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## THE INCIDENCE OF BENIGN AND MALIGNANT TUMORS AMONG ADULTS WITH LONG-TERM PHYSICAL DISABILITIES

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**Ключові слова:** пухлинні утворення, захворюваність, люди з довгостроковими вадами фізичного розвитку

**Abstract. The incidence of benign and malignant tumors among adults with long-term physical disabilities. S. Alekova Todorova.** People with long-term physical disabilities also suffer from different types and nature of tumors as well as general population. Unfortunately, the information about the frequency of these diseases among the specified contingent is very deficient. The objectives of the study were to determine the incidence of benign and malignant neoplasia among the adults and elderly with physical disabilities and to indicate the risk factors for the appearance and development of tumors in this population. In this descriptive survey, 186 people, living in the largest home on the Balkan Peninsula for adults and elderly people with long-term physical disabilities were studied in 2021. 82.79% of the residents were over 51 years of age and almost all of them are inhabited by two residents. 42.47% of the respondents were men and 57.52% – women. Data on the demographic characteristics of the respondents, including their personal lifestyle and self-reported diagnosis of presence and/or history of a tumor formation, were collected through a semi-structured interview. The verification of the collected information about the incidence of benign and malignant lesions among adults with physical disabilities was carried out by means of the application of the second research method – content analysis based on the medical records. For processing and analysis of the collected data, it was used statistical software – IBM SPSS Statistics V21.0. The results showed a significantly high rate in the prevalence of tumor formations in the sample – 24.19%. The pre-cancerous formations have the highest incidence among residents – 42.22% with the most common variant – chronic form of cholecystitis combined with cholelithiasis (37.77%). Prostatic hyperplasia and uterine leiomyoma are the leading benign lesions in male residents – 11.11%, in female respondents – 11.11% respectively. The predominant form of cancer is breast carcinoma – 8.88%. The research found a high prevalence of tumor formations among adult patients with long-term physical disabilities. The harmful impact of a number of behavioral habits and health determinants significantly contributes to this negative tendency.

**Реферат. Захворюваність на доброякісні та злоякісні пухлини серед дорослих з довгостроковими фізичними вадами. С. Алекова Тодорова.** Люди з довгостроковими фізичними вадами також страждають від різних типів і характеру пухлин, як і загальна популяція. На жаль, інформація про частоту цих захворювань серед зазначеного контингенту є дуже обмеженою. Завданнями дослідження було визначення захворюваності на доброякісні та злоякісні новоутворення серед дорослих і людей похилого віку з фізичними вадами та визначення факторів ризику появи та розвитку пухлин у цій популяції. У цьому описовому дослідженні у 2021 році було досліджено 186 осіб, які проживають у найбільшому на Балканському півострові будинку для дорослих і людей похилого віку з довготривалими фізичними вадами. 82,79% мешканців були віком понад 51 рік і майже всі з них проживали по два мешканці. 42,47% респондентів становили чоловіки та 57,52% – жінки. Дані про демографічні характеристики респондентів, включаючи їхній особистий спосіб життя та самооцінку наявності пухлинного утворення та/або історію хвороби, були зібрані шляхом напівструктурованого інтерв'ю. Перевірку зібраної інформації щодо захворюваності на доброякісні та злоякісні утворення серед дорослих з обмеженими фізичними можливостями проводили за допомогою другого методу дослідження – контент-аналізу на основі медичної документації. Для оброблення та аналізу зібраних даних використовувалося статистичне програмне забезпечення – IBM SPSS Statistics V21.0. Результати показали достовірно високий показник поширеності пухлинних утворень у вибірці – 24,19%. Найбільшу частоту серед мешканців мають передракові утворення – 42,22% з найбільш поширеним варіантом – хронічна форма холециститу в поєднанні з жовчнокам'яною хворобою (37,77%). Гіперплазія передміхурової залози та лейоміома матки займають провідні позиції серед доброякісних новоутворень у чоловіків – 11,11%, відповідно в жінок – 11,11%. Переважною формою раку є карцинома молочної залози – 8,88%. Дослідження виявило високу поширеність пухлинних утворень серед дорослих пацієнтів з довгостроковими фізичними вадами. Шкідливий вплив ряду поведінкових звичок і детермінант здоров'я істотно сприяє цій негативній тенденції.

Disability affects many people and often turns out to be a life-changing event. People with disabilities are not a homogeneous group. They have different types and levels of damage. They come from all demographic and socio-economic groups and interact with every aspect of life, in many areas of social and health policy [1]. Unfortunately, adults with disabilities have higher rates of chronic disease than adults without disabilities [2]. According to data of Centers for Disease Control and Prevention, individuals with disabilities are at increased risk for certain cancers and are less likely to receive the recommended cancer screenings as opposed to non-disabled people [3]. To date there are no Bulgarian publications to present verified information on the prevalence of neoplasms

among patients with acquired and congenital long-term physical disabilities. In addition, the number of such studies worldwide is significantly small. Fowler H. and co-authors have noted that it is common for people who are diagnosed with cancer to have other comorbidities, such as diabetes, arthritis, cardiovascular disease, asthma, and mental illness [4]. Furthermore, in most countries, increased incidence of malignant tumors is mainly driven by population aging [5]. The aging, combined with elevated exposure to risk factors and determinants, leads to a strong increase in the absolute numbers of cases of the most common cancer sites [6]. People with long-term physical disabilities have higher rates of some modifiable health risk factors and behavior, such as

poor diet, tobacco smoking and physical inactivity than people without disability [1]. A number of scientific studies highlight parallels between changes in the prevalence of smoking, dietary habits and reproductive factors in the past and cancer incidence today and confirm associations known for years [6, 7, 8]. Many carcinogenic infections are also potentially modifiable risk factors and can provoke the onset of some of the most common cancers in the world [9]. Unlike carcinomas and precancerous lesions, for most benign tumors the cause for their appearance is unknown. These non-aggressive tumor lesions also may have a high prevalence among the human population, including among disabled people. That's why early diagnosis and treatment of tumors in adults with physical disabilities are also essential to enable them to live with the highest quality of life within the limitations related to their congenital or acquired impairment.

The objectives of the study were to determine the incidence of benign and malignant lesions among the adults and elderly with physical disabilities and to indicate the risk factors for the appearance and development of tumors in this population.

#### MATERIALS AND METHODS OF RESEARCH

It was used two methods – descriptive cross-sectional analysis and content analysis.

Main criteria for inclusion of individuals in the study were:

- persons over 18 years
- adults and elderly people with physical disabilities, who must be accommodated in a social home
- presence of congenital or acquired physical disabilities
- presence of diagnosed and proven tumor formation

Main criteria for exclusion of persons in the survey were:

- individuals under 18 years
- persons who are not accommodated in the social home
- lack of congenital or acquired physical disabilities
- lack of tumor formation

Study area:

The time interval of conducting the survey was March-June 2021. The location of the research was Bulgarian social home for adults and elderly people with physical disabilities, which is situated in the northern industrial zone of Stara Zagora. It is a purpose-built social care home for persons with congenital and acquired physical disabilities, originally opened in 1976. The institution offers short-term and long-term accommodation for adults over the age of 18 with physical disabilities and a loss of working capacity of more than 70%. Accommodation is carried out by the Social Assistance Directorate. This is the largest social home of this kind on the Balkan

Peninsula. With an official capacity of 211 beds, at the time of the visit, the establishment was accommodating 186 adult residents with long term physical disabilities – 79 (42.47%) men and 107 (57.52%) women.

154 (82.79%) of the respondents were over 51 years of age and 47 (25.26%) of them were over 71 years. All bedrooms had en-suite facilities and almost all of them are inhabited by two residents. The team of specialists provides 24-hour full medical, household and social services to the residents with severe physical disabilities. At the home visited, individual needs assessment and individual support plans were drawn for every resident by multi-disciplinary teams.

Sample size:

The sample includes 186 persons with long-term physical disabilities caused by pre-existing haemorrhagic or ischaemic cerebral infarction, fracture of bones and traumas, congenital deformations and anomalies, permanent movement disorders that appear in early childhood and others.

Sampling methods:

Descriptive analysis – the semi-structured interview.

It was used direct individual survey, which involved questions about demographic profile of respondents, their unhealthy habits and self-reported explanation of the presence of neoplasms.

Content analysis – collection and analysis of the content of available medical documents.

To compare, corroborate and verify the information shared by the recipients, all available medical data were reviewed and analyzed. In particular a personal health record, medical documents presenting consultations with specialists, prescribed medication therapies and epicrises from performed operative interventions, individual plans for health and social care.

Data analysis technique:

For processing and analysis of the collected data, it was used statistical software – IBM SPSS Statistics V21.0 (No. 213045). Descriptive analysis was applied to summarize the specifics of the sample and key variables, and correlation analysis - to establish the relationship between the studied indicators. Frequencies and proportions were used to describe categorical variables. Continuous variables were examined by means of measures of central tendency and dispersion (mean, median, standard deviation). The associations between categorical variables were assessed by chi-square tests. P-values less than 0.05 were considered statistically significant.

Ethical issues (including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the author. The interviewed adults and elderly with physical disabilities were treated according to the Helsinki

Declaration of biomedical ethics. Informed consent was obtained from each interviewed respondent after proper orientation regarding the goals of the survey. The study was approved by the Stara Zagora Municipality's ethics commission and Public health department council staff (decision from the meeting of 11.01.2021).

#### Study limitations

The limitations of the study that should be mentioned are as follows:

- deficiency of previous Bulgarian verified studies on the subject to serve as a comparative framework when analyzing the incidence of tumor formations in the target group.

- a problem with self-reported bias in data collection through the application of semi-structured interview.

- the small size of the sample. This also determines the need to study a population with a larger number of participants in the future that would be considered representative of a group of people to whom the results will be generalized.

#### RESULTS AND DISCUSSION

The results showed a prevalence rate of neoplasms in the sample of 24.19%. Consequently, some form of neoplasms was identified and clinically proven in one quarter of the respondents in the sample. 37.77% (17) of adults with long-term disabilities included in the sample suffer from an established chronic form of cholecystitis combined with cholelithiasis which is illustrated in Table 1.

Table 1

Selected Demographics of Focus Group patients with physical disabilities, n (%)	
<b>Gender</b>	
Male	79 (42.47%)
Female	107 (57.52%)
<b>Age</b>	
<50 years	32 (17.20%)
51-60 years	61 (32.79%)
61-70 years	46 (24.73%)
>71 years	47 (25.26%)
<b>Prevalence of neoplasms among patients with physical disabilities, n (%)</b>	
Total number of neoplasms in the sample	45 (24.19%)
<b>Prevalence of benign neoplasms among patients with physical disabilities</b>	
Total number	15 (33.33%)
Male	6 (13.33%)
Female	9 (20%)
<b>Prevalence of premalignant neoplastic conditions among patients with physical disabilities</b>	
Total number	19 (42.22%)
Male	4 (8.88%)
Female	15 (33.33%)
<b>Prevalence of malignant neoplasms among patients with physical disabilities</b>	
Total number	11 (24.44%)
Male	2 (4.44%)
Female	9 (20%)

The leading gender affected by neoplasms is female. 20% of the women with long-term physical disabilities suffer from the benign form of the tumor.

Uterine leiomyoma accounts for 11.11% of all benign tumor lesions among female respondents which is visible in Table 2.

Table 2

**Prevalence of neoplasms among patients with physical disabilities, n (%)**

Prevalence of benign neoplasms among patients with physical disabilities	
Liver hemangioma	1 (2.22%)
Benign prostatic hyperplasia	5 (11.11%)
Uterine leiomyoma	5 (11.11%)
Fibroadenoma of breast	1 (2.22%)
Fibroma of the external ear	1 (2.22%)
Vocal cord polyp	1 (2.22%)
Pituitary adenoma	1 (2.22%)
Prevalence of premalignant neoplastic conditions among patients with physical disabilities	
Rectal polyp	1 (2.22%)
Chronic ulcerative hemorrhagic colitis	1 (2.22%)
*Chronic cholecystitis and cholelithiasis	17 (37.77%)
Prevalence of malignant neoplasms among patients with physical disabilities	
Prostatic adenocarcinoma	1 (2.22%)
Breast cancer	4 (8.88%)
Rectal cancer	1 (2.22%)
Cervical cancer	2 (4.44%)
Endometrial cancer	2 (4.44%)
Retroperitoneal mesenchymal tumor	1 (2.22%)

Notes. \* – chronic condition with a slightly increased risk of Gallbladder cancer. Controversial association with malignancy due to limited data.

The same percentage of women in the sample had a proven malignant formation (20.00%). The predominant form of cancer is breast carcinoma – 8.88%. In the men of the sample, benign tumor formations definitely prevail (13.33%). Benign prostatic hyperplasia is the most common variant among male residents. The results of the individual interview, which are summarized in Table 3, show that adults with long-term physical disabilities lead more sedentary lifestyle. 69.35% of residents are not physically active.

Nearly one-third of the sample participants are obese or overweight (34.94%). Overweight, obesity, immobilization caused are risk factors for developing multiple chronic health conditions, from which 66.66% of disabled people suffer, namely cardio-

vascular diseases, diabetes mellitus type II, osteoarthritis and musculoskeletal diseases, as well as cancer.

The presented research, which is based on a sample of respondents living in one of the largest European social homes for adults with physical disabilities, found the occurrence of neoplasms in the order of 24.19%. In 2020 the frequency of new cases of malignant neoplasms was 399.3 per 100,000 of the Bulgarian population with leading position of prostate cancer, colon cancer, lung cancer, breast cancer, cervix cancer and uterine cancer [10] Presented statistics include all population groups and there is a lack of detailed data on the incidence of neoplasia in vulnerable groups, especially people with congenital or acquired physical disabilities. There is considerable

evidence that disabled people experience suboptimal health compared to non-disabled people, regardless of the existing health and social care provided by state specialized institutions [11, 12]. According to Healthy People 2020, individuals with disabilities experience significant health disparities as opposed to those without disabilities [13]. Adults with disabilities are

three times more likely to develop chronic diseases like heart disease, diabetes, or cancer than patients without disabilities [14]. At the same time, a lower percentage of disabled people receive preventive measures and health care for chronic conditions and tumors compared to individuals without disabilities [15, 16].

Table 3

**Presence of some risk factors among patients with physical disabilities, n (%)**

Advanced and old age	89 (47.84%)
Overweight and obesity	65 (34.94%)
Physical inactivity	129 (69.35%)
Co- and polymorbidity	124 (66.66%)
Unhealthy dietary habits	87 (46.77%)
Active smoking and tobacco abuse	38 (20.43%)
Active alcohol consumption	31 (16.66%)

It is known that many factors can cause a gene mutation, resulting in benign or malignant tumor growth. These include benzene and other professional toxic chemicals exposure, environmental intoxications, alcohol and tobacco abuse, immune disorders and viral infections, excessive sunlight exposure, radiation, hormonal and metabolic changes, genetic anomalies and disorders, tissue injury and inflammation, eating unhealthy habits, obesity and reduced physical activity. Adults with long-term physical disabilities involved in the sample are exposed to a significant number of these risk factors, especially the manifestation of harmful habits. Research has found that disabled individuals can find it more difficult to eat healthy and control their weight [17, 18]. People with disabilities consistently report higher rates of obesity, smoking and lack of physical activity as noted by Krahn and co-authors [3]. Disability status also contributes to unhealthier behaviors and poorer health. Adults with disabilities have led more sedentary lifestyles and they are more prone to high body mass index [19]. Obesity is more prevalent among people with disabilities than for people without disabilities and it is an important risk factor for other health conditions, including tumors [2, 14].

The malignancy with the highest frequency among the respondents was the one with breast localization, which is known as obesity-related cancer. Breast cancer was the third most common incident cancer overall with an estimated 2.0 million incident cases in 2017 and the majority occurred in

women [5]. Because women with mobility limitations have difficulty maintaining normal weight, this can place them at increased risk. Factors to consider are a woman's personal or family history of breast or gynecologic malignancy. They include gene mutations, reproductive factors which influence endogenous estrogen exposure like early menarche, later menopause, nulliparity, later age at first full-term pregnancy, the use of oral contraceptives and menopausal hormone replacement therapy [20]. Modifiable risk factors such as excess weight and increased waist circumference, alcohol consumption, smoking, physical inactivity and the abstinence from breastfeeding should be the main focus of primary prevention interventions to reduce breast cancer burden [21]. Disabled women at particular risk of breast cancer should be advised to be screened earlier and should have clinical breast examinations and mammography on the same schedule recommended for all women their age. Endometrial cancer is another one of the obesity-linked cancers, which has a growing prevalence among women with physical disabilities from the sample (4.44%). It is the second most frequent gynaecological malignant tumor in the world and the first in continental Europe [22]. According to the data of some tautology disabled women are at increased risk for endometrial cancer, associating that they are more inclined than the general population to be overweight or obese [23]. Similarly, to breast cancer, for endometrial cancer varying reproductive and hormonal risk factors mostly explain the

increased frequency in Central and Eastern Europe [24]. The role of excess body fatness as a significant driver for this cancer, in addition to various reproductive risk factors, has also been confirmed [25]. Increasing hysterectomy rates can also affect the incidence of cervical cancer and endometrial cancer, which shows studies in USA [26]. The incidence of cervical cancer internationally is a typical example of inequalities in cancer with vast differences in burden by social-demographic index. Globally, 1 in 65 women developed cervical cancer during a lifetime. In every region on Earth, two subtypes, HPV16 and HPV18, are responsible for about 70% of cervical cancer cases. As a completely preventable cancer where cost-effective vaccination and screening approaches are available, cervical cancer has recently gained global attention through the World Health Organization's call for elimination [27]. Unfortunately, Bulgaria is still facing the largest burden due to lack of screening programs. Women with disabilities are as likely as women in the general population to have cervical cancer. This fact is confirmed by the established rate of manifestation of this malignant lesion among the female contingent included in the study (4.44%). Sometimes medical professionals, believing that this group of women are less sexually active, may inappropriately minimize the risk of cervical cancer and their need for recommended screening and advices to prevent sexually transmitted diseases involving human papilloma virus, herpes simplex virus, human immunodeficiency virus and chlamydia, increasing the risk [28].

The study found that premalignant conditions had the highest prevalence in the sample (42.22%). Gallbladder diseases, which also affect people with long-term physical disabilities, are one of the most frequent medical conditions requiring surgical intervention [29]. Chronic cholecystitis is a common form of gallbladder inflammation. Although chronic inflammation has been shown to be associated with an increased risk of cancer and it is considered a premalignant condition, there is still limited data on this [30]. In many studies, chronic cholecystitis has been related to cholelithiasis (85-95%). This result confirmed that chronic inflammation of the gallbladder occurs most often in the setting of biliary concretions [31]. These two health problems were dominant pre-malignant formation in the sample (37.77%). Known risk factors for gallbladder stones, which lead to the subsequent inflammation and changes in the wall of the gallbladder include advanced age, female gender, rapid weight loss and gain weight, physical inactivity, dietary habits, obesity, multiparity, family history, application of oral contraceptives and hormonal therapy [32]. A large part of

the listed personal health determinants has been found in people with physical disabilities suffering from a chronic form of cholecystitis and cholelithiasis. It has been proven that age greater than 60 years, chronic presence of large gallstones and gallbladder wall calcification are some of the leading causes of malignant degeneration. Nevertheless, gallbladder malignancy is an unusual and extremely rare pathology in a large part of European population [33]

Leiomyoma and prostate enlargement were the leading non-neoplastic diseases in the studied sample. Leiomyomas, also known as fibroids, are the most common benign gynecological tumor in premenopausal women [34]. The prevalence of fibroids varies from 4.5% to 68.6% among countries, depending on study population and its racial/ ethnic demographics, type of investigation and diagnostic methodology [35]. They are also the predominant non-malignant tumor formation among the women in the sample (11.11%). Leiomyomas are of monoclonal origin which arises from the smooth muscle of the uterus and with a well-established high sensitivity to the effects of steroid hormones [36]. Several risk factors have been identified, ranging from genetic predisposition to variable lifestyle behaviors such as nutrition, smoking, use of contraceptives, vitamin D deficiency [37]. Dyslipidemia, obesity, arterial hypertension, presence of other hormone-dependent tumors as ovarian cancer and breast cancer also increase the risk of developing leiomyoma [34, 35, 36, 37, 38]. Of the non-cancerous lesions among men in the sample, the commonest was benign prostatic hyperplasia (11.11%). Prostate enlargement is the most frequent prostate disease in middle-aged and elderly men worldwide [39]. It is defined as an increased prostate volume, largely due to the cellular proliferation occurring in the transition zone, namely the portion of the prostatic tissue that surrounds the urethra, which leads to bladder outlet obstruction [40]. The deterioration of the lower urinary tract is known as a typical combination of symptoms of impaired urine voiding and/or storage [41]. The clinical manifestation of benign prostatic hyperplasia reduces the patient's quality of life [42], especially among male with long-term physical disabilities, in which the influence of risk factors provokes an earlier onset of the disease with a pronounced clinical picture. The process of aging and hormonal changes, genetic predisposition, prostatic inflammation, reduced physical activity, obesity and elevated body weight, the metabolic syndrome, diabetes mellitus and disruptions in glucose homeostasis may substantially impact the risk of benign prostatic hyperplasia and lower urinary tract symptoms in men [39, 40, 41, 42, 43], [40], [41], [42], [43]. The lack of or limited

opportunities for self-care in disabled people create additional difficulties and challenges in managing this health problem.

### CONCLUSION

1. The research found a high prevalence of tumor formations among adult patients with long-term physical disabilities. The presence of congenital or acquired disability creates significant preconditions for the harmful and combined impact of multiple potential risk factors, leading to the development of one or another form of tumor formation.

2. The studied contingent of institutionalized individuals has substantial higher levels of vulnerability to common and suspected health determinants for benign and malignant lesions such as advancing age, limitations in body functions and physical inactivity, overweight and obesity, cigarette smoking, alcohol consumption, inadequate and unbalanced diet, chronic inflammation and additional non-communicable diseases.

3. Despite even serious and visible disabilities, these persons are trying to have a normal life span and they have the same needs for health promotion, early screening and adequate medical services for tumors as all people. The existence of a disability should not be used as a reason to delay or ignore recommended

screening. Rather, the presence of a disability may increase the necessity of earlier and appropriate screening and timely diagnosis. This is of particular importance for institutionalized adults, considering the accompanying specifics such as frailty, restricted endurance and poor physical functioning.

4. Today, medical and rehabilitation advancements may be contributing to longer life expectancies for disabled people. It requires the commitment and partnership of a wide range of health and social institutions to improve the understanding of the manifestation of tumor formations in the context of long-term physical disabilities and to increase the vigilance in screening and diagnosis in this population.

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