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# Awareness of Testicular Cancer Among the Male Population in the Republic of Croatia

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## Abstract

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Testicular cancer is the most common tumour in men of reproductive age. The incidence has increased in the last few years, both globally and in the Republic of Croatia. No studies have been conducted in the Republic of Croatia that show the level of knowledge about testicular cancer, so this study was conducted to examine the knowledge and attitudes of the male population about testicular cancer, to determine whether there are differences in knowledge and attitudes between members of the male population from rural and those from urban areas, and to examine how to increase the awareness of the male population about the prevention of testicular cancer. A cross-sectional survey was conducted among 200 respondents from rural and urban areas of the Republic of Croatia. The study was conducted using an anonymous survey questionnaire. Knowledge of risk factors, clinical presentation, diagnosis and treatment methods, and self-examination was examined. The results did not show a significant difference in the knowledge and attitudes between participants from rural and those from urban areas. However, the overall level of knowledge about testicular cancer has been shown to be low and efforts need to be made to improve prevention programs to protect the health of the male population.

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## Introduction

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Testicular cancer is the most common solid malignant tumour in younger men (1). Since testicular cancer occurs in the younger population, men do not take the symptoms of the disease seriously. Unfortunately, testicular cancer cannot be prevented, but it is important to encourage the male population to detect the disease early in order to reduce the risk of mortality and improve the quality of life since the incidence of testicular cancer is highest among the reproductive population. Testicular tumours account for only 1% of malignancies in men, but solid tumours are most common in men between the ages of 15 and 35 (2). A large increase in morbidity has been observed in Finland, Slovakia, Slovenia and Croatia (3). In the Republic of Croatia, testicular cancer is most often diagnosed in the age group of 20 to 34 years (51% of all cases), and the lowest number is diagnosed in those of over 60 years of age. Due to the growing incidence, environmental factors are believed to play a role in the development of testicular cancer, in addition to genetic factors. Risk factors for testicular cancer include cryptorchidism, considered the most important factor, Klinefelter's syndrome, a family history of testicular cancer among first-degree relatives and the existence of a contralateral tumour.

Testicular malignancy is usually presented as a unilateral lump or painless mass. Testicular enlargement is the most important sign of testicular tumours. Dull pain is less common, and acute pain has been reported in 10% of patients. A greater number of patients with disseminated disease have symptoms arising from metastatic disease. Testicular tumour is most often detected by clinical examination, testicular ultrasound, MR and CT. Serum tumour markers AFP,  $\beta$ HCG and LDH are important prognostic factors. In bilateral testicular tumours, radical orchidectomy is performed. In the case of tumours of one testicle, a partial orchidectomy is performed, thanks to which the functional tissue of the testis and male fertility are preserved. During the operation, a biopsy for pathohistological analysis must be taken. Further treatment depends on the stage of the disease and includes chemotherapy and radiotherapy. Testicular cancer and metastatic disease are also associated with elevated inflammatory markers and systemic inflammation, which can significantly impair spermatogenesis. It is recommended that men wait at least three months after completing chemotherapy before

conceiving a child. After radiotherapy, complete recovery of spermatogenesis is possible, but this depends on the radiation dose. Infertility in the case of removal of one testicle is rare. An average study conducted on 680 patients after testicular cancer treatment assessed the fertility of patients after orchidectomy who were treated with chemotherapy, radiotherapy, and chemotherapy in combination with radiotherapy (4). In 77% of men, conception is achieved naturally.

Treatment of testicular cancer diagnosed at an early stage has been associated with positive results including prolonging survival and minimizing morbidity caused by treatment methods. The cure rate is about 96%, which significantly affects survival. However, more than 50% of cases are diagnosed in the metastatic phase of the disease. Once the cancer has spread to the lymph nodes, the survival rate is significantly reduced.

Testicular self-examination has been shown to increase the rate of early detection of cancer, but there are insufficient data to suggest that this improves long-term survival (5). Testicular self-examination is short, easy to learn and apply, safe and economical, and non-invasive. It is recommended at least once a month, starting from the beginning of puberty. The role of self-examination in screening for testicular cancer is still a matter of debate. For the purpose of making an early diagnosis, the American Cancer Society and the American Urological Society recommend that doctors include a testicular examination as part of their routine examination. Some organizations, such as the Canadian Task Force, do not recommend regular self-examinations because they can cause anxiety and unnecessary visits to the doctor (6). Some believe that self-examination can lead to a false positive diagnosis, which may then lead to performing unnecessary invasive procedures to confirm the diagnosis of cancer. However, self-examination is a useful method for early diagnosis due to the very small number of men involved in preventive health care. Although some studies believe that self-examination is not highly effective in diagnosing testicular cancer, other studies advocate conducting testicular self-examination because of its practicality and simplicity. The health beliefs model explains the relationship between an individual's attitudes and behaviours and the impact of personal motivation on health behaviours. It is considered a health behaviour that is the integration of individual perception and values that lead an individual to a certain goal and is directly related to the onset of the disease. Self-examination is a behaviour

that promotes health. Nurses can identify the beliefs and attitudes of the population and develop an initiative to change these attitudes and achieve responsible behaviour necessary for overall health.

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## Methods

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### Study design

Cross-sectional study.

### Participants

The study was conducted among the male population of urban and rural areas of Croatia. It was conducted on 200 respondents in the period from 1 April 2021 - 20 September 2021. According to the place of residence, 112 respondents live in urban areas, and 88 of them live in rural/suburban areas. Of the total number of respondents, most respondents have secondary education, and the smallest number of respondents have primary education. The most represented respondents in the study are in the age group between 18 and 35, and the smallest number of respondents is older than 60.

### Statistics

The study was conducted by having respondents fill out a questionnaire. Respondents who agreed to participate in the survey were informed about the purpose and the anonymity of the survey. The study used non-probabilistic sampling in which respondents recruited new samples through a network of acquaintances, where a chain of recommendations using the "snowball method" was used. Respondents from the work environment were encouraged to forward the questionnaire to male friends, colleagues and family members. In order to ensure the privacy and reliability of the answers, the survey questionnaires were distributed individually to the study participants in sealed envelopes. The participants returned the completed survey questionnaires in the same way. Statistical data processing was performed using the Microsoft Office Excel program. The data are presented in graphs. Descriptive

statistical methods were used to describe frequency distribution.

### Instrument

The research questionnaire was compiled independently. Respondents were asked 19 closed-ended questions. The first part of the survey referred to sociodemographic data (age, education, level of education, place of residence, marital status). The second part of the survey questionnaire deals with questions related to cancer and testicular self-examination.

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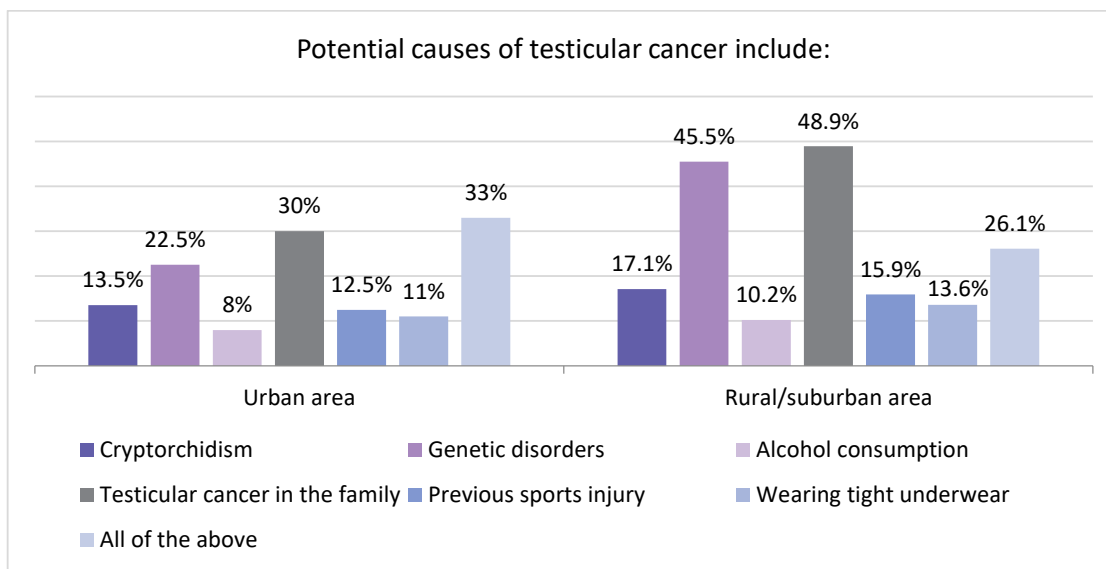
## Results

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The most represented respondents in the study are in the age group between 18 and 35 years (73.5%). The average age of all respondents is 32.2. Of the total number of respondents, the majority have secondary education (60.5%), and only 1.5% of respondents have primary education. According to place of residence, 112 (56%) respondents live in urban areas, and 88 (44%) live in rural/suburban areas. 44.5% of respondents are single, 29.5% of respondents live in a cohabitation relationship and 22.5% of respondents were married. Divorced respondents represent the smallest share (3.5%).

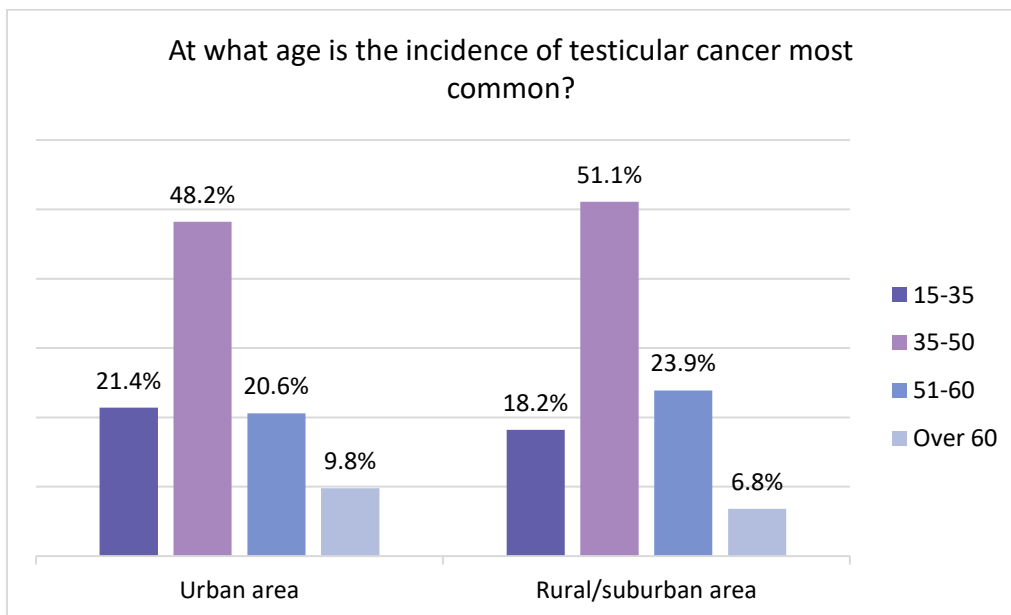
When testing knowledge about testicular cancer risk factors, respondents were offered a choice of claims and could select one or more of them. The fewest number of respondents (12.5%) consider alcohol consumption to be a risk factor. 40 (20%) respondents believe that the cause is cryptorchidism, and 84 (42%) respondents believe that genetic disorders are responsible for the development of testicular cancer. Testicular cancer in the family is mentioned as a risk factor by 102 (51%) respondents, and 39 (19.5%) believe that the cause is a previous sports injury. 34 (17%) respondents believe that wearing tight underwear is a risk factor. 60 (30%) respondents answered that all these factors play a role in the development of testicular cancer. The responses of respondents from rural and urban area are shown in Graph 1. The graph shows that respondents from rural areas are more informed about risk factors in comparison with respondents from urban areas.



Graph 1. Distribution of respondents from urban and rural areas according to the answers on risk factors for the development of testicular cancer

The prevailing opinion among the respondents is that testicular cancer most often affects men between the ages of 35 and 50. 99 (49.5%) respondents selected this statement. 40 (20%) respondents believe that the incidence is highest in men aged between 15 and 35, and almost the same number of respondents, 44 (22%), believe that testicular cancer most

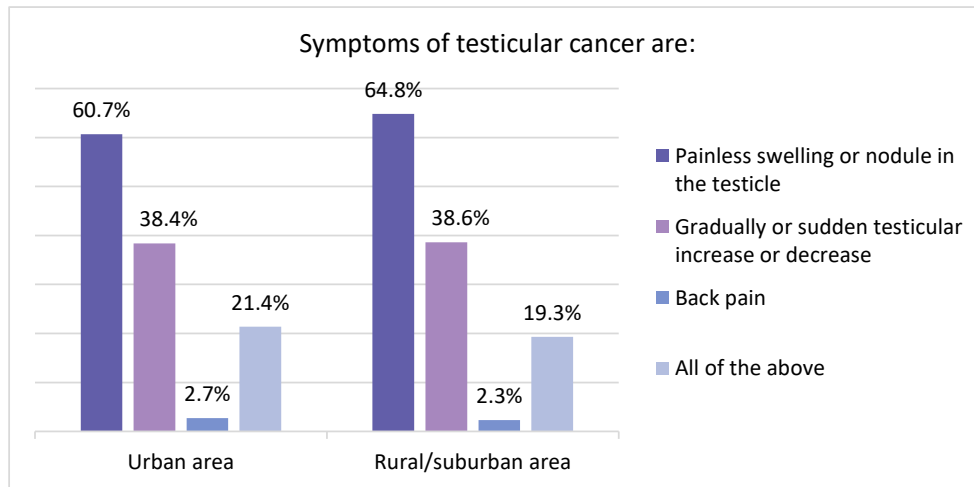
often occurs between the ages of 51 and 60. Only 17 (8.5%) respondents believe that the development of testicular cancer is most common at the age of 60 or above. According to the results shown in Graph 2., respondents from rural and urban areas have equal knowledge about the age incidence of testicular cancer.



Graph 2. Distribution of respondents from urban and rural areas according to the answers on the age incidence of testicular cancer

Respondents were able to select multiple answers when testing their knowledge of testicular cancer symptoms. The largest number of respondents, 125 of them (62.5%), believe that the symptom of testicular cancer is painless swelling or a nodule in the testicle, and only 5 (2.5%) believe that the symptom is back pain. 77 (38.5%) respondents believe that

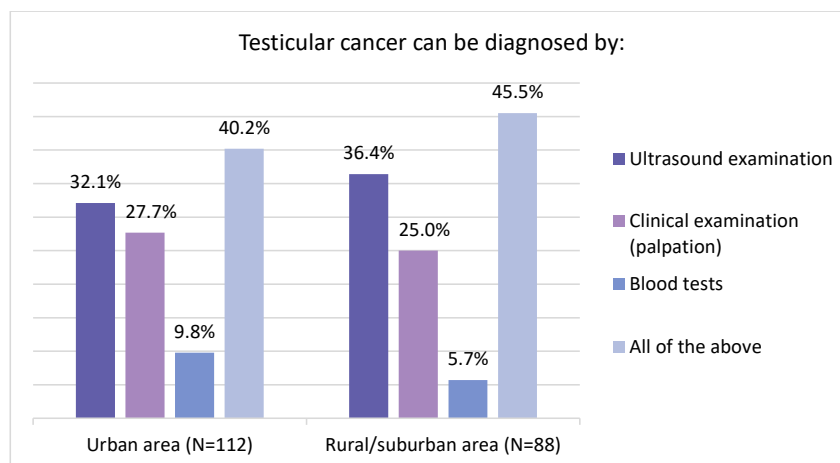
it is presented by a gradual or sudden increase or decrease in the testicles. 41 (20.5%) respondents believe that all these symptoms may occur. One respondent from a rural area did not answer the question. Graph 3 shows that there is no significant difference in knowledge between the urban and the rural population.



Graph 3. **Distribution of respondents from urban and rural areas according to the answers on the symptoms of testicular cancer**

68 (34%) respondents agreed that ultrasound examination of the testicles is a diagnostic method for testicular cancer, and 53 (26.5%) of them believe that a clinical examination is necessary for diagnosis. 16 (8%) respondents believe that laboratory blood testing is a diagnostic method. 85 (42.5%) respondents

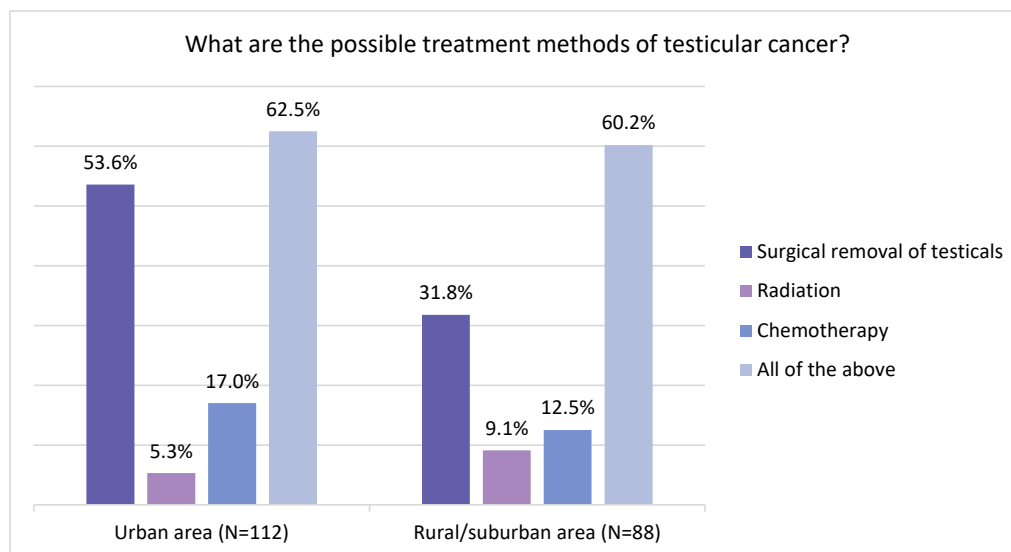
believe that all three diagnostic methods are needed for diagnosis. Respondents were offered the possibility of multiple answers. Comparing the responses of the population from urban and rural areas, a slight difference in knowledge is noticed, as seen in Graph 4.



Graph 4. **Distribution of respondents from urban and rural areas according to the answers on the diagnosis of testicular cancer**

63 (31.5%) respondents believe that surgical removal of the testicles is one of the treatment methods. 14 (7%) respondents believe that radiation can be used in treatment, and 30 (15%) respondents believe that chemotherapy is a treatment option. 120 (60%) respondents believe that all treatment methods are applicable to tes-

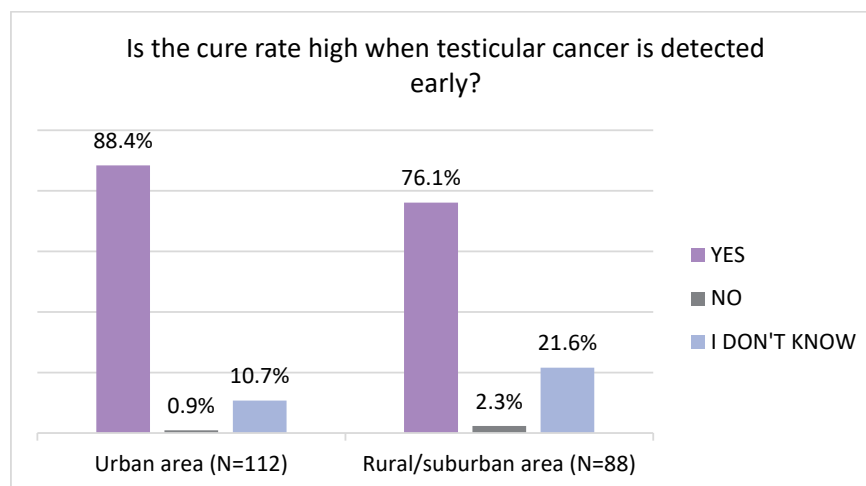
ticular cancer. Respondents were able to give multiple answers to the question. There is a significant difference in the responses of the rural and urban population to the operative removal of the testicles. Respondents from the urban areas are more informed about surgical testicular removal as a treatment method.



Graph 5. **Distribution of respondents from urban and rural areas according to answers about methods of testicular cancer treatment**

The largest number of respondents, 166 of them (83%), believe that testicular cancer has a high cure rate if detected at an early stage. A significantly smaller number of respondents, 31 (15.5%) do not know whether the detection of testicular cancer at an early stage affects

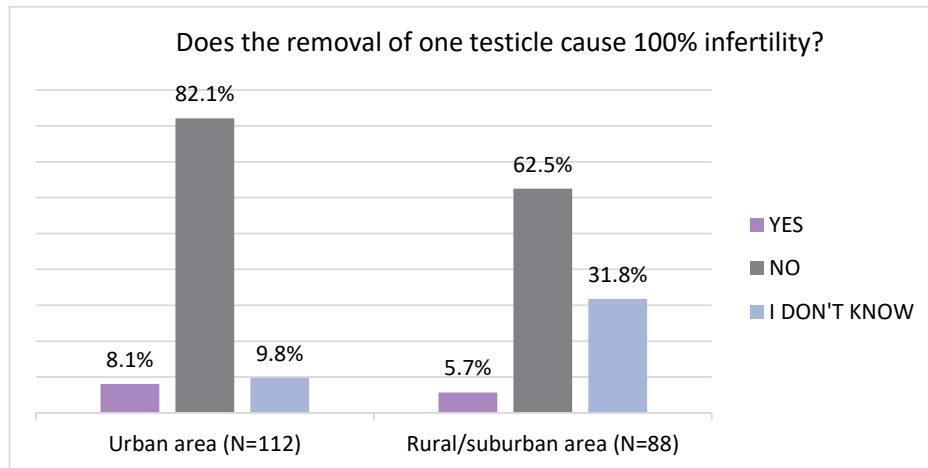
the cure rate, and only 3 (1.5%) respondents believe that early detection of testicular cancer does not affect the high cure rate. The rural population is less informed about the importance of early diagnosis compared to the urban population as shown in Graph 6.



Graph 6. **Distribution of respondents from urban and rural areas according to the answers on the cure rate of testicular cancer**

147 (73.5%) respondents believe that the removal of one testicle does not cause 100% infertility, and 39 (19.5%) respondents are unsure. Only 14 (7%) respondents believe that the removal of one testicle leads to 100% infertility. There is a significant differ-

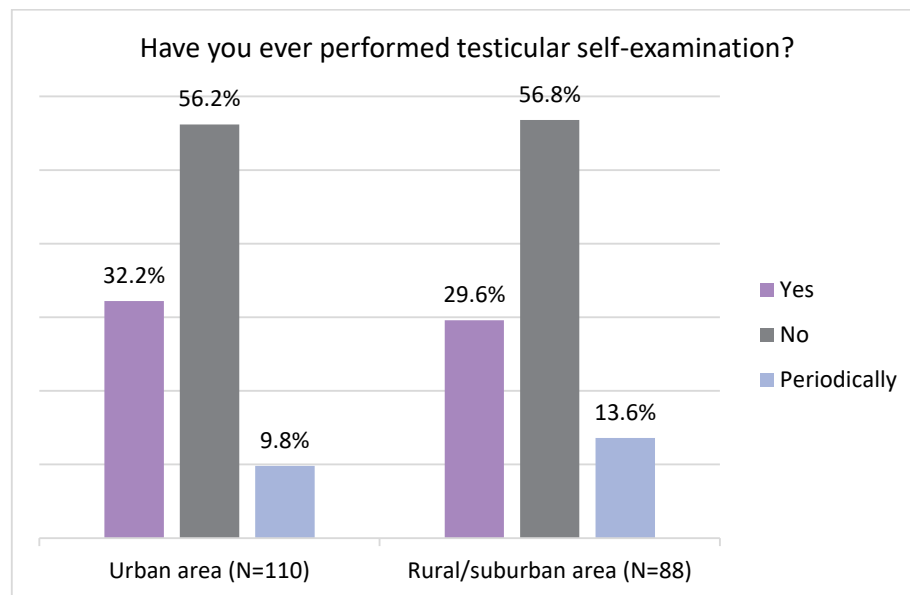
ence between respondents from rural and urban areas. Respondents from rural areas are less informed about 100% infertility as a result of removing one testicle than respondents from urban areas. The difference in responses is shown in Graph 7.



Graph 7. **Distribution of respondents from urban and rural areas according to the answers on infertility caused by testicular removal**

60 (30%) respondents stated that they perform testicular self-examination, and 23 (11.5%) respondents that they perform it occasionally. 115 (57.5%)

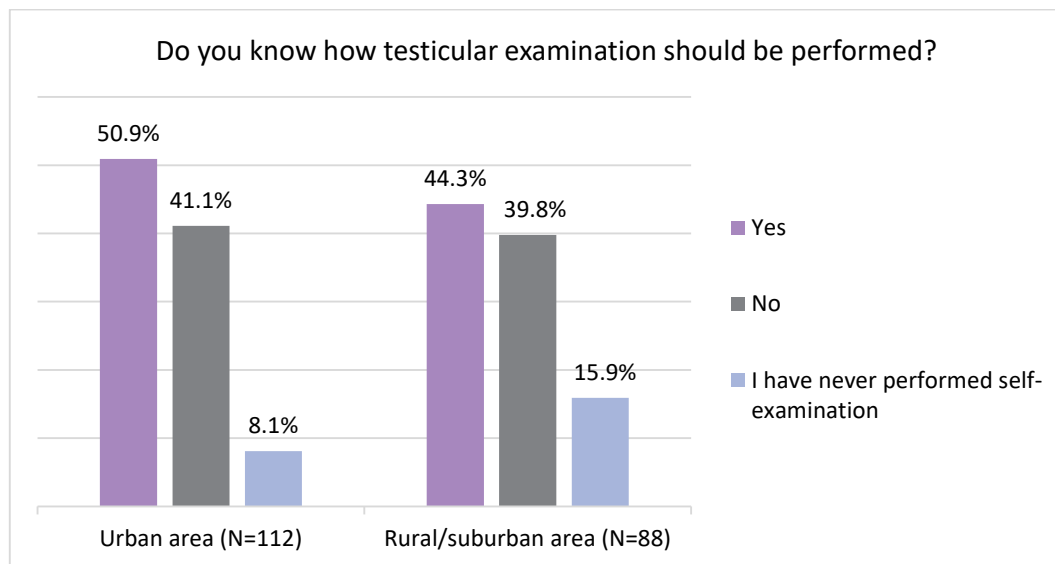
respondents have never performed testicular self-examination. 2 (1%) respondents did not answer the question.



Graph 8. **Distribution of respondents from urban and rural areas according to the answers on the conduct of testicular self-examination**

Of the total sample, 96 (48%) respondents state that they know how to perform testicular self-examination, followed by 81 (40.5%) respondents who are

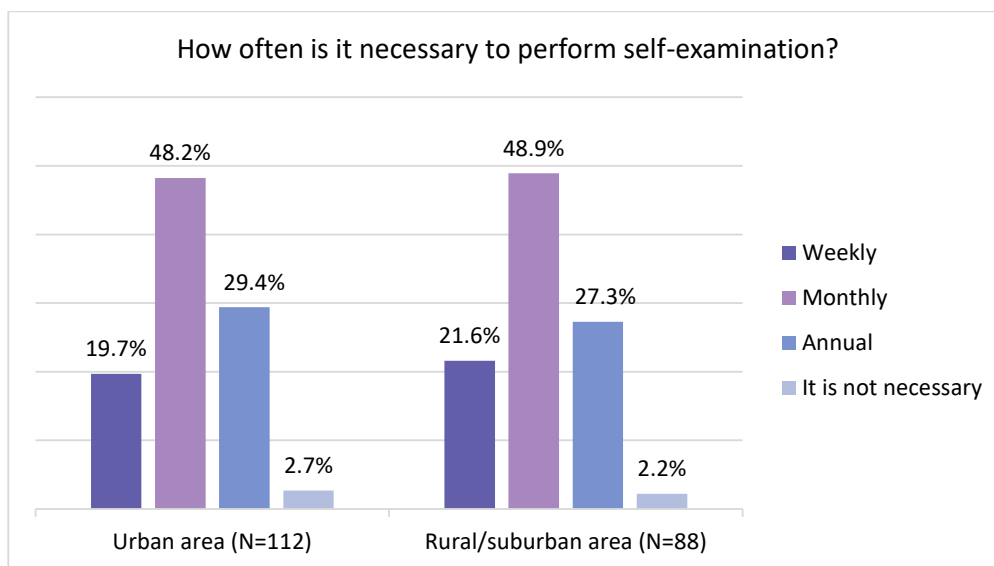
not familiar with performing self-examination. 23 (11.5%) respondents stated that they had never performed a testicular self-examination.



Graph 9. Distribution of respondents from urban and rural areas according to the answers on the knowledge of performing testicular self-examination

97 (48.5%) respondents believe that testicular self-examination should be performed once a month, while 57 (28.5%) respondents believe that it is necessary to perform it once a year. 41 (20.5%) re-

spondents believe that testicular self-examination is important once a week, and the smallest number of respondents, 5 of them (2.5%) believe that it is not necessary.

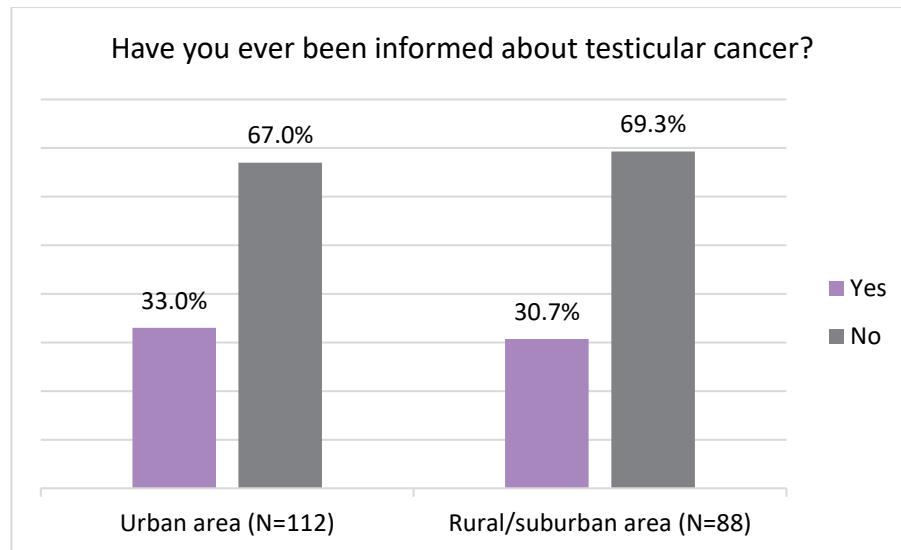


Graph 10. Distribution of respondents from urban and rural areas according to the answers on the regularity of testicular self-examination



Of the total sample, 136 (68%) respondents had never been informed about testicular cancer, as opposed to 64 (32%) respondents, who had. The answers of

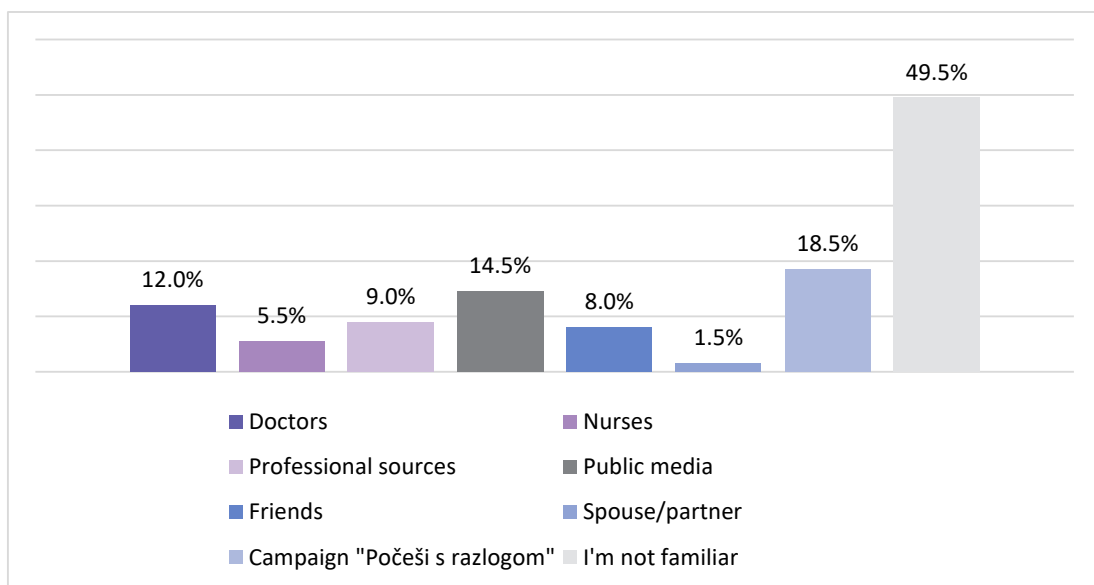
respondents from rural and urban areas are almost equal, as shown in Graph 11.



Graph 11. **Distribution of respondents from urban and rural areas according to the answers on the level of knowledge about testicular cancer**

The majority of the respondents state that they are not familiar with this malignant disease. Self-examination of the respondents was mostly encouraged by the "Počeši s razlogom" campaign and the me-

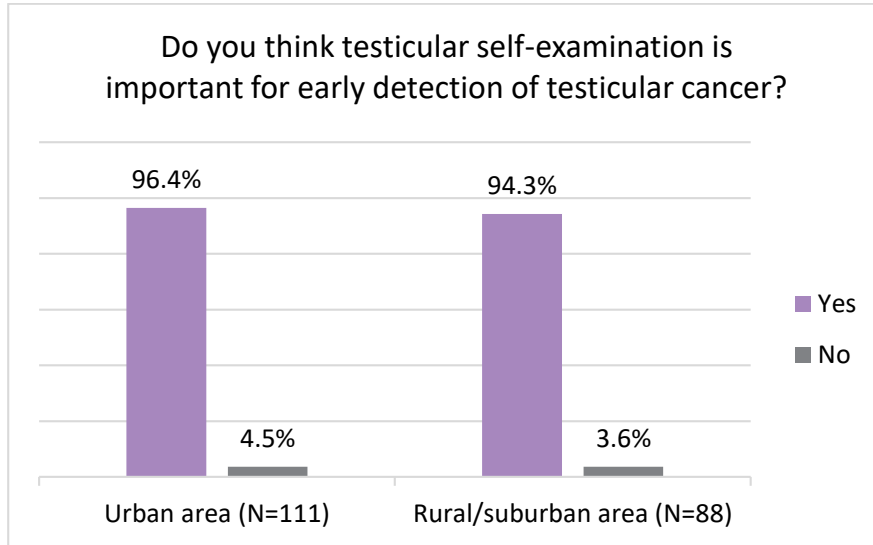
dia, while the lowest percentage of respondents received information from partners and health workers, as seen in Graph 12.



Graph 12. **Distribution of subjects in the total sample according to the sources of information about testicular cancer**

190 (95%) respondents believe that testicular self-examination is important for early detection of testicular cancer, and only 9 (4.5%) respondents believe

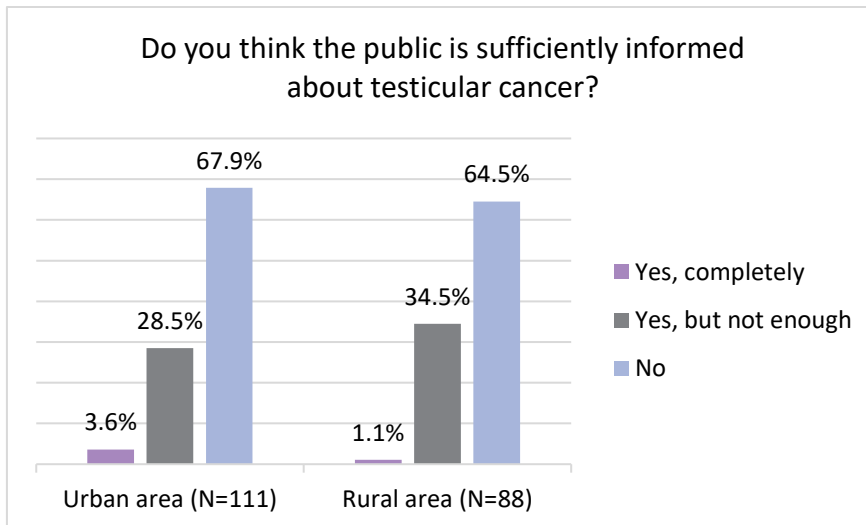
that it is not important. One respondent did not answer the question. Graph 13 shows the responses of the rural and urban population.



Graph 13. **Distribution of respondents from urban and rural areas according to the answers on information about testicular cancer**

Of the total sample, 62 (31%) respondents felt that the public was informed about testicular cancer, but not enough. 6 (3%) respondents agree that the public is fully informed. The largest number of respondents, 131 (65.5%) believe that the public is not sufficiently

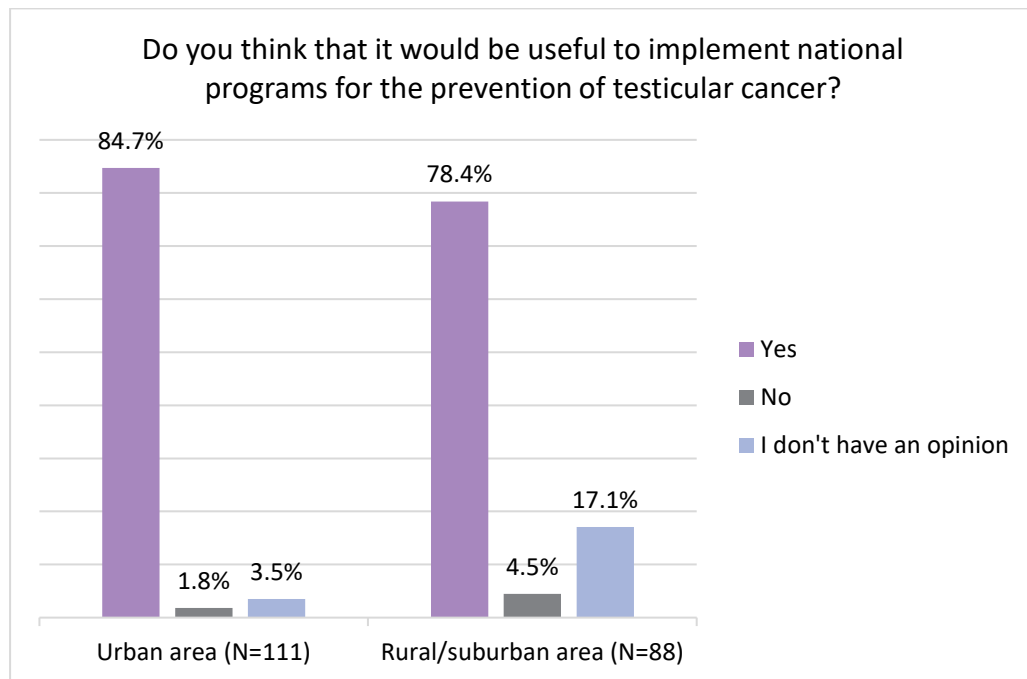
informed. One respondent did not answer this question. Respondents from urban and rural areas provided almost identical answers to these questions, which is shown in Graph 14.



Graph 14. **Distribution of respondents from urban and rural areas according to the answers on public information about testicular cancer**

The implementation of the national prevention program is desirable for 163 (81.5%) respondents, and only 6 (3%) respondents do not consider their implementation useful. 30 (15%) respondents do not have an opinion on the implementation of the national prevention program. Respondents from rural and urban

areas believe that the implementation of a national prevention program is necessary, but it is also evident that compared to the urban population, the rural population has no opinion on the implementation of the national prevention program, with a share of 17.1%. The differences in responses are shown in Graph 15.



**Graph 15. Distribution of respondents from urban and rural areas according to the answers on the usefulness of implementing national prevention programs**

## Discussion

Given that the incidence rate shows a steady growth trend, including Croatia, it is important to examine the knowledge of the male population about testicular cancer. The results of this study indicate that respondents have different perceptions about risk factors, treatment, and clinical presentation of testicular cancer. Studies conducted in different parts of the world have highlighted the relatively low level of awareness among men of risk factors and signs and symptoms of testicular cancer (7). Men need to be aware of risk factors. A review of existing literature shows that approximately 20-30% of men with testicular cancer delay medical care for more than 3 months after the onset of symptoms (8). Cryptorchid-

ism as the most relevant risk factor is not recognized as such. However, genetic disorders and testicular cancer in the family are considered relevant, especially in respondents living in rural areas. Knowledge of risk factors is important because of the motivation for testicular self-examination. According to a study by Ugobom and Abuom, only a small number of individuals believe that testicular self-examination may help in the early detection of testicular cancer (9). This study showed different results. Despite a high level of awareness and importance of self-examination, only 30% of respondents practiced it. Men do not perform testicular self-examination due to a number of factors including lack of knowledge, fear of cancer, feelings of shame, and insufficient free time (10). Studies show that men have basic knowledge of testicular cancer but lack knowledge of testicular self-examination (11). This suggests that

awareness of testicular cancer does not necessarily increase the practice of testicular self-examination. It has also been shown that men at risk for testicular cancer are not educated and do not know how to perform testicular self-examination (12). In this study, respondents from rural and urban areas state both that they know how to perform self-examination and that they are not familiar with it. Abnormalities in the structure of testicles, which may indicate cancer, can be noticed through self-examination. For this reason, it is advisable for men to perform regular self-examination. Self-examination should be performed once a month, with which 48.5% of respondents agree in this study. According to numerous studies, men in the risk group (under 35) have never performed testicular self-examination, and very small number of respondents knew that men in the age of 18-50 should perform testicular self-examination every month (13). Most malignancies are considered to have the highest incidence in old age, but the development of testicular cancer is associated with younger age. This study demonstrated a lack of knowledge about the age incidence of testicular cancer. Most respondents (49.5%) believe that it develops between the ages of 35 and 50, and only 20% of respondents believe that the incidence of testicular cancer is most common between the ages of 15 and 35.

Treatment with chemotherapy and radiotherapy in men causes damage to the gonads. In a study by Matos et al., half of the patients wanted to have children after testicular cancer treatment. However, according to the results of the study, fertility rate was lower after treatment (14). Given the detrimental effects of treatment methods on fertility, it is important to research the level of knowledge of the male population about this issue after testicular removal. The results of this study show that the respondents from the total sample were familiar with the fact that the removal of one testicle does not cause 100% infertility. The answers highlight 31.8% of respondents from rural areas who are not familiar with the problem of infertility in the case of removal of one testicle. Cornet et al., estimate that the incidence of testicular cancer in Europe will increase by 25% by 2025 (15). They also point out that Croatia, along with Slovenia and Norway, is the country with the highest risk. Due to the above data, it is important to improve preventive health care of the male population in Croatia. This study sought to determine how respondents were informed about testicular self-examination.

Awareness of 18.5% of respondents was influenced by the campaign "Počeši s razlogom" for early detection of testicular cancer, and 14.5% of respondents were informed through public media. The results of this study show that the respondents were not sufficiently informed about self-examination, which is why other preventive programs should be developed with an emphasis on testicular self-examination. Also, nurses are listed as the second least represented group credited with educating men about self-examination. It is known that nurses often perform the function of promoters for improving and maintaining the health of the population and therefore should be actively involved in the implementation of prevention programs. 1.5% of respondents state that their spouse/partner had an impact on them conducting self-examination. Studies have shown that partner attitudes and behaviour are associated with greater awareness and motivation in the context of cancer screening (16). Women who are sufficiently informed about testicular cancer can motivate men to perform self-examination. Given the above, it is desirable to attract the attention of women in the implementation of prevention programs.

The goal of any cancer screening program is to diagnose the disease at an early stage, which affects survival. It has been found that the implementation of a national program for screening and early detection of cancer can significantly reduce mortality (17). Encouraging participation in prevention programs is key to promoting men's health and is aimed at early detection of testicular cancer. An integral part of prevention is informing the population about the disease. The results of this research show that the public is insufficiently informed about testicular cancer, which is supported by the answers of 65.5% of respondents. 81.5% of respondents believe that it would be useful to implement national prevention programs for early detection of testicular cancer, given that it has not yet been developed in Croatia.

In most countries, health policy is focused primarily or exclusively on women's health, and men's health is often neglected. Although they do not contribute to the mortality rate directly, male-specific health problems are becoming more common. Health policy must improve the provision of information on men's health, develop information and confidentiality programs, and promote the development of preventive measures for the main causes of mortality and morbidity in men, including preventive health examina-

tion. Given that testicular cancer occurs in men of reproductive age, it is desirable that education be conducted as part of the curricula of high schools and universities in cooperation with primary care health professionals. It is also important to strengthen the role of public media in raising awareness about testicular cancer.

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## Conclusion

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Testicular cancer is associated with a high morbidity rate and a negative impact on quality of life. Therefore, attention should be paid to the health of the male population and promote it in order to achieve better health outcomes.

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## INFORMIRANOST O KARCINOMU TESTISA MEĐU MUŠKOM POPULACIJOM U REPUBLICI HRVATSKOJ

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### Sažetak

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Karcinom testisa najčešći je tumor kod muškaraca reproduktivne dobi. Incidencija se povećala posljednjih nekoliko godina, kako na globalnoj razini tako i u Republici Hrvatskoj. U Republici Hrvatskoj nisu provedene studije koje pokazuju razinu informiranosti populacije o karcinomu testisa, stoga je provedeno ovo istraživanje čiji je cilj bio ispitati znanje i stavove muške populacije o karcinomu testisa, utvrditi postoje li različitosti u znanju i stavovima muške populacije iz ruralnog i urbanog područja te ispitati na koji način povećati informiranost muške populacije o prevenciji karcinoma testisa. Među 200 ispitanika iz ruralnog i urbanog područja Republike Hrvatske provedeno je presječno istraživanje. Istraživanje je provedeno ispunjavanjem anonimnoga anketnog upitnika. Ispitano je znanje o rizičnim čimbenicima, kliničkoj prezentaciji, dijagnostici i metodama liječenja te provođenju samopregleda. Rezultati nisu pokazali značajnu razliku između znanja i stavova populacije iz ruralnog i urbanog područja. Međutim, pokazalo se da je ukupna razina znanja o karcinomu testisa niska te da je potrebno ulagati napore u unaprjeđenje preventivnih programa u svrhu zaštite zdravlja muške populacije.

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**Ključne riječi:** karcinom testisa, informiranost, hrvatsko ruralno i urbano područje, prevencija

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