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The importance of informing about the preventive program for early detection of prostate cancer- a preliminary pilot study

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ABSTRACT

Objectives: The aim was to determine the knowledge of men about prostate cancer and screening methods, and the influence of these factors on participation in prostate cancer screening.
Participants and methods: Participants in this observational and cross-sectional study were men aged 40 to 79 years. Participation in the study was voluntary. Data were collected in May 2023 via an anonymous online survey.
Results: There is a lack of knowledge about prostate cancer among men in Istria. Most receive information from the media, while a smaller number receive information from physicians. Most have heard that there is a PSA test, but few know that it is a method for early detection. Subjects have different perceptions of digital rectal examination and other screening methods. Some men are afraid of discomfort and pain during the examination, while others do not consider this a problem. Most indicate that they intend to participate in screening in the future and that early detection of prostate cancer is important and a positive attitude towards it influences the decision to participate in the screening program.
Conclusion: The lack of knowledge about prostate cancer among men in Croatia is evident. Although most of the respondents do not consider themselves as a risk group, a positive attitude towards early detection affects the participation in prevention programs. Raising awareness and educating men about prostate cancer and available screening methods are key to increasing the number of participants in prevention programs and reducing the incidence of this disease.

Introduction

In recent years, prostate cancer has become a major public health problem affecting men all over the world. Prostate cancer is not only the second most common cancer worldwide, but also the leading cause of cancer mortality in men in both developed and developing countries (European Commission 2023; Eurostat, 2023). In 2020, there were 1414,259 new cases and 375,304 deaths, accounting for about 6.8 % of all cancer-related deaths in men. More than 60 % of all prostate cancer cases are diagnosed in men over the age of sixty, with the average age at diagnosis being around sixty-six. The likelihood of developing prostate cancer increases with age, a positive family history and race, while other risk factors such as diet, obesity and smoking can be linked to the development of the disease. Patients are usually unaware that prostate cancer only causes symptoms at an advanced stage, and they are not informed that tumour markers can help detect the disease early. According to statistics, only 40 % of diagnoses are made at a stage where the cancer can be cured. Prostate cancer differs from other malignant diseases in that it develops more slowly. Studies show that the disease can appear as early as the age of 30, but rarely do the first symptoms appear before the age of 50 (in less than 1 %) (Croatian Society of urology and HEMED, 2023; Eurostat, 2023).

Early detection of the disease at an early stage can be crucial for the use of effective treatment methods for affected men (Berenguer, 2023). This can reduce the mortality rate from this disease and provide the opportunity for early intervention and more successful treatment (Salem, 2022).

Prevention and early detection of prostate cancer are extremely important for public health (Dickinson, 2023; Van Poppel, 2021; Zhang, 2022). While there is currently no scientific consensus on effective

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strategies to reduce the risk of prostate cancer, regular testing and screening is crucial to detect the disease before symptoms appear (Becker, 2011; David and Leslie, 2022). Treatment is most effective at this early stage, as the cancer is usually curable and has a good prognosis. The most important method for early detection of prostate cancer is a combination of a PSA test and a digitorectal examination (DRE), and the diagnosis is confirmed by biopsy (Basourakos et al., 2023). Delay in seeking help due to symptoms is an important factor and reason for late diagnosis and treatment (De Camargo Cancela, 2023; Vargovčák, 2022). Health education is key to early detection and more successful treatment Given the complexity of the issues surrounding prostate cancer screening, experts recommend that men educate themselves about the benefits and risks of screening before making a decision (Morlando, 2017).

As a result, unprecedented screening and early detection may be the key to reducing mortality from this disease. However, there are many factors that can influence a man's decision to undergo screening, including his perception of his own health status and sources of information about prostate cancer. There are only a limited number of studies on this topic in the literature. The aim of this study is therefore to investigate men's perceptions of their health status and the impact of these perceptions on their decision to undergo prostate cancer screening. It also aims to investigate where men get the information they need about prostate cancer and how often they talk to their GPs about it, in order to determine what factors influence a man's decision to undergo prostate cancer screening. The PSA test was introduced in Croatia in the 1990s and is currently used as a method of opportunistic screening in men aged 50 years and older (Reljić, 2018). The European Commission has included prostate cancer in its cancer screening programme from 2023, according to the new guidelines. The Croatian guidelines for the diagnosis and treatment of prostate cancer recommend annual screening for men over the age of 50, although screening can start earlier for men at increased risk. However, screening is generally not recommended for men with a life expectancy of less than 10 to 15 years. If a pathological finding is detected during screening, further diagnostic tests are required, usually a prostate biopsy.

The aim of the research was to determine the level of knowledge of respondents about prostate cancer and to examine the influence of men's perception of their own health and their intention to talk to their doctor about prostate cancer screening methods and related risks. Istria, as the most developed region in Croatia, was chosen as a pilot study that we will later conduct in other parts of Croatia in order to develop an effective preventive program for the early detection of prostate cancer.

Subjects and methods

The study was conducted as a pilot observational and cross-sectional study. A random sample of 107 male subjects aged 40 to 79 years in Istria County was used. The questionnaire was distributed to the general male population via social media. The data was collected by means of an online survey with multiple-choice questions. The questionnaire consisted of 28 questions, 4 of which related to socio-demographic data, while the remaining 24 questions analysed respondents' knowledge, attitudes, habits and health. A few questions were used for the qualitative analysis of the respondents' attitudes.

The categorical data are presented with absolute and relative frequencies. Differences in categorical variables were tested using the chi-square test, in which the difference between expected and empirical frequencies was tested. All p-values are two-sided. The significance level was set at 0.05.

The programme STATISTICAL PROGRAMME IBM Corp. Published 2019 IBM SPSS Statistics for Windows, Version 26.0 was used for the statistical analysis. Armonk, NY: IBM Corp.

Results

Of the 107 respondents, 50.0 % are 40–49 years old, 25.5 % are 50–59 years old, 13.2 % are 60–69 years old, and 11.3 % are 70–79 years old. In terms of professional qualifications, 0.9 % have completed primary school, 69.2 % have completed secondary school and 29.9 % have a university degree. 74.8% are employed, 2.8% are unemployed and 22.4% are pensioners. In terms of marital status, 64.5 % are married, 17.8 % are unmarried and 17.8 % are widowed. His state of health is rated as excellent by 18.9 %, good by 67.0 % and satisfactory by 14.1 %. No one gave a negative assessment of their state of health. 5.6 % of respondents had a positive history of prostate cancer in their family. 42.1 % responded that prostate cancer is a major problem in Croatia, while 51.4 % do not know or are not sure. The most common sources of health information are the Internet (36.4 %), family and friends (23.4 %), newspapers (14.0 %) and television (11.2 %), while a doctor is responsible for prevention programmes in only 5.5 % of cases and for the onset of disease symptoms in 17.7 %. In terms of internet use, 93.4 % of respondents access the internet daily, while 2.8 % never do. Half of the respondents (50.5 %) had heard of prevention programmes for the early detection of prostate cancer, while the other half did not know or had no idea. In terms of symptoms associated with prostate cancer, most (61.7 %) have no symptoms, frequent urination, especially at night has 19.6 %, and inability to pass a normal stream 15.0 %, difficulty urinating 5.6 %, pain and burning during urination 4.7 %, and blood in urine noticed 1.9 %. know that these are early signs that may indicate prostate cancer, and at the same time 81.3 % have never spoken to a doctor about prevention and early detection of prostate cancer. Of those who have spoken to a doctor, only 23.3 % have been recommended treatment. 61.3 % have heard of the PSA test, but only 43.4 % know that it is a method of prostate cancer screening. Screening for prostate cancer is only necessary if there is a symptom or problem and is considered by 18.3 %. When asked which of the above tests were performed for prostate cancer screening, most (64.5 %) answered no, while the PSA test was performed by 24.3 % and the digital rectal examination by 8.4 %. The most common reasons why respondents did not go for screening were that they had not been advised to do so by a doctor (35.9 %) or that they felt healthy (30.2 %) or had no symptoms (2–8.2 %). People who had symptoms but did not request a test said that they did not know that reliable tests were available (23.4 %), that they were embarrassed to suggest to the doctor what to do (12.1 %), or that they trusted their doctor (13.1 %). When asked at what age men should start a screening programme for early detection of prostate cancer, 67.3 % of respondents answered that they were between 40 and 50 years old. Most men do not realise that prostate cancer is one of the most common cancers in men. Almost all believe that early diagnosis would improve the chances of surviving prostate cancer. About two-thirds of respondents know that people over 50 and those with a positive family history have an increased risk of developing prostate cancer, but more than 80 % do not categorise them as a high-risk group. In addition, more than 80 % of respondents said that they would respond to screening. The analysis of the responses undoubtedly shows that all those who have consulted a GP are more familiar with the prevalence of prostate cancer, the symptoms and the possibilities of prevention and early detection. In terms of age, participants in the 70–79 age group are the best informed about prevention and early detection programmes, while participants in the 40–49 age group are the least informed. The internet is the most common source of information about screening programmes in all age groups. The family doctor plays a subordinate role as a source of information about screening programmes, especially in the younger age groups. The 60 to 69-year-olds and the 70 to 79-year-olds know more about prevention programmes and are more likely to use information sources such as newspapers, television and GPs. Younger respondents in the 40–49 age groups are less familiar with the programme and rely mainly on the internet. The majority of respondents (28.2 %) who had not been screened for prostate cancer stated that they had no symptoms.

The main reasons why the men surveyed do not go for test are lack of medical advice (35.9 %), 30.8 % consider themselves healthy, 28.2 % say they have no symptoms and 23.4 say they did not know it was possible. This suggests that they felt no testing was necessary because they had no signs of illness. The second most common reason for not taking up screening is ignorance of the tests available. All of this emphasises the importance of educating and informing the public about screening and its availability. Knowledge and attitudes towards prostate cancer and screening are shown in Table 1.

Discussion

In the fight against malignant diseases, primary and secondary prevention is paramount. This also applies to prostate cancer. Experience in Istria, the most developed Croatian region, shows that we cannot be satisfied with preventive measures, because every year about 800 men die from prostate cancer, and in recent years it has become the most common cancer in men. According to reports from the cancer registry, it has overtaken lung cancer in incidence since 2016 and is the second most common cause of cancer death in men. According to the Cancer Registry 2020, 2299 people have been diagnosed with prostate cancer, 785 patients have died from it, and it is estimated that nearly 600 cases go undetected each year (Croatian Urological Society, 2023; National Strategic Framework against Cancer in Croatia, 2023). Prostate cancer is most common in men over the age of 50 and is difficult to detect at an early stage as there are no symptoms (Croatian Urological Society, 2023). Analysing the data from this study shows that a large number of participants did not go for prostate cancer screening. One of the main reasons why respondents did not go for prostate cancer screening was the lack of symptoms. Most of the respondents felt that there was no reason for screening as they did not feel any signs of disease. This points to the misconception that screening should only be carried out when symptoms are present. Education should emphasise that early-stage prostate cancer can be asymptomatic and that screening is the key to detecting early-stage disease (Solarić, 2019). Another common reason for non-participation in screening is the lack of information about the available tests. Many subjects did not know that screening tests exist and how important they are for detecting prostate cancer. This emphasises the need for more public education about prostate cancer, symptoms of the disease and the importance of screening. Public health campaigns and education programmes can play a key role in raising awareness of prostate cancer and informing men about available screening. The results of this study confirm the findings of similar studies on this topic, which found low rates of early detection of prostate cancer, mainly due to the lack of medical recommendations and guidelines on the importance of early detection (Musalli, 2021). In addition, some subjects believe that screening is only necessary when urological symptoms are present. This attitude indicates a lack of understanding of the concept of screening and emphasises the need for intervention through public health campaigns and medical counselling. This study is thus in line with previous research findings on this topic and warns of insufficient awareness and sensitisation to the importance of prostate cancer screening (Musalli, 2021).

The results of the analysis thus suggest that a systematic approach to prostate cancer screening is needed, that communication between doctors and patients about the importance of screening needs to be improved, that education about the risks and importance of prostate cancer screening is needed, and that the availability of reliable and accurate information about screening needs to be ensured through various communication channels. The media play an important role in disseminating information about prostate cancer screening, but healthcare professionals, particularly GPs but also nurses, also need to be actively involved in educating the public (Mirone, 2017).

Prostate cancer is the most common cancer in men in the Republic of Croatia, along with colon and lung cancer, and according to the research data, most respondents were not aware of this fact and did not recognise

Table 1
Knowledge and attitudes about prostate cancer and health assessment.

		N	%
Are you aware that these symptoms can occur in prostate cancer?	I do	66	62,3 %
	No	28	26,4 %
	I don't know or I'm not sure	12	11,3 %
	Altogether	106	100,0 %
How to assess your health status?	Excellently	20	18,9 %
	All right	71	67,0 %
	Satisfactorily	15	14,2 %
	Badly	0	0,0 %
	Altogether	106	100,0 %
Have you talked to your family physician about tests for early detection of prostate cancer?	I do	17	15,9 %
	No	87	81,3 %
	I don't know or I'm not sure	3	2,8 %
	Altogether	107	100,0 %
If yes, did he recommend that you undergo screening?	I do	17	23,3 %
	No	44	60,3 %
	I don't know or I'm not sure	12	16,4 %
	Altogether	73	100,0 %
Have you heard of the PSA test?	I do	65	61,3 %
	No	35	33,0 %
	I don't know or I'm not sure	6	5,7 %
	Altogether	106	100,0 %
Did you know that PSA test, a screening method for prostate cancer?	I do	46	43,4 %
	No	52	49,1 %
	I don't know or I'm not sure	8	7,5 %
	Altogether	106	100,0 %
		N	
Screening tests for cancer prostate syllables are needed Only when you've got symptoms or problems	I do	19	
	No	54	
	I don't know or I'm not sure	31	
	Altogether	104	
Are any of the relatives diagnosed prostate cancer?	I do	6	
	No	97	
	I don't know or I'm not sure	4	
	Altogether	107	
Prostate cancer is great problem in Croatia?	I do	45	
	No	7	
	I don't know or I'm not sure	55	
	Altogether	107	
		N	
Are you familiar with the fact that prostate cancer is the most common type of cancer in men?	I do	45	
	No	33	
	I don't know or I'm not sure	29	
	Altogether	107	
Do you think early diagnosis would improve a person's chances of surviving prostate cancer?	I do	97	
	No	2	
	I don't know or I'm not sure	8	
	Altogether	107	
Are you familiar with the fact that people over the age of 50 and those with a positive family history are at increased risk of developing prostate cancer?	I do	74	
	No	13	
	I don't know or I'm not sure	19	
	Altogether	106	
Do you think you belong to the risk group knowing the above?	I do	18	
	No	72	
	I don't know or I'm not sure	16	
	Altogether	106	

(continued on next page)

Table 1 (*continued*)

		N	%
Would you like to undergo a preventive examination in the future?	I do	89	
	No	5	
	I don't know or I'm not sure	13	
	Altogether	107	

prostate cancer as an important public health problem (Croatian Institute of Public Health, 2022). Our study was conducted in Istria, one of the most developed regions of Croatia, which may not accurately reflect the knowledge and attitudes of men in other regions of Croatia, but although our findings have limited generalisability beyond this specific geographical area, they could be a first step for future studies. Only 41.1 % of respondents knew that prostate cancer is one of the most common cancers in men, while more than 50 % of respondents said they did not know or were not sure. This lack of awareness of the importance of prevention and early detection of prostate cancer may lead to an increase in mortality from this disease. In terms of socioeconomic status and education level, the results have shown that this influences men's knowledge and attitudes towards prostate cancer screening. Therefore, it is necessary to educate the public, men and their families, about the importance of prostate cancer prevention and early detection and to raise awareness of this disease through public health campaigns and education. The comparison of these results with other studies conducted in Europe, the United States and Japan confirms the lack of information about prostate cancer in the general population. Information about prostate cancer is inadequate or limited for most subjects in these studies. Some studies suggest that one of the barriers to screening is the belief that a digital rectal examination is painful and uncomfortable. However, other studies examining the influence of family history on knowledge and susceptibility to the disease have found that a large number of participants have a family history of prostate cancer and that a higher percentage of them attend screening than a group of participants without a positive family history. These results suggest that a family history of prostate cancer increases men's knowledge and awareness of the disease (Turkan, 2016).

Socio-demographic factors such as age are also cited as important determinants of behaviour. The results indicate a lack of awareness of prostate cancer and screening among young men. This finding emphasises the need for targeted education about prostate cancer at a young age. Educating young men about risks, symptoms and available screenings can have long-term benefits and contribute to prevention and early detection of the disease. Education about prostate cancer symptoms and available tests plays a key role in raising awareness and promoting regular screening in this age group. The data shows that older men often have a greater awareness of prostate cancer and the need for screening. As the risk of developing prostate cancer increases with age, older men are often more aware of the symptoms and screening available. Although awareness is more pronounced at this age, further education on the importance of regular prostate examinations and early detection of the disease is needed. According to the data, 89 % of respondents expressed a desire to participate in prostate cancer screening, demonstrating the importance of educating the public about the importance of regular screening and early detection of the disease. This is consistent with other published results showing that the majority of men (80 %) who participated in these studies were willing to be screened. A well-designed and targeted campaign can also help to raise awareness of prostate cancer and encourage men to participate in screening to detect the disease early and reduce associated mortality (Somasundaram, 2022).

While it can be stated that there is a willingness to participate in screening, at the same time it is important to consider the reasons that prevent men from getting screened. Therefore, strategies need to be developed to reduce the anxiety and discomfort associated with DRE and to educate the public about the importance of early detection of the disease. This research is a good pilot study that should be conducted throughout Croatia with an additional qualitative part of the research through focus groups to improve prevention programmes for early detection of prostate cancer.

Conclusion

Insufficient knowledge about risk factors for prostate cancer can lead to an underestimation of one's own risk and influence the informed decision in favour of screening. It is important to educate men about risk factors for prostate cancer such as age, family history, diet and lifestyle so that they can make informed screening decisions. GPs also need to ensure that their patients are well informed about the risks and benefits of screening so that they can make the best decision for their health. All campaigns emphasise the importance of educating the public about prostate cancer and screening. GPs play a key role in this as they are often the patient's first point of contact with the healthcare system and can provide information and advice based on the individual's health status and risk factors. Through targeted awareness campaigns, public health initiatives and collaboration with healthcare professionals, we can ensure that information about prostate cancer reaches all men, regardless of their age, and create a society in which prevention, early detection and treatment of prostate cancer are prioritised. The data presented indicates a lack of awareness of this health problem among men and a lack of commitment from GPs. Nurses with graduate training can play a key role in educating men about the importance of regular screening and early detection of prostate cancer. There are many benefits to nurses taking an active role in prostate cancer prevention and education. Their expertise, communication skills and accessibility allow them to help men understand the risks, importance of preventative measures and early detection of this disease. Therefore, it is extremely important to educate nurses and care technicians, as continuous training on the latest guidelines, research and technology enables nurses to be informed, professional and competent in their profession.

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Ethical approval

There is no ethical issue in our research and the research conducted is of minimal risk and was conducted in accordance with the usual standards of good academic practice. All participants was informed about research goals and methods.

Conflict of interest

We have no conflict of interest to declare.

CRediT authorship contribution statement

Antonija Lipić: Investigation, Conceptualization. **Bojan Miletić:** Methodology, Formal analysis. **Željko Jovanović:** Writing – review & editing, Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

References

Basourakos, S., et al. (2023). Harm - to-benefit of three decades of prostate cancer screening in black men. *NEJM Evidence, 1*(6), 8. https://doi.org/10.1056/evidoa2200031 [Online]Available at[Accessed 3/23/].

Berenguer, C. V. (2023). Underlying features of prostate cancer statistics, risk factors, and emerging methods for its diagnosis. *Current Oncology, 30*(2), 2300–2321. https://doi.org/10.3390/curroncol30020178 [Online]Available at[Accessed 17.03.2023].

Becker, N. (2011). Epidemiologie des prostatekarzinoms. *Radiologists, 51*(11), 922–929. https://doi.org/10.1007/s00117-011-2183-1. Available at[Accessed: 4/24/2023].

De Camargo Cancela, M., et al. (2023). Can the sustainable development goals for cancer be met in Brazil? A population-based study. *Frontiers in Oncology, 12*(3), 106. https://doi.org/10.3389/fonc.2022.1060608 [Online]Available at[Accessed 17.03].

Dickinson, J., et al. (2023). Trends in prostate cancer incidence and mortality in Canada during the era of prostate specific antigen screening. *CMAJ Open, 4*(1), 73–79. https://doi.org/10.9778/cmajo.20140079 [Online]Available at[Accessed 23/3/].

David, M.K. and Leslie, S.W. (2022) Prostate specific antigen. Treasure Island (FL): StatPearls. [Online] Available at: https://www.ncbi.nlm.nih.gov/books/NBK557495/ [Accessed 2023 April 12].

European Commission. Questions and answers: a new EU approach to cancer screening [Online] Available at: https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_5584 [Retrieved 2023 April 29].

Eurostat. Health statistics – Atlas on mortality in the European Union Online] Available at : https://ec.europa.eu/eurostat/web/products-statistical-books/-/KS-30-08-357 [Accessed 4/7/2023].

Croatian Institute of Public Health (2022) Bulletin: Incidence of Cancer in Croatia in 2020 [Online] Available at: https://www.hzjz.hr/wp-content/uploads/2022/11/Bilten-Incidencija-raka-u-Hrvatskoj-2020.godine.pdf, [Accessed 23/3/2023].

Croatian Society of Urology and HEMED - Croatian Society for Hematology and Transfusion Medicine. Prostate cancer [Prostate cancer] [Online] Available at: https://www.hemed.hr/Default.aspx?sid=13008 [Accessed 4/26/2023].

Croatian Urological Society [Online] Available at: http://www.uro-hud.org/SMJERNICE [Cited 2023 April 29] Available at: http://www.uro-hud.org/SMJERNICE.

Morlando, M., et al. (2017). Prostate cancer screening: Knowledge, attitudes and practices in a sample of men in Italy. And the survey *PLoS ONE, 12*(10), 18. https://doi.org/10.1371/journal.pone.0186332 [Online].

Mirone, V., et al. (2017). Knowledge, attitudes, and practices towards prostate cancer screening amongst men living in the southern Italian peninsula: The Prevention and Research in Oncology (PRO) non - profit Foundation experience. *World Journal of Urology, 35*(1), 1857–1862. https://doi.org/10.1007/s00345-017-2074-9 [Online] Available on[Accessed 29 April 2023].

Musalli, Z. F. (2021). Knowledge, attitude, and practice toward prostate cancer and its screening methods among primary care patients in King Abdulaziz Medical City, Riyadh, Saudi Arabia. *Cureus, 13*(4), e14689. https://doi.org/10.7759/cureus.14689 [Online]Available atPMID: 34055533; PMCID: PMC8150678 [Retrieved 2023-03-17].

National Strategic Framework against Cancer by 2030. Official Gazette [Online] Available at. https://narodne-novine.nn.hr/clanci/sluzbeni/2020_12_141_2728.html [Accessed 06.0 5.2023].

Reljić, A., et al. (2018). Epidemiology of prostate cancer in Croatia-situation and perspectives. *Acta Clinica Croatica, 57*(1), 27–34. [Online]Available at https://hrcak.srce.hr/207886 [Accessed April 12, 2023].

Salem, A., et al. (2022). The effect of educational program on knowledge and commitment of male employees at Tanta university regarding prostate cancer screening. *Tanta Scientific Nursing Journal, 25*(1), 68–81. https://doi.org/10.21608/tsnj.2022.241904 [Online]Available at[Accessed 23/3/2023].

Solarić, M., Fröbe, A., Huić, D., Zahirović, D., Kaštelan, Ž., Bulimbašić, S., & Curić, Z. (2019). Guidelines for diagnosing, treating and monitoring prostate cancer patients. *Medical Journal, 141*(11–12), 313–325. https://doi.org/10.26800/LV-141-11-12-41

Somasundaram, P., et al. (2022). Knowledge, attitude, perception, and awareness regarding benign prostatic hyperplasia and prostate cancer among men older than 40 years - an online cross sectional study. *Journal of Pharmaceutical Negative Results*, 3847–3852. https://doi.org/10.47750/pnr.2022.13.S08.480 [Online][Cited 2023-03-17].

Turkan S. et al. (2016) The level of knowledge and awareness about prostate cancer in the Turkish male and the relevant effective factors [Online] 42(3) p. 134–9. Available at: doi: 10.5152/tud.2016.90235. PMID: 27635286; PMCID: PMC5012438 [Retrieved 2023-03-17].

Vargovčák, M., et al. (2022). Prostate cancer screening - is it time to change approach? *Central European Journal of Public Health, 30*(5), 11. [Online]Available at https://cejph.szu.cz/pdfs/cjp/2022/88/02.pdf [Accessed 2023 April 12].

Van Poppel, H., et al. (2021). Prostate-specific antigen testing as part of a risk-adapted early detection strategy for prostate cancer: European association of urology position and recommendations for 2021. *European Urology, 80*(6), 703–711. https://doi.org/10.1016/j.eururo.2021.07.021 [Online]Available at[Accessed: 4/24/2023].

Zhang, L., et al. (2022). An international consensus on the essential and desirable criteria for an 'organized' cancer screening programme. *BMC Medicine, 20*(1), 101. https://doi.org/10.1186/s12916-022-02291-7 [Online]Available on[Accessed 2023-03-17].