Neoplasms – the state of knowledge among high school students

Potempa Magdalena1,*, Jonczyk Paweł1, Janerka Michał1, Kucharzewski Marek2

1. Student Research Circle at the Faculty of Descriptive and Topographic Anatomy, Medical University of Silesia, Department of Medicine and Dentistry in Zabrze
2. Faculty of Descriptive and Topographic Anatomy, Medical University of Silesia, Department of Medicine and Dentistry in Zabrze

#Corresponding author: Potempa Magdalena, Faculty of Descriptive and Topographic Anatomy, Medical University of Silesia, Department of Medicine and Dentistry in Zabrze, ul. Jordana 19, 41-808 Zabrze, e-mail: magdalenapotempa@o2.pl

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ABSTRACT
Background: Neoplasms are the second only to cardiovascular cause of mortality worldwide. This outlines neoplastic disease as a real social problem and an object of common interest. The aim of our research is to assess the state of knowledge about the neoplasms in high school students and their awareness of cancer risk.
Material and Methods: Authors prepared a questionnaire with 33 single choice questions concerning basic terminology, statistics of neoplasms, cancer risk factors and screening methods. Respondents were 409 students of Silesian high schools, aged 17 to 19.
Results: The results were summarized in four paragraphs as mentioned before (terminology, statistics, risk factors, screening). Obtained data were presented as the percentage value – the absolute number of answers to the number of respondents in group: male, female, comprehensive, technical-vocational schools and total.
Conclusion: High school students are familiar with elementary terms connected with neoplasms apart from ‘cancer’ definition. There are some ‘famous neoplasms’ like leukemia or cervical cancer, which are wrongly indicated as most common in Polish population. Our respondents are in general aware of cancer risk factors and screening methods. Educational programs undertaken among students between 17-19 years of age become a good moment to gain the cancer knowledge and awareness of this disease.
INTRODUCTION

According to the World Health Organization (WHO) reports, 8.2 million people died from cancer in 2012, which was 22% of all NCDs (Noncommunicable Diseases), the second only to cardiovascular cause of mortality [1]. In Poland in 2010 over 140,5 thousand people were diagnosed with malignant neoplasms and nearly 93 thousand died. [2] This outlines neoplastic disease as a real social problem, but an object of common interest as well. Numerous government health programs are being implemented to enhance the awareness of cancer risk factors and screening methods. Neoplasms are also a popular topic for the media, which have the role to educate people, especially young, about the early prevention.

The main goal of our research is to measure the state of knowledge about the neoplastic diseases in nearly adult people, being now high school students. In this paper authors try to assess, whether educational programs relate their effects, either these effects are really sufficient or not.

MATERIAL AND METHODS

The questionnaire prepared by the authors consisted of 33 single choice questions, informally assigned to four main groups:

- basic terminology – 12 questions
- statistics of neoplasms – 6 questions
- cancer risk factors – 6 questions
- screening methods – 9 questions

The survey was fully anonymous and the participation of students was voluntary. Our research group were 409 students of Silesian high schools, aged 17 to 19. According to the sex there were 116 men and 293 women, and dividing upon the type of school the students attended: 194 students from comprehensive schools and 215 from technical and vocational schools.

Students were completing the questionnaire during their school lessons with teacher’s consent and presence. Time they have spent on the test closed in 15 minutes. These conditions of carrying out a survey helped in receiving the real student’s knowledge about the topic, without the use of other sources like Internet, family, etc. If it was possible, authors attended the classroom while the test was being completed. Directly after finishing the completion, questionnaires were gathered by authors to analyze.

The results were summarized using two parameters:

- The absolute number of individual answers selected by students.
- The percentage is the ratio of the absolute number of each answer given and the total number of respondents in particular group (male, female, comprehensive school, technical-vocational schools, altogether) represented as a percent value.

The second parameter will be used to present the results of the survey.

RESULTS

For clarity authors divided the results of the study between the four groups of questions, the same as mentioned above.

Basic terminology

The vast majority of students knows the terms of a neoplasm (88% answers correct), a tumor and malignancy (respectively 87 and 88%). In the question about benign neoplasms were in all 83% answers correct. In the question ‘What is cancer?’ respondents provide mostly wrong answers. Altogether 71% of students claim, that ‘cancer is the synonym for neoplasm’ (results for comprehensive and technical-vocational respectively 78% and 64%). The correct answer: ‘cancer is only malignant neoplasm derived from the epithelial tissue which covers and cushions the organism’ was chosen by one quarter of students, wherein there were 30% of students of technical-vocational schools and 20% from comprehensive schools. 99% surveyed know, that the neoplastic disease can also occur in children. 88% comprehensive schools students and 75% technical-vocational schools students believe, that there is no distinctive symptom, which indicates the beginning of the neoplastic disease in the organism. 57% of students are familiar with the term of alarming symptoms – they know, that ‘Alarming symptoms are uncharacteristic symptoms which, if lasting for quite long time, in total could suggest neoplasia’. However, 26% of respondents point wrong, that they are unique for neoplastic disease. 49% of men and only 37% of women (40% altogether) correctly list these symptoms. There is an opinion of 43% of total respondents, that alarming symptoms ‘can not be specified, because they are individual for every patient’. Only 61% of respondents (75% of comprehensive schools students and 55% from technical-vocational schools) are aware, that melanoma is a malignant neoplasm derived from the pigment cells – melanocytes. 16% of respondents still claim, that it is a benign neoplasm.

Statistics of neoplasms

71% of students know, that environmental factors are responsible for almost two thirds of the cases of cancer. The correct answer was more often chosen by men (76%) than by women (69%) and more often by comprehensive schools students than by technical-vocational schools students (respectively 75% and 67%). The half of respondents knows, that the neoplasms of the lung are the most common neoplasms in Polish population. This awareness is greater in men: 60% vs. 46% answers correct in women. 35% of total respondents (and 39% of women) mistakenly pointed the leukemia to be the most common neo-
plasm in Poland.

According to the respondents the main cause of cancer mortality in women is cervical cancer (62% answers given). The correct answer – breast cancer – was chosen by 34% of students. In the question of the most frequent cause of cancer mortality in men, a significant discrepancy is observed: the correct answer ‘the lung cancer’ was chosen by 42% of respondents (59% of men and 36% of women). The second popular answer was prostate cancer – 45% altogether (28% of men and 51% women).

65% of comprehensive schools students and 54% from technical-vocational schools know, that the reportability for screening tests to detect cervical cancer in Polish women amounts to slightly less than one third. In total 60% of respondents pointed the correct answer.

Cancer risk factors

76% of respondents are aware of multifactorial risk of the neoplastic disease, wherein 83% of women and only 56% of men gave the correct answer. The difference between the comprehensive and technical-vocational schools were respectively 86 and 74%.

Less than half of respondents (49%) reports, that the cancer risk increases with age in some types of cancer (including 63% of comprehensive schools students and 41% form technical-vocational schools). 24% of respondents claim, that the determination of the cancer risk is impossible.

41% of students correctly points all of listed colon cancer risk factors (obesity, sedentary lifestyle, colon polyps and consumption of large quantities of red meat). This answer (‘all correct’) was chosen by 51% of comprehensive schools students and only 31% of technical-vocational schools students. Among the distractors with one alone risk factor was ‘consumption of large quantities of red meat’, chosen merely by 6% of respondents.

More than half of respondents (51%) know, that smoking 15 cigarettes a day cause 15-fold increase in lung cancer risk. Meanwhile 5% of students (9% of men and 6% of comprehensive schools students vs. 3% of women and 4% of technical-vocational schools students) claim, that ‘is an acceptable daily amount, which is not harmful’. At the same time the vast majority, 90% of respondents, indicated smoking as a factor of the greatest influence on lung cancer probability (93% in comprehensive schools, 87% in technical-vocational schools).

61% of respondents know, which risk factors promote the development of melanoma. However, quite much percentage of answers given (22% of women and 32% of students from technical and vocational schools) pointed to the exclusive effect of the frequent use of the solarium.

Screening methods

61% of comprehensive schools students and only 41% of technical-vocational schools students properly explains the term of ‘screening test’ (48% of total respondents).

The name and the aim of cytological examination are familiar for 87% of respondents. They correctly associate them with the prevention of cervical cancer, indicate the age range and the interval between successive tests in accordance with the screening program of the National Health Fund (65% altogether). 12% of men claim, that this examination is used for the diagnostic of the lung cancers in advanced stages. 48% of total respondents know, and 52% do not know a person from their entourage, who benefited from the free cytological examination. Only 40% of men know such a person or persons.

The mammography is indicated as an essential screening method for breast cancer by 86% of respondents, therein women – 87% and men – 82%. 46% of men and 42% of women know, that the aim of the mammary gland biopsy is confirming the neoplasm. In general this answer was chosen by 43% of respondents. Other answers, e.g. ‘as the screening test for breast cancer’ and ‘to diagnose inflammatory diseases’ were respectively 25% and 27%.

17% of students are aware, that the basic test for detecting the prostate cancer is the peripheral blood PSA concentration test. 37% of total indicate as such a test ultrasound examination of the prostate gland, whereas 35% pointed the urinalysis.

48% of respondents are familiar with the FOB (Fecal Occult Blood) examination as a basic laboratory test in recognition of the colon cancer development risk after the age of 55. This answer was chosen by 56% of comprehensive schools students and 40% form technical-vocational schools.

The latter mistakenly indicate the abdominal ultrasound examination as recommended screening for the prevention of colorectal cancer more often than the comprehensive schools students (respectively 21% and 10%). The is less difference in the correct answer (‘colonoscopy after the age of 50 every 5 years’; respectively 26% – technical-vocational sc., 31% – comprehensive sc.). The most of respondents claim, that screening colonoscopy should be performed every year or two.

DISCUSSION

Knowledge about neoplasms is a multi-field area. It contains medical knowledge sensu stricto, starting from cell cycle disturbances (both in fetal and postnatal life), full carcinogenesis process and leading to appropriate treatment of cancer. The knowledge of these processes (as well as many others correlated with neoplastic disease) is necessary for doctors and people connected with healthcare. The other areas about cancer, e.g. exposure to significant exoge-
nous factors, awareness of screening methods and their meaning in early cancer detection – these parts of neoplasms should be known to the vast part of society, in at least superficial grade. This knowledge lets people increase their awareness of cancer and help them understand that only early detection can mean successful treatment outcomes.

In the literature there are not plenty of data about general cancer knowledge, its biology and basic cancer terminology. However, in Poland in March and April 2014 there was an extensive study conducted by the foundation Rosa within the campaign called Rakooobraha among high school and middle school students. The total number of students in the study was above 1500. The research had a form of a questionnaire concerned on the awareness and basic knowledge about cancer. Only preliminary results of this study are available, but they suggest to be already enough for the first conclusions. 52,2% of students claim that cancer is untreatable and 28,8% of them have opposite opinion. In the scale from 1 to 10 about cancer knowledge, student assess themselves on average as 4,9. In this study there was no question of medical cancer definition; the authors already enclosed a brief definition ('a malignant neoplasm') in the parenthesis [3].

In our study this question appeared and only 20,1% and 30% (of comprehensive school student and technical-vocational ones respectively) gave the correct answer. Authors suggest that it is highly possible, that in mentioned study, authors deliberately omitted this question, expecting that majority would have answered incorrectly. Our study also indicates that only 9% of students think, that malignant neoplasm can not be cured.

In Rakooobraha report 6 out of 10 students claim, that there are possibilities to avoid cancer and 4 out of 10 indicate that prevention is an effective way to overcome the cancer. 94% of students have an opinion that the early detection can affect the following cancer treatment [3].

Ray et. al. [4] have conducted the study about cancer knowledge among people living in West Bengal, India. The total number of respondents was 900. The aim of the study was to estimate associations between response variables, that is knowledge about cancer (symptoms, established risk factors, treatment and follow up regarding cancer disease) and predictor variables that is socio-personal and economic factors of the respondents (age, sex, level of education). A Knowledge Index was developed and used for measurement. General results from the study are that 98,33% of respondents have heard of ‘cancer’ during their whole life. Only 35% of the respondents were aware of the 7-danger signals as defined by WHO. None of the respondents knew all 7-primary symptoms of cancer and the majority (about 88%) knew only one or two (mainly tumor lumps and ulcers). Authors of this paper claim that ignorance of this symptoms may be one of the major causes of delay in reporting by cancer patients. Our data also confirm this statement and moreover suggest that nearly 43% of respondents can not specify these symptoms and claim that these are individual. In Indian study 58,33% of respondents claim that cancer can be curable in early stages [4]. This is a similar result to the study among Polish students [3].

An interesting study was conducted in 2010 by Kvåle et al. [5]. They tried to obtain an insight into the following case: how nurses’ cancer knowledge and its influence on patients’ perceptions can affect the compliance and nursing care. The study took place in the oncology ward in Norway. Study had a form of an interview with the patients. Questions were open and interviewer tried to hold dialogues rather than receive simple answers. Twenty oncological patients aged 40 to 70 were interviewed; interviews were recorded. Findings from the study were mostly consistent. Nurses who had acquired the knowledge about cancer and its treatment, have good technical skills, make the patients feeling more safe and diminish suffering from the disease. Clinical nurses’ knowledge can also relieve side effects of the treatment and disease’s symptoms. What is important, most of the patients were on palliative life-prolonging therapy, and therefore feeling safe and understood by the people taking care of them can be alleviating.

Undoubtedly the majority of studies are due to cancer prevention and risk factors and the awareness of them among people. We agree with this attitude because studies explicitly show that earlier diagnosis means better results. Unfortunately, in general practice there are many various symptoms patient reports to the general practitioner, but among many non-serious diseases like infections, indigestion, diet mistakes, medical staff do not think of a in most cases. For some cancers, delayed presentation is due to incorrect physical examination [6]. It can correlate positively with a statement revealed in Rakooobraha report [3].

It had also cast the light on a very significant aspect of oncological patients. Namely, it shows that most of students stigmatize oncological patients. They associate them with specific appearance, that is 46,9% of students think that patient suffering from cancer is cachectic, 30% claim that such a patient is bald and 24,5% – that they reveal paleness [3]. In our opinion these results just confirm common society approach to cancer as a disease without efficient treatment and rescue. It means that society correlate cancer with some kind of sentence, as there is no more medical help for them. That is why prevalence and verification of awareness and knowledge about it is so important. Just because the topic of screening methods was our main interest during questionnaire preparation. However, looking at our answers concerning statistics of neoplasms, we have a conclusion that there
are some 'medial' and 'famous' neoplasms like leukemia or cervical cancer, which were incorrectly pointed as the most common cancers and as a main cause of death in Polish population (35% and 62% respectively).

According to Iwanowicz-Palus et al. study [7], media are the main source of knowledge about cervical cancer for 20-25.4% of women.

In the study conducted by Baran et al. [8] for women in the age group between 18 and 33 internet was the main source of cervical cancer information. However looking at all age groups, a large number of women admitted to have been informed by gynecologist, midwife, women magazines etc. as well. On the other hand, Rakooobra reports shows that only about half of student (53.4 %) know what cervical cancer really is and just 10.4 % of them gave the right answer about its cause [3]. In authors opinion there are two sides to this coin. The first: it is good for media to speak out some cancer, even they are not the main cause of death, because they develop a needful awareness about each cancer. From the other side, there is just talk about the cancer, as a cancer, that is all. There is still little information about the cause and risk factors. We believe, that women should understand the aim of the cytological examination and the danger of cervical cancer, to participate in screening program. The study shows that only half of respondents know a person who underwent this examination. In our opinion, looking at the cervical cancer prevention it is too less, as it correlates positively with the Polish population frequency of attending to this examination, which is about 33%. Our data ensure that people are aware of this population frequency percent, as they underline that answer.

Other study performed in Podkarpackie region among the women, reveals that 61.7% of them having good cancer prevention rules attended the cytology once a year, as well as the half of women with insufficient knowledge. The rest of that group indicated less frequent cytology undergoing or even none [8].

We did not ask the respondents a question about the goal of HPV (Human Papillomavirus) vaccination, but there are certain data showing it. Rakooobra report reveals that 35% of students know which type of cancer the HPV vaccination can prevent [3]. An interesting Polish study was conducted by Gotlib et al. [9]. The research evaluated effectiveness of educational program about HPV knowledge level. Respondents were high school student in the number of 250. Questionnaire consisted of 14 choice test about HPV. Student were completing it before and after the educational program and then the results were compared. Unfortunately before the test results were unsatisfactory: only 68% of students indicated HPV as a main cause of cervical cancer. Only 53% students pointed an early sex initiation as a risk factor of HPV infection. After the education of the students a number of correct answers increased significantly. On the cited question the right answers increased to 98% and 96% respectively. To sum up, on 12 of 14 questions, of which the questionnaire consisted, indicated a statistically significant increase of the correct answers.

One of the newest study from China [10] did similar questionnaire, but respondents were about 1700 women in reproductive age. Results were nearly the same as in previous study. Knowledge before the educational program and after were completely different. It increased from 12-28% before the program to 70-90% after it. Women asked about a will to vaccinate their children before the program, answered in 44% affirmatively. After receiving the education it has increased up to 81% (p<0.001).

There are many other data suggesting poor basic society knowledge about the HPV and its increase after education. It is an elementary lore, which can really help particularly the young people [11-15].

The situation comparable in papers is with the breast cancer. There are many researches checking people's knowledge and awareness. Our study shows that mammography as a screening method is nearly known to the students (86% of respondents), but they are not familiar with the goal of the mammary gland biopsy. We suggested more important questions about mammography as the screening method: if women do not attend the mammography, biopsy would not concern them at all. The problem is: they often miss the mammography, which can result in the miss of the beginning of breast cancer development. Therefore certain studies of this field shall be quoted.

Andsoy et al. [16] performed a study about Turkish nurses’ knowledge about breast, cervical and colorectal cancer. Total number of respondents was 226 nurses from the one of Turkish hospital. Mean age of a respondent was 32. 64.2% of nurses would like to achieve more information about cancer risk factors. They feel they are lack of it, opposite to the knowledge about a cancer which results present as quite good. An important point during breast cancer talk is the breast self-examination (BSE), so nurses were also asked about it. Result revealed that monthly BSE is done by 10.4% of nurses. More than a half (62.4%) do it whenever they remember, and even 19% do not practice BSE at all. Bad news is that 65% of nurses do not receive gynecological examination unless they have first signs of the disease.

Erbil et al. [17] have performed a similar study in Turkey. Their respondents were nursing students and they obtained the results somewhat better than in the previous study. 83.1% of the respondents had a knowledge about breast cancer. BSE was practiced by 70.4% of nursing students and 21.8% of them.
performed BSE regularly. An anxiety of developing the breast cancer was stimulus for 85% of nursing students to practice BSE. Looking at these results, it should be taken into consideration, that these woman study and learn about it simultaneously, when the questionnaire was performed. Authors do not rule out bigger awareness of cancer both among these young women and lecturers and it probably contributed to have more classes about cancer than 10-15 years ago.

Another study showed BSE among female in Iran, which were not connected with health service. Total number of women taking part in the study was 384. 26.0% of women claim they practice BSE and percentage of female, who do not performed BSE was 74.0%. The main reason given for not doing BSE was a lack of knowledge on how to do it (72.1%). Other answers were: forgetfulness (12.3%), fear of finding a mass (8.8%), not necessary (5.2%), and lack of time (2.5%) [18].

Question about BSE was also in the questionnaire performed in Polish Medical School in Otwock. It revealed, that 97% of tested women did not know this procedure. Among 67 respondents, 1 of them did BSE monthly. This period of time proves that it is not done ‘by accident’, but with awareness of the breast cancer prevention. After an educational program and a demonstration of how BSE should be done, nearly all women could properly do it. This study shows a substantial lack of BSE acquaintance and a visible evidence, how educational programs can improve it [19].

Our study does not engage in these topics, as our research group was different and both sexes were asked. It is to consider, whether there shall be an additional question for girls about their attendance on gynecological appointments; from the other side, questionnaire should consist of questions for both girls and boys. We suppose that in our study results correlated with BSE would be similar to those mentioned above.

Polish study from 2008 conducted by Woźniak [20] presents a level of knowledge about breast cancer symptoms. It consisted of 100 women from a random-choice. According to their answers, main breast cancer symptoms were tumor (35%), nipple leakage (17%), changes in breast look (16%), bigger lymph glands (7%) and breast pain (4%). BSE is not practiced by 48% of respondents.

Talking about cancer risk factor, is good to mention the percent of 24 of respondents from our study who claim that cancer risk designation is impossible. In our opinion this percentage is too high. On the other hand, 71% of students know that environmental factors can cause two of three cancer cases. With more respondents, our data would surely be more reliable and detailed in it.

We believe, an important question was also the one connected with colon cancer risk factors. It is such a cancer, which is strongly associated with lifestyle and diet habits from the very beginning of one’s life. Additionally positive family history and gastrointestinal polyps increase the risk. Our question listed most common factors affecting the development of colon cancer. The correct answer contained all factors mentioned (obesity, sedentary lifestyle, colon polyps and consumption of large quantities of red meat) – it was underlined only by 41% of students. Moreover, among respondents who indicated one of the factors, we directed our attention to the only 6% of respondents who correlate eating large amounts of red meat with colon cancer. In our opinion, it is a clear proof of lack of knowledge in primary prevention of this cancer. Furthermore, it has straight significance in increasing incidence of colorectal cancer in Poland, where the consumption of red meat is very common. Overweight and obesity is also a rising problem among European population, and in Poland as well. Children become less and less active, and their eating habits worsen in time. Obesity is now called ‘the 21st century epidemic’ [21]. This is correlated with numerous biochemical changes, where i.a. a ghrelin hormone (known as ‘the hunger hormone’) is relevant [22].

Study of Can et al. [23] evaluated eating habits among 20-years old Turkish and revealed that their diet habits are not proper at all. Their consumption of vegetable in general diet has a ratio of 36.3%. The same is with fruits, eaten mostly as a raw and vegetables in fried form. Distribution of Knowledge of Cancer Prevention in this study oscillates between 83.9% – the highest response ratio for ‘avoidance of excessive amount of alcohol intake’ and 44% for ‘avoidance from foods preserved by salt-curing, salt-pickling or smoking’. Study show that adolescents are aware of keeping diet in cancer prevention but their eating habits are unfortunately different than their knowledge in theory.

The last but not least point we want to raise in our discussion are smoking habits among young people and their level of knowledge about how huge risk the smoking brings to lung cancer development. The lung cancer is a serious malignant neoplasm with poor prognosis, when diagnosed in advanced stage. It is unfortunately still discovered too late to be curable at all. It is the most common cancer in Polish population. Molecular base of it is very rich as more and more genes are involved in lung carcinogenesis process (at the level of controlling cell cycle, apoptosis, cell differentiation, signaling paths). Some of them can modify treatment and cause resistance to main cytostatic used in lung cancer therapy. Some mutations are characteristic for lung cancer and their detection determinate treatment, like EGFR mutations, particularly in exon 21 [24]. Smoking can additionally accelerate some of mutations and cause new ones. This process can be clinical silent or cause benign
symptoms, completely ignored by patient; after some time, diagnosing routine often shows cancer in high stage. That is why it is very important not to ignore chronic cough, hoarseness or lingering weakness. Sometimes hemoptysis appears only when tumor is completely formed and metastases are present. 

Looking at our results connected with lung cancer risk factor, we are pleased that vast majority of our respondents are aware of smoking as the main lung cancer risk factor. In Rakoobrona report 94.7% of student confirmed this statement [3]. Krukowska et al. [25] showed similar results about lung cancer knowledge among nursing students.

In 2013 Rotter et al. [26] have investigated a study which aim was to evaluate the harmfulness of smoking among high school students. Total number of respondent was 288. The majority of them (95.1%) indicated smoking as a harmful both for passive and active smokers. Main consequences of smoking were according to the respondent the pulmonary diseases and cancer. The others answers were underlined in less cases (heart diseases, pregnancy complications, atherosclerosis, stroke). What is consoling, 83.2% of them try to avoid rooms filled with smoke.

Our questionnaire contained also more detailed questions about tobacco. Respondents were asked how smoking fifteen cigarettes a day correlates with the lung cancer – and here the more interesting view appears. 51% of people answered well (15-fold increase of lung cancer risk), directly proportional. But the attention shall be focused on the 5% of students giving the answer that 15 cigarettes a day ‘is an acceptable daily amount, which is not harmful’. Looking at our number of 409 respondents those 5% determine quite allot. This opinion is a great risk for young people, becoming addicted to tobacco in adolescence and smoking for numerous years as adults.

The authors’ plan in this discussion was to show a problem of cancer, common knowledge about it, the awareness of screening tests and prevention methods. There are rich scientific achievements correlated with this theme. Authors hope to encourage the reader to delve in this problem, so important in the context of young people cancer awareness, as well as their health in general.

CONCLUSIONS

High school students are familiar with elementar-
y issues about neoplasms, although it should be emphasized, that the word ‘cancer’ is often misused. Sometimes the misusage occurs even in media like the Internet, television and magazines, which are becoming the main source of knowledge for adolescents. Consequently it can lead to further misinformation of young people in the topic of neoplastic disease.

Our data show, that there are some ‘famous neoplasms’ like leukemia or cervical cancer in Poland: they are being suspected of greater morbidity and mortality than other ‘silent’, but being a real problem in Polish population. On the other hand, thanks to media reports and ‘famous neoplasms’ screening programs of the National Health Fund the awareness of those neoplasms gradually increases. Young people being more familiar to the topic of neoplasms do not fear talking about it, which is very important for social awareness of this health problem.

Our respondents are in general aware of cancer risk factors, but the meaning of diet influence on the development of colon cancer requires intensive education. As the comprehensive school students did better in the questionnaire, we suggest that they are on average more aware of cancer risk factors than the students from technical and vocational schools. State of students’ knowledge generally does not depend on the sex.

Students are familiar with basic screening methods for cervical, breast and colorectal cancer. What is intriguing, though increasing number of health programs in the case on the prostate cancer prevention, PSA antigen test is still little recondite. Young men should be educated to acquire good habits in order not to be ashamed to consult with a doctor and do not trivialize the early signs of cancer in adulthood. There were certain schools where various health educational programs (e.g. National Olympics Contest of Healthy Lifestyle Promotion of the Polish Red Cross, ‘Transplantation Day’, ‘Melanoma Academy’, ‘Deceitful Viral Hepatitis’ workshops) are regularly conducted. Students’ results from these schools were in general more valid than the results of the students in whose schools such programs were not run. That emphasizes the meaning and need of health educational programs in school education. High school age, when students begin to take care of health affairs on their own, is in our opinion the best time to develop positive health habits for entire adulthood, so the education as the prevention must not be missed.

In general, students treated the survey seriously: they were showing their interest of the research and wrote the test fairly (trying to complete the test on their own, without looking at the classmate’s work), with constant level of concentration. Authors claim that further investigations should be carried out and – what can be even more important – subsequent educational programs of neoplasms prevention ought to be introduced in high schools.

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