

Knowledge of the role of vaccinations, physical activity and other cancer prevention methods among Polish outpatients

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Summary Background. Mortality rates connected with cancer are increasing nowadays due to demographic changes in the worldwide population and the increasing number of health risks leading to cancer. Primary cancer prevention is based on avoiding exposure to identified cancer risk factors. Therefore, awareness of basic health hazards is necessary.

Objectives. The purpose of this study was to assess the knowledge of the role of vaccinations, physical activity, second-hand smoke exposure and other factors in cancer prevention in Polish outpatients.

Material and methods. This was a survey involving Polish primary care patients. The study was based on an original questionnaire designed for this purpose and was distributed among primary care patients in either hardcopy (among primary care patients in the urban settings of the city of Lodz) or over the Internet.

Results. 612 respondents took part in the study. Among the respondents, 28.4% claimed that vaccinations do not play any role in cancer prevention. Physical activity may prevent cancer according to 58.6% of the surveyed population. Tobacco smoking is a well-known cancer risk factor, which was admitted to by 97.2% of the respondents. Second-hand smoke exposure in the workplace was reported by 18.3% of the respondents, more often by those with secondary education than with a university degree. Second-hand smoke exposure was strongly connected with the age of the respondents.

Conclusions. There is little knowledge about vaccines and physical activity as cancer prevention methods. Tobacco smoking is a well-known cancer risk factor. Second-hand smoke exposure remains a serious problem in Poland despite a total ban on smoking in the workplace and public places.

Key words: preventive medicine, papillomavirus vaccines, tobacco smoke pollution.

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Background

Mortality rates connected with cancer are increasing nowadays [1] due to demographic changes [2] in the worldwide population and the increasing number of health risks leading to cancer. The number of new cancer cases in Poland in 2016 was 164,140 [3]. The number of people aged 65 or older is projected to grow from an estimated 524 million in 2010 to nearly 1.5 billion in 2050, with most of the increase in developing countries [4]. It was estimated that 18.1 million (95% UI: 17.5–18.7 million) new cancer cases and 9.6 million (95% UI: 9.3–9.8 million) cancer deaths occurred in 2018 worldwide, and on average, there is about a 20% risk of getting cancer before the age of 75, and there is a 10% of dying from it [5]. Therefore, awareness of basic health hazards and intervention before health effects occur, through measures such as vaccinations, altering risky behaviours (poor eating habits, tobacco use) and banning substances known to be associated with a disease or health condition are necessary. All these actions are called primary prevention [6]. Vaccinations are one of the greatest achievements of medicine, not only as protection from infectious diseases, but also as cancer prevention in particular cases. It is alarming that there have been recent trends of parents in Western countries refusing to vaccinate their children due to numerous reasons and perceived fears [7]. The HPV vaccination is recommended in Poland, but it is still quite expensive and funded only by several local governments. Not only can the HPV vaccination prevent cancer, but hepatitis B virus (HBV) immunisation, a risk factor of

hepatocellular cancer, is also considered a major success in cancer prevention. Approximately 2 million new cancer cases are attributed to infectious agents each year worldwide [8].

Cervical cancer is the fourth most frequent cancer in women, with an estimated 570,000 new cases in 2018, representing 6.6% of all female cancer cases. Approximately 90% of deaths from cervical cancer occurred in low- and middle-income countries [9]. The GLOBOCAN 2012 project places Poland among countries with the highest rate of incidence and mortality due to cervical cancer, with the standardised incidence rate (SIR) at 12.2/100 000 and the standardised death rate (SDR) at 5.4/100,000 (one of the highest among the surveyed countries). Both SIR and CDR are relatively high compared to other European countries [10]. In the absence of further intervention, there would be 44.4 million cervical cancer cases diagnosed globally over the period 2020–2069. First-generation human papillomavirus (HPV) vaccines, including the quadrivalent vaccine and the bivalent vaccine, can prevent about 70% and 84% of cervical cancers, respectively. A next-generation nonavalent HPV vaccine, Gardasil 9, can prevent approximately 90% of cervical cancers. However, these vaccines do not treat pre-existing infections and related cervical abnormalities. Thus, several generations of women need effective cervical screening. In 2016, the American Society of Clinical Oncology (ASCO) released cervical screening guidelines [11] recommending screening for women aged 30–49 years one to three times per lifetime in lower-resource settings with primary HPV testing, on the basis of very strong evidence that HPV testing is a more effective, reliable and adaptable method of screening (via the use of



self-collected specimens) than traditional cytological methods [12]. According to the European Guidelines, as well as the World Health Organization (WHO), HPV testing is now proposed as the primary screening tool for cervical cancer [13, 14]. There are several countries in Europe and all over the world integrating HPV vaccination and population-based HPV testing in cervical cancer screening programmes [15]. Nevertheless, in Poland, the cervical cancer screening programme is based on the conventional Pap test, repeated every three years among women aged 25–69 [16].

Apart from vaccinations, the fundamental task of primary prevention is education concerning physical activity and tobacco use, as well as second-hand smoke exposure. According to many epidemiological studies and systematic reviews [17], regular physical activity is strongly correlated with reduced risks of bladder, breast, colon, endometrial, oesophageal adenocarcinoma, renal and gastric cancers. Relative risk reductions ranged from approximately 10 to 20%.

Interim findings of this paper were presented at the 10th International Congress of Internal Medicine, 22–24 March 2018 in Athens, Greece, as an oral presentation.

The first part of the research was published in 2017 in *Family Medicine & Primary Care Review*: Kurczewska-Michalak M, Kardas P. The knowledge of selected cancer prevention methods among Polish outpatients. *Fam Med Prim Care Rev* 2017; 19(3): 235–238, doi: <https://doi.org/10.5114/fmPCR.2017.69283>.

Objectives

The purpose of the study was to assess the knowledge of the role of vaccinations in the prevention of certain types of cancers. Secondly, the aim of the research was to determine which foodstuffs and chemicals may lead to the development of cancer according to respondents. Furthermore, we wanted to evaluate the knowledge of physical activity as a cancer prevention method. The last objective of the survey was to assess awareness of tobacco use as a cancer risk factor, as well as exposure to second-hand smoke at work.

Material and methods

This was an open study involving primary care patients and an Internet-based survey. The study was based on an original questionnaire designed for this purpose and was distributed among primary care patients in the urban settings of Lodz, Poland, and was made available on the dedicated website over the Internet for the respondents from Poland. Data was collected in the period from September 2016 to April 2017. Patients at least 18 years of age who voluntarily agreed to participate in the study were eligible for the research. The questionnaire consisted of 40 questions, of which 10 were open questions, and the remaining were multiple choice questions. The possible answers for multiple choice questions were: 'yes', 'no' and 'hard to say'. The open questions were listed under groups of frequency. Quantitative data was analysed using SPSS, employing descriptive and non-parametric statistics. The Shapiro–Wilk test was employed to assess normality of distribution. Data was analysed using the chi² test and Mann–Withney test, wherever applicable. A $p < 0.05$ was considered significant. Missing data was excluded from statistical analysis.

Ethical approval and consent were not required for the study.

Results

Patients' characteristics are provided in Table 1. 612 respondents took part in the study. The detailed characteristics of the participants were described in the first part of this research, which was published in *Family Medicine & Primary Care Review* in 2017. Missing data was not considered in the statistics.

Some food products were regarded as potentially carcinogenic by 73.2% of all respondents ($n = 559$), while chemicals were regarded as potentially carcinogenic by 88.9% of the population. People with university education more frequently gave a positive answer to question concerning the carcinogenicity of food products (76% vs 64.8%, $p < 0.05$) and chemicals (91.4% vs 82.1%, $p < 0.05$). Among the chemicals which may cause the cancer, the following were listed: food additives (19.9%), chemicals in tobacco products (14.4%), benzene (14%), asbestos (10.8%), heavy metals (9.6%) and others chemicals (20.1%). Food additives were listed more often by female respondents (14.9% vs 23%; $p < 0.05$), while men pointed out benzene (18.6% vs 11.2%; $p < 0.05$).

Table 1. Characteristics of the survey participants

Variable	n	percentage [%]
Gender		
male	215	35.1
female	348	56.9
missing data	49	8.0
Age		
18–24	21	3.4
25–49	310	50.7
50–69	202	33.0
missing data	79	12.9
Education		
primary	4	0.6
secondary	143	23.4
university	396	64.7
missing data	69	11.3
Smoking status		
smoker	119	19.4
non-smoker	423	69.1
missing data	70	11.5
Cancer family history		
yes	329	53.8
no	191	31.2
missing data	92	15.0
Vc Total	612	100.0

Any kind of physical activity may prevent cancer according to 58.6% of the population. There were slight differences between male and female opinions (57.1% vs 60.9%, $p > 0.05$). The older respondents more often believed that physical activity may be a cancer prevention method than those aged 18–24 ($p > 0.05$). With regard to level of education, the differences were close to statistical significance, and more people with a university degree (60.3% vs 51%) think that physical activity may play a preventive role ($p = 0.057$) (Table 2).

Some vaccinations against viruses that cause cancer play a preventive role in the opinion of 40.4% of respondents, and nearly one-third (31.2%) said it is hard to say. Women, more frequently than men, thought that immunisation can also prevent cancer (43.2% vs 35.8%; $p = 0.059$). Differences close to statistical significance ($p = 0.076$) in various age groups (33.3% vs 36.8% vs 48.5%) were also observed (Table 3).

Smoking cigarettes is a well-known cancer risk factor, which was admitted by 97.2% of the respondents. Smokers made up one-fifth (21.6%) of our population. Respondents said that smoking causes lung cancer (88.8%), cancer of the larynx (39.1%), oropharyngeal cancer (16.5%) and others. Second-hand smoke exposure in the workplace was reported by 18.3% of the respondents, more often by those with secondary education than those with a university degree (28.6% vs 14.7%, $p < 0.05$). Second-hand smoke exposure was strongly connected with age, and the older the person, the more often smoke exposure was reported (4.8% vs 16% vs 22%, $p < 0.05$).

Table 2. Physical activity as a cancer prevention method according to respondents (n = 612)

Can physical activity prevent cancer?	Gender (%)		p	Age (%)			p	Education* (%)		p
	F	M		18–24	25–49	50–69		Sec.	Univ.	
Yes	57.1	60.9	> 0.05	47.6	58.1	59.4	> 0.05	51.0	60.3	0.057
No	12.1	7.0		9.5	11.3	7.9		14.7	8.6	
Hard to say	30.8	32.1		42.9	30.6	32.7		34.3	31.1	

M – male, F – female, Sec. – secondary education, Univ. – university degree; * – due to the low number of respondents with primary education (n = 4), they were not used for these statistics. Statistical analysis: Shapiro–Wilk and chi² test. Missing data was not considered in the statistics.

Table 3. Vaccines as a cancer prevention method according to respondents (n = 612)

Do vaccines prevent cancer?	Gender (%)		p	Age (%)			p	Education* (%)	
	F	M		18–24	25–49	50–69		Sec.	Univ.
Yes	43.2	35.8	0.059	33.3	36.8	48.5	0.076	41.9	41.2
No	24.9	34.0		38.1	31.3	23.0		26.2	28.8
Hard to say	31.9	30.2		28.6	31.9	28.5		31.9	30.0

M – male, F – female, Sec. – secondary education, Univ. – university degree; * – due to the low number of respondents with primary education (n = 4), they were not used for these statistics. Statistical analysis: Shapiro–Wilk and chi² test. Missing data were not considered in the statistics.

Table 4. Second-hand smoke exposure in the workplace (n = 612)

Second-hand smoke exposure at work	Gender (%)		p	Age n (%)			p	Education* (%)		p
	F	M		18–24	25–49	50–69		Sec.	Univ.	
Yes	17.3	19.9	> 0.05	4.8	16.0	22.0	0.0039	28.6	14.7	0.0002
No	81.2	77.7		80.9	82.4	77.0		67.8	84.0	
Hard to say	1.5	2.4		14.3	1.6	1.0		3.6	1.3	

M – male, F – female, Sec. – secondary education, Univ. – university degree; * – due to the low number of respondents with primary education (n = 4), they were not used for these statistics. Statistical analysis: Shapiro–Wilk and chi² test. Missing data was not considered in the statistics.

Artificial UV light, such as sunbeds, were visited by almost two-thirds of all women (66.1%), usually once every two or three years (40%) or once a year (16.7%).

Discussion

There are several effective primary cancer prevention methods. Some of them, like reduced tobacco use, are well known in the population, and others are usually not directly linked with cancer protection, such as vaccinations, and some recommendations, e.g. regular physical activity, have poor adherence. Prevention and a patient's education are the major tasks of GPs in their everyday work. Vaccinations are one of the primary successes of medicine, but they are becoming a great challenge for all healthcare professionals nowadays.

In literature, there are only a few similar studies investigating a patient's knowledge of such cancer prevention methods. There are some mentioned below that focus on each method separately.

According to the results of our survey, some vaccinations against viruses may prevent cancer in the opinion of approximately 40% of respondents, and nearly one-third (31.2%) of them said it is hard to say. The oncogenic potential of viruses, such as HPV, HBV, hepatitis C virus (HCV), human herpesvirus 8 (HHV8) and Merkel, is well known, and an increased risk of cancer is expected in some individuals who experience these infections [18]. In literature, there are multiple studies evaluating the knowledge and acceptability of the HPV vaccine, which is new and, in many countries, not available for free. A Chinese study [19] provided the first insight into HPV awareness and attitudes towards the HPV vaccine among women. It showed that only 29% of the respondents had heard of HPV, and few knew that it is associated with cervical cancer. In a Polish survey, almost half of 450 parents of high school students who participated in the study (44.7%) had never heard of HPV [20]. Regarding parents' attitudes toward HPV, 92% stated that vaccines are effective in

disease prevention, and 43.1% were concerned about the possible side effects of vaccination.

It is well known that regular physical activity is recommended and necessary to prevent obesity, cardiovascular diseases and to maintain a good overall health condition in old age. Multiple research has also shown that physical activity can be regarded as one cancer prevention method in particular cases. Increased levels of leisure-time physical activity were associated with lower risks for 13 of the 26 cancers investigated in current international original research conducted on large cohorts of patients [21], extending our current evidence base beyond colon, breast and endometrial cancers [22]. Nearly 60% of our participants stated that physical activity may prevent cancer, but still almost one-third of respondents said it is hard to say. On the contrary, the vast majority (90%) of Irish respondents agreed that remaining physically active throughout life greatly reduces cancer risk [23].

Centres for Disease Control and Prevention analysed data from the 2015 National Health Interview Survey (NHIS) Occupational Health Supplement to assess the prevalence of self-reported workplace second-hand tobacco smoke (SHS) exposure. In 2015, 19.9% of non-smoking workers reported exposure to SHS at work during the 12 months preceding the interview, and 10.1% reported frequent exposure (twice a week or more) [24]. Similarly to this report, second-hand smoke exposure in the workplace was self-reported by 18.3% of the respondents in our research. According to main sanitary inspectorate data, second-hand smoke exposure in a workplace has declined recently and remains at a level of 8% [25]. Taking into consideration the risks and consequences that may arise from the high level of second-hand smoke exposure in a workplace, there is still a lot to do to make this as low as possible.

The major limitation of our study was a lack of representativeness of the study population (in fact, it used the convenience sample). Due to the fact that it was mainly an Internet-based survey, there is some missing data that cannot be considered in statistical analysis. What is more, the results of our study are

probably culture specific. However, good knowledge of cancer risk factors and proven prevention methods are demanded by the population. Not only GP's but all healthcare professionals still have a lot to do in this area.

Conclusions

In the face of rapid civilization development all over the world, increasing cancer incidences and the resultant mortality, the knowledge of certain cancer prevention methods and risk factors is necessary. Nearly one-third of the respondents in this study was not aware of the anti-cancer role of selected vaccinations. In times of the anti-vaccination movement, it is essential to educate patients and promote the use of all vaccines, even those not obligatory.

Awareness of potentially carcinogenic food products and chemicals was high among our respondents. Female respondents pointed out food additives, whereas all participants listed chemicals in tobacco products, benzene, asbestos, heavy metals and others.

Physical activity was regarded as an effective prevention method, but in a majority of cases, this not directly linked with cancer prophylaxis. To the contrary, tobacco smoking was a well-known cancer risk factor among the respondents. Despite this fact, second-hand smoke exposure in the workplace was reported by almost 20% of the respondents and still remains a great challenge for employers in Poland.

All these findings are of practical usefulness for public health campaigns and may inspire general practitioners to provide relevant education to their patients.

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