Microreviews in Cell and Molecular Biology
An undergraduate science journal
2023

The Effects of Adjustable Risk Factors and How it Plays a Role in the Contribution of Cancer

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Key Words: Cancer, modifiable risk factors, high risk, lifestyle, gene, awareness, mortality, survival rates, treatment, health

Abstract

The goal for these articles is to analyze how smoking cigarettes, using a tanning bed, and poor diet can indeed lead to cancer. These factors are modifiable, in which an individual can practice prevention of obtaining cancer by stopping this kind of lifestyle. These studies dig deeper to understand exactly how these components can cause cancer and to exert comprehension to the world around us. Tests that were conducted in each article to see exactly how long one needs to smoke, how often one needs to use a tanning bed, and what is considered having a poor diet, etc. to receive a cancer gene. This brings awareness to factors that people choose to do and how they choose to live, and their likeness of getting the cancer gene.

Introduction

Many individuals around the world battle with the deadly disease of cancer. Cancer can be developed in a multitude of ways, including one's everyday style of living. A person can unintentionally make themselves a high risk of developing this damaging illness by acting in habits that one has been doing every day for several years. Modifiable risk factors that stimulate the delivery of cancer include smoking tobacco, utilizing tanning beds, and obesity. These factors are modified because a person has the ability to change these habits. It is critical to understand why people put themselves at risk and what are the outcomes of their choices. Also analyze the studies of many cases involving each component and what kind of cancer it will possibly induce. In these studies, it is important to consider other attributes with this particular lifestyle and how that will influence if an individual ever develops cancer in their lifetime or not.

Recent Progress

The article **"**Tobacco smoking and alcohol drinking at diagnosis of head and neck cancer and all-cause mortality: Results from head and neck 5000, a prospective observational cohort of people with head and neck cancer," researched by Rhona A Beynon., et al. evaluates how individuals that smoke tobacco cigarettes and consume large amounts of alcohol over a period can ultimately lead to head and neck cancers. Based on this study a test was conducted where 1,393 people were observed for a median of 3.5 years (Beynon, Rhona A., et al., 2018). Smoking tobacco has the possibility to produce head and neck cancers like lung cancer, lip and oral cavity cancer, laryngeal cancer, a variety of throat cancers, etc. These types of cancers originate by forming tumors from the surface of mucosal epithelium and begin to divide and spread within the body. Over time it was calculated that oral cavity cancer, n=403; oropharyngeal cancer, n=660; laryngeal cancer, n=330 was reported in this study (Beynon, Rhona A., et al., 2018). These cancers are very difficult to treat and will commonly result in death if it is not detected early enough. The effects of smoking vary with every individual and the likelihood of triggering a cancer gene depends on other considerations. This includes a person's age, ethnicity, gender, stage, comorbidity, body mass index, HPV status, ability to receive treatment, education, income, marital status, and the regularity of smoking use (Beynon, Rhona A., et al., 2018).

According to this article, head and neck cancers are characterized as the sixth leading cause of cancer nationwide (Beynon, Rhona A., et al., 2018). Oropharyngeal cancers, tonsil and tongue based, have been declared the largest increase of any head and neck cancers by double compared to past years. And it is true that lifestyle factors play a substantial role in the cause of these cancers. Survival rates in people with HPV- positive oropharyngeal tumors are higher than those that illustrate HPV- negative counterparts. Enhanced therapeutic responses are responsible for why this is the case. It is also recorded that people with HPV- positive also manage to have discrete risk factor profiles, involving greater socioeconomic status and a decrease in comorbidity, which is ideal for survival (Beynon, Rhona A., et al., 2018).

In this study participants were requested to fill out a questionnaire that included questions of interest on social and economic conditions, lifestyle choices, overall health, and their history of sexual activity. Ultimately, the research nurses accumulated a blood sample from all approving participants. The samples were then frozen at -80 degrees Celsius in the Avon Longitudinal Study of Parents and Children bio- sample repository (Beynon, Rhona A., et al., 2018). This released data on stage of diagnosis, tumor stage, treatment, and other clinical prognostic components. Clinical staging of the tumor was made from the American Head and Neck Society TNM staging of head and neck cancer.

The paramount findings of this study declared that the smoking status during this time of head and neck cancer diagnosis is correlated with poor survival. It was revealed that current smokers had around a 70% increase in all- cause mortality exposure compared to individuals who have never smoked. It was also found that former smokers were above 40% more acceptable to pass away during follow-up (Beynon, Rhona A., et al., 2018). From this study it was proposed that smoking at this time of the head and neck cancer diagnosis could cause deficient clinical results and a decline in survival. This study also acknowledged that around fivefold greater mortality risk in individuals with >60 pack- years of smoking compared to individuals that have never smoked. High smoking levels result in increased tumor hypoxia. And this can lead to high rates of the binding of carbon monoxide to haemoglobin (Beynon, Rhona A., et al., 2018). It is assumed that tobacco declines the success of radiotherapy by provoking a p53 mutation that could encourage resistance to apoptosis.

The repetition of smoking is notorious for affecting inflammatory responses and immune competence, which can possibly enhance the chance of unfavorable clinical results. From this study it was concluded that there was no valuable evidence that HPV status or tumor stage altered the correlation of smoking with survival (Beynon, Rhona A., et al., 2018).

The article "Stay Out of the Sunbed! Paternalistic Reasons for Restricting the Use of Sunbeds," declares that frequent usage of tanning beds is notorious for being the main cause of melanoma and non- melanoma skin cancer. Melanoma deals with the pigment-generating cells that offer color to the skin that become cancerous. Using tanning beds is the most primitive voluntary act one can do to their body that could form into cancer (Anderson, et al., 2017). According to the World's Health Organization this is considered a group 1 carcinogen and oftentimes viewed as an example of "self-harm." Because it is so dangerous, many countries have already imposed countless kinds of limitations on the usage of sunbeds: Brazil, France, Spain, Portugal, Germany, Austria, Belgium, The UK, parts of Australia, Canada, and the USA (legislation banning the use by individuals under the age of 18). While doing this study, researchers ask the questions of: "Are tanning bed users apprehensive of the health concerns associated? Do they willingly accept the exposure involved? Can the usage of tanning beds be detected to repressive norms of socialization? Do users of tanning beds work under an assessment illusion?" (Anderson, et al., 2017). Does the danger in itself concerning the use of tanning beds defend striking limitations on the act.

In the more current comprehensive meta- analysis, Mathieu Boniol and colleagues established earlier findings of a notable connection between tanning bed use and melanoma. It is recorded that once an individual first uses a sun bed before the age of 30 they have a 75% higher chance in developing cancer compared to those that have had no exposure to sunbeds (Anderson, et al., 2017). Although melanoma is not as customary compared to other skin cancers, it is more destructive and has greater mortality. The meta- analysis discovers an important association between sunbed use and non- melanoma skin cancer. Treatment for this is a critical hardship on health care systems. It was released that individuals that were confirmed to be using indoor sunbeds compared to individuals that have never used them, there was a detection for the possibility of squamous cell carcinoma and basal cell carcinoma. Using tanning beds before the age of 25 was more likely affiliated to both carcinomas (Anderson., et al., 2017). Too much UV radiation can lead to the progress of many eye conditions, premature skin aging, and suppression of the immune system. There are actually some positive benefits when it comes to tanning bed use such as receiving a source of vitamin D and conditioning the skin to exposure to the sun (Anderson., et al., 2017).

It is reasonable to state that there is an overall public awareness of the possible hazards involved with extreme tanning. Although in reality, there are some individuals that don't know the risks of consistently using tanning beds, recently an article was published and stated that around 70% of interviewees pronounce themselves in consensus with claims such as "frequent use of tanning beds leads to skin cancer" (Anderson., et al., 2017)**.** With a high percentage of this voluntary activity, the objective of this article is to surely bring awareness to all and provide reasons why tanning beds should be prohibited in the U.S.

The article, "Non-viral causes of liver cancer: Does obesity led inflammation play a role?," written by Badr Alzahrani., et al. goes in depth to explain that multiple population research has exposed significant relations between obesity and the spread of liver cancer. This article is important to the influence of cancer because liver cancer is one of the most common cancers nationally and is the 3rd most

common cause of cancer mortality (Alzahrani, Badr, et al., 2014). Hepatitis B and hepatitis C virus are the most common originators of liver cancer, but the difference is these are viral infections. Having a poor diet and being obese can change the hepatic pathology, metabolism, encourage inflammation, and leads to nonalcoholic fatty liver disease (Alzahrani, Badr, et al., 2014).

In this article it is significant to know the definition of obesity and its relation to body mass index. Obesity is defined as an individual having a body mass index equal to or above 30 kg/m2 and this is connected to the formation of metabolic syndrome (Alzahrani, Badr, et al., 2014). A true realization from this article is announcing that about half of the adult population in industrial countries are now overweight or obese. Questions about how cancer typically spread amongst obese people were clarified. These individuals have a large selection of adipose tissue and once the tumor reaches these fatty tissues they spread rapidly (Alzahrani, Badr, et al., 2014). This article advocates preventing obesity by making it a public awareness and to see more education programs to help.

Discussion

People all over the nation suffer from cancer, as it is a growing disease. Cancer is developed by specific alterations to genes. And voluntarily, individuals can enhance their cancer risk by the decisions one makes every day. This is one's free will to involve themselves in activities, knowing that they have the potential to develop cancer. And there are some cases where it is unintentional for an individual to allow themselves to become a high risk from habits one has been doing for years. Smoking tobacco, utilizing tanning beds, and obesity are examples of changeable risk factors that can amplify the development of cancer. These articles explain the different ways one can develop cancer and how it affects one's life long-term. There is a common goal to bring awareness about these dangerous habits and to educate in order to decrease the chances of developing cancer.

References

Alzahrani, Badr, et al. "Non-Viral Causes of Liver Cancer: Does Obesity Led Inflammation Play a Role?" *Cancer Lett*, vol. 345, no. 2, 2014, pp. 223–229., https://doi.org/10.1016/j.canlet.2013.08.036. (Alzahrani, Badr, et al., 2014)

Andersen, Didde Boisen, and Søren Flinch Midtgaard. "Stay Out of the Sunbed! Paternalistic Reasons for Restricting the Use of Sunbeds." *Public Health Ethics*, vol. 10, no. 3, 2017, pp. 276–288., https://doi.org/10.1093/phe/phw038.

Beynon, Rhona A., et al. "Tobacco Smoking and Alcohol Drinking at Diagnosis of Head and Neck Cancer and All-Cause Mortality: Results from Head and Neck 5000, a Prospective Observational Cohort of People with Head and Neck Cancer." *Int J Cancer*, vol. 143, no. 5, 2018, pp. 1114–1127., https://doi.org/10.1002/ijc.31416.

