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Original research article

HEALTH LITERACY OF THE CZECH POPULATION CONCERNING CANCER PREVENTION

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Abstract

Cancer is the second most common cause of death in the Czech Republic. Several risk factors and an unsatisfactory level of health literacy in this area significantly contribute to this situation. This paper aims to point out the current state of awareness and interest in preventive activities related to cancer among the Czech population aged 18+ and the level of knowledge about cancer prevention. As part of the empirical investigation, a quantitative survey using an electronic questionnaire with 35 questions of our own design was used. The questionnaire survey was conducted from January 16 to February 14, 2025. The research group included 180 people aged 18+. The obtained data were processed in the MS Office Excel program. When it comes tocancer prevention, the results indicate that the knowledge of the Czech population aged 18+ is unbalanced. The level of knowledge increases with the increasing level of education. Women show a higher interest in prevention, and as respondents' age increases, interest in prevention decreases. More significant gaps in knowledge appear in relation to screening programs and the frequency of preventive examinations. Our findings point to the necessity of repeated education and the development of educational activities to help increase awareness of the importance of cancer prevention. At the same time, they point to the necessity of effective and repeated education in older age categories, where the risk of developing some cancers may be more significant.

Keywords: *Cancer; Czech Republic; Health literacy; Population 18+; Prevention; Self-examination*

INTRODUCTION

Available data indicate that every third citizen of the Czech Republic will encounter some type of cancer during their lifetime. Cancer has long been the second leading cause of death among people under the age of 65, and has become the leading cause of death for people over the age of 65. Estimates suggest that the prevalence of cancer in the Czech Republic could exceed 750,000 by 2030 (Ministry of Health of the Czech Republic, 2022). The monitored data also show that the incidence of the disease is still increasing. For comparison, in 2000, the incidence of cancer (Malignant neoplasms C00–C97) was 58,553 and there were 28,089 mortalities. In 2023, the incidence of these diseases (Malignant neoplasms C00–C97) was 95,551, with 27,314 mortalities (Krejčí et al., 2024). On a positive note, between 2011 and 2021, the cancer mortality rate in men decreased by 17% and in women by 12%. Nevertheless, the mortality rate remains higher in the Czech Republic than the average for the European Union. This disappointing statistic is due to the results related to risk factors for cancer, especially alcohol consumption, physical inactivity, overweight and obesity, and poor air quality. The influence of the social gradient also appears to be significant in this context. The attendance rate of screening programs (especially in the case of breast, cervical, and colon cancer) has also long been below the desired values (OECD, 2025; Pehalova et al., 2021).

Regarding the need to increase health literacy concerning cancer prevention, it is also necessary to mention the issue of demographic development. In 2023, life expectancy for the Czech Republic was 80.0 years (a slight increase compared to 2012, when life expectancy was 78.1 years). The share of the population aged 65+ in 2023 was 20.4% (in 2012 it was 16.2%) (OECD, 2025). The need to streamline and plan a realistic, feasible, and long-term sustainable strategy concerning combating cancer also increases the outlook for 2035. It is assumed that by this year, cancer will become the leading cause of death in the European Union (considering the ageing of the population, insufficient health literacy and persistent unhealthy lifestyles). This group of diseases is partially preventable in adulthood (Krejčí et al., 2024).

A persistent problem that reduces the effectiveness of implemented preventive activities is undoubtedly the population's health literacy level and the degree of interest and responsibility of citizens for their health. It turns out that a low level of health literacy is directly related to a lower probability of choosing behaviour that would be beneficial to health (Holčík, 2017; Parker, 2009). In this context, we encounter a phenomenon known as the "decision paradox". This is caused by the demands associated with the need to choose a healthy lifestyle. The active promotion of an unhealthy lifestyle in modern society, the increasingly complex structure of the healthcare system, the level of education of the population, and the degree to which the population is equipped with adequate skills to obtain, understand, evaluate, and use available information in an effort to improve their own health (Kickbush et al., 2020) play a significant role in this process.

In accordance with its premise, this descriptive study aims to:

(1) Describe the current state of knowledge, awareness, and interest in preventive activities related to cancer prevention in the Czech population aged 18+.

(2) To indicate the level of willingness to change selected areas of the target group's lifestyle to reduce the risk of developing cancer.

MATERIALS AND METHODS

This contribution is based on data obtained during the implementation of research related to creating a bachelor's thesis entitled "Health Education of the Lay Public Related to the Prevention of Cancer Diseases from the Perspective of Nursing" (Farová, 2025). To achieve the set goals, a quantitative survey was chosen using an electronic questionnaire of our own design, in accordance with the literature (Gurková, 2019). It included 35 closed and semi-closed questions, which were supplemented by a scale of answers with the possibility of adding one's own answers. The questionnaire questions were compiled based on a study of the available literature and the research team's own experiences with the given issue. The questionnaire did not contain any ethically questionable questions and was anonymous. Respondents expressed their consent to participate in the research by completing the questionnaire. Before distributing the questionnaire, its comprehensibility was verified through a pilot study with eight respondents. Based on the results of this pilot study, the questionnaire was finalised and divided into three parts. The first part of the questionnaire focused on obtaining demographic data about the respondents. The second part of the questionnaire focused on determining and describing the respondents' knowledge about cancer and its prevention and screening programs. The third, most comprehensive part of the questionnaire was devoted to describing the attitudes, risk factors, and behaviour of the respondents in relation to the prevention of cancer. Motivation for the prevention of these diseases and interest in education in this area was not neglected.

Data was collected from January 16 to February 14, 2025, via the online Survio system. The questionnaire was displayed 507 times in the given period. 187 questionnaires were filled out, making the return rate 36.9%. The remaining 320 questionnaires were incomplete, and seven were discarded after optical inspection due to incomplete responses. The resulting research group consisted of 180 people over 18 years of age, of which 51% (92) were women and 49% (88) were men (for more detailed characteristics of the research group, see Table 1).

Table 1. Characteristics of respondents (*N* = 180)

Monitored feature	Absolute frequency	Relative frequency
Age		
18–30 years	76	42%
31–40 years	30	17%
41–50 years	17	9%
51–60 years	20	11%
61–70 years	22	12%
71+	15	8%
Sex		
F	92	51%
M	88	49%
Highest education		
Basic	14	8%
Secondary without A-levels	43	24%
Secondary with A-levels	63	35%
Higher vocational	13	7%
University (Bachelor's degree)	22	12%
University (MA, PhD, etc.)	25	14%
Place of residence		
City/town	92	51%
Small town/village	88	49%

The data was analysed in Microsoft Office Excel. As part of the 1st stage classification, the aim of which was to identify the frequency of occurrence of individual variants of the investigated characters, the absolute and relative frequency of the categories of the given characters was determined. Subsequently, the 2nd stage classification was applied, which focused on comparing the distribution of characters with others. Contingency tables were created, allowing for the analysis of the relationships between variables. The chi-square test with a significance level of 0.05 was used to test the relationships of interest, as per the recommendations (Chráska, 2016).

RESULTS

Considering the number of educational activities implemented, we assumed that the level of public awareness of the symptoms of cancer and the implemented screening programs would be satisfactory. However, the analysis of the results points to an unsatisfactory level of knowledge. In relation to the understanding of screening programs aimed at the early detection of cancer that are implemented in the Czech Republic, it appears that respondents (*N* = 180) most frequently confirm this knowledge in the case of breast cancer screening (152 respondents), colorectal cancer screening (148 respondents), and cervical cancer screening (122 respondents). Seventy-three respondents were informed about lung cancer screening, 53 about malignant melanoma screening, and 44 about pancreatic cancer screening. In 22 cases, the option "I don't know" also appeared. Public knowledge regarding the frequency of examinations within the framework of screening programs implemented in the Czech Republic is presented in Table 2. This table also presents how respondents perform recommended self-examinations to prevent selected cancers.

Knowledge about the risks of tobacco smoking was tested with the question: "What effect does smoking have on the risk of developing cancer?" Respondents were asked to mark one of the options offered. Most respondents (140; 78%) stated that *"smoking increases the risk of developing several types of cancer, including lung, larynx, and bladder cancer"*. A total of 37 (21%) respondents believed that *"smoking increases the risk of developing lung cancer, but not other types of cancer"*, and three respondents (2%) chose the option that *"smoking increases the risk of developing cancer only at an advanced age"*. The following can be stated in terms of knowledge of early symptoms of cancer, which was tested using a question with a range of

Table 2. Frequency of examinations within screening programs implemented in the Czech Republic

Screening examination within the framework of implemented screening programs	Recommended frequency	Absolute frequency	Relative frequency
Mammography in women over 45 (*N* = 180)	Every year	25	14%
	Every 2 years	132	73%
	1× in 5 years	5	3%
	Only if the woman has symptoms or a family history of this diagnosis	4	2%
	I don't know	14	8%
Screening examination for early detection of cervical cancer (*N* = 180)	Every year since they were 15	87	48%
	Every two years since they were 15	35	19%
	Every five years since they were 15	14	8%
	I don't know	44	24%
Fecal occult blood test for colorectal cancer screening (*N* = 180)	Once in two years since they were 45	23	13%
	Every year since they were 50	63	35%
	Every two years since they were 55	50	28%
	Every two years between 45–50, every year since they were 50	23	13%
	I don't know	21	12%
Self-checking for skin changes (i.e., birthmarks, new skin lesions) (*N* = 180)	Regularly (monthly)	25	14%
	Sometimes (several times a year)	70	39%
	Rarely (once a year or less)	71	39%
	I don't do it	14	8%
Breast self-examination (*N* = 92)*	Regularly (monthly)	33	36%
	Sometimes (several times a year)	35	38%
	Rarely (once a year or less)	18	20%
	I don't do it	6	7%
Testicular self-examination as part of testicular cancer prevention (*N* = 88)**	Regularly (monthly)	19	22%
	Sometimes (several times a year)	33	38%
	Rarely (once a year or less)	29	33%
	I don't do it	7	8%

Note: * 180 respondents answered the question, of which 92 were women and 88 were men, who chose the answer "I don't do it because it doesn't apply to me – I'm a man". Therefore, these respondents are not included in the analysis. ** 180 respondents answered the question, of which 88 were men and 92 were women, who chose the answer "I don't do it because it doesn't apply to me – I'm a woman". Therefore, these respondents are not included in the analysis.

symptoms offered, where respondents could mark one or more of the options provided. The most frequently reported symptoms were unusual lumps (169 respondents), unexplained weight loss (158 respondents), chronic fatigue (154 respondents), and skin changes (148 respondents). Significant mood swings as an early symptom of cancer were noted in 68 respondents, and the answer "don't know" appeared in 71 cases.

Analysing the responses related to statements that concerned understanding the connection between the selected risk factors and cancer development produced interesting findings. These were determined through a series of statements to which a scale of responses was assigned expressing the degree of agreement: *"I completely agree – I tend to agree – I don't know – I tend to disagree – I completely disagree."* In addition to these statements, attention was also paid to determining the willingness of the respondents to implement selected changes to reduce the risk of cancer (see Table 3).

These findings led us to consider whether there is a relationship between the selected demographic indicators (in this case, the highest level of education, gender, place of residence, and age of the respondents) and interest in and knowledge of cancer prevention. To assess knowledge, questions were selected from the questionnaire and scored according to the correctness of the answers. These questions aimed to test knowledge related to orientation in individual levels of prevention, the existence of screening programs, knowledge related to cancer symptoms, and the frequency of selected preventive examinations. High

Table 3. Expression of the degree of agreement with the specified statements related to knowledge and self-management in the prevention of cancer

Monitored statement	Agreement rate Absolute frequency (relative frequency)				
	Agree	Somewhat agree	Do not know	Somewhat disagree	Disagree
Statements related to knowledge					
I believe that a healthy diet rich in fruits and vegetables can reduce the risk of cancer.	71 (39%)	86 (48%)	14 (8%)	9 (5%)	0 (0%)
I believe that using tobacco products can increase the risk of cancer.	130 (72%)	49 (27%)	0 (0%)	0 (0%)	1 (1%)
I believe that getting enough exercise can reduce the risk of cancer.	106 (59%)	38 (21%)	28 (16%)	7 (4%)	1 (1%)
I believe that drinking alcohol can increase the risk of cancer.	86 (46%)	84 (47%)	9 (5%)	4 (2%)	1 (1%)
I believe that stress contributes to cancer.	58 (32%)	87 (48%)	33 (18%)	1 (1%)	1 (1%)
Statements related to self-management					
I would be willing to change my diet (healthy diet, no alcohol) to reduce the risk of developing cancer.	74 (41%)	91 (51%)	11 (6%)	2 (1%)	1 (1%)
I would be willing to get more exercise to reduce the risk of developing cancer.	82 (46%)	77 (43%)	18 (10%)	3 (2%)	0 (0%)
I would be willing to visit the doctor more often than for preventive check-ups to reduce the risk of developing cancer.	42 (23%)	93 (52%)	35 (19%)	9 (5%)	1 (1%)
I would be willing to get vaccinated against viruses associated with the risk of developing cancer (e.g., HPV) to reduce the risk of developing cancer.	44 (24%)	46 (26%)	57 (32%)	29 (16%)	4 (2%)
I would not take any steps to reduce the risk of developing cancer because I do not feel threatened.	1 (1%)	2 (1%)	6 (3%)	59 (33%)	112 (62%)
I am interested in receiving information about current events related to cancer prevention.	42 (23%)	90 (50%)	38 (21%)	9 (5%)	1 (1%)

knowledge was possessed by respondents (64 people; 36%) who scored 15–18, medium knowledge (72 people; 40%) by respondents who scored 11–14 points, and low knowledge (44 people; 24%) by respondents who scored 10 or less points. Based on the data analysis, it can be stated that a statistically significant difference was demonstrated between the level of education and the level of knowledge about cancer prevention, and that those with a higher level of education also achieve a higher level of knowledge. The calculated value of the test criterion was $\chi^2 = 71.158$. According to the degrees of freedom (f = 10), the critical value of the test criterion χ^2 0.05 (10) = 18.307 was found in the statistical table for the selected level of significance (0.05). No statistically significant relationship was found when testing the relationship between the level of public knowledge about cancer prevention and place of residence. The calculated value of the test criterion was $\chi^2 = 5.249$. According to the degrees of freedom (f = 2), the critical value of the test criterion χ^2 0.05 (2) = 5.991 was found in the statistical table for the selected level of significance (0.05).

A statistically significant difference was also noted in the relationship between gender and interest in cancer prevention, confirming that women showed a higher level of interest than men. The calculated value of the test criterion was $\chi^2 = 11.702$. According to the degrees of freedom (f = 2), the critical value of the test criterion χ^2 0.05 (2) = 5.991 was found in the statistical table for the selected significance level (0.05). A statistically significant relationship between interest in preventive activities related to cancer prevention was also noted in the age group of the respondents. It can be stated that the level of interest in these activities gradually decreases with increasing age, with older age categories showing relatively medium or low interest. The calculated value of the test criterion was $\chi^2 = 54.081$. According to the degrees of freedom (f = 10), the critical value of the test criterion χ^2 0.05 (10) = 18.307 was found in the statistical table for the selected significance level (0.05).

DISCUSSION

Knowledge, awareness, and interest in preventive activities

Cancers belong to a group of diseases that are to some extent preventable in adulthood (Krejčí et al., 2024). Nevertheless, the Czech Republic still ranks among the countries with a relatively high epidemiological burden. The Czech population ranks 16th–17th in the total incidence of malignant tumours in Europe, and 21st–22nd in global mortality. In terms of mortality, it ranks 22nd in Europe and 48th globally. Although this is a positive trend in the long term, there are still gaps in the form of the consequences of late detection of cancer, especially in the case of colon and rectal tumours or breast and prostate tumours (Ministry of Health of the Czech Republic, 2022). Screening examinations provide the opportunity to detect cancer at an early stage or to identify individuals who are at risk of cancer occurring. Although there are disadvantages to these examinations (e.g., false positivity or negativity, the psychological impact of testing, etc.), the positives they bring (especially in reducing incidence, mortality, reducing the need for invasive therapy, etc.) clearly outweigh these disadvantages (WHO, 2022). This is also why screening examinations appear in guidelines focused on the early detection of cancer (American Cancer Society, 2023; Kiss et al., 2025; Ministry of Health of the Czech Republic, 2023).

Our results point to certain limits in the awareness of the screening examinations. It turns out that respondents have a good understanding of the existence of breast, colorectal, and cervical cancer screening. In the case of lung cancer, malignant melanoma and pancreatic cancer screening, awareness of the existence no longer reaches very satisfactory values. The fact that lung cancer screening is relatively new (it launched on January 1, 2022), may have contributed to this finding. The situation is similar for prostate cancer screening, which was launched on an organised scale on January 1, 2024 (Ministry of

Health of the Czech Republic, 2022). In the case of malignant melanoma screening, this may contribute to the fact that it is a screening for which widespread population screening has not yet been introduced. This is although the importance of clinical screening is confirmed by clinical studies (Kodet and Krajsová, 2017). The last-mentioned screening is also very young – pancreatic cancer screening, which in the Czech Republic is implemented more as part of studies: ScrePAN (Absolonová et al., 2024) or HEPACAS (Slodička et al., 2021).

In addition to awareness of the existence of these examinations, it is difficult to know at which time intervals and from what age an individual should undergo these examinations (see Table 2). The finding that only 36% (N = 92) of women in our research group regularly (i.e., monthly) perform breast self-examination can be considered significant feedback for healthcare professionals. Although this examination has a substantial and irreplaceable place among other diagnostic methods in detecting early changes (American Cancer Society, 2023). A possible cause of this situation, which is also indicated by the conclusions of a survey conducted among women in India, can be seen in women's knowledge of the course of self-examination, its importance and the quality of the education provided. After all, it has been proven that after a suitably implemented intervention, the level of knowledge and skills in this area increases significantly (Das et al., 2019). Similarly, unsatisfactory results were found in the case of performing testicular self-examination as part of prevention; of 88 (100%) men, only 22% performed it regularly. This is consistent with the findings of studies addressing the issue of performing testicular self-examination. According to the conclusions of these studies, inadequate knowledge related to the problem of testicular self-examination and fear of discovering changes significantly contribute to this result (Ibitoye et al., 2022; Pietrzyk et al., 2020). However, it should be mentioned that the most at-risk age group includes men aged 20–40, in whom this disease occurs most often. Even in this case, it is true that it should be performed at least once a month (Military Health Insurance Company, 2023).

Similarly problematic is the level of knowledge associated with the prevention of cancer. Only 36% of respondents had a high level of knowledge and a significant proportion of respondents (24%) showed a low level of knowledge. Hence it has been shown that education is a significant factor influencing the level of knowledge; those who had a higher level of education achieved a higher level of knowledge. The importance and impacts of population awareness of cancer prevention are pointed out by Yu and Baade (2020). They emphasise that increasing the population's knowledge and understanding of cancer prevention leads to a reduction in the high burden of cancer. In other words, if the level of health literacy in this area is increased appropriately, a significant decrease in the risk of cancer diagnosis can also be expected compared to groups whose level of health literacy is unsatisfactory (or low). However, the role of healthcare professionals and key barriers that may hinder knowledge acquisition and behavioural changes cannot be overlooked (Obročníková and Majerníková, 2013; Yu and Baade, 2020). In this context, a significant factor seems to be the level of overall health literacy of the Czech population, which is inadequate or problematic for almost 60% of the Czech adult population. In the sphere of disease prevention (i.e., the ability to obtain adequate information, evaluate it, and use it), 54.1% of the population showed limited health literacy — according to the results published by Kučera et al. (2016). In health promotion (i.e., the use of information related to maintaining and strengthening one's health and potential), 64.3% of the population showed limited health literacy (Kučera et al., 2016).

Willingness to change one's lifestyle

The willingness to change goes hand-in-hand with the knowledge necessary to achieve a healthy lifestyle. Our findings can be considered positive in this respect. A certain degree of agreement, through the choice of the options "I completely agree" and "I tend to agree", was expressed by most respondents in the case of willingness to change their diet (a total of 92% of respondents), to include more exercise (a total of 89% of respondents), and to attend more doctor's visits – even beyond preventive check-ups (a total of 75% of respondents). The degree of agreement was not so clear in the willingness to get vaccinated against viruses associated with the risk of

developing a malignant disease. 50% of respondents indicated the option "I completely agree" or "I somewhat agree". In this case, the option "I don't know" was more prominent (32% of respondents). According to a press release from the Academy of Sciences of the Czech Republic (Klicperová and Šerek, 2022), the cause of a certain ambiguity and indecision in the willingness to be vaccinated can be found primarily in cultural factors, or rather in the contradiction between East and West, in differences in the concept of freedom, and also in trust in disinformation.

In line with generally valid findings, our results show that women are more interested in cancer prevention than men. The Amelie Association (2025) suggests that men's lower level of interest in cancer prevention is linked to the fact that health-related topics are often difficult for them to engage with, as they strive to fulfil societal expectations of their roles flawlessly.

They also mention that it is more difficult for men to accept professional support and understand their body's signals (which leads to trivialising problems) (Amelie, 2025). An equally important factor influencing the interest in prevention among our respondents was age. It was shown that with increasing age, interest in these activities gradually decreases, with older age categories showing more medium or low interest. This finding – and the fact that from the age of 65, cancers move to the first place in the causes of death in this population (Ministry of Health of the Czech Republic, 2022) – subsequently led us to compile information material that serves to support education led by a general nurse on the topic of cancer prevention in the target group 65+ (Fig. 1).

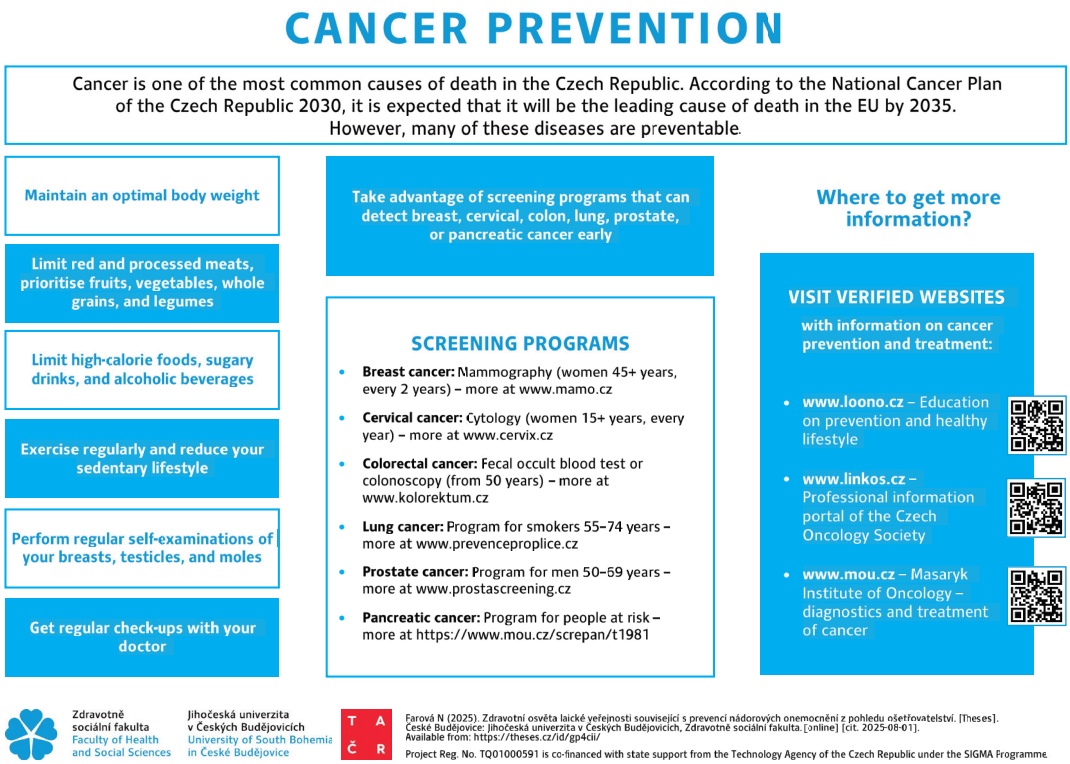

Fig. 1. Material to support general nurse-led education on the topic of cancer prevention in the target group 65+

CONCLUSION

The issue of cancer prevention has been very topical for a long time. The National Oncology Plan repeatedly mentions the need to update and streamline the implemented activities. However, despite the large spectrum of implemented preventive and educational activities, the level of health literacy in this area still fails to reach satisfactory values in the Czech environment. Although the research set in this survey cannot be considered representative of the Czech Republic (and therefore the results cannot be generalised), it provides significant data on the level of health literacy in this area. Concerning our findings, a practical output was compiled as educational material used in implementing educational meetings for the 65+ target group. Although it may seem that using links (using QR codes) to obtain more detailed information may be difficult for the 65+ target group, our experience from implemented educational meetings suggests the opposite. However, we know the limitations concerning the internal differences in the health status, abilities and possibilities of people aged 65+, and we know that this cannot be generalised. It is necessary to approach this group and individuals individually and to work with the material accordingly; this is a group that repeatedly requests and positively perceives information on cancer prevention. In connection with our findings, in the future it seems appropriate to focus on mapping the level of health literacy in this area on a nationwide scale so that the results can be generalised – and subsequently, in accordance with these results, work on updating, individualising, and innovating the preventive activities implemented so far.

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Ethical aspects and conflict of interest
The authors have no conflict of interest to declare.

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