Oral cancer awareness among patients at 3 university hospitals in Poland and Germany: A survey research

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Abstract

Background. The epidemic of cancer (including oral cancer) is a growing public health and economic problem in the European societies. A high percentage of patients who come for the appropriate treatment are in the late stages of advancement, often with nodal and/or distant metastases. The literature on the public oral cancer awareness in Poland and Germany is limited.

Objectives. To investigate the levels of public awareness about the early symptoms and risk factors of oral cancer, and to analyze the findings in the context of the socioeconomic profiles of the subjects.

Materials and methods. The survey consisted of a 20-item questionnaire divided into 4 sections: socioeconomic and demographic factors, the awareness of oral cancer, symptoms of oral cancer, and its risk factors. It was distributed to 465 adult patients in Poland (Wrocław and Łódź) and Germany (Dresden).

Results. The response rate was 97.6%. Most of the respondents (65.4%) had heard of oral cancer. The sources of information were mainly the traditional mass media and the Internet, with only 23.8% of the respondents indicating doctors as a source of information about oral cancer. What is worrying, only about 1/5 of the participants in each of the 3 centers had an oral cancer examination last year. The awareness of oral cancer correlated positively with the age of the respondents and negatively with the size of the place of residence. Education level had no significant impact on declared knowledge.

Conclusions. The results of this survey do not only show unsatisfactory levels of patients' awareness of the risk factors and symptoms of oral cancer but also emphasize the need to improve the level of healthcare concerning this disease, including screening programs.

Key words: oncology, awareness, head and neck, oral cancer

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Background

The silent epidemic of cancer is a growing public health and economic problem in European societies, while oral cancer has been well recognized as part of this problem. As many as 377,713 people were diagnosed with oral and lip cancer in 2020 in the world, according to GLOBOCAN 2020.[1] Around 7300 German and more than 4200 Polish citizens were newly diagnosed with oral and lip cancer in 2020, with 2320 (Germany) and 2051 (Poland) people dying of these cancers over that period.[2,3] Oral and lip cancer are the 17th most common malignancy in Germany (1.2%), and the 15th most common one in Poland (2.1%). Most of the patients were diagnosed with oral cancer at the age of 50 or older and the 5-year survival rate was about 50–60% both for men and women, which is comparatively lower than rates for most digestive tract cancers, as oral cancer is usually diagnosed at its advanced stages.[4–6] A worryingly high percentage of patients who come for the appropriate treatment are in the late stages of advancement, often with nodal and/or distant metastases.[6] Such advanced cancers usually require aggressive surgical treatment that leads to aesthetic and functional defects of the face and the oral cavity, which significantly decreases patients' quality of life.[6–9] Unfortunately, sometimes, cancer advancement along with patients' general conditions make only palliative therapy possible.[6]

Therefore, the early diagnosis could further improve the survival rate.[10] It has been shown that both patients and healthcare professionals are responsible for delays in the implementation of the appropriate treatment.[6,11] Given the constant advances in medicine regarding the diagnosis and treatment of various diseases, including malignancies, the key question becomes what exactly causes the delayed diagnosis of cancer (which contributes to high mortality) and how it can be improved.

The literature on the public oral cancer awareness in Poland and Germany is limited. Recent studies showed that one of the reasons for advanced-stage diagnosis is the low level of public awareness about oral cancer, its risk factors and symptoms.[7,10,12–14]

Objectives

This study was designed to investigate the levels of public awareness about the early symptoms and risk factors of oral cancer, and to analyze the findings in the context of the socioeconomic profiles of the subjects.

Materials and methods

Questionnaire

A self-designed validated questionnaire was used. The questionnaire was a shortened version of the original one by Yellowitz et al.,[14] and it was translated into German and Polish in a standardized way. The survey comprised of a 20-item questionnaire divided into 4 sections: 1. Socioeconomic and demographic factors (5 items: age, gender, education level, family status, and place of residence); 2. The awareness of oral cancer (4 items); 3. The symptoms of oral cancer (5 items); 4. The risk factors of oral cancer (6 items).

Study population

The questionnaire was distributed to 465 selected adult patients at the Departments of Maxillofacial Surgery in Wrocław (Poland), Łódź (Poland) and Dresden (Germany) from January to October 2013, and in January 2021. The cities were chosen as the research sites due to numerous similarities: population, infrastructure, and comparable educational and economic profiles. Randomly selected adult patients already diagnosed with oral cancer who were receiving the treatment, along with the patients visiting the Departments for the first time with potentially cancerous lesions, were included in the study. The questionnaire was distributed in the waiting rooms of the Departments. Prospective respondents had been assured of their anonymity and the confidentiality of the survey.

Statistical analyses

The analyses were performed using the statistical package STATISTICA v. 13.3 (TIBCO Software Inc., Palo Alto, USA). Each categorical variable is presented as numbers and percentages. The comparisons were performed with the χ^2 test. The value of $p < 0.050$ was considered statistically significant. Due to the dichotomous nature of the dependent variables (answers to the questionnaire questions), a logistic regression analysis was performed. The independent (describing) variables were sociodemographic characteristics of the patients. Logistic regression coefficients were estimated using the maximum likelihood method. Dependent variables (explained, e.g., having knowledge) are dichotomous variables; therefore, to assess the probability of their occurrence depending on the level of independent variables, uni- and multivariate logistic regressions were used.

Ethics statement

The research was conducted in 3 cities (Wrocław, Łódź and Dresden). All data was collected, kept and analyzed in Wrocław (Maxillofacial Department of Wroclaw Medical Uniwersity). The study was officially approved by Wroclaw Medical University (Bioethics Committee of Wroclaw Medical University, approval No. KB 760/2012). The research was conducted in accordance with the Declaration of Helsinki of 1975, as revised in 2008.

Results

The response rate was 97.6% (454 out of 465 respondents completed the questionnaire). In 9 cases, the respondents wrote additional notes unrelated to the study, and some answers were omitted in 11 cases. Nonetheless, all of the questionnaires were taken into consideration. The reliability of the questionnaire was rated as acceptable (Cronbach's alpha 0.72).

The age of the participants ranged from 18 to 95 years, and the men to women ratio was 161:293. There were no statistically significant differences between the compared centers in the gender structure (p = 0.230). The majority of respondents had completed secondary education (55.9%). The detailed demographics of the study population are presented in Table 1.

Most of the respondents (65.4%) had heard of oral cancer, but the levels of self-declared awareness were significantly lower in the Polish population than in the German one (50% in Wrocław and 50% in Łódź compared to 100% in Dresden) (Fig. 1). The sources of information were mainly the traditional mass media (similar values in 3 centers) and the Internet. The knowledge about oral cancer was obtained less frequently from the Internet by patients in Dresden than patients in Wrocław (35.7% compared to 53.3%; p < 0.001) and Łódź (35.7% compared to 65.7%; p = 0.002). Only 23.8% of the respondents indicated doctors as a source of information about oral cancer. The majority of the respondents would consult with general practitioners and dentists, if concerned.

The information about neoplasms was less frequently reported by patients aged 19–39 than patients over the age of 65 (54.8% compared to 70.0%; p = 0.034), and in the age of 40–65 (54.8% compared to 78.7%; p < 0.001). However, the knowledge about oral cancer is more often obtained from the Internet by patients aged 19–39 than patients over the age of 65 (57.8% compared to 30.2%; p < 0.001), and in patients aged 40–65 (57.8% compared to 43.1%; p = 0.015). The older the patients, the less frequently they use the Internet to obtain the information about oral cancer. Using Internet for this purpose correlates positively with education (r = 0.159, df = 322, p = 0.04). People with higher education more often gathered the knowledge from the Internet.

About 20% of the participants in each of the 3 centers had an oral cancer examination last year (Table 2, Fig. 2).

The perception of most signs and symptoms in the studied groups was similar (Table 3). A lump in the oral cavity, on the tongue or lips would worry less often patients in Dresden than patients in Wrocław (44.3% compared to 68.0%; p < 0.001) and Łódź (44.3% compared to 61.4%; p = 0.020).

The features most frequently identified as oral cancer risk factors were: tobacco smoking (84.4%), alcohol (69.8%) and prior viral infection (for example human papillomavirus (HPV)) (39.2%). According to the inhabitants of Wrocław,

Table 1. Basic statistics of demographic data of the studied patients and the results of comparisons (χ^2 test)

Demographic data	Wrocław n = 244	Łódź n = 70	Dresden n = 140	p-value
	n	n	n	
Age				
19–39 years	153	30	47	$\chi^2 = 42.6$ df = 4 **<0.001**
40–65 years	56	33	75	
≥66 years	35	7	18	
Sex				
Women	163	39	91	$\chi^2=2.94$ df = 2 0.230
Men	81	31	49	
Education level				
Primary	20	9	38	$\chi^2 = 32.2$ df = 4 **<0.001**
Secondary	159	36	59	
Tertiary	65	25	43	
Family status				
Single	143	24	56	$\chi^2 = 38.0$ df = 6 **<0.001**
Married	77	34	79	
Divorced	14	5	5	
Widow(-er)	10	7	0	
Place of residence				
Village	60	10	75	$\chi^2 = 110$ df = 4 **<0.001**
County town	76	10	59	
Voivodeship city	108	50	6	

df – degrees of freedom. Values in bold are statistically significant.

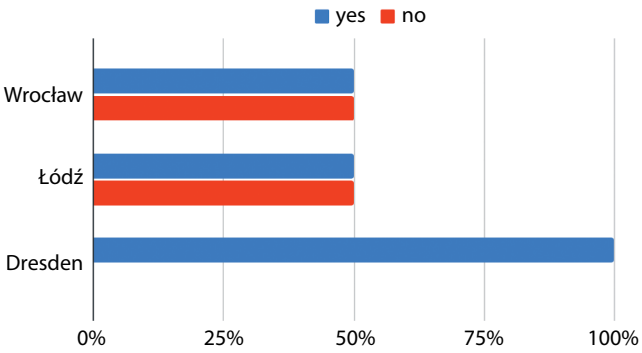

Fig. 1. Insufficient knowledge about cancer among the general population

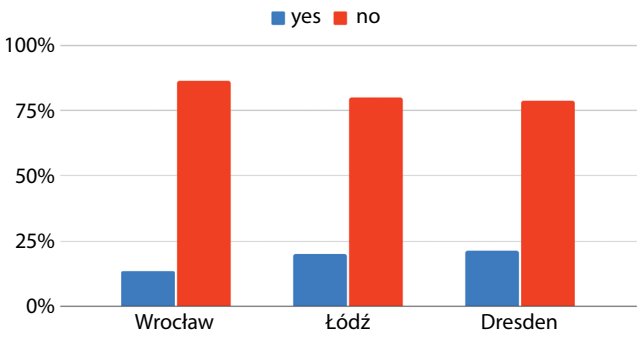

Fig. 2. Low percentage of oral cavity cancer routine check-up

Table 2. The number (n) and proportion (%) of patients in respective subgroups regarding responses to the questionnaire on knowledge about oral cancer and the results of comparisons

Question	Wrocław n = 244		Łódź n = 70		Dresden n = 140		χ^2	p-value
	n	%	n	%	n	%		
1. Do you have information about cancers of the mouth, tongue or lip?								
Yes	122	50.0	35	50.0	140	100.0	107	**<0.001**
No	122	50.0	35	50.0	0	0.0		
2. What sources do you have the information from?								
a. TV, radio, newspapers	61	40.7	19	54.3	78	55.7	7.07	**0.029**
b. Internet	80	53.3	23	65.7	50	35.7	14.5	**<0.001**
c. Doctor	47	31.3	16	45.7	45	32.1	2.78	0.250
d. Friends	32	21.3	3	8.6	54	38.6	17.8	**<0.001**
3. If something disturbed you in your mouth, which doctor would you go to?								
a. General practitioner	120	49.6	25	37.3	69	49.3	3.38	0.184
b. Dentist	112	46.3	46	68.7	79	56.4	11.6	**0.003**
c. ENT	56	23.1	10	14.9	28	20.0	2.25	0.325
d. Other	9	3.7	4	6.0	1	0.7	4.77	0.092
4. Have you had an oral cavity cancer check-up in the last 12 months?								
No	211	86.5	56	80.0	110	78.6	4.49	0.106
Yes	33	13.5	14	20.0	30	21.4	–	

ENT – ear, nose, and throat doctor. For all χ^2 tests, the number of degrees of freedom is 2. Values in bold are statistically significant.

Table 3. Number (n) and proportion (%) of patients in subgroups who differed by study site and questionnaire responses to disturbing symptoms and comparison results

Question	Wrocław n = 244		Łódź n = 70		Dresden n = 140		χ^2	p-value
	n	%	n	%	n	%		
5. Which of the symptoms in the mouth would concern you?								
a. White or red plaques in the mouth, on the tongue or on lips	109	44.7	32	45.7	68	48.6	0.55	0.760
b. Non-healing wounds in the mouth, on the tongue or on lips	148	60.7	48	68.6	80	57.1	2.56	0.278
c. Difficulty chewing or swallowing	112	45.9	37	52.9	58	41.4	2.48	0.290
d. A lump in the mouth, on the tongue or on lips	166	68.0	43	61.4	62	44.3	21.0	**<0.001**
e. Oral cavity pain	127	52.0	41	58.6	60	42.9	5.32	0.070
f. Numbness of the tongue or other parts of the mouth	130	53.3	30	42.9	62	44.3	4.09	0.130

For all χ^2 tests, the number of degrees of freedom is 2. Values in bold are statistically significant.

alcohol consumption may have an impact on the development of oral cancer less often, as compared with the inhabitants of Dresden (56.6% compared to 88.6%; $p < 0.001$). Age influences cancer less often, according to the inhabitants of Wrocław, when compared with the inhabitants of Dresden (28.7% compared to 44.3%; $p = 0.002$) and Łódź (28.7% compared to 41.4%; $p = 0.044$). The infection with viruses, e.g., HPV, may have an influence on the development of cancer in the oral cavity more often, according to the patients in Wrocław, compared with the patients in Łódź and Dresden (45.5% compared to 25.7%; $p = 0.003$ and 35.0%; $p = 0.045$, respectively; Table 4). Patients with higher education more often believed that the analyzed factors could affect the development of cancer in the oral cavity than patients with primary and secondary education. Statistically significant differences were observed for all factors, except for alcohol consumption, diet and nutrition.

The estimated values of the logistic regression coefficients of the analyzed features with the survey responses are presented in supplementary material (https://doi.org/10.5281/zenodo.6078355).

The knowledge of oral cancer positively correlated ($r = 0.200$, degrees of freedom (df) = 453, $p < 0.001$) with the patients' age (the older the patient, the bigger the knowledge) and negatively ($r = 0.137$, $p = 0.004$) with the place of residence (the more inhabitants of a given place, the less the knowledge).

Interestingly, the education level has no significant impact on declared knowledge ($r = 0.015$, df = 453, $p = 0.938$). On the other hand, people with higher education name

Table 4. Number (n) and proportion (%) of patients in subgroups that differed by study site and survey responses to the causes of cancer and comparison results

Question	Wrocław n = 244		Łódź n = 70		Dresden n = 140		χ^2	p-value
	n	%	n	%	n	%		
6. Which of the following factors, in your opinion, may affect the development of cancer in the oral cavity?								
a. Tobacco use	204	83.6	55	78.6	124	88.6	3.76	0.152
b. Alcohol consumption	138	56.6	55	78.6	124	88.6	46.3	**<0.001**
c. Age	70	28.7	29	41.4	62	44.3	10.7	**0.005**
d. Viral infection, i.e., HPV	111	45.5	18	25.7	49	35.0	10.4	**0.005**
e. Overexposure to sunlight	88	36.1	33	47.1	69	49.3	7.34	**0.025**
f. Nutrition, diet	58	23.8	17	24.3	28	20.0	0.84	0.657

HPV – human papillomavirus. For all χ^2 tests, the number of degrees of freedom is 2. Values in bold are statistically significant.

the symptoms and risk factors of oral cancer correctly more often than patients with primary and secondary education only.

Acquiring the information about oral cancer from the Internet correlates negatively with age (r = –0.580), and positively with the size of the place of residence (r = 0.465) and the level of education (r = 0.607).

More people aged over 65 than younger ones attended oral cancer examinations last year. The very low interest rate (less than 20%) is alarming.

It is important that the explanatory ability of the models is poor, as reflected by a very low Nagelkerke's R2. A weak but statistically significant correlation was observed between the independent (explanatory) variables, i.e., education, age and place of residence. The dependent variable (described) values of the odds ratios (ORs) and their 95% confidence intervals (95% CIs) were estimated using multivariate logistic regression.

Discussion

The study was conducted to assess the awareness of the risk factors and early signs of oral cancer among patients at 3 maxillofacial surgery departments in Poland and Germany, and analyze the findings in the context of the socioeconomic profile of the subjects. To the authors' knowledge, this is the first German-Polish study of this type. Relatively little attention has been paid to the level of public awareness of this type of cancer, taking into account both patients and healthcare providers.

Over 65% of the respondents in our study had ever heard about oral cancer, which is comparable to the studies from different countries.[15–17] The sources of the information were, similarly to the other studies, mainly television, radio and newspapers, but the role of the Internet is gaining significance.[18–20] The fact that less than a quarter of respondents mentioned doctors as a source of information about oral cancer is alarming. The other studies, however, showed even lower rates.[19,20] Also, the study concluded that less than 20% of the participants had an oral cancer examination last year, which may be related to the low levels of awareness.[21,22]

It is important to point out that non-medical sources of information increase the level of basic knowledge about cancer and contribute to raising awareness. On the other hand, however, they may turn out to be insufficient for patients without medical education and knowledge.

Grant et al. researched young oral cancer patients in the aspect of symptom recognition and delays in seeking professional help. Actually, most of the participants had some awareness of this disease before noticing the initial symptoms (mainly from the television). However, what is interesting, in some cases, prior knowledge was neither instrumental for patients to suspect they may have oral malignancy nor did it prompt them to visit a doctor. The patients, ignoring the seriousness of the symptoms, undertook self-treatment. A very important conclusion of the authors was that the relationship between having awareness and knowing the symptoms might be distrubing for the patients and persuade them to visit a healthcare professional.[18]

Therefore, it turns out that healthcare professionals play an essential role in terms of increasing the awareness and early detection of the disease. In our research, when asked "If something worrisome would appear in your oral cavity, where would you go for a consultation?", the patients indicated not only a dentist but also a general practitioner (GP), otolaryngologist and other healthcare professionals.

People, depending on the disturbing symptoms they notice within the oral cavity, seek advice from doctors of various specializations.[6] It means that oncological vigilance against oral cancer is necessary not only among dentists but also among all doctors.

In terms of the main risk factors of oral cancer, the vast majority (84.3%) of the respondents indicated tobacco, similarly to data from other studies.[19,20,23] Alcohol consumption was recognized as a risk factor by less than 70% of subjects. Some researchers showed even lower results: 55% for tobacco[24] and 33.8% for alcohol.[23] Since

the synergistic effect of both of these risk factors is little known to the public, it is very important to inform more people about its role in the oral cancer pathogenesis. Also, a relatively high percentage (39.2%) of the respondents described infections as an oral cancer risk factor, compared to lower such rates (about 25%) in other studies.[23] A significantly lower percentage of patients indicated diet and malnutrition, as well as ultraviolet (UV) and sunlight exposure as risk factors. Therefore, intending to persuade the population to eliminate modifiable risk factors for cancer development, it is crucial to make people aware of all the factors that predispose them to the disease.

The study showed few associations between the level of awareness of oral cancer and socioeconomic factors. The self-declared awareness of oral cancer correlated positively with age and no significant differences were found in terms of gender. This is consistent with some studies,[17] while other ones showed deficits in older patients and male respondents.[23] An important observation was that the awareness of risk factors and early signs of the disease correlates positively with the level of education, as shown in previous studies.[20,23]

The survey was designed to assess oral cancer awareness among patients seeking advice in maxillofacial surgery departments in 3 selected cities. However, its results do not only show unsatisfactory levels of patients' awareness of the risk factors and symptoms of oral cancer, but also emphasize the need to improve the level of healthcare concerning this disease. It has been shown that to a large extent, people's knowledge comes from the sources of mass media, which positively indicates the advisability of running pro-health campaigns. On the other hand, the patients' knowledge is basic and not sufficient to significantly reduce the causes that delay the implementation of the appropriate treatment. Also, it has been shown that oral cancer screening is not commonly performed. Relatively often, the first (and often early) symptom of malignancy is detected accidentally or during a check-up for another reason; therefore, the improvement in the scope of more frequent screening tests is crucial.[6] This also applies to medical students. Other authors pointed out that the undergraduate students lacked knowledge on the identification and detection of oral cancer, and they were not examining patients' oral mucosae routinely. Also, many students had insufficient information on risk factors and associated oral cancer lesions.[25,26]

It is worth noting that the very low values of Nagelkerke's R2 statistics prove that the ability to explain logistic models is poor.

Limitations

The limitation of our results is a questionnaire assessing patient awareness and taking into account the suggested answers. Patients, having a choice of the proposed variants (possibility of multiple choice), even without any knowledge, marked random answers. Open questions, without the option of selecting particular variants, would be more credible. It would be advisable to do such research and compare it with the results presented in this study.

Conclusion

This study emphasizes the need for public oral cancer preventive programs and public awareness campaigns. Educational efforts of healthcare professionals (especially general practitioners and dentists) should be intensified too. Therefore, it is advisable to conduct the following research among groups of doctors and medical students, and find effective ideas to increase the level of awareness. Similarly, it is important to conduct such research on the premalignant disorders, in the aspect of early prevention.

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