

Cancer screening non-attendance among women: Inequalities, determinants, and barriers

Anna Altová
Doctoral thesis



Faculty of Science, Charles University
Department of Demography and Geodemography
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Charles University
Faculty of Science
Department of Demography and Geodemography

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Mgr. Anna Altová

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Neúčast žen na screeningu rakoviny:
nerovnosti, determinanty a bariéry

Doctoral thesis

Supervisor: RNDr. Michala Lustigová, Ph.D.

Advisor: Ivana Kulhánová, Ph.D.

Prague 2024

Prohlášení

Prohlašuji, že jsem závěrečnou práci vypracovala samostatně a že jsem uvedla všechny použité informační zdroje a literaturu. Tato práce ani její podstatná část nebyla předložena k získání jiného nebo stejného akademického titulu.

Anna Altová
v Praze dne 4. listopadu 2024

Abstract

Cancer screening is an important tool for early cancer detection. This thesis aims to quantify screening attendance and screening non-attendance among women and identify inequalities in screening attendance, its determinants, and barriers to screening. Mixed-methods approach and various sources of data, including administrative data from health insurance, data from health surveys, and semi-structured interviews, are used to fulfil the research objectives. The focus is on cervical and breast screening and Czech women, while screening inequalities in Europe are also examined. The results show that there are large differences in screening attendance between women in terms of education, age, marital status, regions of Czechia or between countries in Europe. Some of the main screening barriers identified include perceived good health (lack of symptoms), fear of diagnosis or examination, low health literacy, and negative prior experiences with healthcare. As this topic has not been extensively studied in Czechia, the findings of this research have the potential to contribute to informed policy making for increasing screening participation.

keywords: cancer, health inequalities, prevention, screening, women's health

Abstrakt

Screening rakoviny je důležitým nástrojem pro její včasné odhalení. Cílem této práce je kvantifikovat účast a neúčast na screeningu u žen a identifikovat nerovnosti v účasti na screeningu, její determinanty a překážky v účasti na screeningu. Pro naplnění výzkumných cílů je použit tzv. mixed-methods research a několik zdrojů dat, včetně administrativních dat ze zdravotního pojištění, dat ze zdravotních šetření a polostrukturovaných rozhovorů. Pozornost je věnována screeningu děložního hrdla a prsu a českým ženám, zároveň jsou však zkoumány i nerovnosti ve screeningu v Evropě. Výsledky ukazují, že existují velké rozdíly v účasti na screeningu mezi ženami z hlediska vzdělání, věku, rodinného stavu, regionu Česka nebo mezi zeměmi Evropy. Mezi hlavní zjištěné překážky screeningu patří vnímání dobrého zdravotního stavu (absence příznaků), strach z diagnózy nebo vyšetření, nízká zdravotní gramotnost a negativní předchozí zkušenosti se zdravotní péčí. Vzhledem k tomu, že toto téma nebylo v Česku dosud rozsáhleji studováno, mají výsledky tohoto výzkumu potenciál přispět k informované tvorbě politik a opatření pro zvýšení účasti na screeningu.

klíčová slova: rakovina, nerovnosti ve zdraví, prevence, screening, zdraví žen

List of publications

This thesis includes four research articles that form chapters 5–8. Three of the articles are already published and one is under review. I am the first author of all the articles, and the authorship shares are listed below.

- **Altová, A.**, Kulhánová, I., Reisser, K., Netrdová, P., Brož, J., Eikemo, T. A., Balaj, M. and Lustigová, M. (2024). Educational inequalities in cervical cancer screening participation in 24 European countries. *Public Health*, 233, 1-7.
WoS, Q1, IF = 3.9 (2023), Autorship share = 60%
- **Altová, A.**, Kulhánová, I., Brůha, L., and Lustigová, M. (2021). Breast and cervical screening attendance among Czech women. *Central European Journal of Public Health*, 29(2):90–95.
WoS, Q4, IF = 1.154 (2021), Autorship share = 80%
- **Altová, A.** and Lustigová, M. (2022). Bariéry českých žen v účasti na screeningu karcinomu děložního hrdla. *Česká gynekologie*, 87(4).
Scopus, Autorship share = 50%
- **Altová, A.**, Lustigová, M. and Kulhánová, I. Perceived barriers to cervical and breast screening: a qualitative study.
Under review in *Bratislava Medical Journal (Bratislavské lekárske listy)*, WoS, Q2, IF = 1.5 (2023), Autorship share = 70%

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Beyond writing articles and doing all the rigorous work necessary for PhD, an essential part

of this journey has been my involvement with the Young Demographers. I am so glad that I was able to become part of this amazing group of people and that I was able to do more than just read and write. Through this community, I met amazing ECRs from all over the world and helped create a safe and fun environment for us to share our knowledge and research. For this, I have to thank Dr Kateřina Brázová, Dr Barbora Janáková Kuprová and Dr Klára Hulíková Tesárková who took me as their own. I would not be the person or researcher I am today without the YD.

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I dedicate this work to my godmother Marie, who always believed in me and who would never have doubted that I would make it this far.

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Author's preface

“Cancer is just as curable as other diseases, if the sick person arrives on time.”

Vedra et al. (1960)

In 1960, a group of authors – Dr Bohumír Vedra, Dr Jan Horský, Dr Vilém Schönfeld, and Professor Jiří Trapl – published the 4th edition of a book called *Lékař píše ženám* (The Doctor Writes to Women). This book shared the most up-to-date knowledge on women's health at that time. I came across it about halfway through my PhD and was struck by how much was already known about prevention over 60 years ago. Although some of the content is now outdated and even disproven, the quote I selected from the chapter on cancer remains profoundly true today.

Growing up in a medical environment, my mother being a dentist, I was always surrounded by discussions about health. Prevention was something I naturally prioritised from a young age (especially given by the preventive nature of dentistry, a field I was surrounded by). I considered myself fairly health-literate and assumed that some aspects of health were common knowledge. It wasn't until later that I realised that many of the things I took for granted were not universally known.

I began my research on prevention during my bachelor's thesis, which focused on vaccination coverage. Later, in my Master's thesis, my focus changed to cancer screening participation and cancer prevention, which is also the focus of this thesis. Both vaccination and screening are preventive measures that, in theory, individuals are free to choose. However, when I discovered that vaccination coverage in Czechia was declining and later, as I will show in the upcoming chapters, that only about half of Czech women participate in cancer screening programmes, I was shocked. Why would not someone take advantage of something free that could potentially save their life? At first, I admit, my immediate thought was *“They must be stupid!”*

I hope that as you read this thesis, it becomes clear that I no longer think this way. And I hope you will, too, come to understand that it is not just about being uninformed or about social inequalities in health (though these are critical and fundamental factors).

What I have come to realise is how deeply personal experiences shape health decisions. Even when we know something is good for us, the emotional toll – stress, fear, or anxiety – can override rationality. I personally had a negative experience with a healthcare provider that caused me to

delay my own preventive check-ups. Although I eventually overcome this, not everyone can do so, and this is just one factor in a complex decision-making process around prevention.

Returning to *Lékař píše ženám*, already in 1960, the authors wrote that cervical cancer at stage 0 is 100% curable with only a minor procedure. In stage 1 it is 90% curable, in stage 2 it is more than 50%, in stage 3 it is around 25%, and in stage 4 it is only 10% curable. For more than 60 years, we, women have *known* about the curability of cancer. As the authors noted, “*it is not enough to wait for the first symptoms*”, in the context of this thesis, these symptoms are the tragic reality of women still dying from cancer. We must emphasise, as they did, that we must “*not postpone a specialised examination even for a day.*” I hope the presented thesis, my *specialised examination* of the determinants of screening non-attendance, contributes to more successful cancer treatment in the future by helping us detect more cases earlier.

I believe I have been extremely lucky to have been given the opportunity to research a topic that has a real impact on people’s lives. No one ever asked me “so why is this important”, it was always clear to everyone. In this work, I write about real people who all have stories and we need to care about their health. If this work serves as the basis for changing anything related to screening to make it more accessible, it will be a definite win.

I hope you enjoy reading the upcoming pages, that you find it interesting and I encourage you to keep an open mind (and also not to skip your upcoming preventive check-up).

1 Introduction

Cancer is one of the leading causes of death in Europe. All aspects of cancer are widely studied, from biological and medical perspectives to various types of social, behavioural, and demographical perspectives. Many common cancer sites are either largely preventable or well treatable if diagnosed during an early stage of the disease. In addition to primary prevention, by avoiding unhealthy lifestyle or vaccination, screening plays an essential role in reducing cancer mortality. Early detection improves the survival chances of cancer patients and reduces potential healthcare costs.

Population-based cancer screening programmes are available in many European countries and are offered to a large percentage of European women. However, in many countries, screening is still underused, and large inequalities in screening attendance persist between and within countries.

Using various sources of aggregated and individual data and a mix of methodological approaches, this work aims to identify groups of women who are less likely to participate in population-based cervical or breast cancer screening programmes. Furthermore, using the example of Czechia, it tries to uncover some of the determinants and reasons behind screening non-attendance. The results can contribute to the development of recommendations on how to encourage people to attend screening and reduce barriers to attending screening.

2 The impact of breast and cervical cancer screening on cancer burden and its role in public health

“Screening is the systematic application of a test or inquiry to identify those individuals at sufficient risk of a specific disorder to benefit from further investigation or direct preventive action, among persons who have not sought medical attention on account of symptoms of that disorder.”

Wald (2008)

Cancer screening is considered one of the most important tools of secondary prevention. It has been shown that screening plays a pivotal role in lowering cancer mortality (Jansen et al., 2020; Nelson et al., 2016; Otto et al., 2003; Njor et al., 2012; Läärä et al., 1987a). For example Myers et al. (2015) conducted a systematic review on the benefits and harms of breast screening. They found that the reduction in breast cancer mortality due to breast screening was about 20% among women of all ages. Marmot et al. (2013) suggest a 20% mortality reduction in women invited to the screening. Some studies reported even higher mortality reduction, for example, participation in the Norwegian screening programme was associated with 42% breast cancer mortality reduction (Hofvind et al., 2013). In the English Breast Screening Programme, breast cancer mortality was 35% lower among attendees compared to those who never attended (Massat et al., 2016), and 41% reduction in the risk of dying from breast cancer was found in Swedish women who participated in screening (Duffy et al., 2020).

Despite the fact that breast cancer can occur before the age of 40, some authors discourage the early onset of population-based breast screening. Desreux (2018) argues that breast screening before the age of 40 is inefficient and potentially harmful and is beneficial only in high-risk women. Similarly, screening of older women is also a subject of scientific discussion. According to Walter and Schonberg (2014), the health status and life expectancy of each individual woman should always be taken into account before recommending screening, to evaluate the possible benefits. Women older than 75 years who are of good health and reasonably estimated life expectancy could however benefit from breast screening (Galit et al., 2007).

The effectiveness of cervical screening is shown to be even higher. A British study sug-

gested that about 80% of cervical cancer mortality is likely to be prevented by screening (Peto et al., 2004). Another study from the UK estimated that 70% of cervical cancer deaths can be prevented, and if women attend regularly, it can be even 83% (Landy et al., 2016). A systematic review of the effects of organised screening on cervical cancer mortality in Europe showed a mortality reduction in attendees vs. non-attendees to be between 41% and 92% (Jansen et al., 2020). Age-specific effectiveness of cervical cancer screening has not been widely studied. Lönnberg et al. (2012) showed 66% risk reduction in mortality in all ages, however, little or no effect among women 25–39. Additionally, Vicus et al. (2014) concluded that cervical screening is only effective from the age of 30, but before the age 30, no association between screening and mortality reduction has been found. On the other hand, high efficacy among older women (50–79 years old) was found (Kaminen et al., 2013).

2.1 Recommendations on screening implementation

According to the European Council Recommendation of 2 December 2003 on cancer screening (2003/878/EC), all European Union (EU) member states should implement population-based cancer screening programmes. Specifically, colorectal cancer screening, breast cancer screening and cervical cancer screening should be available on a national level. A centralized system of related data, monitoring of the situation and screening programmes' outcomes should also be established. The 2003 EU screening recommendation said that biennial mammography should be offered to all women aged 50–69 (Perry et al., 2006). For cervical screening, the use of PAP smear test was recommended, starting not earlier than at the age of 20, but no later than the age of 30 in 3–5-year intervals, until the age of 60 or 65 (Arbyn et al., 2008).

In September 2022 European Commission presented a new approach to support Member States in increasing the uptake of cancer screening, together with the new proposal of *Council Recommendation on strengthening prevention through early detection: A new EU approach on cancer screening* replacing Council Recommendation 2003/878/EC. In this update, it is recommended to extend the target group for breast cancer screening to ages 45–74 years of age. Additionally, it is newly recommended that instead of PAP smear, Human Papillomavirus (HPV) testing should take place for women aged 30–65, every 5 years or more, as a form of cervical screening (also taking into account HPV vaccination status) (European Commission, 2022). Once adopted by the Council, the Recommendation will replace the current Recommendation from 2003.

2.1.1 Screening recommendations in Czechia

In Czechia, population-based breast screening has been available since 2002. Until 2009, there was an upper age participation limit of 69 years. Since 2010 there has been no upper limit for breast screening participation (Majek et al., 2011). Screening is offered every two years in the form of mammography (Ministerstvo zdravotnictví ČR, 2010).

Population-based cervical screening was introduced in 2008 and it is in the form of a Pap smear test. Screening is part of the regular gynecological prevention exam and is offered to women 15 years of age every year (Ministerstvo zdravotnictví ČR, 2007). Since 2021, HPV testing has also been included for women at the ages of 35 and 45 (Ministerstvo zdravotnictví ČR, 2021).

2.2 A note on breast and cervical cancer incidence and mortality

According to Eurostat, cancer was the second leading cause of death in the European Union and accounted for 23% of all deaths in 2020. The standardised cancer mortality rate was 242.2 per 100,000 people in 2020 (Eurostat, 2023a). Breast cancer (coded as C50 in the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, ICD-10) is also the most common cancer among women in Europe, with an estimated incidence of more than half a million new cases (75.6 cases per 100,000 women¹) and 144.5 thousand deaths (14.6 per 100,000¹) in Europe in 2022. Although cervical cancer (C53 in ICD-10) is far less common in the European female population with 58 thousand cases (10.6 per 100,000¹), almost 27 thousand women died (3.8 deaths per 100,000¹) in 2022 in Europe (Ferlay et al., 2024).

Similarly, in Czechia breast cancer is the leading cause of cancer death among women (14.1% of all cancer deaths among women in 2021), together with the malignant neoplasm of bronchus and lung (14.4% of all cancer deaths among women in 2021). In 2021 there were 1,786 deaths from breast cancer (30.0 per 100,000²) and 7,437 new cases were diagnosed (126.5 per 100,000³). In terms of cervical cancer, 301 women (5.2 per 100,000⁴) died in 2021 and 739 new cases (13.1 per 100,000⁵) of cervical cancer were registered.

Breast cancer mortality in Czechia has decreased significantly in the last three decades (Figure 2.1). Before 1993 there was a stable increase from 1980 (first available mortality data at the National Health Information Portal (Národní zdravotnický informační portál, NZIP (Mužík et al., 2023b))), which, however, could have been caused by better diagnosis methods. The incidence has been increasing over the period 1977–2021. As mentioned above, the breast cancer screening programme started in 2002 and was expanded in 2009. While more women are diagnosed with breast cancer each year, fewer women die from the disease. Compared to that, both incidence and mortality of cervical cancer are lower and have been decreasing throughout the whole period (Figure 2.1). In this case, the effect of screening can be hidden due to diagnosis in precancerous stages (e.g. it can be coded as D06 – carcinoma in situ of cervix uteri).

¹Age standardized rate using the World Standard Population (ASR-W), as calculated by Globocan

²European Standard Population, own calculation; ASR-W = 12.9 per 100,000

³European Standard Population, own calculation; ASR-W = 72.2 per 100,000

⁴European Standard Population, own calculation; ASR-W = 2.8 per 100,000

⁵European Standard Population, own calculation; ASR-W = 8.9 per 100,000

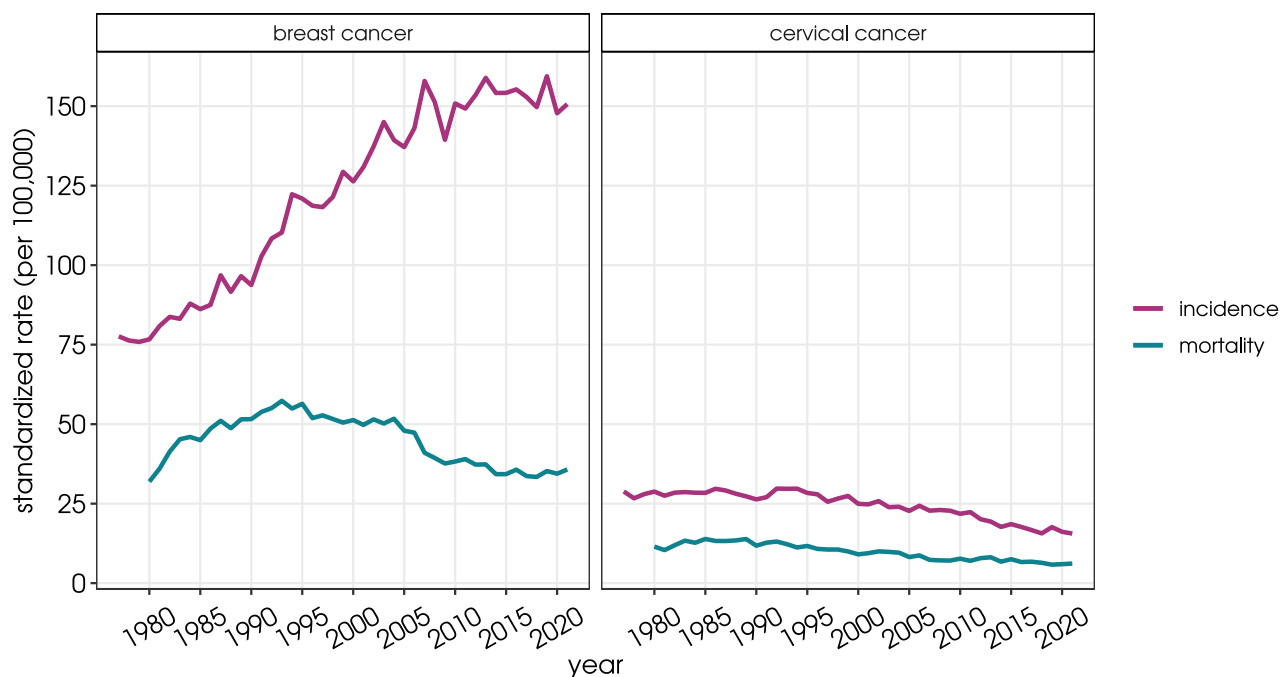


Figure 2.1: Age-standardized incidence and mortality rates, breast and cervical cancer, Czech women, 1977–2021, data sources: [Mužík et al. \(2023a\)](#) and [Mužík et al. \(2023b\)](#)

Figures 2.2 and 2.3 show age-specific incidence and mortality of breast and cervical cancer. For breast cancer, it is possible to observe an increase in incidence rates over time for almost all age groups. There is a visible peak at the 45–49 age group in 2021, which might be due to the beginning of the screening target age. Incidence rates in 2011 and 2021 decrease in older ages. Mortality rates are steadily increasing by age in all selected years.

For cervical cancer, incidence rates fluctuate more and decrease in most age groups over time. In 2021, the incidence rate is not changing much from 20 to 64 years of age (which is around 20 cases per 100 000 women). Mortality rates are again steadily increasing with age, but not much over time.

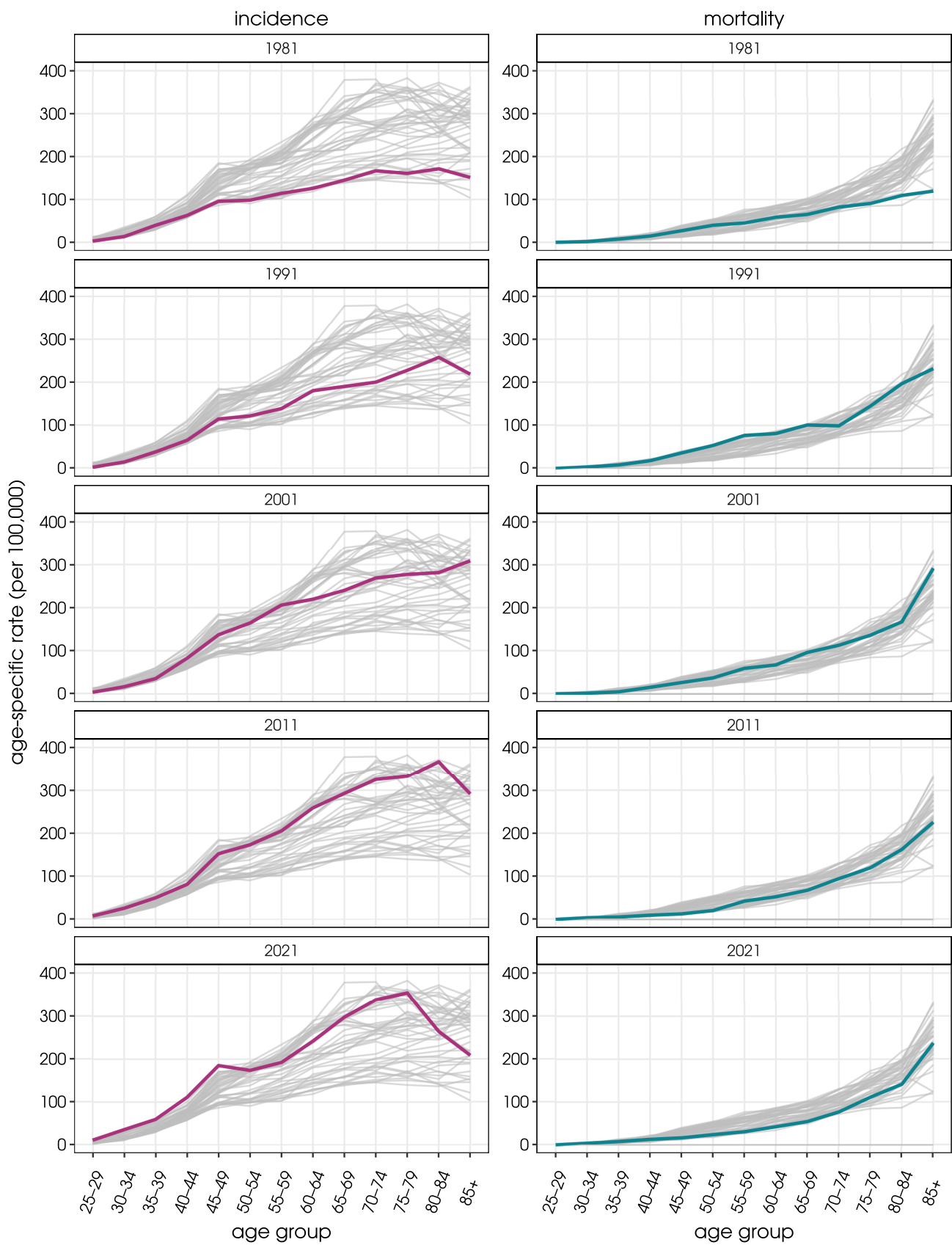


Figure 2.2: Breast cancer age-specific incidence and mortality rates, Czech women, 1977–2021 and selected years; data sources: [Mužík et al. \(2023a\)](#) and [Mužík et al. \(2023b\)](#)

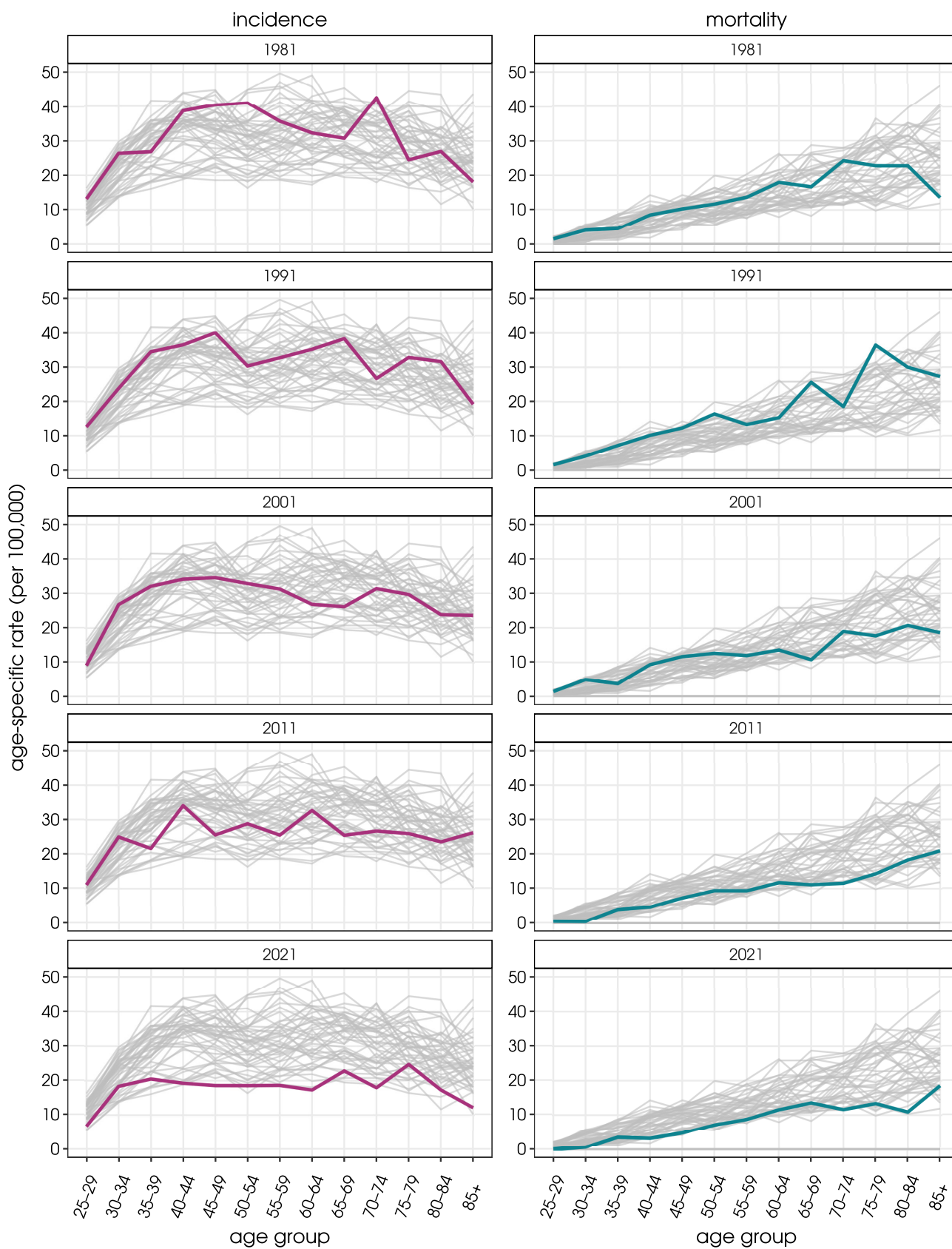


Figure 2.3: Cervical cancer age-specific incidence and mortality rates, Czech women, 1977–2021 and selected years; data sources: [Mužík et al. \(2023a\)](#) and [Mužík et al. \(2023b\)](#)

2.3 Screening attendance and avoidance

Despite the increasing availability of screening services in European countries, participation is still insufficient in most of them and considerable hesitancy towards screening occurs (Gianino et al., 2018). Several authors have tried to uncover the reasons for the low attendance at cancer screenings. Most of the research looks at screening at the population level and inequalities in screening, while less attention has been given to individuals and their barriers and motivations.

2.3.1 Inequalities in screening attendance

Evidence shows differences in screening attendance by age (Schoofs et al., 2017; Leinonen et al., 2017; Edwards and Jones, 2000), socioeconomic status (level of education, household income) (Carrozzi et al., 2015; Martín-López et al., 2010; Douglas et al., 2016; Willems and Bracke, 2018), marital status (Leinonen et al., 2017; Edwards and Jones, 2000; Martín-López et al., 2010), immigration status (Leinonen et al., 2017; Carrozzi et al., 2015) and co-occurring health conditions, such as diabetes, overweight, or family history of heart disease (Schoofs et al., 2017).

Swedish study showed that women in the lowest income group were twice as likely to not participate in cervical screening as women in the highest income group. The same differences in participation in cervical screening were reported among employed women compared to the unemployed. Furthermore, less educated women were 77% more prone to non-attendance (Broberg et al., 2018). Willems and Bracke (2018) also showed an educational gradient in screening attendance. The Danish study focussing on passive nonparticipation in cervical screening (invited women who do not attend but do not actively decline) showed that women with basic education were three times more likely not to participate compared to highly educated women (Harder et al., 2018). Education has been positively associated with screening uptake even in several systematic reviews (Murfin et al., 2020; Damiani et al., 2015). Moreover, a British study suggested that individuals with higher education levels are more likely to receive lifestyle advice on cancer screening compared to less educated ones (Stevens et al., 2019).

In addition to education, health literacy is often mentioned as a factor that affects screening attendance. Inadequate health literacy may be associated with lower screening rates (Oldach and Katz, 2014; Berkman et al., 2011). Health literacy may be related to the ability to understand information about screening (Von Wagner et al., 2009) or cancer knowledge (Galvin et al., 2021). According to Baccolini et al. (2022), health literacy is critical for screening adherence.

Demographic factors are also associated with screening uptake. Women who did not co-habit were 57% more likely to not attend screening (Broberg et al., 2018). Married women were 1.83 times more likely to undergo breast screening in Spain compared to their single counterparts (Martín-López et al., 2010). Being unmarried has also been found to be a strong predictor of non-attendance in Italy (Damiani et al., 2012) or Norway (Leinonen et al., 2017), and being married or co-habiting was also associated with increased attendance of breast screening in

systematic review (Mottram et al., 2021).

Several health outcomes or lifestyle attitudes and choices can also be associated with screening attendance. For example, Martín-López et al. (2010) showed that non-smoking or ex-smoking, physical activity, or eating a healthy diet were positively associated with adherence to screening. Although obesity is a cancer risk factor, it was also found to be associated with higher screening non-attendance (Richard et al., 2015a; Urbute et al., 2022). Aldrich and Hackley (2010) pointed out that obese women may face difficulties in breast and cancer screening. Those may be related to stigma and embarrassment related to body weight, but also inadequately sized equipment and lack of physician-patient communication. From other health-related factors, previous studies have also mentioned that diabetes, high cholesterol, or a history of chronic diseases can lead to screening non-attendance (Schoofs et al., 2017; Richard et al., 2015b).

2.3.2 Screening barriers and reasons for non-attendance

Generally, more research is focused on characteristics of individuals not-attending screening, while less attention has been paid to particular reasons for non-attendance.

Bongaerts et al. (2019) categorized determinants on non-attendance in their systematic review of Dutch screening programmes. The main categories according to them are: *predisposing factors* (such as socio-economic status and other determinants, which have already been described in chapter 2.3.1), *information factors*, such as lack of tailored communication, which would lead to more informed decision making, *awareness factors*, such as limited knowledge about cancer and low priority of health, or being convinced that cancer cannot be cured, *motivation factors* (low motivation), *ability factors*, which were e.g. forgetfulness, language barriers or low health literacy, and *barriers* – fear of the test or its outcome, shame, or time-related barriers. Chorley et al. (2017a) described two main themes overarching the barriers to cervical screening: first, *Should I go for screening?* and second, *Screening is a big deal*. In the first theme, women considered the relevance of screening. They mainly questioned whether it is meant for them in relation to their age, perceived risk – e.g., due to their sexual behaviour, family history or current health (they felt healthy and did not find it necessary) and the value of screening – whether it has value (as a “certificate” of health) or not. The second theme covered mainly concerns related to fear, that it can reveal cancer, cause anxiety, emotional stress, physical harm, or social threat (women may be labelled promiscuous). In this theme, the behaviours of health professionals were also discussed.

Women who actively declined cervical screening mentioned lack of time (“too busy to go to screening”), embarrassment, low relevance due to their sexual behaviour or fear of the results as reasons for screening avoidance (Bennett et al., 2018). Non-risky sexual behaviour, which leads women to believe that they do not need cervical screening, was identified as a reason for non-attendance in multiple other studies (Waller et al., 2012). Interestingly, women who have sex exclusively with women, women who have sex with women and men, and women who had

never had sex were reported to be less likely to attend screening than women who have sex with men (Saunders et al., 2021), therefore there is also another evidence that sexual behaviour can affect screening attendance.

There are common misconceptions about screening, which can also cause women to not attend it. Often, women are concerned about the potential harmful influence of X-ray exposure during mammography screening and the possibility of developing breast cancer after screening (Gong et al., 2023; Loving et al., 2021; Sarma, 2015; Marmarà et al., 2017; Poon et al., 2023; Watson-Johnson et al., 2011). Other common misbeliefs usually arise from low risk perception or lack of knowledge of cancer, e.g., that if a woman does not experience symptoms, feels healthy or has a healthy lifestyle, there is no reason to be screened (Sarma, 2015; Blomberg et al., 2008; Lee et al., 2002; Oscarsson et al., 2008, 2009; Jensen et al., 2015). Another false belief may be that if there is no cancer in the family history, women do not have to worry about their cancer risk (Denberg et al., 2005; Borrayo and Jenkins, 2001; Sarma, 2015). In the French study, women also expressed their doubts about the usefulness of breast screening and had negative opinions about mammography (Ferrat et al., 2013).

Another reason for screening non-attendance is the fear of the test result. According to Persoskie et al. (2014) fear of the screening result can lead to screening delays. Women may be afraid that if they get screened, they can find out that they have cancer (Sarma, 2015; Loving et al., 2021; Oscarsson et al., 2008). Perceiving cancer as a “death sentence” was associated with avoiding seeking medical care (Moser et al., 2014). Notable is also the concept of “manifest destiny” described by Watson-Johnson et al. (2011), which is the belief that thinking or worrying about cancer may lead to its development.

When talking about screening barriers, pain must be mentioned as one of them. It has been repeatedly shown that one of the reasons women do not attend is due to the experience of pain and discomfort through the screening procedure. The systematic review by Whelehan et al. (2013) showed that there is an association between pain experience during mammography and not re-attending it in the future. Even cervical screening can be perceived as painful by some women, which can lead to non-attendance in the future (Chorley et al., 2017b; Oscarsson et al., 2008). Some of the women in the study also report continuing pain or bleeding even after the screening procedure. In addition to being painful, screening can also be perceived as embarrassing, shameful, scary, or invasive, all of which can lead to non-participation (Gesink et al., 2016; Chorley et al., 2017b; Sarma, 2015; Nagendiram et al., 2020; Brown et al., 2019).

Barriers related to providers and healthcare professionals are also mentioned in the literature. The attitudes of the physician were reported to be very important, being warm and friendly has been shown to be an important screening facilitator (Brown et al., 2019). In addition, Chorley et al. (2017b) shows that physicians’ behaviour is an important factor: women in their study often felt dismissed, ignored, or that smear takers were in general insensitive to their feelings. Women expressed their desire for the physicians to recognise the importance of screening for them and also their desire to have the screening procedure explained. Gender, age and origin of

the general practitioner (GP) have also been found to be a significant predictor of attendance in the Norwegian study (Leinonen et al., 2017).

3 Objectives and Research Questions

The presented thesis focuses on the phenomena of screening participation among women, with a special emphasis on non-attendance. Using a mixed methods approach and multiple sources of data, this work tries to fulfil two main objectives. First, it aims to quantify screening attendance in Europe and in Czechia. Second, it tries to describe the determinants of participation and the reasons for non-participation women may experience. The main research questions that will be targeted in this work are:

1. How much do women in Europe attend screening? Are there educational inequalities in screening attendance?
2. What are the screening attendance rates among Czech women? Are there age, regional and time differences in attendance?
3. What are the sociodemographic determinants of screening non-attendance among Czech women?
4. What are the reasons for screening non-attendance among Czech women?

Answering these questions and meeting the research objectives should provide information on how to increase participation in screening in the Czechia by better tailoring interventions and policies to the profiles of non-participants.

4 Data and Methods

Several data sources were used in this work and the mixed-method approach was applied to achieve the research objectives. A major part of the analysis was performed in R ([R Core Team, 2022](#)), in addition to this, MS Excel and Atlas22 were used. The maps were created by a colleague, Dr Lukáš Brůha.

4.1 European Health Interview Survey

Data from the **European Health Interview Survey (EHIS)**, Wave 3 (2019) were used to quantify screening participation in European countries and to estimate educational inequalities in screening attendance in Europe. The EHIS is a survey on health status, healthcare use, and health determinants and targets the population aged 15 years and older. EHIS is conducted in all EU countries with the same methodology, hence international comparison is possible. The health data belong to sensitive categories of data, and the access to microdata concerning health is available after a clear justification of substantial public health interest. Upon official request, access to the EHIS data was possible. The entire available data set contains information on 325,577 participants (174,595 women) from 30 countries.

Data from EHIS were analysed using descriptive statistics, direct standardisation (2013 European Standard Population), and binary logistic regression.

4.2 General Health Insurance Company

The General Health Insurance Company (Všeobecná zdravotní pojišťovna, VZP) is the largest provider of health insurance in Czechia, covering approximately 55–60% of the whole Czech population. The **health insurance data obtained from VZP** were used to calculate attendance to cervical and breast cancer screening in Czechia. Data were provided in the form of an extensive database, where the main source of information was the treatment record. Each treatment record consists of the code of treatment, the year when the treatment was provided and the region (LAU 1 administrative unit) of the provider, as well as patient details (sex, year of birth, region of permanent residence). The 5-year age group structure of the number of insured clients by LAU 1 region was also obtained from VZP. Data were only available for 2009–2017¹.

¹Recently, screening data has been opened and are now publicly available at the National Health Information Portal (NZIP).

Data from General Health Insurance Company were analysed using direct standardisation (2013 European Standard Population) and calculation of age-specific attendance rates.

4.3 Self-conducted Questionnaire

Thanks to the collaboration with the Medical Information Centre (Lékařské informační centrum) it was possible to gather individual-level data on screening participation from Czech respondents. The Medical Information Centre in cooperation with INRES-SONES carries out an annual representative sociological survey of Czech citizens since 1995. Approximately 1,800 participants are interviewed each year with questions about various aspects of lifestyle, health, and healthcare. The basic sociodemographic characteristics of each participant, such as age, marital status, education attainment, occupation, or household income, are included in the survey. The Medical Information Centre offers researchers the opportunity to include their own questions in the survey. Using this possibility, several questions about attitudes towards cancer screening among Czech women were asked in the survey, which was conducted in 2020. The questions were based on the EHIS survey (questions about attendance and its timing) and the literature review (questions about barriers and motivations for screening attendance). This data allow to further investigate determinants of screening attendance and to identify possible reasons for non-attendance Czech women may experience. A total number of 902 participants joined the survey (out of 1,012 women invited to participate).

Data were analysed using descriptive statistics and binary logistic regression.

4.4 Semi-structured Interviews

Lastly, semi-structured interviews were conducted with 10 women of different ages and educational backgrounds who did not attend screening. The interviewees were women eligible for cervical or breast screening or both and did not attend at least one of the screenings in the past three or five years, respectively. The main recruiting strategy was cooperation with an external market research agency STEM/MARK and the majority of respondents were recruited through a short questionnaire on the Czech national panel. In the first round of selection, women who considered themselves non-attendees and were willing to be interviewed were asked for contact information. The non-attendance status was then confirmed via a short phone call or through text messages or email (based on their indicated preference). Those who met our criteria were then invited for an interview. The interviews with the participants were conducted from December 2021 to May 2022 in face-to-face or ZOOM settings, according to their preference.

The interview guide was used to conduct the interviews and included seven main areas: the basic information about the participant, use of healthcare services (including preventive healthcare visits, specialised healthcare services, medication, vaccination, and supplements), lifestyle and other types of health care, disease management and health information seeking, relationship

with healthcare professionals, reasons for screening non-attendance, and understanding of the Czech healthcare system.

All interviews were recorded and transcribed verbatim. The duration of the interviews was between 26 and 50 minutes. All interviews were conducted in Czech and only selected parts and quotes were translated into English. An inductive approach was applied to the analysis. First, the transcribed interviews were read through several times and the initial free coding was applied using Atlas22 software. From the initial reading and coding, several underlying themes emerged. The initial codes were grouped into themes that describe groups of barriers. The interviews were conducted by the same person who performed the coding. The entire study was approved by the Institutional Review Board of the Faculty of Science, Charles University (approval number 2021/12).

5 Educational inequalities in cervical cancer screening participation in 24 European countries

Anna Altová¹, Ivana Kulhánová^{1,2}, Katharina Reisser^{3,4}, Pavlína Netrdová², Jan Brož⁵, Terje Andreas Eikemo⁶, Mirza Balaj⁶, Michala Lustigová^{2,7} ¹Department of Demography and Geodemography, Faculty of Science, Charles University, Prague, Czechia, ²Department of Social Geography and Regional Development, Faculty of Science, Charles University, Prague, Czechia, ³Faculty of Medicine, Leipzig University, Leipzig, Germany, ⁴ Faculty of Health, Medicine, and Life Sciences, Maastricht University, Maastricht, the Netherlands, ⁵Department of Internal Medicine, Second Faculty of Medicine, Charles University, Prague, Czechia, ⁶Research (CHAIN), Department of Sociology and Political Science, Norwegian University of Science and Technology, Trondheim, Norway, ⁷National Institute of Public Health, Prague, Czechia

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Abstract

Objectives: Cervical cancer screening (CCS) is an important public health measure for early detection of cervical cancer and prevents a large proportion of cervical cancer deaths. However, participation in CCS is relatively low and varies substantially by country and socio-economic position. This study aimed to provide up-to-date participation rates and estimates on educational inequalities in CCS participation in 24 European countries with population-based CCS programmes. **Study design:** This was a cross-sectional study. **Methods:** Using data from the European Health Interview Survey (EHIS) conducted in 2019, 80,479 women aged 25–64 years were included in the analyses. First, standardized participation rates and standardized participation rates by educational attainment were calculated for all 24 countries based on each country-specific screening programme organization. Second, a series of generalized logistic models was applied to assess the effect of education on CCS participation. **Results:** Screening participation rates ranged from 34.1% among low-educated women in Romania to 97.1% among high-educated women in Finland. We observed that lower-educated women were less likely to attend CCS than their higher-educated counterparts. Largest educational gaps were found in Sweden (odds ratio [OR] = 6.36, 95% confidence interval [CI] = 3.89–10.35) and Poland (odds ratio = 5.80, 95% CI = 4.34–7.75). **Conclusions:** Population-based screening initiatives have successfully reduced participation differences between women with medium and high educational attainment in some countries; however, persistent disparities still exist between women with low and high levels of education. There is an urgent need to increase participation rates of CCS, especially among lower-educated women. **keywords:** Cervical cancer, Screening, Attendance, Inequalities, Education, Europe

Introduction

Cervical cancer screening (CCS) is an essential public health measure for early detection of cervical cancer. Cancer screening can be opportunistic or population based. Opportunistic cancer screening depends on the individual's initiative or a physician's recommendation. Population-based or organized cancer screening is available to all eligible individuals (target population) who are systematically invited and screened through a policy-regulated structure (Basu et al., 2019). While opportunistic screening is less cost-effective and less equal (Arbyn et al., 2009), well-organized populationbased cancer screening programmes for cervical cancer are proven to save lives and be cost-effective. Hence, a high attendance rate is crucial for individual and public health (Arbyn et al., 2009; World Health Organization, Regional Office for Europe, 2022). Regarding the effectiveness of CCS, a study from Nordic countries estimated a decrease in cervical cancer mortality between 25% and 80% (Läärä et al., 1987). According to a recent systematic review, cervical cancer mortality was reduced by 41%–92% for women attending organized screening vs non-attenders (Jansen et al., 2020).

The participation in the national cancer screening programmes is often insufficient (Ginanino et al., 2018). Participation rate in CCS in Europe was recorded at only 34% in 2016 (Ponti et al., 2017). Even in the longest running and well-funded cancer screening programmes, participation has stagnated at lower than 70% of the eligible population. One of the main reasons for the untapped full potential of cancer screening is the build-in assumption that all social groups will equally seek

to avert future diseases. However, empirical evidence has documented that higher socioeconomic groups are more likely to use health-care services in general and prevention services in particular. Therefore, regardless of the type of cancer screening programme, lower overall participation is driven by lower rates of participation by disadvantaged social groups (Pérez et al., 2017).

While participation in organized CCS may differ by age group (Kristensson et al., 2014; Altová et al., 2021), evidence also suggests that low participation is linked to socio-economic status (Harder et al., 2018; Murfin et al., 2020). CCS uptake rates were greater among the higher-educated women in different countries (Harder et al., 2018; Willems and Bracke, 2017). Education is a socio-economic determinant consistently described to be associated with CCS participation (Murfin et al., 2020; Willems and Bracke, 2017; De Prez et al., 2021). Systematic reviews and meta-analyses showed a clear association between educational attainment, measured by the highest educational attainment or the years of schooling, and participation in opportunistic and organized CCS in high-income countries (Murfin et al., 2020; Damiani et al., 2015). It has been shown that women with highest educational attainment are twice as likely to adhere to cervical screening compared with lowest educated women (Damiani et al., 2015).

The knowledge of differences in CCS participation by social position is essential for policymakers to provide recommendations for preventive strategies. To our knowledge, recent comprehensive overview of educational inequalities in cervical screening is missing. The comparison of the European Union (EU) can only

be found in studies analysing data from Eurobarometer 66.2 conducted in 2006 (Willems and Bracke, 2017) and EHIS Wave 2 conducted in 2013–2015 (Bozhar et al., 2022). Therefore, this study aimed to estimate recent educational inequalities in CCS in a wide range of European countries with individual population-based CCS programmes.

Methods

This study used pooled data from the European Health Interview Survey (EHIS), particularly wave 3 of the EHIS (EHIS-3) obtained from EUROSTAT. EHIS-3 is a cross-sectional country-level representative health survey. The main goal of this health questionnaire is to obtain harmonized and high-quality data on health across Europe. The survey is based on the Commission Implementing Regulation (EU) No. 2018/255. Data were collected between January 2018 and September 2020 in all EU countries, Iceland, Norway, Serbia, the United Kingdom, and Turkey. Data were collected in the prepandemic period, except for those from Germany, Spain, and Malta. EHIS-3 gathers cross-sectional data on health status, health care, health determinants, and socioeconomic characteristics of individuals.

The quality report of the third wave of the EHIS—2022 edition—provides more information (European Commission, Statistical Office of the European Union, 2022).

The survey was conducted in 30 European countries; however, we used the data from 24 European countries with established population-based screening programmes at the time of data collection (Table 5.1). The countries with non-population-based (opportunistic) screening were excluded (Austria, Bul-

garia, Cyprus, Greece and Luxembourg). Furthermore, the analyses did not include data for France, which did not provide individual data for scientific purposes.

Based on the question ‘Last time of a cervical smear test’, we computed ‘up-to-date cervical cancer screening (CCS) participation’ (the dependent variable). The options given to respondents were as follows: ‘within the last 12 months’, ‘1 to less than 2 years’, ‘2 to less than 3 years’, ‘more than 3 years’, and ‘never’.

We computed the variable following each country-specific screening programme interval (Table 5.1). The response options did not allow us to follow the up-to-date participation of the last screening in the case of 5-year screening intervals; in such cases, we could not distinguish between lifetime participation and 5-year interval participation. We evaluate this group of countries separately (shown as ‘group 2’ in the results). We assume that despite these inaccuracies, the computing of up-to-date participation gives us the best information about women’s ability to use offered preventive health care in each country. Countries with a 5-year interval in major parts of the screening interval are also shown as group 2. In addition, Malta was included in the analysis as a group 2 country as screening is opportunistic in the age range of 40–64 years. Thus, ‘group 1’ contains countries where up-to-date participation could be calculated, whereas in ‘group 2’, we calculated lifelong participation for the reasons mentioned earlier.

Women aged 25–64 years were included in the analyses, even if the target age group was wider in some countries. In the case of narrower age groups, only such defined age group was considered (Table 5.1).

Country	Group	Target age	Screening interval (years/age group)	Year of programme initiation	References
Belgium	1	25–64	3	2013	Jolidon et al. (2020); Basu et al. (2018)
Croatia	1	20–64	3	2012	Sabol et al. (2017)
Czechia	1	15+	1	2008	Altová et al. (2021); Basu et al. (2018)
Denmark	1	23–64	3 (23–49); 5 (50–64)	2007	Basu et al. (2018); Njor et al. (2023); Partanen et al. (2019)
Estonia ^a	2	30–55	5	2006	Partanen et al. (2019); Suurna et al. (2022); Kojalo et al. (2023)
Finland	2	25–65	5	1963	Basu et al. (2018); Partanen et al. (2019); Pankakoski et al. (2019)
Germany ^d	1	20+	1 (20–34); 3 (35+)	2020	Wang et al. (2022)
Hungary	1	25–65	3	2003	Basu et al. (2018); Gyulai et al. (2018)
Iceland	1	23–69	3	1964	Partanen et al. (2019); Sigurdsson and Sigvaldason (2006)
Ireland	2	25–60	3 (25–44); 5 (45–60)	2008	Basu et al. (2018); Flannelly et al. (2018)
Italy	1	25–65	3 (25–29); 5 (30–65)	2014	Wang et al. (2022); Venturelli et al. (2019)
Latvia	1	25–69	3	2009	Basu et al. (2018); Kojalo et al. (2023)
Lithuania	1	29–59	3	2004	Basu et al. (2018); Kojalo et al. (2023)
Malta ^b	2	27–64	3	2016	Deguara et al. (2020)
Norway	1	25–69	3 (25–33); 5 (34–69)	1995	Partanen et al. (2019); Riibe et al. (2021)
Poland	1	25–59	3	2006	Basu et al. (2018); Nessler et al. (2021)
Portugal ^e	1	20–64	3	1995	Marques et al. (2022)
Romania	2	25–64	5	2012	Basu et al. (2018); Ilisiu et al. (2023)
Serbia	1	25–69	3	2012	Rančić et al. (2020)
Slovakia ^c	1	23–64	3	2008	Basu et al. (2018); National Oncology Institute (2024)
Slovenia ^c	1	20–64	3	2003	Institute of Oncology Ljubljana (2020); Ivanuš et al. (2021)
Spain	2	25–64	3 (25–34); 5 (35–64)	2019	Portero de la Cruz and Cebrino (2022)
Sweden	1	23–64	3 (23–50); 7 (51–64)	1967	Partanen et al. (2019); Wang et al. (2022); Maver and Poljak (2020)
the Netherlands ^f	2	30–65	5 (30–40); 10 (41–65)	1970	Basu et al. (2018); Maver and Poljak (2020)

Table 5.1: Basic characteristics of cervical cancer screening programmes in selected EU countries around the year 2019.

Group = group of countries analysed; group 1 = countries where it was possible to calculate the up-to-date participation regarding their screening intervals (up to 3 years in all or majority of age groups); group 2 = countries where the screening interval is larger than 3 years and therefore the lifetime participation is calculated.

^a In **Estonia**, since 2021, the target age was expanded to 65 years. ^b In **Malta**, women aged 40–64 years are still screened opportunistically. ^c In **Slovenia** and **Slovakia**, the first two screenings are in 1-year intervals, then in 3-year intervals. ^d In **Germany**, a population-based cervical cancer screening programme was introduced in January 2020. Data for EHS 2019 were collected in 2020 in Germany. ^e In **Portugal**, a population-based CCS programme covers all the country's regions except for the Madeira Autonomous Region. There are also variations in the CCS programme specificities across regions in terms of primary screening test (Human papilloma virus (HPV) test, liquid-based cytology, or conventional cytology), periodicity (every 3 or every 5 years), and target age groups (women aged 25–60, 25–64 or 30–65 years old). ^f In the **Netherlands**, women aged 45 and 55 years are invited only if they missed screening 5 years ago or were HPV positive at the last screening.

Educational attainment level in the EHIS survey is based on International Standard Classification of Education (ISCED)-2011 categories (Eurostat, 2023). We merge the obtained data into three categories: low education (ISCED 0–2), medium education (ISCED 3–4), and high education (ISCED 5–8). Only women with known educational attainment and CCS participation were included in the analysis. In total, data from 80,479 women were analysed (the number of participants for each country can be found in Supplement A, Table A.1).

First, age-standardized up-to-date participation rates for each country were calculated, both by educational attainment and overall. The 2013 European Standard Population was used for standardization (Eurostat, 2013). Second, binary logistic regression was applied to estimate the chances of up-to-date non-participation in CCS by educational level for each country. All regression analyses were adjusted for age.

Results

The overall standardized up-to-date CCS participation rates in the 24 countries ranged from 65.8% (Serbia) to 95.4% (Sweden) in group 1 countries and from 54.8% (Romania) to 97.2% (Finland) in group 2 countries. The participation rate range was wider when distinguished by the women's educational attainment (Fig. 5.1).

Based on the participation rates by education, it is already possible to say that differences in participation differ within and between countries. In some countries, there were very small within-country differences in participation rates between high- and low-educated women—below 11 percent points (pp) in Sweden and Iceland (in group 2 also in Finland, Ireland, Italy, Norway, and Spain, and even a negative difference of -2.1 pp in the Netherlands). In other countries, differences were more substantial—over 30 pp in Poland, Serbia, and Slovakia (and Romania in group 2). The low-

est attendance among low-educated women was recorded in Serbia (46.7%) and Romania (34.1%, group 2), while the highest attendance of high-educated women was in Sweden (96.3%) and Finland (97.1%, group 2). Full results can be found in Supplement A, Table A.2.

The results of binary logistic regression (Fig. 5.2) confirmed significant differences between countries in up-to-date non-participation by educational attainment. In every country except for Malta (group 2), low-educated women had significantly higher chances of non-participation than high-educated women ($P < 0.05$). The odds ratios (ORs) for up-to-date non-participation in low-compared with high-educated women ranged from 6.36 (95% confidence interval [CI] = 3.89–10.35) in Sweden to 1.67 (95% CI = 1.24–2.26) in Slovenia (group 1) and from 4.49 (95% CI = 3.68–5.49) in Romania to 1.81 (95% CI = 1.30–2.51) in Ireland (group 2). When comparing chances for up-to-date non-participation of medium- to high-educated women, they were lower in all countries, and the ORs were not significant in some. The table with the binary logistic regression results can be found in Supplement A, Table A.3.

While in several countries, no discernible social disparity was noted between women with medium and high levels of education, a notable trend emerged in which women with lower educational attainment exhibited significantly higher odds of being non-participants in up-to-date screening than their highly educated counterparts across all countries. It is worth mentioning that this pattern held in all countries except for Malta, where statistical significance was not reached due to a limited number of respondents in the study.

Discussion

Discussion of estimated results

A crucial prerequisite for implementing population-based screening initiatives is the mit-

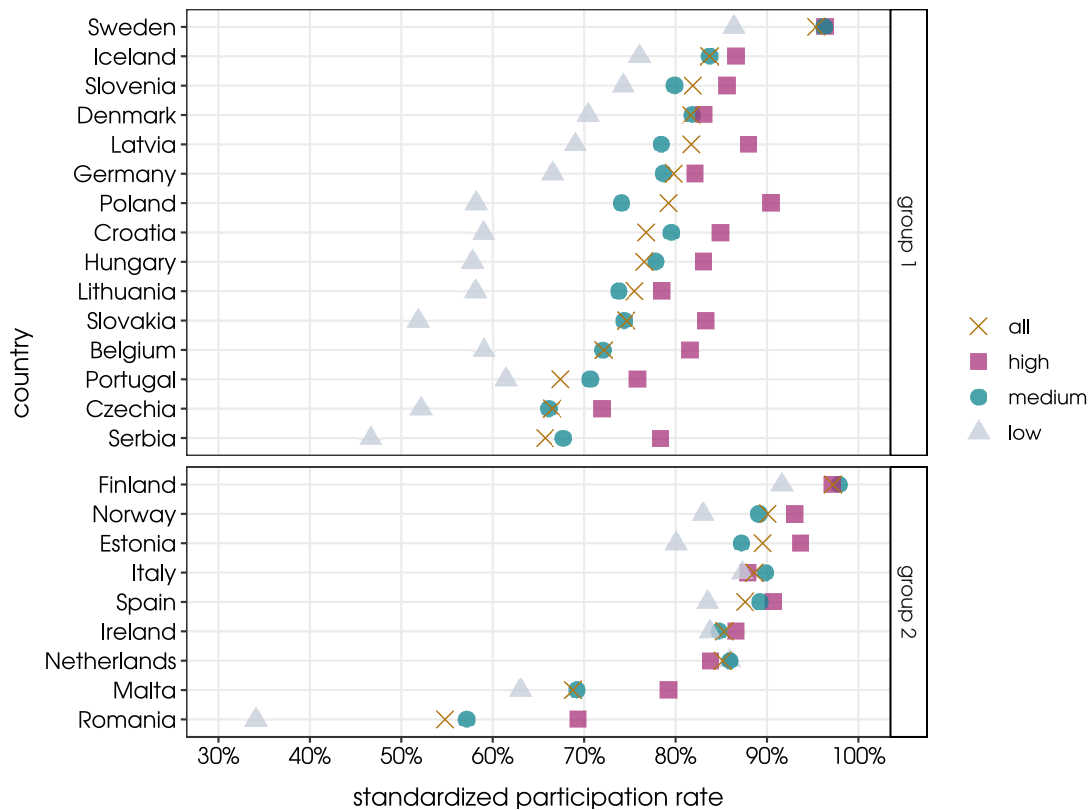


Figure 5.1: Standardized up-to-date participation rates by educational attainment in selected EU countries

igation of social disparities in the utilization of preventative healthcare services (World Health Organization, Regional Office for Europe, 2022). Several studies that exclusively focused on population-based programmes or differences between opportunistic and population-based programmes have already reported the absence of socio-economic inequalities in participation rates (Gianino et al., 2018; Palència et al., 2010; Walsh et al., 2011). However, it is worth noting that educational attainment, recognized as a key socio-economic determinant, consistently emerges as a significant factor linked to screening engagement (Murfin et al., 2020; Damiani et al., 2015; De Prez et al., 2021).

In line with these findings, our research underscores a clear association between educational attainment and participation in organized CCS programmes. In our analytical approach, we intentionally controlled for age alone, allowing us to examine the comprehensive impact of education on

participation. The observed association was consistent across all countries included in our analysis.

It is possible that the high uptake of screening in all educational groups, with no significant social differences in low-medium comparison such as Sweden, Iceland, or Finland (group 2), is due to the very long duration of screening programmes (in both countries, screening was introduced more than 50 years before EHIS 2019) as all cohorts of women are already used to the procedure. In addition, since the participation is already very high in these countries (95.4%, 83.7%, and 97.2%), only the educational benefits of high-educated women compared with low-educated women can be observed.

Explanation of persisting social gap

Attempts to find mediating pathways between education and screening participation identified health literacy, perceived susceptibility, and cues

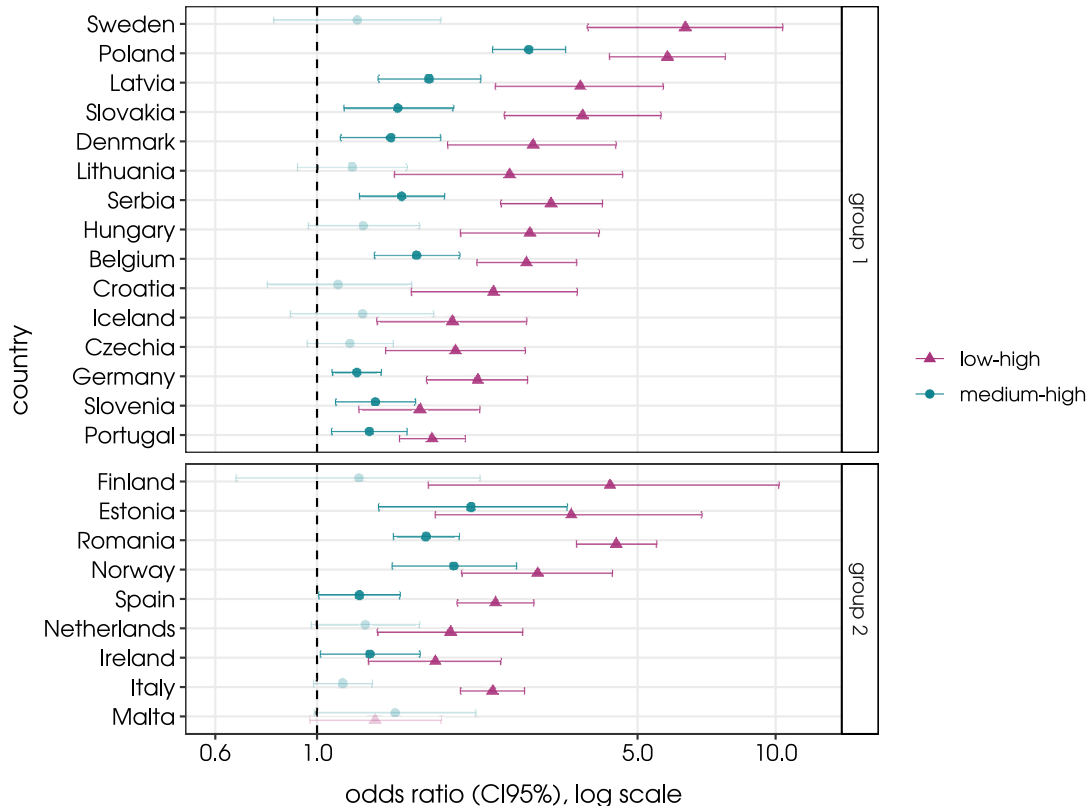


Figure 5.2: Chances of up-to-date non-participation by education compared with high education, results of binary logistic regression.

to action (i.e. feeling symptoms) as the core mediators (Feng et al., 2021). In recent systematic reviews and meta-analyses, adequate health literacy significantly increased the chance of attending screening, including CCS (Baccolini et al., 2022). Some studies have also shown that screening participation is most strongly associated with overall healthcare utilization. Kristensson et al. (2014) reported that having no contact with dental care and no contact with a general practitioner were the main predictors for non-participation in CCS. Different theories try to explain the universally observed association between educational attainment, health outcomes, and preventive behaviour. For instance, Wardle et al. (2004) discussed the role of cognitive and psychosocial models in socioeconomic differences in cancer screening participation. The psychosocial model suggests that factors such as higher stress and lower social support explain, in part, why people from lower socio-

economic status environments are less likely to participate in screening. The cognitive model suggests that beliefs about cancer risk and screening will be essential in differential participation. In practice, both factors may contribute to explaining socioeconomic differentials (Wardle et al., 2004).

Moreover, structural factors and country-level indicators may affect educational disparities in screening attendance. For instance, countries with better access to health care (i.e. higher general practitioner (GP) density, higher public health expenditure) and higher levels of social protections (unemployment benefits, social assistance, and better healthcare provision) have lower social inequalities in CCS (De Prez et al., 2021; Jolidon et al., 2021).

Limitations

Our analyses come with several inherent limitations that deserve acknowledgement. First, our

data on screening participation were sourced from a population-based survey reliant on self-reported information provided by women regarding their utilization of screening services. It is important to note that self-reported data have inherent limitations, including the potential for memory biases and the influence of social desirability bias. In simpler terms, women often overstate their participation in cervical screening within a given timeframe (Howard et al., 2009).

However, it is crucial to recognize that the extent of this overestimation effect may vary among different demographic groups, particularly when considering educational differences. More highly educated women may overestimate their participation more than less educated counterparts due to their awareness of the importance of screening and the societal expectations surrounding it. Screening behaviour is often perceived as socially desirable. Conversely, certain groups, particularly those with lower levels of education, may misreport their screening utilization, for instance, because they are less aware that cervical screening is a component of routine healthcare examinations or the question wording on participation is unclear to them (Howard et al., 2009).

On the other hand, in many countries, self-reported participation is the only way to estimate cancer screening participation in combination with other sociodemographic, health status, and healthcare usage characteristics.

The second limitation is the fact that it was not possible to assess the countries based on the system of their invitations. All countries included in the analysis had some form of population-based screening programme, which should also include systematic inviting of target population to screening. However, there are no general recommendations on the form, content, and frequency of the invitations which countries should use. This can result in inequalities between and within countries which have

not been assessed. It has, for example, been shown that the opt-out invitations, where women are already given a set time of their screening appointment, are more efficient (Allgood et al., 2017). In addition, it also depends on the wording of the invitation to be understood by patients of all educational levels. However, this was not possible to tackle in this study.

The third limitation could be seen in the ‘participation’ outcome definition. Several outcomes can be used: non-participation within the period, lifelong non-participation, participation up-to-date, participation within the last year, and participation in EU-recommended interval. As our main goal was to estimate the ability of different women’s groups to use offered preventive care and see the ability of individual health systems to include vulnerable and most at-risk groups in preventive care, we believe that comparing the participation up-to-date is the best measure for health behaviour of the populations.

Determining up-to-date participation in each studied population posed certain complexities and proved quite labour intensive. Initially, it was necessary to retrospectively gather information on screening guidelines in each country around 2019 as the EHIS data were primarily collected during that year. The literature used for this step is listed in Table 1. Furthermore, it became apparent that the proposed question regarding CCS in the EHIS study adhered to EU recommendations for that particular year (endorsing a 3-year screening interval). However, from the responses, it was impossible to distinguish between regular and lifetime participation in countries where the screening occurred within a 5-year interval. Further inaccuracies may arise in countries where health care is not uniformly structured, and individual regions have different rules for screening and so forth. Overall, it has been revealed that there is significant variability in screening practices, and cross-country

comparisons can introduce various biases and challenges. However, this should not affect the assessment of the social gradient.

The examination of social inequalities in cervical screening participation has been the focus of numerous studies. However, from our perspective, this study stands out as one of the first to explore these disparities across all EU countries where population-based screening programmes operate. Another noteworthy advantage of our study is the uniform utilization of the EHIS 2019 data set across all countries, using a consistent methodology for estimating the potential screening uptake, irrespective of its health-related impacts.

Conclusion

Prevention and early detection of diseases have become increasingly prominent in population health within developed countries. This shift in focus is necessitated by chronic diseases, including cancer, comprising a significant portion of the disease burden and mortality. One valuable intervention for mitigating the incidence and mortality associated with cervical cancer in women is screening.

Despite the availability of highly effective CCS programmes, many women remain disengaged from screening activities. A notable trend emerges where women with lower educational backgrounds tend to underuse CCS services. While population-based screening initiatives have successfully narrowed the participation gap between women with medium and high educational attainment in some countries, a persistent disparity exists between women with low and high levels of education. This enduring inequality was evident in 23 of 24 countries studied and contributed to the widening health disparities. Remarkably, this pattern persists even in countries with well-established population-based CCS traditions.

There are potentially several ways to help in-

crease the participation, such as walk-in screening or prescheduled invitations, offering days off for preventive care appointments, increasing health awareness and health education. However, for setting appropriate health policies, exploring mediating pathways between screening participation and education (or social status) is necessary. This is crucial for gaining comprehensive understanding of non-participation and addressing the unequal participation properly. Health systems should consider vulnerable groups' social and cultural context when designing prevention programmes.

Author statements

Ethical approval

All data used in this study were anonymized entirely. Therefore, ethical approval was not required.

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Competing interests

None declared.

Authors' contributions

A.A. and M.L. conceived the study. A.A., M.L., and P.N. performed the analysis. A.A., I.K., and M.L. drafted the manuscript. K.R. provided the literature review. All authors critically reviewed the manuscript for important intellectual content and approved the final version of the article.

Data availability

This article is based on data from Eurostat, EHIS 2019. The responsibility for all conclusions drawn from the data lies entirely with the authors.

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6 Breast and cervical screening attendance among Czech women

Anna Altová¹, Ivana Kulhánová^{1,2}, Lukáš Brůha³, Michala Lustigová^{2,4}

¹Department of Demography and Geodemography, Faculty of Science, Charles University, Prague, Czechia, ² Department of Social Geography and Regional Development, Faculty of Science, Charles University, Prague, Czechia, ³Department of Applied Geoinformatics and Cartography, Faculty of Science, Charles University, Prague, Czechia ⁴National Institute of Public Health, Prague, Czechia

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Abstract

Objectives: The aim of the study was to investigate the variation in breast and cervical cancer screening attendance among Czech women by age and in regions in 2009–2017. **Methods:** The data from the health insurance company that covers around 50% of the Czech population were used to calculate age-specific attendance rates and standardized attendance rates by year and region. **Results:** In 2017, the attendance of all eligible women was 52% in breast cancer screening and 46% in cervical cancer screening. There were differences in attendance among groups of women. Women aged 45–49 had attendance rates in both screenings around 60%, while 39% of women aged 75–79 attended breast cancer screening, and 23% attended cervical cancer screening. In regions, attendance ranged from 38% to 70% in breast cancer screening and from 32% to 55% in cervical cancer screening. **Conclusions:** We identified the age-specific differences and regional variation in both breast and cervical cancer screening attendance among Czech women. Those with lower attendance may have a higher risk of dying from breast and cervical cancers. Mitigating this risk should be a priority of public health policies.

keywords: cancer screening, breast cancer, cervical cancer, cancer prevention, Czechia

Introduction

Cancer is the second leading cause of death in Czechia, causing annually about one-quarter of all deaths. Breast cancer is the most frequently diagnosed cancer among women and the third most common cancer in the Czech population. Due to breast cancer 1,620 women died, which accounts for 13% of all cancer

deaths among Czech women in 2017 (Czech Statistical Office, 2019). In the last 30 years, the number of newly diagnosed breast cancer cases per year has increased more than twice, with over 7,000 women being diagnosed in 2017 (Dušek et al., 2005).

Cervical cancer is less common, however still a quite frequent disease with around one thousand diagnosed cases every year.

Since 2011 the incidence has dropped below 1,000 cases per year to almost 800 cases in 2017 (Dušek et al., 2005). In 2017, there were 354 deaths due to cervical cancer in Czechia (Czech Statistical Office, 2019).

Breast cancer mortality in Czechia was below the average of the European Union in 2016 (Eurostat, 2020a). The value of standardized mortality rate for the EU-28 was 32.9 deaths per 100,000 females, while in Czechia 30.1 deaths per 100,000 females. On the other hand, the standardized cervical cancer mortality rate of Czechia – 5.6 deaths per 100,000 females, was slightly higher than EU-28 average of 3.8 per 100,000 females.

The success of cancer treatment depends heavily on the timely diagnosis in the earliest stage possible. Screening is a valuable tool for achieving cancer mortality reduction of some cancer sites. For instance, it has been estimated that breast cancer mortality can be reduced approximately by 20% (Myers et al., 2015; Marmot et al., 2013) and cervical cancer by 80% (Peto et al., 2004) due to screening. Landy et al. (2016) showed that cervical cancer mortality of women aged 25–79 could be reduced by half if all of them attended screening regularly. The evidence for mortality reduction due to screening in older women is limited. However, Galit et al. (2007) suggest that women aged 75 and older with reasonably estimated life expectancy and without comorbidities may benefit from breast cancer screening in terms of reduced breast cancer mortality and detection of smaller tumours. The efficiency of cervical cancer screening for older women (age 55–79) has also been shown (Kamineni et al., 2013). In older women, the potential harms and benefits of breast cancer screening should

always be taken to account (Walter and Schonberg, 2014).

According to the EU guidelines for quality assurance, breast cancer screening should be provided to women aged 50–69 every two years using mammography (Perry et al., 2006). For cervical cancer screening, the guidelines recommend cervical cytology, which should start between the ages of 20 and 30 and should continue in 3–5 years interval until the age of 60 (Arbyn et al., 2008).

The Czech Breast Cancer Screening Programme – population-based cancer screening – was launched in September 2002. Until the end of 2009, the target population was only women at the age of 45–69. Since 2010 screening has been provided to all women from the age of 45+ without any upper age limit (Ministerstvo zdravotnictví ČR, 2010). Compared to EU recommendations and most other EU member states, Czechia has a wider age interval, as it does not have any upper age boundary for participating in the screening programme (Ponti et al., 2017). The screening is provided free of charge once in two years in one of around 70 specialized mammographic centres. If a woman wishes to participate in the screening programme, she firstly must visit her primary care provider (general practitioner or gynaecologist) to get a request form and then she can be screened in the mammographic centre.

The Cervical Cancer Screening Programme was launched in 2008 (Ministerstvo zdravotnictví ČR, 2007). The Pap smear test is used as a screening method, and it is an integral part of the annual gynaecologist check-up. The target age for screening is the same as the target age of this check-up, which is 15+ years (although

the age of the first visit to the gynaecologist may vary slightly). Again, compared to EU recommendations and most of the EU member states, there are no upper age limits for cervical cancer screening and the target age is 15+ in Czechia (Ponti et al., 2017). The screening is performed annually and free of charge.

In 2014, the personalized invitation programme was introduced (Czech Society for Oncology, 2020). The health insurance company sends the invitation letter to every woman aged 45–70 for the breast cancer screening and to every woman aged 25–70 for cervical cancer screening when she has been insured at that company for at least four years and has not been attending the screening for a longer period of time. The purpose of personalized invitations is to increase the attendance of long-term non-attendees.

Attendance in screening is a critical measure in a country with population-based screening (Bulliard et al., 2014) not only for the evaluation of screening usage but also for better targeting of screening and promotion. According to our knowledge, there is only one study evaluating the breast cancer screening attendance in Czechia (Majek et al., 2011). This study provides information about the first 7 years of the screening (2002 to 2008) and only takes women aged 45–69 into account. Therefore, the presented paper aims to investigate the attendance rates in breast and cervical cancer screening among Czech women and to analyse the regional differences and age structure of those rates from 2009 to 2017. Additionally, problematic regions and age groups of women will be identified.

Materials and Methods

We used data from the General Health Insurance Company (Czech acronym VZP). This health insurance company covers healthcare of approximately 55–60% of the whole Czech population, which makes it the largest provider of health insurance in Czechia. Health insurance in Czechia is mandatory by law, so everyone must be insured by one of 7 insurance providers. The insurance covers almost all expenses, such as preventive care, diagnostic care, hospital care, pharmaceuticals, etc. (only a small part of care is excluded, such as some dental care, cosmetic surgery and non-essential procedures). Cancer screening is provided free of charge to every resident who is in the eligible group (Kinkorová and Topolčan, 2012).

Anonymized healthcare records were provided for this study in the form of an extensive database based on Act No. 106/1999 Coll., on Free Access to Information. There was a single record for every treatment provided to a patient with the information on sex, year of birth, year when the care was provided, district of permanent residence of the patient (LAU 1 administrative division (Eurostat, 2020b) – “districts” in Czechia), district of healthcare provider, code of the treatment and anonymized ID. Data were provided for the years 2009–2017. Also, the end period structure (structure on 31st December) of insured clients was provided in 5-year age intervals for years 2008–2017, from which mid-period counts for every observed year were counted. We selected counts of two medical procedures – breast cancer screening and cervical cancer screening, both divided by 5-year intervals and LAU 1 districts of patient residence.

From the provided data, the screening attendance rates were counted. First, we counted the crude attendance rates for both screenings. In the case of cervical cancer screening, the crude attendance rates were counted as the number of performed cytology divided by the number of women insured by the VZP for every age interval and district. For the breast cancer screening, the number of women insured by the VZP was divided by two, due to the two-year screening interval and then applied the same way as for the cervical cancer screening. Second, we counted standardized attendance rates for both screenings, using the 2013 European Standard Population (Eurostat, 2013). Age-specific attendance rates were counted as well for every year. Although the results of the analysis are rates, for simplification they are presented as a percentage of the population. As the eligible group for the breast cancer screening changed in 2010, instead of the year 2009 the year 2010 was chosen for comparing with the year 2017 in regional results for both screenings and in breast cancer screening for national results.

Results

Table 6.1 shows crude and standardized attendance rates of Czech women in both screening programmes. Based on the differences between crude and standardized rates, a slight effect of age structure on the overall attendance rates was observed. The attendance rates in breast cancer screening rose between 2010 and 2017. The attendance has also grown between 2009 and 2017, however, there has been a stagnation since the year 2013. Since 2014 the attendance in breast cancer screening has been over 50% but it has remained under 50% for

cervical cancer.

Age-specific Screening Attendance

Figure 6.1 shows age-specific breast cancer screening attendance rates. In each age group, attendance has grown between the years 2009 and 2017. The attendance was the highest among the youngest women (45–49 years) with a 61.8% attendance rate in 2017 (compared to 49.4% in 2009). However, after the age of 70, attendance drops rapidly. In the year 2017, women aged 45–49 attended almost twice as much as women aged 75–79 and more than four times compared with women in the age group 80–84. Similar results were found for the age-specific cervical cancer attendance rates (Figure 6.2).

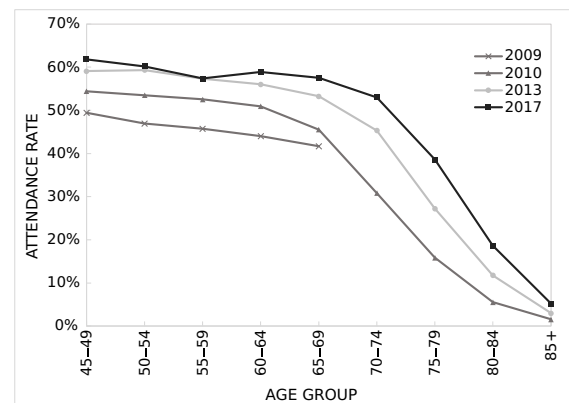


Figure 6.1: Age-specific breast cancer screening attendance rates (%), Czech women

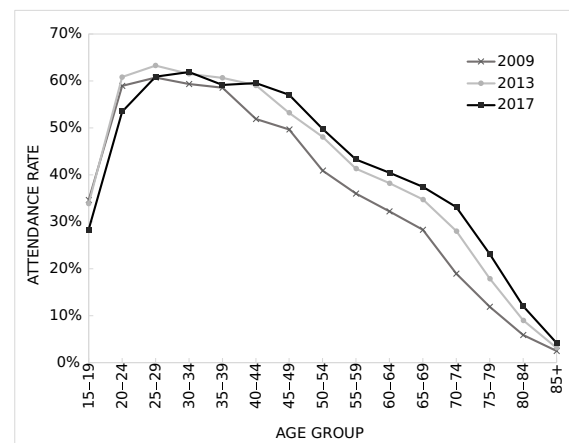


Figure 6.2: Age-specific cervical cancer screening attendance rates (%), Czech women

year	crude rates [%]		standardized rates [%]	
	breast cancer screening	cervical cancer screening	breast cancer screening	cervical cancer screening
2009 ^a	45.5	39.7	45.8	41.0
2010	39.6	41.6	41.1	43.1
2011	40.5	42.4	42.0	44.0
2012	43.5	42.4	45.1	44.0
2013	46.0	43.7	47.9	45.4
2014	49.0	43.3	50.9	45.0
2015	48.1	44.0	50.1	45.8
2016	49.4	44.1	51.4	45.8
2017	49.7	44.1	51.7	45.9

Table 6.1: Crude and standardized breast and cervical cancer screening attendance rates (%), Czech women, 2009–2017

^aIn 2009 only women aged 45–69 were eligible for population-based breast cancer screening

Younger women had higher attendance (except for the youngest group 15–19 years of age). In 2017, the highest attendance of 61.9% in cervical cancer screening was at the age of 30–34, whilst in 2009 it was 60.7% at the age of 25–29. Between the years 2013 and 2017, the cervical cancer screening attendance has dropped for the two youngest categories. The attendance rates started declining at younger ages than in the case of breast cancer screening – at around the age of 50 years. In 2017 women in the age group 30–34 attended screening 1.5 times more than those aged 60–64 and almost three times more than women in the age group 75–79.

Regional Variation in Cancer Screening Attendance

Standardized attendance rates for 77 LAU 1 districts were counted. Results for both breast cancer screening (Figures 6.3a, 6.3b) and cervical cancer screening (Figures 6.4a, 6.4b) are shown for the years 2010 and 2017. The data for each year and district can be found in the supplementary Tables A.4 and A.5.

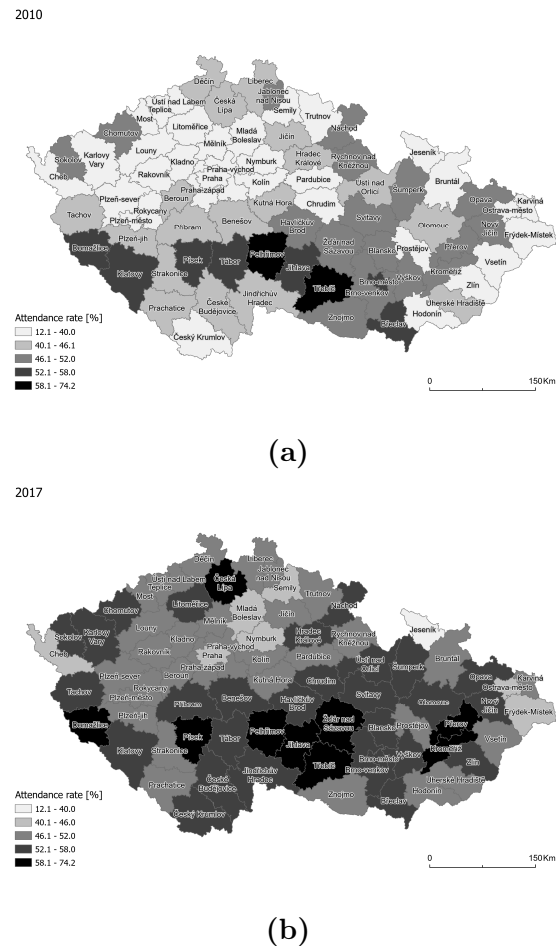
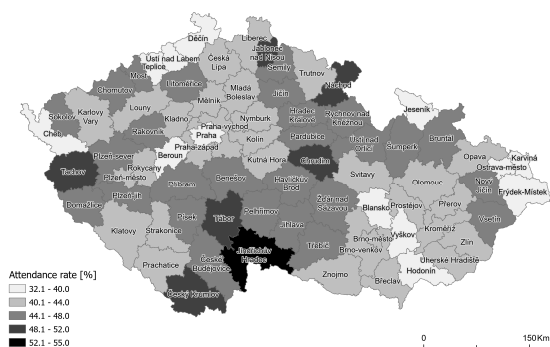


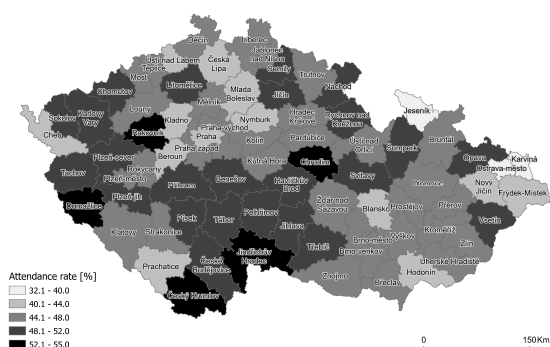
Figure 6.3: Standardized breast cancer screening attendance rates (%), 2010 (a), 2017 (b), Czech women, LAU 1 structure

2010



(a)

2017



(b)

Figure 6.4: Standardized cervical cancer screening attendance rates (%), 2010 (a), 2017 (b), Czech women, LAU 1 structure

From 2010 to 2017, attendance in breast cancer screening has increased in all 77 districts. The highest attendance in 2017 was in Třebíč district with 69.8% of women attending, lowest in the Jeseník district with only 38.3% attendance rate. The highest increase in breast cancer screening attendance was observed in Mladá Boleslav; it was 3.6 times higher in 2017 than in 2010. In the case of cervical cancer screening, attendance has increased in all except 7 districts. The highest attendance in cervical cancer screening was in the Jindřichův Hradec district, where 55.0% of women attended in 2017. The lowest attendance was again observed in the Jeseník dis-

trict with an attendance rate of 32.5%. The highest increase in cervical cancer screening attendance was observed in the Teplice district, where 1.26 times more women attended in 2017 compared to 2010. On the other hand, 11% fewer women in 2017 compared to 2010 attended in the Nový Jičín district.

Discussion

We found that screening attendance varied substantially between the different groups. Younger women tended to attend screenings more often than older women. One of the explanations may be that the screening and other preventive exams are rather new, and older women are not used to attend these measures and care for prevention as much as the younger women. A similar age pattern was found in other studies, e.g., when interviewing women over 65 years of age, more women aged 80+ would refuse breast cancer screening if it was offered to them (Edwards and Jones, 2000).

For cervical cancer screening, the pattern changed slightly during the observed period. Among the youngest age groups (15–24 years), the screening attendance rates dropped slightly. It is not clear why the attendance of women aged 15–24 is lower in 2017 than in 2013 for both cervical cancer screening and gynaecological check-up. It might be due to the changes in sexual behaviour and the recent drop in the use of oral contraceptives (Institute of Health Information and Statistics of the Czech Republic, 2018), which requires gynaecologists' prescription, that would also imply an overall drop in the visits.

According to the Report on the implementation of the Council Recommendation (Ponti et al., 2017) on cancer screening, the national

breast cancer screening examination coverages varied among EU countries. While in countries like Sweden, Finland, Ireland or the Netherlands more than 75% of women aged 50–69 were screened and, in the UK, more than 83% were screened, in some countries screening coverage was relatively low – 33.6% in Latvia, 33.0% in Belgium, 19.1% in Slovenia, and 16.5% in Cyprus. For cervical cancer screening examination coverage reached more than 80% in Ireland, Denmark and Sweden, but in Italy 30.6%, in Latvia 26.0%, in Poland 21.1%, and in Romania only 9.2% women were screened.

That means that cancer screening attendance rates found in this study put Czechia in the middle of screening coverages in Europe. Considering the tradition of screening in many of the countries with higher screening coverage is longer (e.g., the breast cancer screening was implemented in 1986 in Sweden, 1987 in Finland and in 1989 in the Netherlands), the results for Czechia can be considered good; however, there is a potential for improvement. We believe that the attendance of older women will rise in the future, as the cohorts who are attending screening now grow older. Also, as cancer screening is a new preventive measure in Czechia compared to countries as mentioned above (Ponti et al., 2017), it is possible that the general awareness of screening existence and importance will grow with time.

There are considerable differences in regional attendance rates in both screenings in 2017, varying from 38.3% to 69.8% in breast cancer screening and from 32.5% to 55.0% in cervical cancer screening. For the breast cancer screening, the attendance has grown in the observed period in all 77 districts of Czechia.

For the cervical cancer screening, the attendance has dropped in 7 districts. We have expected higher attendance in the city regions, like Prague, Brno, Ostrava, Plzeň, or Liberec, as the overall health awareness should be higher as well as the accessibility of the health services, screening centres etc. This assumption, however, showed not to be accurate, as the highest attendance rates are in the less urban districts. One of the reasons could be, that in Czechia people with lower health literacy tend to visit medical professionals less often than those with higher health literacy (Kučera et al., 2016). According to Leung et al. (2015), the screening attendance does not necessarily have to be lower in rural regions compared to urban ones.

The limitation of this study is a transversal approach to the data. It is not possible to consider the cohort approach due to data available only from 2009 onwards. The sample size is still large enough for the findings being applicable to the whole population and the period data are easier to use and more sensitive to the new trends in treatment and prevention.

The use of data by region of permanent residence may be another limitation of the study. As the Czech system does not require registration of the address of usual residency, it is very hard to track the place where individuals actually live and seek health care. Therefore, the place of permanent residence does not have to correspond with the place where a person attended the screening. This might result in some imprecision in the regional attendance rates, which cannot be detected.

Despite the limitations of this study, to our knowledge, this is the first study using age-standardized attendance rates, especially both

on the national and regional level, which allows to compare data across years, countries and regions, and also to count attendance for all age groups together. Also, it provides a unique look at how attendance in screening may vary across the regions of one country and between relatively small administrative units.

Conclusion

With breast cancer being the most commonly diagnosed cancer among Czech women and cervical cancer incidence remaining around the same value in recent years, those cancers are an important issue in Czechia. Even though the country has implemented organized screening according to the European Union recommendations already more than ten years ago, recent studies evaluating the screening attendance of Czech women or performance of the screening itself are missing.

We have discovered that the overall attendance rates in both breast and cervical cancer screening were relatively low, considering that the population-based breast cancer screening programme has been running since 2002 and cervical cancer screening for 12 years. Only around half of Czech women attended the screening.

There were large differences among various groups of women. In general, older women attended less compared to younger women. It is expected that the attendance of women at older ages will grow as the cohort of women attending the screening will grow older. Despite our expectations, attendance is lower in the city regions. Further research is needed to investigate the reasons for the regional variation. The strategy of how to increase the attendance rate

of Czech women in breast and cervical cancer is crucial for the prevention of these cancers.

Electronic Supplementary Material

This article contains supplementary material (Tables S1 and S2) available at <https://doi.org/10.21101/cejph.b0144>.

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Availability of the data and material

The data for this study were provided upon request by the General Health Insurance Company, which does not allow further redistribution.

Conflict of Interests

None declared

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7 Barriers to the cervical cancer screening attendance among Czech Women

Translation of this chapter can be found in Supplement B.

Anna Altová¹, Michala Lustigová²

¹Department of Demography and Geodemography, Faculty of Science, Charles University, Prague, Czechia, ² Department of Social Geography and Regional Development, Faculty of Science, Charles University, Prague, Czechia

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Abstract in English

Objectives: The main aim of this study was to find specific barriers to cervical cancer screening attendance that Czech women declare. Furthermore, the objective was to find out whether there are differences between women who do and do not attend screening according to sociodemographic characteristics. Finally, we investigated whether women who do not attend the screening differ by sociodemographic characteristics in declaring particular barriers to attendance. **Materials and methods:** Data were collected using a representative questionnaire survey. The women were asked about their previous participation in the cervical cancer screening program. Those who did not attend screening in the past 2 years or those who do not (intend to) attend screening regularly were considered non-attendees. The non-attendees were then asked about their reasons for non-attendance in the screening. First, descriptive statistical methods were used to analyze the data. Second, the differences between the different groups of women were analyzed by Pearson's chi-squared independence test. **Results:** In the studied sample population (N = 902), 36.7% were considered non-attendees. Statistically significant differences in sociodemographic characteristics (age, education, marital status, household type) were observed between attendees and non-attendees. The three most common reasons for non-attendance were: "I do not experience any symptoms", "fear of cancer diagnosis", and "fear of the examination procedure". Almost no differences in sociodemographic characteristics in the declaration of particular barriers to attendance were found. **Conclusions:** We observed differences between women who attended and those who did not attend the screening. However, sociodemographic characteristics do not play an important role once a woman decides not to attend the screening. Therefore, it is essential to communicate cancer prevention throughout the spectrum of Czech women.

keywords: screening, cervical carcinoma, prevention, early detection of disease, barriers

Abstract in Czech

Objectives: Hlavním cílem studie bylo nalézt konkrétní bariéry účasti na screeningu, které české ženy zmiňují. Dále zjistit, jestli se ženy, které se screeningu neúčastní, liší dle sociodemografických charakteristik od žen, které se účastní, a jestli se ženy, které se neúčastní, liší dle deklarace jednotlivých bariér.

Soubor a metodika: Data byla získána z reprezentativního šetření. Ženy, které se v posledních 2 letech neúčastnily screeningu nebo se neúčastní pravidelně, byly tázány na důvody neúčasti. Data byla vyhodnocena pomocí metod popisné statistiky. Rozdíly mezi skupinami žen byly porovnávány pomocí Pearsonova chí-kvadrát testu nezávislosti. **Výsledky:** Z celkového souboru 902 dotazovaných žen lze za neúčastnice na screeningu považovat 36,7 % z nich. Ženy, které se screeningu účastní, se statisticky významně liší ve všech sledovaných charakteristikách (věk, vzdělání, rodinný stav, typ domácnosti) od žen, které se screeningu neúčastní. Nejčastěji deklarovanými důvody neúčasti byly „nepociťuji příznaky“, „strach z diagnózy“ a „strach z vyšetření“. U většiny z těchto důvodů nebyly pozorovány statisticky významné rozdíly v charakteristikách žen, které dané důvody deklarovaly a které je nedeklarovaly. **Závěry:** Byly potvrzeny rozdíly v sociodemografických charakteristikách žen, které se screeningu účastní a které se neúčastní. Jakmile se žena screeningu neúčastní, nezáleží již na jejích sociodemografických charakteristikách v deklarovaném důvodu její neúčasti. Proto je nezbytné komunikovat prevenci v oblasti nádorových onemocnění napříč celým spektrem žen.

klíčová slova: screening, cervikální karcinom, prevence, včasný záchyt onemocnění, bariéry

Úvod

Screening novotvarů je dlouhodobě považován za jednu z účinných metod včasného záchytu nádorových onemocnění. Benefit screeningu karcinomu děložního hrdla byl prokázán v mnoha vědeckých studiích. Ukazuje se, že velké části úmrtí na rakovinu děložního hrdla lze právě díky screeningu předejít. Redukce úmrtnosti se pohybuje od 41 do 92 % (Jansen et al., 2020).

Dle doporučení Rady Evropské unie mají členské státy Evropské unie (EU) poskytovat celoplošné screeningové programy prevence karcinomů prsu, kolorekta a děložního hrdla. EU doporučuje zahájit cervikální screening u žen ve věku 20–30 let a pokračovat v pravidelných 3–5letých intervalech až do věku 60 nebo 65 let (Arbyn et al., 2008). Organizovaný screening karcinomu děložního hrdla probíhá

v Česku od roku 2008 a je poskytován všem ženám od 15 let věku v rámci každoroční preventivní prohlídky v podobě cytologického stěru Pap (a od roku 2021 nově i screeningový HPV test pro ženy ve věku 35 a 45 let). Screening tedy v Česku probíhá častěji a v širším věkovém intervalu, než uvádí doporučení EU, a i častěji, než ve většině evropských zemí (Ponti et al., 2017).

I přesto, že je screening již relativně zaběhnutý, z administrativních dat zdravotních pojišťoven se ukazuje, že účast na něm je stále relativně nízká. Míra účasti se pohybuje okolo 50 % (Májek et al., 2022; Dušková et al., 2014; Altová et al., 2021). Zahraniční literatura, která se věnovala nerovnostem v neúčasti na cervikálním screeningu, ukazuje na rozdíly v neúčasti podle vzdělání či ekonomické aktivity (Broberg et al., 2018). Konkrétní důvody pro neúčast na screeningu jsou však ve svě-

tové literatuře relativně neprozkoumané téma. Studie se věnují specifickým případům, jako je např. aktivní odmítání screeningu (Bennett et al., 2018), případně neúčasti na screeningu u minoritních skupin (Marlow et al., 2019). V české literatuře se tématu důvodů neúčasti na screeningu zatím nikdo nevěnoval.

Prvním cílem této studie je nejprve zjistit, jestli se ženy, které se screeningu neúčastní, liší v sociodemografických charakteristikách od žen, které se screeningu účastní. Hlavním cílem je pak nalézt konkrétní bariéry v účasti na screeningu, které ženy pro účast na screeningu vnímají, a dále pak zjistit, zda se ženy liší dle demografických či sociodemografických charakteristik při deklaraci jednotlivých bariér.

Soubor a metodika

Data pro studii byla získána v rámci dotazníkového šetření, které v Česku každoročně realizuje Lékařské informační centrum. Toto reprezentativní šetření se zabývá problematikou zdravotnictví z pohledu běžné populace. Zároveň se věnuje problematice subjektivního zdraví respondentů a jejich životnímu stylu. Nezbytnou součástí šetření je zjišťování základních demografických a socioekonomických charakteristik respondentů. Šetření v roce 2020 navíc zahrnovalo i otázky na cervikální screening – na frekvenci účasti a motivace, případně bariéry pro účast, respektive neúčast.

Výzkumný soubor zahrnoval 902 žen (výzkumu se rozhodlo neúčastnit 110 z celkem 1 012 oslovených žen). Účastnice byly nejprve tážány na účast na screeningovém programu, konkrétně: „Kdy jste byla naposledy na cytologickém vyšetření stěru z děložního čípku (screening rakoviny děložního čípku)?“ Odpovědi vybíraly z následujících možností:

- v posledních 12 měsících;
- před 1–2 roky;
- před 2–3 lety;
- před 3 a více lety;
- nikdy.

V případě, že žena zvolila jednu z prvních dvou možností, byla jí položena otázka: „Účastníte se (nebo se plánujete účastnit) screeningu pravidelně (doporučený interval je 1 rok)?“. V případě, že odpověděla „ne“ anebo se účastnila screeningu před více než 2 lety, byla vyhodnocena jako neúčastnice. Neúčastnice byly dále tážány na bariéry: „Z jakých důvodů se (častěji) neúčastníte cytologického vyšetření stěru z děložního čípku?“ Ženy pak mohly vybírat jednu či více z nabízených možností, případně vypsát vlastní odpověď. Účast byla vyhodnocena podobně, jako uvádí Ponti et al. (2017), tedy jako podíl žen, které se screeningu účastnily, vůči ženám, které mají na screening nárok (v případě Česku tedy všechny ženy 15+ každý rok). Vzhledem k sebereportovací povaze šetření však byla přidána benevolence 1 roku navíc, tedy za účastnice byly považovány ženy, které se účastnily v posledních 2 letech.

K analýze dat byly nejprve použity metody popisné statistiky (frekvenční analýza) charakterizující ženy podle frekvence účasti na screeningu a představující deklarované důvody neúčasti na screeningu. Pro hlubší analýzy byly vybrány pouze tři nejčastěji uvedené důvody bariér. Pomocí testu nezávislosti (Pearsonův chí-kvadrát test) bylo jednak testováno, zda se statisticky významně liší podle vybraných sociodemografických charakteristik (věk, vzdělání, rodinný stav, typ domácnosti) ženy, které se účastní screeningu a které nikoli. A jednak bylo testováno, zda se podle výše zmíněných sociodemografických charak-

teristik liší ženy, které uvedly konkrétní důvod neúčasti, od žen, které se neúčastní, ale z jiného důvodu. Testy byly provedeny na 5% hladině významnosti, tzn. $p < 0,05$ značí statisticky významný rozdíl v rozložení sledované proměnné mezi porovnávanými skupinami.

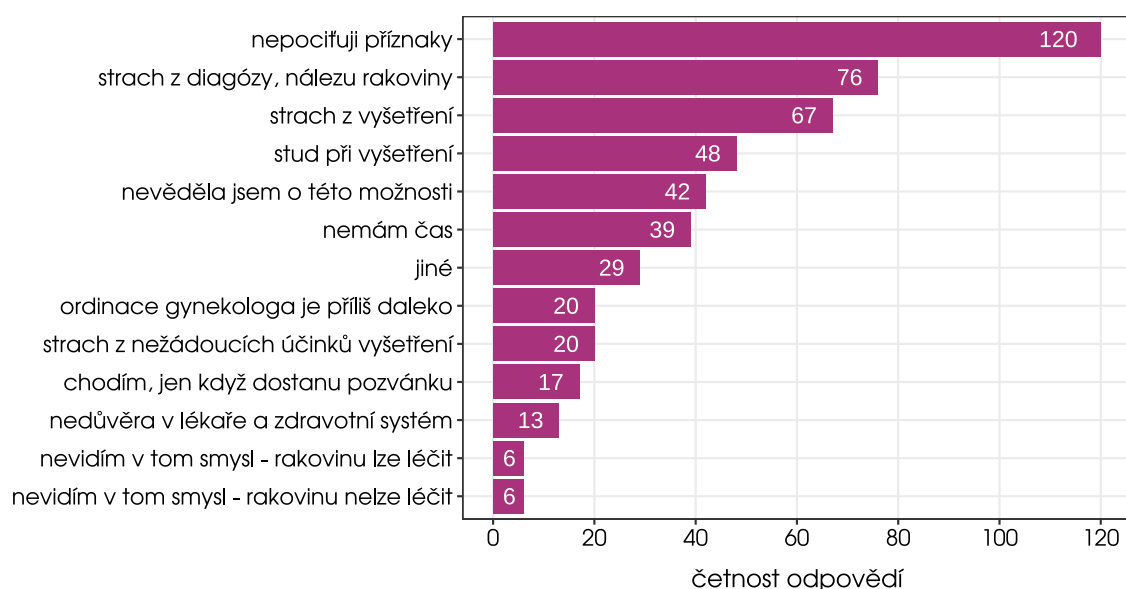
Výsledky

Z celkového počtu 902 žen se screeningu pravidelně a v doporučeném intervalu účastnilo 571 žen (63,3 %). Zbýlých 331 žen (36,7 %), které se screeningu neúčastní, pak deklarovalo důvody neúčasti tab. 7.1).

Nejčastějšími bariérami v účasti na screeningu bylo nepocitování (absence) příznaků (120 žen, 36,3 %), strach z diagnózy (76 žen, 23,0 %) a strach z vyšetření (67 žen, 20,2 %). Naopak dostupnost ať už z hlediska lokality („ordinace gynekologa je příliš daleko“, 20 žen, 6,0 %), nebo z hlediska časových možností tázaných žen („nemám čas“, 39 žen, 11,8 %) byly spíše méně prevalentní (graf 7.1). V rámci odpovědi „jiné“ ženy nejčastěji uváděly jako důvod neúčasti na screeningu hysterectomii, stáří nebo to, že nemají potřebu navštěvovat lékaře.

Poslední účast	pravidelná účast	nepravidelná účast	celkem
před 1 rokem	424 (47,0 %)	9 (1,0 %)	433 (48,0 %)
před 1–2 lety	147 (16,3 %)	30 (3,3 %)	177 (19,6 %)
před 2–3 lety		91 (10,1 %)	91 (10,1 %)
před 3 lety		99 (11,0 %)	99 (11,0 %)
nikdy		102 (11,3 %)	102 (11,3 %)
celkem	571 (63,3 %)	331 (36,7 %)	902 (100,0 %)

Tabulka 7.1: Deklarovaná účast na cervikálním screeningu v Česku v roce 2020



Graf 7.1: Deklarované bariéry v účasti na screeningu v Česku v roce 2020

Charakteristiky	Soubor žen, které se screeningu neúčastní		nejčastěji deklarované bariéry	
	Celý soubor (n = 902)	(n = 331; 36,7 %)	nepocítují příznaky (n=120, 36,3 %)	strach z diagnózy (n=76; 23,0 %) strach z vyšetření (n=67; 20,2 %)
Věk				
15–34	223 (24,7 %)	79 (35,4 %)	30 (38,0 %)	11 (13,9 %) 20 (25,3 %)
35–54	309 (34,3 %)	77 (24,9 %)	28 (36,4 %)	18 (23,4 %) 18 (23,4 %)
55–74	310 (34,4 %)	127 (41,0 %)	47 (37,0 %)	36 (28,3 %) 21 (16,5 %)
75+	60 (6,7 %)	48 (80,0 %)	15 (31,3 %)	11 (22,9 %) 8 (16,7 %)
		p < 0,001^{ba}	p = 0,884^b	p = 0,125^b p = 0,363^b
Vzdělání				
ZŠ	85 (9,4 %)	45 (52,9 %)	11 (24,4 %)	8 (17,8 %) 12 (26,7 %)
vyučen/SŠ bez mat.	215 (23,8 %)	94 (43,7 %)	34 (36,2 %)	30 (31,9 %) 17 (18,1 %)
maturita, VOŠ	407 (45,1 %)	139 (34,2 %)	56 (40,3 %)	25 (18,0 %) 30 (21,6 %)
VŠ	195 (21,6 %)	53 (27,2 %)	19 (35, 8 %)	13 (24,5 %) 8 (15,1 %)
		p < 0,001^{ba}	p = 0,296^b	p = 0,073^b p = 0,485^b
rodinný stav				
svobodná	227 (25,2 %)	90 (39,6 %)	35 (38,9 %)	13 (14,4 %) 25 (27,8 %)
vdaná, družka	447 (49,6 %)	130 (29,1 %)	49 (37,7 %)	28 (21,5 %) 23 (17,7 %)
rozvedená	118 (13,1 %)	39 (33,1 %)	13 (33,3 %)	19 (48,7 %) 9 (23,1 %)
vdova	110 (12,2 %)	72 (65,5 %)	23 (31,9 %)	16 (22,2 %) 10 (13,9 %)
		p < 0,001^{ba}	0,775^b	p < 0,001^b 0,128^b
Domácnost				
sama bez stálého partnera	231 (25,6 %)	112 (48,5 %)	35 (31,3 %)	27 (24,1 %) 22 (19,6 %)
v manželství, s partnerem	548 (60,8 %)	164 (29,9 %)	62 (37,8 %)	38 (23,2 %) 31 (18,9 %)
jiné	123 (13,6 %)	55 (44,7 %)	23 (41,8 %)	11 (20,0 %) 14 (25,5 %)
		p < 0,001^{ba}	p = 0,346^b	p = 0,835^b p = 0,568^b

Tabulka 7.2: Charakteristiky žen z hlediska participace a nejčastěji deklarovaných bariér účasti

Poznámka: p-hodnoty < 0,05 značí statisticky významný rozdíl;

^asoubor žen, které se neúčastní byl porovnáván s ženami, které se účastní;

^b ženy, které deklarují danou bariéru byly porovnávány s ženami, které se neúčastní a tuto bariéru nedeklarovaly

Charakteristiky žen, které se zúčastnily šetření, stejně jako charakteristiky žen, které byly vyhodnoceny na základě výše popsané metodiky jako neúčastnice, jsou uvedeny v tab. 7.2. Rozložení žen, které se screeningu účastní a neúčastní, bylo rozdílné a statisticky významné u všech sledovaných proměnných ($p < 0,001$). Naopak pro většinu nejčastěji deklarovaných bariér pak nebyly statisticky významné rozdíly mezi ženami, které je deklarují a které je nedeklarují. Statisticky významný rozdíl byl pouze v rozložení žen dle rodinného stavu u odpovědi strach z diagnózy. Tento důvod uvedl menší podíl svobodných žen (14 %) a naopak větší podíl rozvedených žen (49 %). U ostatních odpovědí nebyl významný rozdíl mezi ženami, které danou odpověď vybraly a které danou odpověď nevybraly.

Diskuze

V české odborné literatuře je téma důvodů neúčasti na screeningu karcinomu děložního hrdla zatím neprozkoumáno, přestože Národní program screeningu karcinomu děložního hrdla v Česku probíhá již od začátku roku 2008 a je poskytován jednou ročně všem ženám od 15 let věku v rámci pravidelné gynekologické prohlídky. Z výsledků dotazníkového šetření vyplynulo, že v Česku je stále relativně hodně žen, které se screeningu neúčastní (případně ne v doporučeném intervalu). Rozdíl v míře účasti deklarované samotnými ženami a zjištěné na základě administrativních dat z veřené zdravotního pojištění je dán řadou faktorů. Respondenti výběrových šetření životního stylu a zdraví souvisejícího chování mají zpravidla touhu „dělat“ se lepšími. Lze předpokládat, že i zde ženy nadhodnocují svoji účast na screeningu ať již úmyslně, či

neúmyslně. Dalším problémem je administrativní vykazování prevence, která má probíhat jednou ročně, nicméně je pacientkám často umožněna až pro 365 dnů. To může vést k posunu screeningu, a v případě návštěv na přelomu roku tak může žena „vypadnout“ z administrativních záznamů.

Ženy, které deklarovaly účast na screeningu, se statisticky významně lišily od neúčastnic ve všech sledovaných sociodemografických charakteristikách, tedy věkem, vzděláním, rodinným stavem i uspořádáním domácnosti. Předchozí výzkum v této oblasti ukázal, že se screeningu méně účastní ženy s nižším vzděláním oproti ženám se vzděláním vyšším (Willems and Bracke, 2018), zaměstnané oproti nezaměstnaným, ženy, které žijí v domácnosti samy (Broberg et al., 2018), svobodné oproti vdaným (Petkeviciene et al., 2018) a mladší oproti starším (Gianino et al., 2018). V rámci participace na screeningu zhoubných novotvarů je tedy stejně jako v dalších oblastech zdraví a prevence patrný socioekonomický gradient.

Naproti tomu nebyly pozorovány statisticky významné rozdíly mezi ženami deklarujícími konkrétní důvod neúčasti a ženami, které ho nedeklarovaly, s výjimkou „strachu z diagnózy“. V tomto případě se ženy statisticky významně lišily dle rodinného stavu.

Předchozí výsledky lze tedy zjednodušeně interpretovat následujícím způsobem: ženy, které se screeningu neúčastní, bez rozdílu důvodu, jsou v sociodemografických charakteristikách odlišné od žen, které se screeningu účastní. Jakmile se však žena screeningu neúčastní, nezáleží již na jejích sociodemografických charakteristikách v deklarovaném důvodu její neúčasti.

Zaměříme-li se podrobněji na jednotlivé

bariéry, lze je rozdělit do několika kategorií.

První kategori jsou bariéry, které nějakým způsobem souvisí s nízkou informovaností i zdravotní gramotností v oblasti screeningu a prevence zhoubných novotvarů. Zahraniční studie ukazují, že nízká zdravotní gramotnost může být u žen spojena s nevyužíváním zdravotní péče (Mancuso, 2008), a tedy i s neúčasti na screeningu zhoubných novotvarů (Kim and Han, 2016). Mezi bariéry související s nízkou zdravotní gramotností lze zcela či částečně zařadit i následující bariéry: „nepociťuji příznaky“, „nevěděla jsem o této možnosti“, či „strach z nežádoucích účinků“. U těchto bariér lze předpokládat, že se jedná o miskoncepci o zhoubných novotvarech, či screeningu samotném, či o prostou nevědomost, či neznalost problematiky. Do této skupiny bariér by pak bylo možné zařadit i přesvědčení, že „rakovinu nelze léčit“, případně strach z vyšetření.

Druhá skupina bariér pak souvisí především s negativním vztahem k lékařům či zdravotnímu systému („nedůvěra v lékaře, zdravotní systém“). Například Taber et al. (2015) zmiňují „physician factors“ jako jednu z významných bariér pro vyhledávání lékařské péče. Mezi těmito faktory respondenti často zmiňují „mezilidské“ (problémy s komunikací, nedůvěra v lékaře, přesvědčení, že lékaře o pacienta nezajímá) nebo medicínské důvody (např. nízká důvěra v lékařovu expertízu).

Předchozí výzkum ukazuje, že i „strach z diagnózy“ nebo obecněji obavy ze získání špatných zpráv z oblasti zdraví může vést k vyhýbání se lékařské péči (Taber et al., 2015). To platí i v případě nádorových onemocnění, která jsou často vnímána jako „rozsudek smrti“ (Moser et al., 2014). Tato bariéra naopak

paradoxně vede k horším výsledkům v případě, že je zhoubné bujení odhaleno v pokročilejších fázích. Do blízké skupiny bariér pak lze zařadit i „strach z vyšetření“ či „stud“, které nějakým způsobem souvisejí s nepříjemnými pocity spojenými s lékařskou péčí.

Pouze zlomek žen deklaroval jako důvod neúčasti na screeningu dostupnost fyzickou („ordinace gynekologa je příliš daleko“) nebo časovou („nemám čas“). Výše zmíněná studie (Taber et al., 2015) zařazuje tyto bariéry mezi tzv. tradiční (spolu např. s vysokými finančními základy na zdravotní péči). Přestože i dle další literatury (Wilding et al., 2020) bylo možné očekávat, že tyto bariéry budou i pro české ženy relativně časté, ukazuje se, že např. v městských regionech, kde by měla být dostupnost gynekologů lepší, je účast na screeningu nižší (Altová et al., 2021). V případě těchto bariér tak pravděpodobně záleží na systému zdravotní péče a zdravotního pojištění, ale i na rozloze a odlehlosti regionů v dané zemi.

Screeningový program v Česku probíhá oproti mnoha dalším zemím v Evropě častěji a v širším věkovém intervalu. Je však poskytován jako součást každoroční gynekologické prohlídky. Proto mohou výše zmíněná zjištění částečně odrážet i vztah českých žen k účasti na pravidelných gynekologických prohlídkách.

Na závěr je nutné zmínit i limitace této studie. Mezi ně lze zařadit možná zkreslení plynoucí ze sebedeklaratorního sběru informací o účasti na screeningu či o době od uplynutí posledního screeningu. Předdefinovaný výběr potenciálních bariér mohl dále vést k tomu, že některé bariéry mohly být opomenuty. Nepotvrzení statisticky významných rozdílů může být dáno velikostí výzkumného souboru. V neposlední řadě je třeba

zmínit i formulaci otázky, na jejímž základě je vyhodnocována účast na screeningu. Je možné, že některé ženy nevědí, že je screening součástí pravidelné gynekologické prohlídky, což se ukázalo při detailnějším zkoumání odpovědí v kategorii „jiné“. Několik žen odpovědělo, že se screeningu neúčastní, protože chodí každý rok na gynekologii. Zároveň lze tuto domněnku potvrdit i ze zkušeností z dalšího výzkumu, který autorky aktuálně provádí.

I přes výše zmíněné nedostatky je možné říci, že studie přináší nové poznatky, na něž je vhodné myslet v rámci poskytování lékařské péče. V kontextu české literatury se jedná o ojedinělý výzkum, který lze využít pro zlepšení kvality poskytované péče a zejména pak ke zvýšení účasti na screeningu karcinomu děložního hrdla.

Jedním z nesporných prostředků na zvýšení účasti na screeningu je edukace české populace v oblasti prevence nádorových onemocnění a zvýšení povědomí o možnostech včasného zachytu těchto onemocnění. Je třeba dostatečně komunikovat fakta, např. to, že lidé v časných stádiích nádorového onemocnění často příznaky nepociťují, ale zaměřit se i na zvyšování důvěry v lékaře a snižování míry strachu z vyšetření, jako je právě střer z děložního čípku. Pro určité spektrum populace mohou být metody samoodběru vzorku přijatelnější, jako je tomu např. v případě testu okultního krvácení do stolice. Některé studie uvádí, že samostatný odběr vzorku z čípku pro HPV testování by mohl být pro některé ženy, které se screeningu aktivně odmítají účastnit, vhodnou variantou (Bennett et al., 2018). V Česku momentálně na toto téma probíhají pilotní studie, které zkoumají možnosti zařazení použití samoodběrových sad

pro účely screeningu (Národní screeningové centrum, 2022).

Závěr

Screening karcinomu děložního hrdla je bezpochyby zásadním nástrojem pro snižování úrovně úmrtnosti (i míry incidence) na toto onemocnění, ale i zlepšování kvality života pacientek. Program screeningu je v Česku relativně zaběhnutý, přesto české ženy stále nacházejí velké spektrum důvodů své neúčasti. Mezi nejčastější patří nepociťování příznaků (a onemocnění se jich tedy netýká), strach z diagnózy a strach z vyšetření. Těmto, ale i ostatním důvodům pro neúčast je třeba věnovat dostatečnou pozornost, a to jak v ordinacích gynekologů, tak i u praktických lékařů a v rámci komunikace prevence a veřejného zdraví. Většina ze zmiňovaných bariér totiž plyne z nedostatečné informovanosti v oblasti (gynekologické) prevence či dřívějších negativních zkušeností s lékaři či zdravotní péčí.

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Autoři deklarují, že v souvislosti s předmětem studie/práce nemají žádný konflikt zájmů.

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8 Perceived barriers to cervical and breast screening: a qualitative study

Anna Altová¹, Michala Lustigová², Ivana Kulhánová^{1,2}

¹Department of Demography and Geodemography, Faculty of Science, Charles University, Prague, Czechia, ² Department of Social Geography and Regional Development, Faculty of Science, Charles University, Prague, Czechia

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Abstract in English

Background: Screening is an essential tool for lowering cancer mortality. Although widely available in many European countries, screening attendance rates are still quite low in many of them. **Objectives:** The objective of this study is to investigate the barriers women experience towards cervical and breast screening attendance, to conceptualise these findings, and to establish a typology of barriers. **Methods:** Semi-structured interviews were conducted with 10 Czech women of different ages and education. **Results:** Five main themes were identified. The first theme, perceived risk of cancer and a healthy lifestyle, included a low perceived risk of cancer due to healthy lifestyle or no perceived need to seek healthcare. Second, health literacy and awareness, concerned misbeliefs or lack of awareness about screening. Third, previous experiences with healthcare and healthcare professionals included unpleasant situations experienced during screening, but also in other types of healthcare. Fourth, women identified personal traits, such as laziness, leading to non-attendance. Last, the traditional barriers included practical aspects of screening, such as unsuitable times of appointments. **Conclusions:** The findings of this study are valuable for designing effective strategies to increase screening participation. Implementing both organisational changes (opt-out system of invitations) together with attempts for more complex changes in education of healthcare professionals and increasing health literacy of general population should be considered.

keywords: Screening And Diagnostic Tests, Preventive Health Care, Breast/Chest Health, Cancer, Gynecology, Qualitative Research

Introduction

Cancer screening plays an essential role in lowering cancer mortality (Jansen et al., 2020; Nelson et al., 2016). Although the implementation of population-based screening, pro-

grammes is recommended by the European Council (European Commission, 2022) and is provided in most of European Union (EU) countries, the attendance rates are still low in many of them (Eurostat, 2022).

Previous studies have explored the relation-

ship between different socioeconomic and demographic factors and screening attendance. A positive relationship between educational attainment and screening attendance has been established (Willems and Bracke, 2018), and it has also been shown that age, marital status or co-occurring health conditions can affect screening uptake (Willems and Bracke, 2018; Bongaerts et al., 2019; Douglas et al., 2016; Jensen et al., 2012; Martín-López et al., 2010; Schoofs et al., 2017). While inequalities in screening attendance at the population level are investigated quite broadly, a smaller body of literature is focused on specific barriers and motivations to screening, especially at the individual level.

A Dutch systematic review identified several determinants of (non-)attendance, such as: predisposing factors (e.g., socioeconomic status), information factors, awareness factors (lack of knowledge, low priority), motivational factors (lack of motivation), ability factors (language, health literacy), and barriers (fear of test outcome, anticipation of shame, time-related constraints) (Bongaerts et al., 2019). Similarly, four categories of barriers were identified in the Australian systematic review: personal factors (fear of the test or its results, lack of knowledge, low relevancy), practitioner barriers (comfort felt with them, preferences regarding language or gender), logistical barriers (time, distance, costs, forgetfulness), and test-related barriers (embarrassment, discomfort) (Nagendiram et al., 2020). Multiple studies focused on specific populations, such as immigrant populations, hard-to-reach populations, or other minorities, but the amount of literature on general populations is smaller. The reasons for screening hesitancy among women

are not yet well described, although it is essential to set effective prevention strategies. Therefore, the objectives of this study are 1) to investigate the barriers women experience to attending breast and cervical screening, and 2) to conceptualise these findings and establish a barrier typology. For fulfilling the aims, the case of Czechia is used, which is convenient for several reasons. First, Czechia has universal health coverage, which is based on mandatory health insurance. Second, everyone is eligible for a wide range of preventive services, including regular general practitioner (GP) and, dentist check-ups, and in the case of women, regular gynecologist visits. Furthermore, population-based screening programmes are available. All women 15+ are eligible for annual cervical screening since 2008 as a part of regular gynecological examination, and all women 45+ are offered breast screening biannually, in specialised mammography centres (“mamacenters”). Both screenings are opt-in-based (women must schedule an appointment by themselves), and opt-in invitations are sent to those who have not attended for a longer time. According to Eurostat, about 75% of Czech women attend cervical and about 59% attend breast screening (4). However, insurance records show lower values – 52% in cervical and 46% in breast screening in 2017 (Altová et al., 2021). This means that screening is underutilised despite its wide availability and there are other obstacles to attendance.

Materials and methods

Semi-structured interviews were conducted with 10 women of different ages and educational backgrounds (Table 8.1). Participants were recruited through posting on social media

and in cooperation with an external research agency STEM/MARK. The interviewees were women eligible for cervical or breast screening or both, who had not attended either of the screenings in the last three or five years, respectively. Women who were eligible for both screenings and did not attend only one of them were also included to understand whether their reasons differ.

The interviews were conducted between December 2021 and May 2022 in face-to-face or ZOOM settings, according to the preferences of the participants. An interview guide was used to conduct the interviews and covered seven main areas: basic information about the participant, use of healthcare services, lifestyle, disease management, and health information seeking, relationship with healthcare professionals, reasons for screening non-attendance and understanding of the Czech healthcare system. All interviews were recorded and transcribed verbatim. An inductive approach was used. First, interviews were read through several times and initial coding was applied, codes were grouped, and then formed into themes that described the groups of barriers. Interviews were conducted in Czech and only selected quotes were translated into English. Atlas TI 22 software was used for analysis.

The entire study was approved by the Institutional Review Board of the Faculty of Science, Charles University (approval number 2021/12). All participants provided a written consent.

Results

Five main themes identified in our study. None of the participants had one distinct rea-

son for non-attendance, in all interviews multiple themes were identified.

Perceived risk of cancer and healthy lifestyle

Most of the participants considered themselves healthy and having a healthy lifestyle (no smoking, low or no alcohol intake, a healthy diet, etc.) which they thought prevented them from getting cancer or getting it soon. One woman also mentioned breastfeeding and performing self-examination as a form of healthy lifestyle.

I think that I have such a good lifestyle that I've reduced the risk, so it will only begin to increase as I get older. I don't smoke, I don't drink, I don't eat cancer-causing products. I think I have nothing to worry about. (P2)

I breastfed my kids, I did my best to be healthy in that regard. I check my breasts, my glands, it's all a routine thing, I know that's kind of my prevention. (P10)

Some women also considered themselves at low risk due to the absence of cancer in their family history.

I don't know why I should go somewhere to be screened. I'm fine and there is no history of, for example, breast cancer as far and wide in the family. (P3)

Most of the women said they feel healthy and therefore do not have the urge to be screened or seek medical care. They also mentioned that they trusted their bodies enough to let them know if something was wrong.

Some women mentioned that they avoid screening as a way of taking care of their health.

	Age	Education	Partnership status	Cervical screening attendance	Breast screening attendance
Participant 1 (P1)	28	tertiary	single	approx. 9 years	not answered
Participant 2 (P2)	42	tertiary	divorcing	approx. 7 years	considers going when eligible
Participant 3 (P3)	59	tertiary	married	approx. 14 years	never
Participant 4 (P4)	36	tertiary	single	approx. 10 years	plans to go at least once when eligible
Participant 5 (P5)	29	vocational	partnered	approx. 3 years	would consider going
Participant 6 (P6)	66	tertiary	married	approx. 2 years ago, doesn't plan to go anymore	approx. 8 years ago, doesn't plan to go anymore
Participant 7 (P7)	53	secondary	single	doesn't know, said she "just don't go"	never
Participant 8 (P8)	63	primary	not answered	goes regularly	never
Participant 9 (P9)	27	vocational	partnered	approx. 5 years	wants to go when eligible
Participant 10 (P10)	49	tertiary	single	approx. 5 years	never

Table 8.1: Participants' characteristics and screening attendance status

They said that screening was stressful for them, either due to waiting for screening results, fear of a negative result (finding cancer), or being a stressful situation by itself.

Before I go to the doctor, I get so stressed that it's maybe worse than if I didn't go to a check-up. I know that stress is harmful, which is why I try to avoid it as a part of my lifestyle. (P7)

I don't want to be stressed by going to a mammogram where someone scans something and then I'm going to be in some sort of tizzy wondering if it's all right. Then, God forbid, they find something a little different than normal, and I'm going to give myself breast cancer just because I was stressed. (P10)

Women also said that their fear of diagnosis outweighs the rational belief that she should be screened or that they feel better not knowing if something is wrong. A level of fatalism and the inevitability of death was also mentioned.

I regularly receive invitations that I haven't been anywhere yet, so I always keep it in my diary and then my unhealthy mind always tells me to throw it away and pretend I didn't receive anything. [...] An old grandma would say – unless you are under the care of doctors, you're fine. (P4)

Well, you must die of something, don't you? I don't intend to stay here till I'm 90. (P6)

Health literacy and awareness

Several women were completely or partially unaware of the possibility of screening or screening recommendations.

I don't know if I could say what the available screenings are, but in 2020 I found a strange lump in my breast, and I went to my GP who felt it there too, so she immediately sent me for a screening. It was the 'mamacenter', and it was free. (P5)

Actually, I don't know that there are any screenings specifically for my age group, I thought it was for older people, like 40, 50 plus. (P1)

In some cases, lack of awareness led women to misbeliefs about screening, such as the incorrect length of screening interval, possible side effects, or the thought that there is nothing that could be done to lower the risk of cancer.

I have friends and colleagues who are very conscientious and really go every six months... they are under the control of those mammograms, everything. And at the end of the day, they all had their breasts removed. (P3)

I'm scared of cancer, because my mom died from bowel cancer, and I hope I can avoid it, or I hope it passes me by. But you never know. It's a disease that you can't control. (P8)

One woman said that she thinks that breast and cervical cancer prevention, even in the form of HPV vaccination, is unnecessary, as she believed that health problems with women's reproductive system are caused by low self-esteem.

I mean, it's not smallpox, it's not some sort of thing that's worthy of eradication... Because for me, cervical cancer, and in general, bottom problems, breast problems, everything, are really linked to disrespecting yourself. It is just connected with the psychological stuff. (P10)

Previous experience with healthcare and healthcare professionals

One theme emerged in most of the interviews. It was a previous negative experience

with healthcare or healthcare professional (doctor, nurse). Some women did not consider it to be the main barrier initially, however, they mentioned it as an important factor if asked for details.

A group of women experience unpleasant situations directly in the field of obstetrics and gynecology. This included feelings during the preventive examination, unpleasant childbirth experiences, or insensitive behaviour of the doctor after traumatic experience.

With my son, I woke up sometime in the morning and started bleeding. And what was quite unpleasant was the large number of examinations that I had then had at the maternity ward [...] and they shook their heads at me and didn't really know why I was bleeding. But what I think had a huge impact on me not going to that gynecologist anymore was this rather uncomfortable regular investigation of the dilatation of that cervix. It's painful, it's uncomfortable [...] The pain of giving birth, the fear of having a baby when doctors shake their heads at you and don't know what's wrong with you, I think I've managed that. But I think these repeated examinations where... I will be honest, someone kept sticking their fingers in me, I think it has left a mark on me. (P2)

I know it might be necessary... But I don't really like this doctor... I had this terrible thing happen to me when I was 11. So, if it is a guy, I don't go at all. If it's a woman, she must be nice, because I feel like a lot of times women are like, well, 'you'll endure it'. [...] Because when I was raped, I had... I think a cyst burst in my stomach or something like that and... And the doctor was there, he could see very well that I was scared, I was shaking, right? And he was

forcibly spreading my legs to put the probe in, right? I couldn't reach him, so I kind of pushed him away with my foot. And then he called the cops on me for attacking him, and it got pretty intense. And then they even kicked me out of the hospital. (P9)

The second group of women had a negative feeling towards medical professionals in general. These were usually caused by a doctor or nurse acting insensitively in the past, not considering women's needs, or not taking enough time with the patient. One participant also said that her doctor body shamed as a child, which resulted in a lifetime of fear of doctors. Lastly, practical issues caused mistrust in preventive care in one respondent.

I have a huge barrier to blood draws. [...] I was there [at the blood draw] for about 20 minutes and then the nurse said, 'you are not trying at all'. And she sent me home. And that was the end of all my efforts at prevention. (P1)

I am constantly confronted with the fact that the doctor doesn't know anything or doesn't tell me something important that might help me with my pain. I have neuropathy and must figure out on my own what makes me feel better. [...] It's just that doctors usually either don't have time for it, so I'm always out of the office in five minutes, sometimes not even that. (P6)

When I was a kid, I wasn't thin. And we had a doctor who was constantly scolding my mom for that and yelling at me. (P7)

I don't go to the gynecologist for preventive care because they mixed up my chart twice there and sent me for a procedure that didn't belong to me at all. [...] They mixed up two last names,

which I can understand. But a 20-year difference cannot be overlooked. [...] Luckily, I noticed this when I was going to the pre-surgery check-ups. [...] The doctor apologised to me, but I don't know, I could have gone for some surgery for absolutely no reason [...] I have not gone there since. (P3)

Traditional barriers

More traditional barriers, such as a long time spent in waiting rooms or the inability to find a doctor that would suit the patient's needs in terms of location, gender, or office hours, were mentioned by women in our sample.

There are very few doctors here in [my hometown]. If I want to find a good doctor, I go to Prague, right? But I don't really want to go to Prague to see a gynecologist... (P9)

I have a gynecologist who has bad appointment times and it never suited me on Thursday afternoon or whenever, so I didn't go, even though I scheduled an appointment. (P10)

And what I just hate is waiting in doctors' waiting rooms. (P2)

A participant repeatedly mentioned that she disagreed with having to pay various fees at the gynecologist (registration fee, single use speculums) when she has medical insurance.

Personal traits

In addition to the barriers mentioned above, women felt certain personal traits, such as laziness, forgetfulness, or lack of interest in their own health, prevented them from screening attendance, even if they knew screening was important for them.

And then I think it would be nice for people like me [...] if there was something like ‘ping’ [sound of notification] – ‘you have not been to the doctor in a year, you should go because otherwise you’re going to die.’ [...] If someone reminded me, because even if I wanted to go, I can’t retain it. (P1)

I wish I hadn’t neglected [my health] as much as I did my entire life. But I can’t change that now. (P8)

Motivations for screening and rationalising non-attendance

Most of the participants in our study showed willingness to or considered the possibility of attending one or both screenings if certain conditions were satisfied (they found a suitable gynecologist, were often reminded, reached a suitable age). Some participants had a problem with one of the screenings, but not with the other.

I’d probably go for a mammography because it doesn’t seem like an invasive procedure that would try to invade my body in any way, which is perfectly fine with me. (P2)

I would definitely want to go, just because I have big back problems and huge breasts, so they even recommended that if I wanted to get a discount on breast reduction from my insurance company, I would have to go for the mammogram anyway, so I’m definitely planning that in the future. (P9)

I have crooked legs and no boobs, so I don’t know how they would realistically do that to me when I think about it... not having anything to squeeze between those two blocks [...] But when the time comes, I’ll go at least once. (P4)

Most of the participants realised that avoiding screening is not good for their health and expressed different levels of dissatisfaction with their health decisions. In some cases, they were even afraid of being shamed for that. However, their barriers outweighed their potential motivations.

And now you can stone me for my approach. (P3)

Discussion

Although the evidence on individual barriers and motivations for screening attendance is scarce in general, it is completely lacking in Czechia. Attendance rates are still low despite wide screening availability. In our study, we identified five main themes that describe the reasons for non-attendance. The themes sometimes overlap, and multiple themes were identified in most of the interviews.

The first theme was the perceived risk of cancer and a healthy lifestyle. In our study, feeling healthy and having a good self-evaluated lifestyle led women to a low perceived need for screening. Although an unhealthy lifestyle is usually associated with a lower adherence to cervical and breast screening (Martín-López et al., 2010; Richard et al., 2015), a low perceived risk of cancer may also lead to non-attendance (Blomberg et al., 2008; Matejic et al., 2011). Women with very good self-evaluated health can perceive screening as unnecessary (Jensen et al., 2015). “Feeling healthy” (Blomberg et al., 2008; Lee et al., 2002; Oscarsson et al., 2009, 2008) as well as beliefs about one’s healthy lifestyle (healthy diet, positive thinking) (Watson-Johnson et al., 2011) was previously indicated as a reason for

non-attendance in multiple studies. Furthermore, women without cancer in their family history may feel healthier and thus less likely to attend screening (Borrayo and Jenkins, 2001). Trusting their own body and that it would “tell if something was wrong” can also cause women to be less susceptible to cancer worry (Watson-Johnson et al., 2011). Unlike in other studies, none of the participants mentioned non-risky sexual behaviour as a reason for non-attendance (Blomberg et al., 2008; Bennett et al., 2018; Marlow et al., 2019). Healthcare avoidance can be one of the methods to cope with negative or stressful health-related events (Byrne, 2008). In our study, women said that the risk of cancer was lower than the potential benefit of screening and the advantages were often outweighed by the stress caused by visiting the doctor, worrying about the results, or the possibility of having to cope with the diagnosis. The worry that this stress will lead to the development of cancer was previously described as a “manifest destiny” (Watson-Johnson et al., 2011).

All the above mentioned can be directly or indirectly related to the second identified theme, health literacy and awareness, since “feeling healthy” could be judged as ignorance or poor health knowledge (Oscarsson et al., 2008). Health literacy and health knowledge are essential for screening adherence (Baccolini et al., 2022) and low health literacy can be associated with lower screening rates (Oldach and Katz, 2014). Many forms of “healthy lifestyle” described by our sample of women would not protect them from cancer and even some more alternative health beliefs and medical denialism also occurred. Health beliefs that are inconsistent with health information, such as that

cervical cancer is caused by low self-esteem, can lead to medical avoidance (Byrne, 2008). A common misconception is also that radiation during mammography causes breast cancer (Watson-Johnson et al., 2011; Marmarà et al., 2017; Poon et al., 2023).

The third theme was previous experience with healthcare and healthcare professionals. The women in our study described unpleasant experiences from early childhood to later life, which led them to screening avoidance. The attitude of a physician (warmness, friendliness) is an important screening facilitator (Brown et al., 2019). Research showed that previously experience discomfort during gynecological examination (Oscarsson et al., 2009) or childbirth (Oscarsson et al., 2008) can lead to cervical screening non-attendance. Other types of negative experience mentioned by our participants, such as weight stigmatization (Mensing et al., 2018), negative childhood medical experience (Pate et al., 1996) or being a victim of sexual abuse (Cadman et al., 2012), have been associated with screening or healthcare avoidance.

The fourth theme was traditional barriers. Although less prevalent in our study, barriers such as lack of time, financial costs (Brown et al., 2019), unsuitable or difficult to schedule appointment times (Walsh, 2006; Waller et al., 2009) have been previously described by multiple researchers. In Czechia, financial costs associated with screening are rather indirect or in the form of “extra” services (registration fees, single-use materials), as screening is covered by medical insurance, however, generally long waiting time difficulties in scheduling appointments occur.

The last theme was personal traits. Laziness, forgetfulness, or lack of interest in one’s

own health, as some interviewees described, prevented them from screening. As women may not consider screening essential, they may be lazy or unwilling to give the energy to schedule appointment or prioritise other things (Oscars-son et al., 2008; Püschel et al., 2010).

While some women did not attend either of the screenings and their reasons did not differ by screening, others only did not attend one of them (or would consider attending the other when eligible). The women also talked about possible motivations and facilitators that would help them attend. Most women realised that screening was important to their health and even were afraid to be shamed for their health decision, which they tried to rationalise. This implies that some general knowledge of screening and its benefits is common. We found some similarities with the Conceptual Model of Medical Care Avoidance (CMMCA) (Taber et al., 2015). This model provides a conceptual categorisation of the three main reasons for not seeking medical care: low perceived need to seek medical care, traditional barriers to medical care, and unfavourable evaluations of seeking medical care. A fourth category, personal traits, is also identified. The authors argue that the model is applicable to a variety of clinical settings, including primary care settings and early detection services. Although there is an obvious overlap between the topics in our study and the CMMCA, the health literacy and awareness aspect of the problem is lacking.

Our study is not without limitations. We experienced some difficulties with recruitment and selected participants based on their willingness to be interviewed. The size of the sample is also limited and there might be an

unequal distribution the characteristics of the participants. Due to that, we might not have been able to tackle all possible screening barriers. However, we were able to identify five main themes and we believe that we provide valuable and complex information on the reasons for non-attendance women may have, which can significantly help in the selection of screening policies in the future.

Participants themselves pointed out that organisational changes, such as reminders or prescheduled appointment could help them attend. Fixed appointment times have been shown to increase screening attendance (Allgood et al., 2017; Stoffel et al., 2021). We believe that switching from the opt-in screening system to the opt-out system could make it easier for women to overcome both traditional and personal traits barriers. Furthermore, walk-in screening options can be implemented to reduce screening barriers (Wang et al., 2020). More complex changes in healthcare and educational systems would have to be introduced to deal with the remaining barriers, to increase health literacy and screening awareness of the population and the communication skills of healthcare professionals.

Conclusion

In our study, we have identified five main themes that describe barriers to breast and cervical screening attendance. Those themes included perceived risk and a healthy lifestyle, health literacy and awareness, previous experiences with healthcare and healthcare professionals, personal traits, and traditional barriers. We believe that implementing both organisational changes (opt-out system of invitations) together with more complex changes, such as

providing healthcare professionals with better tools for patient communication, is needed. Moreover, health education, health literacy, and awareness of the general population should also be addressed. Despite many obstacles, most women knew that screening could be beneficial for them. Making women transition from considering screening attendance to attending is a daunting task for policy makers, health insurance companies, and healthcare providers.

Declarations

Ethics approval and consent to participate:

The study was approved by the Institutional Review Board of the Faculty of Science, Charles University (approval number 2021/12). Informed consents have been signed by all study participants.

Competing interests:

Anna Altová, Michala Lustigová, and Ivana Kulhánová declare that they have no conflict of interest.

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Authors contributions:

A.A. and M.L. conceived the study and prepared the interviews. A.A. performed the interviews and analysis. A.A., M.L. and I.K. interpreted the analysis and prepared and reviewed the manuscript.

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9 “I feel healthy, I don’t need to go” – Relationship between self-perceived health and screening attendance

Anna Altová¹, Ivana Kulhánová¹, Michala Lustigová¹

¹Faculty of Science, Charles University, Prague, Czechia

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This chapter is an extended conference abstract. This abstract (and conference presentation) builds on the work presented mainly in Chapters 7 and 8. It shows the possibility of validating the interview data that was conducted and processed in Chapter 8 against existing data (in this case, from EHIS data).

Introduction

In recent years, cancer has been one of the leading causes of death in (not only) European countries. Early detection of cancer is vital for reducing cancer mortality. Cancer detection is one of the most effective tools for early detection, especially for cancer sites such as cervical, breast, or colorectal cancer (Peto et al., 2004; Lönnberg et al., 2012; Vicus et al., 2014; Kamini et al., 2013). For example, a systematic review of the effects of organised screening on cervical cancer mortality in Europe has been carried out. It showed a range of mortality reduction in attendees versus non-attendees from 41% to 92% (Jansen et al., 2020).

Although many countries have implemented population-based cancer screening,

large inequalities in screening attendance are still persistent between and within European countries. Many studies have attempted to uncover the reasons behind low screening attendance and screening hesitance. Evidence shows differences in screening uptake by age, socioeconomic status, marital status, immigration status, or co-occurring health conditions, such as diabetes or overweight (Schoofs et al., 2017; Edwards and Jones, 2000; Bongaerts et al., 2019; Jansen et al., 2020; Martín-López et al., 2010; Douglas et al., 2016; Willems and Bracke, 2018). The body of literature about particular reasons for non-attendance among individuals is, however, still limited. Bennett et al. (2018) focused on women who actively decline cervical screening. Among other reasons, they mentioned lack of time, embarrassment, low rele-

vance due to sexual behaviour, or fear of the results. In other studies, women reported lack of awareness (Rutten et al., 2004), doubts about the usefulness of breast cancer screening, and negative opinions about mammography (Ferrat et al., 2013). In general, the reasons for screening non-attendance, especially on an individual level, are still largely unknown.

In our previous work, we tried to investigate the most common reasons of screening non-attendance among Czech women. We identified 36.7% women as non-attendees in cervical cancer screening among 902 respondents (representative sample). The three most commonly declared barriers (women could choose one or more predefined reasons) were: *‘I do not experience any symptoms’* (36.3% of women), *‘fear of cancer diagnosis’* (23.0%) and *‘fear of the examination procedure’* (20.2%) (Altová and Lustigová, 2022). Furthermore, we found that *‘I do not experience any symptoms’* is the second most commonly declared barrier (29.4%) among women who do not attend breast cancer screening (after the *‘I do not experience any symptoms’*, 39.9%¹).

Elaborating on this prior knowledge, this paper tries to investigate the relationship between non-attendance to screening and self-perceived health, to understand whether women who feel healthy and do not experience symptoms attend screening less than others.

Data and methods

As the main source, data from the European Health Information Survey 2011/9 (EHIS) are used. Survey data include information about sex, age by 5-year groups, various socioeconomic status (SES) information, etc. We use the *‘self-perceived general health’* variable (question: *How is your health in general? Is it...*, with options: *very good, good, fair, bad, very bad*) where *‘very good’* is a proxy for *‘feeling healthy’* and *‘not experiencing symptoms of a disease’*. We apply binary logistic regression to estimate the chances of non-attendance to cervical screening by self-perceived health.

Preliminary results

Preliminary results for Czechia show that there is a relationship between self-perceived health and screening attendance. In our sample of 4,464 women (where all were eligible for cervical screening and 3,124 for breast screening), we identified 27.7% of cervical screening non-attendees and 34.6% of breast screening non-attendees. Women with *‘good’* and *‘fair’* self-perceived health compared to those with *‘very good’* health had higher chances of attending both cervical (OR = 1.67, 95%CI 1.32–2.12 and OR = 1.33, 95%CI 1.03–1.74) and breast screening (OR = 1.87, 95%CI 1.26–2.72 and OR = 1.49, 95%CI 1.00–2.19), see Figure 9.1. All models were controlled for age and education.

¹these results are not yet published

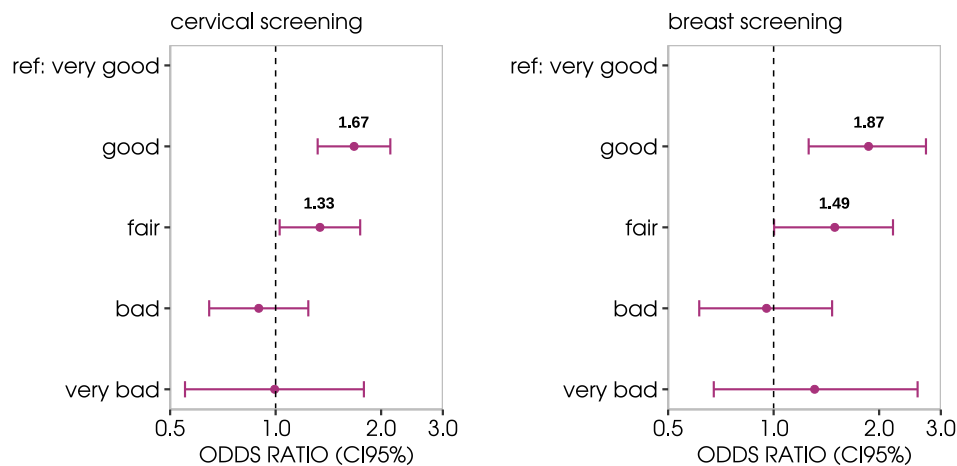


Figure 9.1: Chances of cervical and breast cancer screening attendance by the level of self-perceived health, results of binary logistic regression, EHIS 2019

Conclusion

We found that there are differences in cancer screening attendance according to the level of self-rated health. ‘*Feeling healthy*’ can lead women to believe that they do not need to attend cancer screening. Measures should be taken to improve health literacy and cancer awareness to dispel misconceptions about cancer symptoms and encourage women to prioritise screening.

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10 Conclusion

“We also know that an informed woman, especially a mother, is the best carrier of health culture in the family and in the wider community.”

Prof. Jiří Trapl (Vedra et al., 1960)

The aim of this thesis was to identify groups of women who are less likely to participate in population-based cancer screening. Four main research questions were established to fulfil this objective, which were then answered in individual scientific publications, represented by the chapters 5–8. In this part, the main findings will be summarised and the main research questions will be answered.

How much do women in Europe attend screening? Are there educational inequalities in screening attendance?

The case of cervical cancer screening and EHIS data were used to answer the first research question within Chapter 5: Educational inequalities in cervical cancer screening participation in 24 European countries. First of all, it is important to mention that there are large differences in the organisation of population-based screening programmes among European countries. This means that among the 24 countries that were included in the analysis (and which had established population-based screening programmes by 2019), there were differences in the target age, screening interval, or year of programme initiation. Therefore, attendance in screening was evaluated by each country’s screening organisation and based on ‘which services are available to women’ in each country, rather than by looking at the EU recommended interval or target age.

Using this approach, large disparities were found in screening attendance. The total standardised attendance ranged from 65.8% in Serbia to 95.4% Sweden¹. That would mean that the target of 70% of women being screened, which is set by organisations such as WHO (WHO, 2020) is slowly being reached. However, when comparing screening attendance by educational attainment, it is possible to find much larger disparities.

Women with low education are much less likely to attend screening in most European countries compared to highly educated women. The standardised attendance rates then range from

¹the range was even larger if countries where it is only possible to check for a lifetime participation were included

46.7% (among low-educated women in Serbia) to 96.3% in Sweden. Although in many countries attendance is generally very high – which is precisely the case of Sweden, it accentuates the inequalities in attendance even more. Low-educated Swedish women are more than six times more likely not to participate in screening compared to their highly educated counterparts. Although this difference is extreme, large inequalities have been shown in almost all European countries, and in most of them, low-educated women were at least twice as likely to attend screening compared to high-educated women (but often much more).

This is a significant finding for future policy making in screening. With the increasing availability of screening services and the higher efficiency of screening itself, underprivileged women (education can be used as a good proxy for social status) still remain disengaged from preventive services. In the future, there needs to be a greater focus on reducing inequalities in screening participation rather than just trying to increase overall participation. It can be assumed that the traditional campaigns and policies will target the more educated (or wealthier) women, so without special focus on the more disadvantaged communities, the inequalities will remain the same or will become larger.

To establish appropriate health policies, it is necessary to explore the mediating pathways between social status and participation in screening, as well as to understand other factors that may play a role in screening participation. Therefore, further research questions focused on the case of Czechia.

What are the screening attendance rates among Czech women? Are there age, regional and time differences in attendance?

In Chapter 5, cervical screening attendance in Czechia calculated from the EHIS data was 66.5%. Since EHIS includes survey data it may be subject to a number of biases. To answer the question about screening attendance in Czechia, administrative data from health insurance were used in Chapter 6: **Breast and cervical screening attendance among Czech women**.

According to administrative data, standardised participation was lower for cervical screening compared to the results in Chapter 5 and attendance for breast screening was also low. Although some differences may be due to the fact that the study in Chapter 6 included data older than the EHIS data, the difference is greater than 20 pp.

In 2017 the attendance for breast screening in Czechia was 51.7% and in cervical screening 45.9%. Screening attendance has shown to differ by age; younger women tend to attend screening more than older women. Total attendance and age-specific attendance increased between 2009 and 2017. It is possible that as the cohort of now younger women ages, both age-specific and total screening attendance will increase even more as younger women are now more accustomed to and adherent to preventive measures.

Large regional differences in screening attendance were also found. The highest attendance to cervical screening in 2017 was in Jindřichův Hradec district and was 55.0%, while the lowest

was 32.5% in the Jeseník district. The gap in breast screening attendance was found to be even larger, when the attendance was 69.8% in Třebíč and 38.3% in Jeseník. Surprisingly, the regions with the highest attendance were not the regions of large cities such as Prague or Brno, where there is higher availability of healthcare services, but rather smaller urban centres. From the nature of the available administrative data, it is not possible to identify the true reason for this.

Generally, it is possible to say that the screening attendance among women in Czechia is still rather low and there are large differences not just between women with different education, as shown in Chapter 5, but between women of different age and living in different regions.

What are the sociodemographic determinants of screening non-attendance among Czech women?

Although educational inequalities in screening attendance among all European (including Czech) women were tackled in Chapter 5, Chapter 7: **Barriers to the cervical cancer screening attendance among Czech Women** looks closer at the sociodemographic determinants of screening non-attendance among just Czech women. By using data from the representative survey, it was possible to disclose more variables that may affect screening attendance.

We identified 36.7% of the respondents in the survey to be screening non-attendees. Statistically significant differences were found between women who do and do not attend screening in terms of age, education, marital status, and household composition. The women in our sample were able to choose one or more out of 12 (and “other”) predefined barriers to attendance. The most commonly declared reasons were “I do not experience any symptoms”, “fear of cancer diagnosis” and “fear of the examination procedure”.

Surprisingly, almost no differences were found in the sociodemographic characteristics mentioned above between women who declared different barriers. In other words: women who attend screening differ from those who do not attend screening, however, once they are non-attendees it does not really matter much who they are in terms of their reasons for non-attendance. Choosing the right communication methods for various types of women is therefore critical to increase participation rates.

What are the reasons for screening non-attendance among Czech women?

The answer to the question: what are the reasons for screening non-attendance has already been partly covered in Chapter 7, however, this chapter relied only on the predefined selection of possible reasons based on literature search. In Chapter 8: **Perceived barriers to cervical and breast screening: a qualitative study** semi-structured interviews were conducted to reveal more hidden reasons that were perhaps not yet described in the literature.

In this chapter, five main themes – groups of reasons for non-attendance were identified. The first was the *perceived risk of cancer and healthy lifestyle*. Most of the participants considered themselves healthy and not at risk of cancer, or at least not at the moment. Therefore, they

did not find it important to seek medical care. The participants stated that they adhere to a healthy lifestyle (they do not smoke or drink, they exercise, they eat healthy foods). Women also felt less of a need to be screened if there was no history of cancer in their family. Some women believed that it was healthier for them not to go to the screening because the screening caused them stress, which is unhealthy. Their fear of diagnosis outweighed the rational belief that screening might be good for them.

The second group of reasons was the *health literacy and awareness*. Women were often unaware of screening recommendations or the possibility of attending screening. They also had incorrect beliefs about, for example, the possible side effects of screening, cancer risk factors.

The third and probably the most surprising theme was the *previous experience with healthcare and healthcare professionals*. This theme emerged in most of the interviews and concerned previous unpleasant experiences with medical professionals (doctors, nurses), which may or may not have been associated with care in the field of obstetrics and gynecology. All of these experiences appeared to have a profound impact on women's willingness to attend preventive services.

The last two groups of barriers were the *traditional barriers*, which mainly concerned the availability of care (in terms of time, location, etc.) and *personal traits* such as laziness.

Although this was a qualitative study and the results are not statistically significant, they are still important. The women in the sample were of all kinds of socioeconomic backgrounds, of different ages and different levels of education, yet they still had similar experiences and expressed similar concerns. This study highlighted the importance of communication in prevention at all levels, including general education, preventive campaigns, and communication of healthcare professionals.

10.1 Limitations

Specific limitations are covered in chapters 5–8 individually. There were, however, some main limitations. First, a large part of the results are based on survey or interview data – the self-reported data. Therefore, they are subject to multiple biases. Women may have overestimated their participation in screening due to the social desirability to adhere to health prevention. Women may also have misremembered some aspects of the screening or may have been unaware that they had participated in the screening (especially in case of cervical screening, which at least in Czechia is a part of preventive gynecological exam).

Second, screening data may be collected incorrectly. For example, the question on screening participation in EHIS has not been adjusted for countries where the recommended screening interval is longer. Therefore determining and comparing screening attendance between countries is complicated and may be inaccurate.

Third, some bias may have been caused by the selection of predefined screening barriers or topics that were discussed in the interviews. Women may have been led to conclusions and statements that they would not have made otherwise.

Despite these limitations, it was possible to systematically cover the topic of women's screening non-attendance, especially from the Czech perspective, and to provide comprehensive information on both the extent of non-attendance and its determinants and barriers.

10.2 Possible recommendations and further research

Based on the research presented, there may be several possible recommendations for policy making. First, the implementation of organisational changes in screening programmes should be considered. Sending opt-out invitations (for prescheduled appointments where women have to take action in order to cancel it) rather than current opt-in invitations could remove part of the burden placed on women. In this case, there is also the possibility of persuading the woman to attend if she wants to cancel the appointment. In addition, walk-in screening can be introduced for women to attend more spontaneously, which can encourage those who have a hard time scheduling appointments.

Second, increasing communication and soft skills of healthcare professionals during their education could help avoid negative feelings of women, which later discourage them from participating in prevention.

Third, increasing the health literacy of the Czech population is necessary. It is important to communicate different aspects of health to different groups of people in a suitable way for them. In particular, cancer communication has so far focused more on common risk factors such as smoking, alcohol, and an unhealthy diet. Therefore, most people believe that if they do not smoke, drink, and eat healthy foods, they cannot get cancer, and if they do, it is their fault. It is important to stress the importance of early detection and detection of other risk factors (such as genetic predispositions) together with the importance of a healthy lifestyle.

In order to correctly transform these recommendations into policies, more research is needed. Future research should look at whether the inequalities in screening attendance change over time and whether they decrease with increasing participation.

Second, the results of the qualitative part of this work should be validated by quantitative research methods. This is suggested in the short Chapter 9: **"I feel healthy, I don't need to go" – Relationship between self-perceived health and screening attendance**, which shows the relationship between "feeling healthy" and screening attendance. By using EHIS data, it is possible to see that women with self-evaluated very good health have lower chances of screening attendance compared to women who declare good or fair self-evaluated health. Similar studies and analysis can be done also for other barriers; however, it would be necessary to collect new data through surveys or find surveys that include information regarding the already found barriers.

In addition, the health trajectories of people could be examined to see whether previous health decisions and previous medical interventions somehow affect later outcomes. Examining how the trajectories differ between attendees and non-attendees might be helpful.

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A Supplementary tables

country	not attended	attended	total participants
Belgium	825	2,101	2,926
Croatia	380	1,219	1,599
Czechia	786	1,538	2,324
Denmark	381	1,712	2,093
Estonia	104	887	991
Finland	55	1,796	1,851
Germany	1,438	5,522	6,960
Hungary	405	1,299	1,704
Iceland	212	1,077	1,289
Ireland	378	2,178	2,556
Italy	3,713	10,167	13,880
Latvia	387	1,709	2,096
Lithuania	310	951	1,261
Malta	398	847	1,245
Netherlands	392	2,131	2,523
Norway	537	1,902	2,439
Poland	1,015	3,856	4,871
Portugal	1,486	3,011	4,497
Romania	2,241	2,681	4,922
Serbia	1,294	2,449	3,743
Slovakia	522	1,496	2,018
Slovenia	616	2,731	3,347
Spain	830	5,751	6,581
Sweden	129	2,634	2,763

Table A.1: Number of attendees, non-attendees and participants in cervical screening by country; EHIS, Wave 3; supplementary material for Chapter 5

country	[%]				[percent points] difference high-low
	high	medium	low	all	
Belgium	81.6	72.1	59.0	72.2	22.6
Croatia	84.9	79.5	59.0	76.8	25.9
Czechia	71.9	66.1	52.2	66.5	19.8
Denmark	83.1	81.9	70.4	81.7	12.7
Estonia	93.6	87.2	80.0	89.5	13.6
Finland	97.1	97.9	91.6	97.2	5.5
Germany	82.1	78.7	66.5	79.8	15.5
Hungary	83.0	77.8	57.8	76.6	25.2
Iceland	86.6	83.7	76.0	83.7	10.6
Ireland	86.5	84.7	83.7	85.3	2.8
Italy	87.9	89.8	87.3	88.5	0.6
Latvia	87.9	78.4	69.0	81.7	18.9
Lithuania	78.5	73.8	58.1	75.5	20.4
Malta	79.2	69.2	63.0	68.8	16.1
Netherlands	83.8	85.9	85.9	85.1	-2.1
Norway	93.0	89.1	83.0	90.1	10.0
Poland	90.4	74.1	58.2	79.2	32.2
Portugal	75.8	70.6	61.4	67.4	14.4
Romania	69.3	57.1	34.1	54.8	35.2
Serbia	78.3	67.7	46.7	65.8	31.6
Slovakia	83.3	74.3	51.8	74.6	31.5
Slovenia	85.6	79.9	74.3	81.9	11.4
Spain	90.6	89.2	83.5	87.6	7.2
Sweden	96.3	96.3	86.4	95.4	10.0

Table A.2: Standardized cervical screening attendance rates by educational attainment and country; EHIS, Wave 3; supplementary material for Chapter 5

country	low-high				low-medium				medium-high			
	OR	LB	UB	p	OR	LB	UB	p	OR	LB	UB	p
Belgium	2.86	2.23	3.68	<0.001	1.73	1.42	2.12	<0.001	1.65	1.34	2.04	<0.001
Croatia	2.42	1.61	3.69	<0.001	2.18	1.64	2.90	<0.001	1.11	0.78	1.61	0.569
Czechia	2.00	1.41	2.84	<0.001	1.70	1.24	2.32	<0.001	1.18	0.95	1.46	0.135
Denmark	2.95	1.93	4.48	<0.001	2.04	1.33	3.09	<0.001	1.45	1.13	1.86	0.004
Estonia	3.58	1.81	6.89	<0.001	1.65	0.87	3.00	0.110	2.17	1.37	3.51	<0.001
Finland	4.35	1.75	10.14	<0.001	3.52	1.39	8.42	0.006	1.23	0.67	2.26	0.498
Germany	2.24	1.74	2.87	<0.001	1.84	1.43	2.35	<0.001	1.22	1.08	1.38	<0.001
Hungary	2.91	2.06	4.11	<0.001	2.31	1.71	3.11	<0.001	1.26	0.96	1.67	0.102
Iceland	1.97	1.35	2.86	<0.001	1.57	1.05	2.34	0.027	1.26	0.88	1.79	0.208
Ireland	1.81	1.30	2.51	<0.001	1.39	1.01	1.90	0.041	1.30	1.02	1.67	0.036
Italy	2.41	2.06	2.83	<0.001	2.12	1.86	2.42	<0.001	1.14	0.98	1.32	0.083
Latvia	3.74	2.45	5.68	<0.001	2.13	1.43	3.16	<0.001	1.75	1.36	2.27	<0.001
Lithuania	2.63	1.47	4.63	<0.001	2.21	1.23	3.91	0.007	1.19	0.91	1.57	0.210
Malta	1.34	0.97	1.86	0.082	0.90	0.64	1.29	0.576	1.48	0.99	2.21	0.057
Netherlands	1.95	1.36	2.81	<0.001	1.53	1.07	2.19	0.019	1.27	0.97	1.67	0.080
Norway	3.02	2.07	4.40	<0.001	1.52	1.06	2.18	0.022	1.99	1.46	2.71	<0.001
Poland	5.80	4.34	7.75	<0.001	2.00	1.55	2.58	<0.001	2.89	2.42	3.48	<0.001
Portugal	1.78	1.51	2.10	<0.001	1.37	1.16	1.61	<0.001	1.30	1.08	1.57	0.006
Romania	4.49	3.68	5.49	<0.001	2.60	2.24	3.03	<0.001	1.73	1.47	2.04	<0.001
Serbia	3.24	2.52	4.18	<0.001	2.12	1.77	2.53	<0.001	1.53	1.24	1.90	<0.001
Slovakia	3.79	2.57	5.61	<0.001	2.53	1.83	3.50	<0.001	1.50	1.14	1.98	0.004
Slovenia	1.68	1.24	2.26	<0.001	1.25	0.94	1.65	0.120	1.34	1.10	1.64	0.004
Spain	2.45	2.02	2.97	<0.001	1.98	1.66	2.37	<0.001	1.24	1.01	1.51	0.040
Sweden	6.36	3.89	10.35	<0.001	5.20	3.20	8.40	<0.001	1.22	0.81	1.86	0.344

Table A.3: Chances for not-attending cervical screening by educational attainment and country; EHIS, Wave 3; supplementary material for Chapter 5

District	LAU 1	Standardized attendance rate (%)								
		2009	2010	2011	2012	2013	2014	2015	2016	2017
Czechia	CZ0	41.0	43.1	44.0	44.0	45.4	45.0	45.8	45.8	45.9
Prague	CZ0100	36.5	39.2	39.2	39.4	40.5	40.4	41.2	41.1	40.6
Benešov	CZ0201	43.4	45.3	46.4	47.1	48.1	47.8	48.6	48.5	49.2
Beroun	CZ0202	37.3	37.7	39.1	39.8	40.8	40.5	40.5	43.2	41.2
Kladno	CZ0203	36.1	41.3	40.7	41.0	42.2	42.3	43.2	43.3	43.4
Kolín	CZ0204	42.3	42.9	43.8	43.6	45.0	45.0	46.1	47.3	47.3
Kutná Hora	CZ0205	41.2	42.2	43.7	40.6	43.2	42.8	45.5	43.7	45.0
Mělník	CZ0206	41.7	43.8	44.3	44.0	44.5	45.5	45.0	46.9	46.5
Mladá Boleslav	CZ0207	38.1	41.2	43.6	43.1	43.1	43.8	44.0	43.2	43.5
Nymburk	CZ0208	41.3	41.7	42.8	42.3	42.7	43.6	42.9	43.0	42.8
Prague East	CZ0209	40.7	41.8	43.1	43.0	44.0	43.6	45.4	46.0	45.9
Prague West	CZ020A	40.6	43.0	43.4	42.9	44.7	44.4	45.4	45.8	45.6
Příbram	CZ020B	46.8	46.9	49.1	47.8	49.5	50.0	49.5	51.1	50.7
Rakovník	CZ020C	44.8	47.8	48.9	48.0	50.8	50.2	51.9	51.0	52.9
Č. Budějovice	CZ0311	44.1	45.9	46.5	46.6	48.5	49.3	49.1	49.3	49.9
Č. Krumlov	CZ0312	46.9	49.7	49.3	50.1	52.7	51.4	53.7	53.5	54.2
Jindřichův Hradec	CZ0313	52.6	52.7	54.1	53.8	54.4	54.2	54.2	55.2	55.0
Písek	CZ0314	43.8	45.1	46.5	45.2	48.1	46.5	48.1	47.4	48.2
Prachatice	CZ0315	42.4	41.7	44.0	42.7	44.8	44.0	43.6	44.8	43.2
Strakonice	CZ0316	41.0	41.6	42.3	41.7	43.5	43.0	44.3	43.8	44.1
Tábor	CZ0317	51.6	51.8	51.6	50.9	53.9	50.7	52.0	52.3	51.5
Domažlice	CZ0321	45.4	47.6	51.1	51.1	52.5	51.9	53.4	53.2	53.7
Klatovy	CZ0322	42.6	42.7	44.5	43.8	46.7	45.8	47.1	46.5	47.4
Plzeň City	CZ0323	42.9	41.2	46.3	45.6	48.3	46.6	47.3	46.8	46.7
Plzeň South	CZ0324	45.2	44.5	49.5	49.4	51.1	50.5	50.9	50.7	50.0
Plzeň North	CZ0325	45.0	44.1	47.7	47.9	49.5	49.6	49.4	49.2	49.0
Rokycany	CZ0326	39.5	40.2	43.0	43.3	44.2	44.0	45.1	45.1	44.7
Tachov	CZ0327	49.2	49.1	52.3	50.3	52.9	50.7	51.6	51.3	50.2
Cheb	CZ0411	40.1	39.6	40.7	40.6	41.5	42.9	42.5	43.2	43.0
Karlovy Vary	CZ0412	38.8	41.3	41.9	41.0	42.5	42.3	47.8	48.2	50.3
Sokolov	CZ0413	45.3	46.5	47.4	45.9	47.1	47.1	50.1	49.8	51.2
Děčín	CZ0421	36.3	38.8	37.7	40.3	41.1	41.9	42.4	43.3	44.2
Chomutov	CZ0422	37.7	44.0	45.1	46.3	48.1	46.4	47.6	47.9	48.9
Litoměřice	CZ0423	44.4	47.0	47.3	47.9	47.7	49.8	49.4	51.2	51.0
Louny	CZ0424	37.7	41.1	42.5	42.4	43.3	43.6	46.0	46.2	45.5
Most	CZ0425	43.1	46.1	44.4	45.4	47.2	45.3	45.9	46.1	46.6
Teplice	CZ0426	32.4	35.9	36.8	38.8	40.6	40.4	42.2	43.3	45.1
Ústí n. Labem	CZ0427	35.6	35.5	37.8	37.2	40.1	38.8	40.7	41.9	43.3
Česká Lípa	CZ0511	36.8	42.8	42.9	42.6	42.6	43.0	42.7	43.8	42.6
Jablonec n. Nisou	CZ0512	47.1	49.0	48.4	48.4	49.7	48.5	48.1	48.5	46.7
Liberec	CZ0513	36.9	40.8	43.2	44.7	44.6	44.8	44.5	44.1	44.6
Semily	CZ0514	46.5	47.9	48.8	48.1	49.5	49.7	50.0	49.9	49.8
Hradec Králové	CZ0521	43.4	44.9	45.0	43.5	45.2	45.1	45.1	44.2	45.5
Jičín	CZ0522	47.3	47.9	48.4	47.1	50.5	48.9	50.2	48.1	50.3

District	LAU 1	Standardized attendance rate (%)								
		2009	2010	2011	2012	2013	2014	2015	2016	2017
Náchod	CZ0523	48.1	49.5	50.3	49.8	50.0	51.1	52.3	51.2	51.6
Rychnov n. Kněžnou	CZ0524	44.0	46.3	47.3	46.4	48.5	47.4	49.8	47.9	48.0
Trutnov	CZ0525	40.9	41.9	43.0	42.5	44.2	43.2	45.5	43.5	44.0
Chrudim	CZ0531	49.9	51.0	52.3	52.2	53.2	52.4	54.3	53.4	53.9
Pardubice	CZ0532	43.3	45.7	48.0	47.4	48.2	47.0	49.1	47.7	48.0
Svitavy	CZ0533	41.8	42.9	45.8	46.2	48.0	48.4	49.2	47.6	48.3
Ústí n. Orlicí	CZ0534	45.2	46.7	47.2	46.8	47.9	47.9	49.1	49.0	47.6
Havlíčkův Brod	CZ0631	44.3	46.8	50.3	47.2	49.9	49.6	48.8	49.7	49.7
Jihlava	CZ0632	42.8	44.4	46.0	45.8	47.7	48.2	48.3	48.5	49.3
Pelhřimov	CZ0633	44.4	46.5	46.5	47.2	48.1	47.6	48.4	48.9	49.3
Třebíč	CZ0634	46.6	45.5	48.6	48.4	52.0	50.6	51.3	50.9	50.9
Žďár n. Sázavou	CZ0635	38.6	44.4	42.4	44.7	45.7	43.9	45.4	44.1	45.4
Blansko	CZ0641	37.8	39.7	40.3	40.8	43.0	42.5	42.9	42.9	42.6
Brno City	CZ0642	41.2	42.8	42.8	42.9	43.5	43.8	43.1	44.4	44.8
Brno County	CZ0643	42.3	43.9	44.4	44.7	45.5	45.2	45.2	46.3	46.7
Břeclav	CZ0644	41.8	43.3	45.4	44.7	46.0	44.8	44.8	44.9	44.5
Hodonín	CZ0645	33.7	38.7	38.7	39.7	41.1	40.8	41.2	41.7	41.7
Vyškov	CZ0646	37.7	39.5	41.4	41.1	44.1	42.2	41.1	44.9	45.4
Znojmo	CZ0647	40.8	41.0	41.5	42.4	42.8	42.5	42.6	43.9	44.7
Jeseník	CZ0711	32.4	35.1	35.2	35.7	34.6	35.9	36.6	32.8	32.5
Olomouc	CZ0712	40.6	42.7	43.5	43.9	44.3	44.8	45.4	44.9	44.2
Prostějov	CZ0713	38.2	40.4	41.2	38.9	41.7	42.6	42.9	43.7	44.1
Přerov	CZ0714	38.4	41.1	41.2	42.5	44.6	44.2	45.8	45.3	45.4
Šumperk	CZ0715	42.6	46.0	47.7	47.1	47.9	47.5	47.5	49.2	48.4
Kroměříž	CZ0721	38.6	42.2	41.9	42.6	44.1	43.5	44.7	44.7	45.9
Uherské Hradiště	CZ0722	40.1	43.2	44.3	44.7	45.5	43.8	45.5	46.1	45.5
Vsetín	CZ0723	43.3	46.2	45.9	46.9	48.5	47.4	48.9	49.8	49.4
Zlín	CZ0724	40.4	42.3	43.6	44.5	45.7	44.4	44.6	44.2	44.4
Bruntál	CZ0801	44.3	46.3	46.1	47.2	47.1	47.5	46.9	47.0	47.6
Frydek - Místek	CZ0802	37.5	39.9	40.9	39.6	41.4	40.5	41.2	42.0	43.0
Karviná	CZ0803	37.2	39.3	38.8	38.5	39.4	39.2	41.6	40.0	38.9
Nový Jičín	CZ0804	42.8	45.8	46.0	45.5	46.0	44.6	46.0	45.5	40.7
Opava	CZ0805	41.1	42.9	43.1	42.9	45.3	45.2	47.0	48.1	48.4
Ostrava City	CZ0806	32.1	36.5	36.8	36.3	37.6	36.9	38.3	36.2	34.8

Table A.4: Standardized cervical cancer screening attendance rate (%) by LAU1 region, Czech women, 2009–2017; supplementary material for Chapter 6

District	LAU 1	Standardized attendance rate (%)								
		2009	2010	2011	2012	2013	2014	2015	2016	2017
Czechia	CZ0	45.8	41.1	42.0	45.1	47.9	50.9	50.1	51.4	51.7
Prague	CZ0100	39.1	34.2	33.3	37.7	41.8	43.4	44.2	43.0	45.6
Benešov	CZ0201	53.5	46.0	46.8	46.6	50.5	51.8	52.4	53.8	54.8
Beroun	CZ0202	50.1	42.9	43.0	45.6	44.9	52.4	47.6	54.3	48.8
Kladno	CZ0203	40.6	32.8	35.4	43.0	43.3	47.6	45.2	50.2	51.5
Kolín	CZ0204	40.1	36.4	37.4	40.4	46.0	50.1	48.3	49.0	51.1
Kutná Hora	CZ0205	44.0	41.8	38.2	38.1	44.8	44.6	46.3	46.4	48.9
Mělník	CZ0206	33.0	28.0	31.7	42.8	43.6	48.5	46.9	50.5	49.3
Mladá Boleslav	CZ0207	38.6	34.3	38.7	35.1	39.5	41.2	39.3	41.8	41.1
Nymburk	CZ0208	12.1	12.0	24.1	30.7	38.8	41.5	42.7	44.4	43.2
Prague East	CZ0209	42.7	36.0	36.6	39.6	45.2	46.1	47.9	46.8	49.6
Prague West	CZ020A	44.1	37.4	37.1	39.8	43.5	47.8	46.4	48.3	48.7
Příbram	CZ020B	49.9	41.2	43.8	46.0	50.7	54.8	54.3	56.3	54.8
Rakovník	CZ020C	39.9	35.5	35.8	40.9	41.4	46.5	49.3	50.0	51.5
Č. Budějovice	CZ0311	52.7	42.7	45.2	48.5	48.5	55.3	51.7	52.8	52.8
Č. Krumlov	CZ0312	52.4	39.0	45.3	46.4	48.8	50.9	53.3	50.0	54.0
Jindřichův Hradec	CZ0313	55.0	44.4	44.9	51.0	48.7	56.7	52.6	55.5	53.8
Písek	CZ0314	66.1	52.2	52.6	53.4	52.9	59.4	58.2	58.1	59.0
Prachatice	CZ0315	52.2	43.8	43.5	47.2	43.1	51.8	48.4	47.1	49.4
Strakonice	CZ0316	51.1	42.5	42.0	43.5	42.8	51.4	47.2	49.0	46.8
Tábor	CZ0317	55.1	53.5	47.3	54.0	48.9	59.6	55.3	55.2	56.0
Domažlice	CZ0321	59.5	53.6	52.1	54.2	57.8	56.8	60.5	59.2	59.6
Klatovy	CZ0322	52.8	52.5	43.9	50.3	54.4	53.2	57.8	55.8	55.1
Plzeň City	CZ0323	36.5	34.6	38.4	41.3	46.4	45.2	44.8	45.2	47.4
Plzeň South	CZ0324	46.9	45.3	44.2	46.1	50.6	49.1	50.6	50.1	51.2
Plzeň North	CZ0325	41.9	39.9	42.2	43.1	47.4	48.9	46.7	47.8	50.3
Rokycany	CZ0326	42.6	37.3	41.8	43.0	47.1	47.4	49.0	48.9	48.0
Tachov	CZ0327	44.6	43.8	48.4	47.3	51.2	51.2	54.5	51.6	55.3
Cheb	CZ0411	38.7	34.0	36.4	38.1	40.6	44.0	43.0	43.4	45.7
Karlovy Vary	CZ0412	41.5	38.4	34.8	48.4	48.4	53.6	52.6	51.7	52.6
Sokolov	CZ0413	47.3	49.0	45.6	50.2	49.5	54.0	54.9	55.4	57.0
Děčín	CZ0421	50.0	43.7	43.9	44.9	50.4	49.0	49.2	51.2	50.7
Chomutov	CZ0422	51.5	47.4	42.3	48.4	49.4	52.9	51.1	56.5	55.5
Litoměřice	CZ0423	39.2	36.7	40.3	42.5	49.2	54.3	52.5	54.5	53.6
Louny	CZ0424	24.3	25.4	31.6	37.2	40.2	41.5	43.6	44.5	46.7
Most	CZ0425	34.6	31.5	36.4	46.8	44.1	52.1	48.0	54.9	51.7
Teplice	CZ0426	34.4	33.8	32.9	37.3	40.0	45.4	46.1	49.9	48.5
Ústí n. Labem	CZ0427	35.8	36.6	32.9	37.4	40.8	43.9	44.7	44.3	46.1
Česká Lípa	CZ0511	44.7	45.6	42.8	46.3	52.9	47.9	53.0	48.3	62.4
Jablonec n. Nisou	CZ0512	47.2	47.0	48.3	46.4	51.4	51.9	48.9	55.3	49.5
Liberec	CZ0513	40.2	42.5	43.5	41.9	48.4	49.5	48.4	51.4	49.8
Semily	CZ0514	36.9	30.7	35.6	38.4	40.8	40.7	40.1	40.0	43.4
Hradec Králové	CZ0521	47.2	42.6	44.8	46.2	48.0	50.5	52.0	50.3	53.3
Jičín	CZ0522	60.3	45.9	46.1	47.3	50.6	51.4	50.7	51.8	50.1

District	LAU 1	Standardized attendance rate (%)								
		2009	2010	2011	2012	2013	2014	2015	2016	2017
Náchod	CZ0523	58.8	48.8	46.4	49.1	52.8	56.0	54.3	54.4	53.2
Rychnov n. Kněžnou	CZ0524	51.0	46.9	43.5	49.3	46.8	57.3	54.8	54.4	51.4
Trutnov	CZ0525	32.6	28.3	35.6	37.8	40.7	42.9	39.0	33.8	46.8
Chrudim	CZ0531	40.5	36.9	33.1	39.7	36.2	46.7	51.1	55.5	52.0
Pardubice	CZ0532	34.4	29.6	28.5	34.1	37.3	43.4	45.6	47.0	46.7
Svitavy	CZ0533	61.1	49.4	51.3	53.6	53.3	54.8	56.0	55.9	56.0
Ústí n. Orlicí	CZ0534	45.1	41.6	39.7	45.7	50.1	54.4	54.1	53.5	53.0
Havlíčkův Brod	CZ0631	55.4	49.5	45.4	48.4	46.6	54.5	52.9	54.6	54.6
Jihlava	CZ0632	58.5	53.4	50.9	53.9	57.3	58.7	60.7	57.4	62.0
Pelhřimov	CZ0633	74.2	61.4	61.9	65.6	63.1	67.5	66.2	67.4	61.8
Třebíč	CZ0634	62.3	58.8	71.8	59.3	73.2	63.6	71.9	67.0	69.8
Žďár n. Sázavou	CZ0635	62.7	49.0	53.2	55.3	59.2	61.9	60.0	61.6	59.6
Blansko	CZ0641	61.0	51.9	51.0	52.8	52.7	54.5	55.4	58.3	55.6
Brno City	CZ0642	52.8	52.2	47.9	50.2	52.5	54.6	53.3	53.1	54.8
Brno Country	CZ0643	53.3	51.3	46.7	50.6	51.2	55.5	52.9	54.1	53.8
Břeclav	CZ0644	68.0	55.5	53.5	49.0	52.8	56.1	52.7	54.7	56.4
Hodonín	CZ0645	42.8	37.4	34.2	49.4	43.3	50.7	49.1	49.2	49.0
Vyškov	CZ0646	54.2	46.1	44.8	46.9	47.8	51.1	51.4	52.5	52.4
Znojmo	CZ0647	50.1	47.2	44.3	47.1	49.0	51.6	49.0	52.7	51.0
Jeseník	CZ0711	29.1	36.7	32.0	37.7	36.2	45.6	39.2	42.4	38.3
Olomouc	CZ0712	36.8	45.3	48.5	49.7	51.9	53.9	53.8	57.0	54.1
Prostějov	CZ0713	30.2	31.6	31.0	40.5	43.0	47.6	44.8	48.4	48.5
Přerov	CZ0714	57.9	47.5	48.5	47.6	64.8	59.1	60.3	62.0	62.3
Šumperk	CZ0715	47.3	48.7	48.1	51.9	49.2	60.5	54.7	55.3	57.0
Kroměříž	CZ0721	59.0	50.9	53.2	55.3	59.2	59.7	59.3	62.7	58.4
Uherské Hradiště	CZ0722	44.6	44.0	45.3	48.4	51.1	54.6	51.2	55.2	52.0
Vsetín	CZ0723	54.3	39.9	48.5	56.2	52.8	56.5	50.2	61.5	51.9
Zlín	CZ0724	30.2	25.8	46.4	47.6	43.9	59.7	48.7	55.7	53.8
Bruntál	CZ0801	35.7	37.6	36.8	43.6	44.1	47.6	47.1	47.4	46.8
Frydek - Místek	CZ0802	42.2	31.2	38.8	38.4	45.1	45.5	39.3	45.3	42.7
Karviná	CZ0803	34.3	32.2	35.7	34.1	41.6	41.8	39.4	43.7	47.7
Nový Jičín	CZ0804	57.3	49.6	55.6	52.5	55.9	50.9	51.7	54.3	53.1
Opava	CZ0805	52.9	48.7	45.2	47.8	52.6	52.0	54.3	52.7	53.8
Ostrava City	CZ0806	42.0	36.3	39.0	36.2	44.7	45.5	45.7	46.5	45.5

Table A.5: Standardized breast cancer screening attendance rate (%) by LAU1 region, Czech women, 2009–2017; supplementary material for Chapter 6

B Translation of Chapter 7

Barriers to the cervical cancer screening attendance among Czech Women

Anna Altová¹, Michala Lustigová²

¹Department of Demography and Geodemography, Faculty of Science, Charles University, Prague, Czechia, ² Department of Social Geography and Regional Development, Faculty of Science, Charles University, Prague, Czechia

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Abstract in English

Objectives: The main aim of this study was to find specific barriers to cervical cancer screening attendance that Czech women declare. Furthermore, the objective was to find out whether there are differences between women who do and do not attend screening according to sociodemographic characteristics. Finally, we investigated whether women who do not attend the screening differ by sociodemographic characteristics in declaring particular barriers to attendance. **Materials and methods:** Data were collected using a representative questionnaire survey. The women were asked about their previous participation in the cervical cancer screening program. Those who did not attend screening in the past 2 years or those who do not (intend to) attend screening regularly were considered non-attendees. The non-attendees were then asked about their reasons for non-attendance in the screening. First, descriptive statistical methods were used to analyze the data. Second, the differences between the different groups of women were analyzed by Pearson's chi-squared independence test. **Results:** In the studied sample population (N = 902), 36.7% were considered non-attendees. Statistically significant differences in sociodemographic characteristics (age, education, marital status, household type) were observed between attendees and non-attendees. The three most common reasons for non-attendance were: "I do not experience any symptoms", "fear of cancer diagnosis", and "fear of the examination procedure". Almost no differences in sociodemographic characteristics in the declaration of particular barriers to attendance were found. **Conclusions:** We observed differences between women who attended and those who did not attend the screening. However, sociodemographic characteristics do not play an important role once a woman decides not to attend the screening. Therefore, it is essential to communicate cancer prevention throughout the spectrum of Czech women.

Abstract in Czech

Objectives: Hlavním cílem studie bylo nalézt konkrétní bariéry účasti na screeningu, které české ženy zmiňují. Dále zjistit, jestli se ženy, které se screeningu neúčastní, liší dle sociodemografických charakteristik od žen, které se účastní, a jestli se ženy, které se neúčastní, liší dle deklarace jednotlivých bariér.

Soubor a metodika: Data byla získána z reprezentativního šetření. Ženy, které se v posledních 2 letech neúčastnily screeningu nebo se neúčastní pravidelně, byly tázány na důvody neúčasti. Data byla vyhodnocena pomocí metod popisné statistiky. Rozdíly mezi skupinami žen byly porovnávány pomocí Pearsonova chí-kvadrát testu nezávislosti. **Výsledky:** Z celkového souboru 902 dotazovaných žen lze za neúčastnice na screeningu považovat 36,7 % z nich. Ženy, které se screeningu účastní, se statisticky významně liší ve všech sledovaných charakteristikách (věk, vzdělání, rodinný stav, typ domácnosti) od žen, které se screeningu neúčastní. Nejčastěji deklarovanými důvody neúčasti byly „nepociťuji příznaky“, „strach z diagnózy“ a „strach z vyšetření“. U většiny z těchto důvodů nebyly pozorovány statisticky významné rozdíly v charakteristikách žen, které dané důvody deklarovaly a které je nedeklarovaly. **Závěry:** Byly potvrzeny rozdíly v sociodemografických charakteristikách žen, které se screeningu účastní a které se neúčastní. Jakmile se žena screeningu neúčastní, nezáleží již na jejích sociodemografických charakteristikách v deklarovaném důvodu její neúčasti. Proto je nezbytné komunikovat prevenci v oblasti nádorových onemocnění napříč celým spektrem žen.

Introduction

Screening for cancer has long been considered one of the effective methods for early detection of cancer. The benefit of cervical cancer screening has been demonstrated in many scientific studies. It has been shown that a large proportion of cervical cancer deaths can be prevented through screening. The reduction in mortality ranges from 41 to 92% (Jansen et al., 2020).

According to a recommendation of the Council of the European Union, European Union (EU) Member States should provide nationwide screening programmes for the prevention of breast, colorectal and cervical cancer. The EU recommends starting cervical screening in women aged 20–30 years old and continuing at regular 3–5 year intervals until the age of 60 or 65 years (Arbyn et al., 2008). Organised cervical cancer screening has been in

place in Czechia since 2008 and is provided to all women aged 15 years and older as part of an annual preventive examination in the form of a Pap smear (and from 2021 onwards, a screening HPV test for women aged 35 and 45 years). Screening in Czechia is therefore more frequent and has a wider age range than the EU recommendation, and even more frequent than in most European countries (Ponti et al., 2017).

Even though screening is already relatively well established, administrative data from health insurance companies show that participation is still relatively low. Participation rates are around 50% (Májek et al., 2022; Dušková et al., 2014; Altová et al., 2021). Foreign literature that has looked at inequalities in cervical screening participation shows differences in non-participation by education or economic activity (Broberg et al., 2018). However, the specific reasons for non-participation in screening are a relatively unexplored topic

in the global literature. Studies have focused on specific cases, such as active refusal of screening (Bennett et al., 2018) or non-participation in screening among minority groups (Marlow et al., 2019). The topic of reasons for non-participation in screening has not yet been addressed in the Czech literature.

The first objective of this study is to determine whether women who do not participate in the screening differ in sociodemographic characteristics from women who do participate in screening. The main objective is then to find the specific barriers to participation in screening that women perceive for participating in screening, and then to determine whether women differ by demographic or sociodemographic characteristics in declaring each barrier.

Data and methodology

The data for the study were obtained from a questionnaire survey conducted annually in Czechia by the Medical Information Centre. This representative survey deals with health care issues from the perspective of the general population. It also focuses on the subjective health of the respondents and their lifestyle. An essential part of the survey is including the basic demographic and socio-economic characteristics of the respondents. In addition, the 2020 survey included questions on cervical screening – on frequency of participation and motivations or barriers to participation or non-participation.

The study population included 902 women (110 of the 1,012 women surveyed chose not to participate). Participants were first asked about their participation in the screening program, specifically, “When was the last time you

had a cervical smear cytology (cervical cancer screening)?” They selected answers from the following options:

- in the last 12 months;
- 1–2 years ago;
- 2–3 years ago;
- 3 or more years ago;
- never.

If the woman chose one of the first two options, she was asked, “Do you (or do you plan to) participate in screening regularly (recommended interval is 1 year)?” If she answered “no” or had participated in screening more than 2 years ago, she was considered a non-participant. Non-participants were further asked about barriers: “For what reasons do you not participate in cervical smear cytology (more often)?” Women could then choose one or more of the options offered or write their own answer. Participation was assessed in a similar way as reported in Ponti et al. (2017), i.e. as the proportion of women who participated in screening compared to women eligible for screening (in the case of Czechia, all women 15+ each year). However, due to the self-reporting nature of the survey, an extra 1 year’s benevolence was added, i.e. women who had participated in the last 2 years were considered as participants.

To analyse the data, descriptive statistics (frequency analysis) were first used to characterise women according to the frequency of participation in screening and to represent the stated reasons for non-participation in screening. Only the three most frequently stated barriers were selected for more in-depth analyses. The test of independence (Pearson’s chi-square test) was first used to test whether there were statistically significant differences

between women who did and did not participate in screening according to selected sociodemographic characteristics (age, education, marital status, household type). And secondly, it was used to test whether women who gave a specific reason for non-participation differ from women who do not participate but for a different reason according to the above sociodemographic characteristics. The tests were performed at the 5% significance level, i.e. $p < 0.05$ indicates a statistically significant difference in the distribution of the variable of interest between the compared groups.

Results

Out of 902 women, 571 women (63.3%) participated in screening regularly and at the rec-

ommended interval. The remaining 331 women (36.7%) who did not participate in screening declared their reasons for non-participation (Table B.1). The most common barriers to participation in screening were not experiencing (absence of) symptoms (120 women, 36.3%), fear of diagnosis (76 women, 23.0%), and fear of examination (67 women, 20.2%). On the other hand, accessibility, either in terms of location ("the gynaecologist's office is too far away", 20 women, 6.0%) or in terms of the time available to the women interviewed ("I don't have time", 39 women, 11.8%) tended to be less prevalent (Figure B.1). Within the "other" response, women most frequently cited hysterectomy, age, or not having the need to see a doctor as reasons for not attending screening.

Last attendance	regular attendance	irregular attendance	total
1 year ago	424 (47,0%)	9 (1,0%)	433 (48,0%)
1–2 years ago	147 (16,3%)	30 (3,3%)	177 (19,6%)
2–3 years ago		91 (10,1%)	91 (10,1%)
3 years ago		99 (11,0%)	99 (11,0%)
never		102 (11,3%)	102 (11,3%)
total	571 (63,3%)	331 (36,7%)	902 (100,0%)

Table B.1: Declared participation in cervical screening in Czechia in 2020

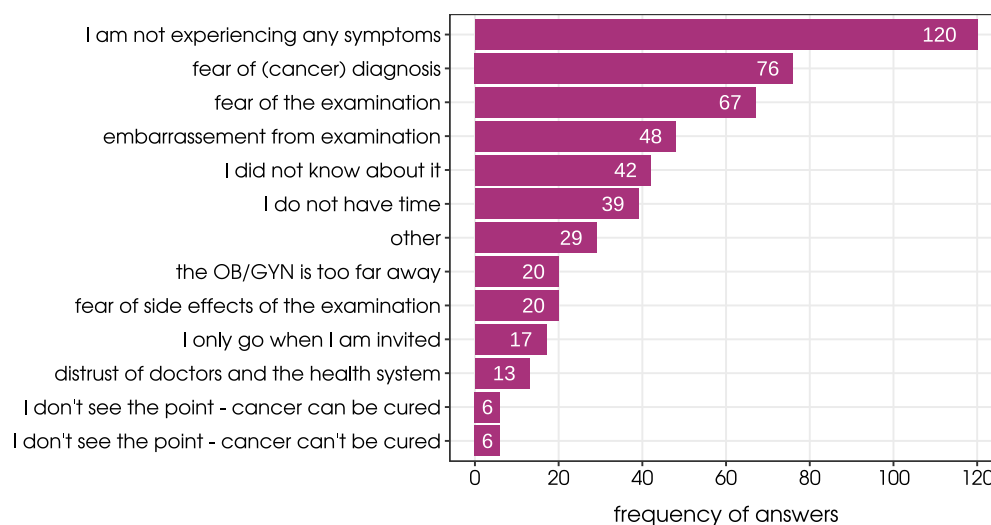


Figure B.1: Declared barriers to participation in screening in Czechia in 2020

Characteristics	Women who do not participate in screening (n = 331; 36,7%)		most frequent barriers	
	All women (n = 902)	I don't experience symptoms (n=120, 36,3%)	fear of diagnosis (n=76; 23,0%)	fear of examination (n=67; 20,2%)
Age				
15-34	223 (24,7%)	79 (35,4%)	11 (13,9%)	20 (25,3%)
35-54	309 (34,3%)	77 (24,9%)	18 (23,4%)	18 (23,4%)
55-74	310 (34,4%)	127 (41,0%)	36 (28,3%)	21 (16,5%)
75+	60 (6,7%)	48 (80,0%)	11 (22,9%)	8 (16,7%)
		p = 0,884 ^b	p = 0,125 ^b	p = 0,363 ^b
Education				
elementary school	85 (9,4%)	45 (52,9%)	8 (17,8%)	12 (26,7%)
vocational school	215 (23,8%)	94 (43,7%)	30 (31,9%)	17 (18,1%)
high school	407 (45,1%)	139 (34,2%)	25 (18,0%)	30 (21,6%)
university	195 (21,6%)	53 (27,2%)	13 (24,5%)	8 (15,1%)
		p = 0,296 ^b	p = 0,073 ^b	p = 0,485 ^b
marital status				
single	227 (25,2%)	90 (39,6%)	13 (14,4%)	25 (27,8%)
married, partnered	447 (49,6%)	130 (29,1%)	28 (21,5%)	23 (17,7%)
divorced	118 (13,1%)	39 (33,1%)	19 (48,7%)	9 (23,1%)
widowed	110 (12,2%)	72 (65,5%)	16 (22,2%)	10 (13,9%)
		0,775 ^b	p < 0,001 ^b	0,128 ^b
Household				
alone, without a steady partner	231 (25,6%)	112 (48,5%)	27 (24,1%)	22 (19,6%)
in marriage, with a partner	548 (60,8%)	164 (29,9%)	38 (23,2%)	31 (18,9%)
other	123 (13,6%)	55 (44,7%)	11 (20,0%)	14 (25,5%)
		p = 0,346 ^b	p = 0,835 ^b	p = 0,568 ^b

Table B.2: Characteristics of women in terms of participation and most frequently declared barriers to participation

Note: p-value < 0,05 indicates a statistically significant difference;;

^athe set of women who do not participate was compared with women who do participate;

^bwomen who declare a given barrier were compared with women who do not participate and did not declare that barrier

The characteristics of the women who participated in the screening, as well as the characteristics of the women who were assessed as non-participants based on the methodology described above, are shown in Table B.2. The distribution of women who did and did not participate in the screening was different and statistically significant for all the variables studied ($p < 0.001$). In contrast, for most of the most frequently declared barriers, there were no statistically significant differences between women who declared and those who did not declare them. The only statistically significant difference was in the distribution of women by marital status for the response fear of diagnosis. This reason was given by a smaller proportion of single women (14%) and conversely by a larger proportion of divorced women (49%). For the other responses, there was no significant difference between women who selected the response and those who did not select the response.

Discussion

The topic of the reasons for non-participation in cervical cancer screening has not yet been explored in the Czech literature, although the National Cervical Cancer Screening Programme has been running in Czechia since the beginning of 2008 and is provided once a year to all women aged 15 years and older as part of a regular gynaecological examination. The results of the questionnaire survey showed that there is still a relatively large number of women in Czechia who do not participate in screening (or not at the recommended interval). The difference in the participation rate declared by women themselves and that found on the basis of administrative

data from public health insurance is due to a number of factors. Respondents to lifestyle and health-related behaviour surveys generally have a desire to “do” better. It can be assumed that here too women overestimate their participation in screening, either intentionally or unintentionally. Another problem is the administrative reporting of prevention, which is supposed to take place once a year, but is often only available to patients after 365 days since the last exam. This can lead to a shift in screening, and in the case of visits at the turn of the year, a woman may “drop out” of the administrative records.

Women who declared their participation in the screening differed statistically significantly from non-participants in all socio-demographic characteristics, i.e. age, education, marital status and household arrangement. Previous research in this area has shown that women with less education participate less in screening compared to women with more (Willems and Bracke, 2018), employed compared to unemployed, women who live alone in the household (Broberg et al., 2018), single versus married (Petkeviciene et al., 2018) and younger versus older (Gianino et al., 2018). Thus, as in other areas of health and prevention, there is a socioeconomic gradient in participation in cancer screening.

On the other hand, no statistically significant differences were observed between women declaring a specific reason for non-participation and those who did not, with the exception of “fear of diagnosis”. In this case, women differed statistically significantly by marital status.

The previous results can therefore be interpreted in a simplified way as follows: women who do not participate in screening, regard-

less of the reason, are different in socio-demographic characteristics from women who do participate. However, once a woman does not participate in screening, her socio-demographic characteristics no longer matter in the stated reason for her non-participation.

Looking at the individual barriers in more detail, they can be divided into several categories.

The first category is barriers that are in some way related to low awareness and health literacy in the field of cancer screening and prevention. International studies show that low health literacy may be associated with non-use of healthcare by women (Mancuso, 2008) and thus non-participation in cancer screening (Kim and Han, 2016). Barriers related to low health literacy may include, in whole or in part, the following barriers: “I do not experience symptoms”, “I did not know about this option”, or “fear of side effects”. These barriers can be assumed to be misconceptions about malignant neoplasms or screening itself, or simple ignorance or lack of knowledge. Beliefs that “cancer cannot be cured” or fear of screening could also be included in this group of barriers.

The second group of barriers is mainly related to negative attitudes towards doctors or the health care system (“distrust of doctors and the health care system”). For example, Taber et al. (2015) mentions “physician factors” as one of the significant barriers to seeking medical care. Among these factors, respondents often mention interpersonal (communication problems, distrust in the doctor, belief that the doctor does not care about the patient) or medical reasons (e.g. low trust in the doctor’s expertise).

Previous research shows that even “fear of

diagnosis” or, more generally, fear of getting bad health news can lead to avoidance of medical care (Taber et al., 2015). This is also true in the case of cancer, which is often perceived as a “death sentence” (Moser et al., 2014). This barrier in turn paradoxically leads to worse outcomes when cancer is detected at more advanced stages. A close group of barriers includes “fear of examination” or “shame”, which are in some way related to the discomfort associated with medical care.

Only a fraction of women declared physical accessibility (“the gynaecologist’s office is too far away”) or time (“I don’t have time”) as a reason for not attending screening. The (Taber et al., 2015) study mentioned above classifies these barriers as “traditional” barriers (along with, for example, high financial bases for healthcare). Although, according to other literature, (Wilding et al., 2020) one might expect these barriers to be relatively common for Czech women, it appears that, for example, in urban regions where access to gynaecologists should be better, participation in screening is lower (Altová et al., 2021). Thus, these barriers are likely to depend on the health care and health insurance system, but also on the size and remoteness of the regions in a given country.

The screening programme in Czechia takes place more frequently and at a wider age range than in many other countries in Europe. However, it is provided as part of an annual gynaecological examination. Therefore, the above findings may partly reflect the attitude of Czech women towards attending regular gynaecological examinations.

Finally, it is necessary to mention the limitations of this study. These include possible

biases resulting from self-reported collection of information on participation in screening or on the time since the last screening. Furthermore, the predefined selection of potential barriers may have led to some barriers being missed. Failure to confirm statistically significant differences may be due to the size of the study population. Last but not least, the wording of the question used to assess participation in screening should be mentioned. It is possible that some women do not know that screening is part of a regular gynaecological examination, which became apparent on closer examination of the responses in the 'other' category. A few women responded that they do not participate in screening because they go to the gynaecologist every year. At the same time, this assumption can also be confirmed from the experience of other research that the authors are currently conducting.

Despite the shortcomings mentioned above, it can be said that the study provides new insights that should be kept in mind when providing medical care. In the context of the Czech literature, this is a unique research that can be used to improve the quality of care and especially to increase participation in cervical cancer screening.

One of the indisputable means to increase participation in screening is to educate the Czech population in the field of cancer prevention and to increase awareness of the possibilities of early detection of these diseases. It is necessary to sufficiently communicate the facts, e.g. that people in the early stages of cancer often do not experience symptoms, but also to focus on increasing trust in doctors and reducing the level of fear of examinations such as cervical smears. Self-sampling methods may

be more acceptable to a certain spectrum of the population, such as in the case of the fecal occult blood test. Some studies have suggested that self-sampling of the cervix for HPV testing may be an appropriate option for some women who actively refuse to participate in screening (Bennett et al., 2018). Pilot studies on this topic are currently underway in Czechia to investigate the possibility of using self-sampling kits for screening (Národní screeningové centrum, 2022).

Conclusion

Cervical cancer screening is undoubtedly an essential tool for reducing the mortality rate (and incidence rate) of cervical cancer, but also for improving the quality of life of patients. The screening programme is relatively well established in Czechia, yet Czech women still find a wide range of reasons for non-participation. The most common ones are not experiencing symptoms (and therefore not being affected by the disease), fear of diagnosis and fear of examination. These and other reasons for non-attendance need to be given sufficient attention, both in gynaecologists' surgeries and in general practitioners' surgeries and in the context of prevention and public health communication. In fact, most of the barriers mentioned stem from a lack of awareness in the field of (gynaecological) prevention or previous negative experiences with doctors or health care.

Publication ethics:

The Editorial Board declares that the manuscript met the ICMJE uniform requirements for biomedical papers.

Conflict of interests:

The authors declare they have no potential conflicts of interest concerning the drugs, products or services

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Cancer screening non-attendance among women:
Inequalities, determinants, and barriers

Doctoral thesis by Anna Altová

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Faculty of Science
Charles University