Great Britain, Ireland, Netherlands, Luxemburg, France, and Croatia, they are performed on the national level<sup>6–8</sup>. In Croatia, the National Program for Early Detection of Breast Cancer, compatible with the World Health Organization's Resolution on cancer prevention and control, was launched in 2006, as a part of the national strategy for development of the health care system 2006–2011<sup>9,10</sup>. The Program implementation is under the responsibility of county institutes of public health<sup>9</sup>. Family medicine practitioners are not actively included, but do record data on responsiveness of their patients to the mammography and on follow up of patients with positive screening results. In brief, women of the target population are invited by mail to take preventive mammography every two years. Based on 70% responsiveness, it amounts about 280,000 women a year. BI-RADS classification (stages 0–5) is used for read-

ing of mammograms. Cases suspected on cancer (BI-RADS 4 and 5) are referred for follow up<sup>9</sup>.

Experience so far indicate the highest cancer incidence in the first year of the screening program implementation. In Croatia, in 2006, there were 2203 newly discovered cases (rate 95.7/100 000), with 861 deaths (rate 36.1/100 000)<sup>11</sup>. Moreover, achieved response rate of 53% was comparable to that one in other European countries<sup>6,11,12</sup>. However, the authorities are not completely satisfied with achieved results. If the primary aim of the program – 25% reduction of the mortality rate in 5 years from the Program onset – had been achieved, the responsiveness would have been at least 70%<sup>9</sup>. This »shortage« in responsiveness implicates the needs for changes in invitation organization, and for better motivation of the women from the target groups.

A possible way to improve the adherence of the women to the screening on breast cancer could be by transferring the responsibility for the program implementation from the public health institutes to family physicians. Namely, family physician's continuous contact with the patient and his/her family, as well as their insight in the family dynamics, enable them to select an appropriate way to present the preventive measures to the patient, and to ensure patient's better adherence to the preventive activities<sup>13</sup>. To test that hypothesis, we investigated the possibility of raising responsiveness rate to preventive mammography check-ups by a pro-active involvement of family physician.

## Subjects and Methods

All of 20 family medicine practices from the Osiječko-Baranjska county, selected for the Project: »Model of early cancer detection integrated in a practice of a family physician«, approved by the Ministry of Science, Education and Sport, and carried out by the Department of Family Medicine of the Osijek University School of Medicine, were also included in this study<sup>14</sup>. Half of them were appointed as the control group and half as the experimental group. In both groups, half of the offices were located in rural and half in urban surroundings. The study started in 2009 and is still lasting.

### Subjects

The study participants were women born on 1937, 1938, 1954, and 1955, as according to the National Program for Early Detection of Breast Cancer.

Experimental group comprised all the women in 10 selected offices who have not yet been invited by the County institute of public health to take preventive mammography (N=1014). In stead, the patients were invited during their visit to the practitioner's office concerning issues other than mammography, or actively, by surface mail or phone (based on the personal data in patient's chart). Women who refused mammography at the first invitation, were included in the motivation program, carried out by a family physician and a field nurse,

and followed-up for the next three months. After this period of time, if their decision remained unchanged, they were classified as resisted the screening with mammography.

The control group consisted of 997 women already invited by the County institute of public health. Data on the responsiveness to mammography for this group were delivered by the Institute.

### Methods

The participants in the experimental group were subjected to a set of specific measures, designed to increase compliance with the preventive activities. Those measures were divided into four phases. First, a nurse would do an introductory private conversation with the participant and would hand out the promotional materials (the one usually distributed by institutes of public health, accompanied by the one published by The Croatian League against Cancer). Those women who failed to adhere at this first phase, were referred to pass to the next phase. The next phase consisted of a private discussion between the family physician and the patient, lasting for quarter of an hour. After that, the physician met the participant's family and discussed with them for 20 minutes. The final phase was 45-minute lecture given by the physicians and the field nurses, to the groups of 20 to 25 women.

The mammographic examinations were performed by mammography units (the main unit located in the Health Centre Osijek, and two mobile, for the distant practices), licensed by The Croatian Ministry of Health. Each mammograph was approved by the Ministry. Every radiogram was analyzed by two independent radiologists licensed by the Ministry (licensing was based on their previous experience – minimum 5000 analyzed mammographic images).

Following the radiography, an anonymous questionnaire, developed by the investigators in this study, was administered to each participant and conducted by an independent interviewer. The following topics were covered: place of residence, working conditions, medical history, current health status, motivation to attend the examination, the importance of the family approach in preparing preventive activities, and the assessment of all the parts of the offered specific programs, comments and suggestions.

## Results

Responsiveness of women invited to do preventive mammography was significantly higher in the experimental than in the control group. In the experimental group responded 81.0% (821 of 1014) and in the control group 63% (634 of 997) of invited women,  $p < 0.001$ , comparison of proportions (Table 1). This difference retained significant across all age groups,  $p < 0.001$ , comparison of proportions (Table 1). Similar to these results, the chi-square test showed no difference in age-related responsiveness (among the different age groups), neither

**TABLE 1**  
RESPONSIVENESS OF WOMEN INVITED TO DO PREVENTIVE MAMMOGRAPHY IN THE STUDY ON FAMILY PHYSICIAN'S INFLUENCE ON WOMEN' MOTIVATION TO TAKE PREVENTIVE MAMMOGRAPHY, CONDUCTED BETWEEN 2009 AND 2010, IN 20 FAMILY MEDICINE PRACTICES IN THE OSJEČKO-BARANJSKA COUNTY

Age*	No. of tested women / No. of invited women (%)		p <sup>†</sup>
	Experimental group	Control group	
1937	156/210 (74.3)	121/212 (57.1)	<0.001
1938	188/254 (74.0)	139/231 (60.2)	<0.001
1954	252/288 (87.5)	178/266 (66.9)	<0.001
1955	225/262 (85.9)	196/288 (68.1)	<0.001
Total	821/1014 (81.0)	634/997 (63.0)	<0.001
p <sup>‡</sup>	0.175	0.185	

\* Year of birth; † Comparison of proportion; ‡  $\chi^2$ -test

within the experimental, nor the control group,  $p=0.175$  and  $p=0.185$ , respectively (Table 1).

As shown in Table 2, the reasons for declining mammography were not equally represented, neither in the experimental, nor the control group, including both age groups (older, born in 1937 and 1938, and younger, born in 1954 and 1955) ( $\chi^2$ -test,  $p<0.001$ ). Objective reasons, such as 1. incorrect address, 2. dead, 3. living abroad, or 4. breast condition, explained only the minor part of non-responsiveness (11.4% in the experimental and 5.8% in the control group), without any of them showing significant differences between the experimental and the control group, including as well both age group (Table 2). There were no age-dependent differences (between the older and the younger age group) neither within the experimental ( $p=0.971$ ,  $0.971$ ,  $0$ ,  $0.727$ , for each of four reasons listed, respectively), nor the control group

( $p=0.959$ ,  $0.923$ ,  $0.932$ ,  $0.661$ , for each of four reasons listed, respectively) (Table 2).

An important reason of non-responsiveness was the mammography performed in the last 12 months (represented in 36.3% of non-responded women in the experimental group and 19.8% of non-responded women in the control group), and varying from the minimum of 16.1% in the younger control group to the maximum of 42.4% in the older experimental group (Table 2). In both age groups, in the last 12 months, significantly more women performed mammography in the experimental than in the control group (42.4% vs. 23.3% in the older age group and 29.8% vs. 16.1% in the younger age group,  $p\leq 0.013$ , comparison of proportion) (Table 2).

The most women nonresponded to the mammography pointed out »other« reasons for declining mammography, significantly more of them in the control, than in the experimental group (52.3% in the experimental vs. 74.7% in the control group,  $p\leq 0.013$ , comparison of proportion) (Table 2). The same proportion, »other« reasons retained in each of the age groups (47.5% vs. 72.0% in the older age group, and 57.5% vs. 77.0% in the younger group,  $p\leq 0.013$ , comparison of proportion) (Table 2). Also, there was no difference in regard to age, neither in the experimental, nor the control group ( $p=0.098$  and  $0.113$ , respectively) (Table 2).

Among reasons listed under »other«, the most important one in the experimental group were transportation problems ( $\chi^2$ -test,  $p<0.001$ ), without showing difference in regard to age (70.2% older, 57.4% younger and 63.4% total,  $p=0.261$ ) (Table 3). In the control group, it was the most important among »other« reasons in the older (36.7%), but not in the younger age group (17.9%), thus showing significant difference depending the age ( $p<0.001$ ) (Table 3). It was significantly more pronounced problem in the experimental compared to the control group, and in the older compared to the younger age

**TABLE 2**  
REASONS FOR DECLINING PREVENTIVE MAMMOGRAPHY IN THE STUDY ON FAMILY PHYSICIAN'S INFLUENCE ON WOMEN' MOTIVATION TO TAKE PREVENTIVE MAMMOGRAPHY. THE STUDY WAS CONDUCTED IN 20 FAMILY MEDICINE PRACTICES IN OSJEČKO-BARANJSKA COUNTY BETWEEN 2009 AND 2010. THE EXPERIMENTAL GROUP CONSISTED OF 1014 WOMEN, WHILE THE CONTROL GROUP CONSISTED OF 997 WOMEN

Reasons	Age* No. (%)				Total No (%)		p <sup>†</sup>	
	1937/1938		1954/1955				1937/1938 vs. 1954/1955	
	Experimental 99 (100.0)	Control 189 (100.0)	Experimental 94 (100.0)	Control 174 (100.0)	Experimental 193 (100.0)	Control 363 (100.0)	Experimental	Control
Incorrect address	1 (1.0)	1 (0.5)	0	2 (1.1)	1 (0.5)	3 (0.8)	0.971	0.959
Deceased	1 (1.0)	1 (0.5)	0	0	1 (0.5)	1 (0.3)	0.971	0.923
Living abroad	0	0	2 (2.1)	1 (0.6)	2 (1.1)	1 (0.3)	0	0.932
Breast condition	8 (8.1)	7 (3.7)	10 (10.6)	9 (5.2)	18 (9.3)	16 (4.4)	0.727	0.661
Mammography in last 12 months	42 (42.4) <sup>‡</sup>	44 (23.3)	28 (29.8) <sup>‡</sup>	28 (16.1)	70 (36.3) <sup>‡</sup>	72 (19.8)	0.098	0.113
Other	47 (47.5) <sup>‡</sup>	136 (72.0)	54 (57.5) <sup>‡</sup>	134 (77.0)	101 (52.3) <sup>‡</sup>	270 (74.4)	0.218	0.332
p <sup>§</sup>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		

\* Year of birth; † Comparison of proportions; ‡  $p\leq 0.013$  vs. the control group, comparison of proportions; §  $\chi^2$ -test

**TABLE 3**  
REASONS LISTED UNDER SECTION »OTHER« FOR DECLINING AN INVITATION TO PARTICIPATE IN THE STUDY ON FAMILY PHYSICIAN'S INFLUENCE ON WOMEN' MOTIVATION TO TAKE PREVENTIVE MAMMOGRAPHY. THE STUDY WAS CONDUCTED BETWEEN 2009 AND 2010, IN 20 FAMILY MEDICINE PRACTICES IN OSJEČKO-BARANJSKA COUNTY. THE EXPERIMENTAL GROUP CONSISTED OF 1014 WOMEN, WHILE THE CONTROL GROUP CONSISTED OF 997 WOMEN

Reasons	Age* No. (%)				Total, No (%)		<i>p</i> <sup>†</sup>	
	1937/1938		1954/1955		Experimental	Control	1937/1938 vs. 1954/1955	
	Experimental	Control	Experimental	Control			Experimental	Control
	47 (100.0)	136 (100.0)	54 (100.0)	134 (100.0)	101 (100.0)	270 (100.0)		
Not want to	3 (6.4)‡	39 (28.7)	5 (9.3)‡	46 (34.3)	8 (7.9)‡	85 (31.5)	0.866	0.390
Fear of the result	10 (21.3)	36 (26.5)	15 (27.8)	53 (39.6)	25 (24.8)	89 (32.9)	0.601	0.031
Sees no real value of the program	1 (2.1)	11 (8.1)	3 (5.5)	11 (8.2)	4 (3.9)	22 (8.2)	0.716	0.847
Transportation	33 (70.2)‡	50 (36.7)	31 (57.4)‡	24 (17.9)	64 (63.4)‡	74 (27.4)	0.261	<0.001
Complicated	15 (31.9)‡	24 (17.6)	14 (25.9)‡	11 (8.2)	29 (28.7)‡	35 (12.9)	0.657	0.034
Not affordable	18 (38.3)‡	26 (19.1)	17 (31.5)‡	13 (9.7)	35 (34.7)‡	39 (14.5)	0.612	0.043
<i>p</i> <sup>§</sup>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		

\* Year of birth; † Comparison of proportions; ‡  $p \leq 0.006$  vs. the control group, comparison of proportions; §  $\chi^2$ -test

group (experimental vs. control: older 70.2% vs. 36.7%, younger 57.4% vs. 17.9%, total 63.4% vs. 27.4%,  $p \leq 0.006$ , comparison of proportion) (Table 3).

On the other hand, women in the control group declined mammography simply because they did not want to perform it more often than women in the experimental group (experimental vs. control: older 6.4% vs. 28.7%, younger 9.3% vs. 34.3%, total 7.9% vs. 31.5%,  $p \leq 0.006$ , comparison of proportions). There were no differences depending on the age ( $p = 0.866$  for the experimental group and  $p = 0.390$  for the control group) (Table 3). In addition, fear of the result was another important reason of non-responsiveness in the control group (32.9%) significantly more pronounced in the older (39.6%) than in the younger group (26.5%) ( $p = 0.031$ ) (Table 3). On the other hand, women felt fear of the result and saw no value of the program equally well in the experimental and the control group (Table 3). And finally, assumptions that the screening with mammography is too complicated and not affordable were more important reasons of non-responsiveness in the experimental than in the control group (28.7 vs. 12.9 and 34.7 vs. 14.5, respectively),  $p \leq 0.006$ , comparison of proportions), ranking the highest in the older age group (31.9% and 38.3%,  $p = 0.034$  and 0.043, respectively) (Table 3).

## Discussion

The fact that breast cancer screening programs reduce mortality from breast cancer in women aged 40 years and more and that this effect remains over time despite an increase in incidence with age is yet well accepted<sup>2,15</sup>. Screening policy, by influencing the rate of up-take and adherence to screening, may therefore have a long-term effect on screening programs' effectiveness<sup>16</sup>. It has been recognized however that regardless of the ap-

proach employed, the success in organized breast screening mostly depends on programs' implementation performances, such as personal invitation letters, participation of opportunistic screening (women are referred by a physician for mammogram outside the program supplied by public services), implement of evidence, strictly managed follow-up and informed decision-making support<sup>17</sup>.

The importance of family physicians' role in reminding and encouraging patients for screening has increasingly been appreciated. However, in most countries, family physicians are only partially involved in breast screening programs, or are included only under certain conditions, such as rural and distant areas<sup>17</sup>. And randomized studies in which patients adherence to family physicians' recommendations for breast screening were explored are still scarce and not based on a large-scale to allow the general conclusions to be drawn on<sup>18</sup>. This is the first study where family physicians have taken full responsibility for breast screening program implementation and where a large number of 10 practices were included, encompassing a representative sample of about a thousand of subjects. A high degree of compliance, achieved, regardless of the patients age, clearly suggests the preferable use of this approach over the standard one, established and supplied by public services (Table 1). However, this conclusion must be taken with a caution. Results obtained in our study could not be simply a consequence of the fact that the screening program was conducted entirely by family physician teams. More important variable predicting high compliance with screening could be thoroughly planned motivation campaign, based on the set of subsequently performed activities, which is an advantage compared to other studies of this kind. In this regard, published data showed poor adherence, about 20–30%, to family physicians' recommendations for breast

screening<sup>18,19</sup>. In addition, in a recent study, significantly higher effectiveness was achieved by a combination of two interventions, compared to any of three interventions applied alone, including telephone calling, physician's letter and personal interview with a physician<sup>20</sup>.

Due to high responsiveness of over 80%, which is among the highest reported so far, one would argue for that reasons for non-responsiveness could be ignored<sup>15</sup>. However, based on recently published papers, for any intervention, it is necessary to know the effect not only in subjects to whom the intervention is offered, but also in those to whom it was really performed. In regard to the latter, the theoretical concept, intention to treat analysis, has recently been employed to ensure that the results of a randomized trial is not due to selection bias. Namely, there is the possibility that women who accepted the screening differ from those who declined to do it and that these differences might have influenced their risk of dying from breast cancer<sup>21</sup>. Based on these considerations, knowing beyond the reasons of declining breast screening will provide better understanding of a self-decision making process and of how it does influence the effect of the screening. Our results indicate only the minor role of objective reasons, such as incorrect address, dead, or living abroad, among the reasons analysed in this study. These results declare in favour of the high level of organization of the health care system concerning administrative issues. The fact that significantly more women in the experimental group, especially those of older age, performed the mammography in the last 12 months, compared to the control group, might be reflective of The National Program of early cancer detection, carried out in a parallel with this study. Intensive media campaign and promotional activities, within the framework of the National Program, might have encouraged yet non-screened women, especially those already experienced some breast disabilities, to perform the mammography (Table 2).

Transportation problems, as expected, was more pronounced as an obstacle to adhere to breast screening in the older, than in the younger age group (Table 3). The fact that it was more important problem in the experimental than in the control group, is less likely to be reasonable explained. One possible explanation could be that this problem exceeded in the experimental group because some others lessened during the motivation process. Except for transportation problems, other reasons in the group listed under the section »other« are associated with inner mental and psychological functions. Related to this, many theories from behavioral medicine have re-

cently been elaborated to provide better insight into the intuitive and reasoning thinking, elements of a self-decision making process<sup>22,23</sup>. Namely, it has been recognized that processes inherent in mammography-screening decisions are subjected to changes by educational and motivational activities<sup>24,25</sup>. This could be the case with the statement »not want to«, in this study, probably influenced by the motivational procedure, performed in the experimental group, and for this reason significantly more declared by women from the control group (Table 3). For the same reasons, *e.i.*, after lessening the other psychological reasons of nonresponsiveness, corresponding to the motivational procedure, assumptions that the screening with mammography is »too complicated« and »not affordable« might have remained as more resistant to change, than some other psychological reasons, and therefore declared as more important in the experimental than in the control group (Table 3). Post-hoc analysis should provide an answer on the question whether women who announced these reasons as barriers to accept the mammography screening were included in the motivational activities, or were, in fact, excluded, because of older age and disabilities accompanying aging. Experience from other studies indicate that women with disabilities, most of them of the older age, are less likely to receive a physician's recommendations<sup>26</sup>. This is in line with our results indicating these two statements ranking the highest just in the older experimental group (Table 3). Based on the same considerations, it might be that the statements »fear of the result« and »seeing no value of the program«, showed in our results to be equally distributed in the experimental and the control group, are those ones strongly resistant to changes by educational and motivational activities.

## Conclusions

Our results, based on the large sample of over 1000 of subjects and 20 family medicine practices included in the study, clearly indicate that it is possible, by a pro-active involvement of family physicians teams and intensive educational and motivational activities, to achieve high level of patients' adherence to mammography screening. Analysis of the reasons of nonresponsiveness can contribute to better understanding of the mental processes of a self-decision making. This, as the final aim, can help family physicians in their efforts to overcome many barriers for their patients to accept the mammography screening.

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## ORGANIZACIJA PROBIRA MAMOGRAFSKIM PREGLEDIMA U OBITELJSKOJ MEDICINI. ŠTO SMO NAUČILI?

### SAŽETAK

Mamografija, preporučena kao standardna metoda za skrining na rak dojke, može otkriti suspektne promjene u dovoljno ranom stupnju da one mogu biti eliminirane u cijelosti. Iskustva sa ženama iz ciljne populacije, starim 50–69 godina, koje su bile uključene u masovne skrining programe, pokazuju smanjenje specifičnog mortaliteta za 30%. Jedan od glavnih problema pri organiziranju preventivnih programa je kako povećati odaziv osoba na skrining. U ovoj studiji, temeljenoj na velikom uzorku od preko 1000 osoba i 20 praksi obiteljske medicine, uključenih u istraživanje, pokazali smo da je moguće, pro-aktivnim uključivanjem timova obiteljske medicine i intenzivnim edukacijskim i motivacijskim aktivnostima, postići visok odaziv, od preko 80%, na mamografski skrining. Analiza razloga ne-odaziva na skrining može pomoći boljem razumijevanju mentalnih procesa uključenih u postupak samo-donošenja odluke. Kao konačni cilj, to može pomoći liječnicima obiteljske medicine u njihovim naporima da prevladaju mnoge nevidljive prepreke koje sprečavaju njihove pacijente da prihvate mamografski pregled.