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GLBH 102

Assignment 2: Non-communicable Diseases

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Lung Cancer in Hungary

Cancer has become one of the most significantly fatal non-communicable diseases worldwide, with Hungary steadily seeing a rise in incidence. Currently, Hungary sits fourth in having the highest incidence of cancer worldwide, with a sizable portion of this incidence being specifically lung cancer.[1]

EPIDEMIOLOGICAL DATA FOR HUNGARY

Currently, the population of Hungary is estimated to be around 10 million people.[1] As of 2020, approximately 186,000 individuals in Hungary have been diagnosed with some form of cancer, with 12,576 of those cases being lung cancer with a prevalence rate of 0.13.[1] In Hungary, lung cancer does not currently have the highest level of prevalence for prominent forms of cancer, however it has a much greater incidence than these other forms in the country.[1,2] In 2020, there were a total of 10,274 new cases with an incidence rate of 109.11 cases per 100,000 people.[1] Groups at risk are primarily smokers or people who have experienced lots of secondhand smoke, either as a result of family members smoking at home, (formerly) workplaces, or from jobs where lots of smoke is produced and easily inhaled because it is often a carcinogen that is toxic to the lungs.[1-3] In Hungary, this peak prevalence is primarily in men and for individuals in lower socioeconomic households because these groups have been linked to higher rates of smoking throughout various regions of the country.[1,2] While there's a lower prevalence of lung cancer in women, they are at equal risk of lung cancer from similar environments and/or practices. Currently for both men and women, the highest risk of contracting lung cancer will continue to increase with age (Men 70-79, Women 60-69 age groups) as the body and immune system become weakened.[1,2]

BURDEN OF LUNG CANCER

Lung cancer is the leading cause of cancer-related deaths worldwide.[1] It often originates in a person's lungs, however it can also develop from cancer spreading from other parts of the body.[1,2] It is also able to spread from the lungs to the lymph nodes or brain, which can cause other types of cancer to arise.[1] Common symptoms of lung cancer include but are not limited to severe coughing, coughing up blood, chest and/or bone pain, and shortness of breath.[1,2] It's important to note however that most symptoms will not be present unless the cancer has progressed over a few years, which can vary between individuals.[1] Risk factors of lung cancer include exposure to chemical gases like radon and diesel exhaust, genetics, radiation, and smoking.[1,2] Smoking is the most common cause of lung cancers for both smokers and nonsmoking bystanders (secondhand smoke), with tobacco being the most risk-inducing, commonly smoked substance.[1,2] The morbidity rate for lung cancer in Hungary for the approximate 12,576 cases is around 131.17 cases for 100,000 individuals every year. In terms of death, Hungary has a gender-adjusted mortality rate of 96.4 deaths per 100,000 people for men and 37.7 deaths per 100,000 people for women.[1]

SURVEILLANCE DATA

There is a wide variety of treatments for lung cancer both in Hungary and abroad, although the commonality of certain practices is surprisingly low in Hungary.[1] One of the ideal interventions is for high-risk groups to

routinely get screened prior to exhibiting symptoms (which indicates an advanced state). There are multiple screening methods for lung cancer: CT (Computed Tomography) scans, blood and sputum samples, and X-ray scans.[1,2] CT scans and X-ray scans allow professionals to examine and analyze a person's lungs to detect any abnormal signs of lung issues including lung cancer.[1] CT scans have been found to have a 74% sensitivity and 90% specificity at the lowest, with other tests finding them to have an 88.9% sensitivity and 92.6% specificity for low-dose CT.[1,2] Thus, while they're a good option, there appears to be a considerable gap of confidence between the machinery. X-ray scans of the lungs were found to have a 78.3% sensitivity and 97.0% specificity, giving them a moderate chance to provide false negatives for individuals with undeveloped lung cancer.[1] Blood and sputum (mucus and other fluids originating from the lungs) samples are analyzed for tumor cells and/or molecular markers that would indicate lung cancer. This technique is the least likely to give false positives at the cost of a higher risk of a false negative; it has a 60% sensitivity and 97.6% specificity for analysis of blood and/or sputum but may be the most efficient method of gathering data.[1] If possible, it may be beneficial for high-risk individuals of lung cancer (or even other lung-illnesses) to both get blood/sputum analysis and CT-scan to compare the results of a high specificity and high sensitivity screening. Overall, all these screening methods help affected individuals to seek treatment before their lung cancer progresses to a symptomatic stage.

INTERVENTIONS

The most common interventions conducted in Hungary are surgery, radiation therapy, and systemic therapy.[1] For surgical interventions, typically an affected individual will undergo a lobectomy (where a lobe/portion of the lung is removed) or a pneumonectomy (an entire lung is removed) to completely remove the affected cancerous regions and prevent any risk of redevelopment or spreading to other parts of the body.[1-3] The issue with this intervention, however, is people with weaker immune systems and/or slower recovery ability are often ineligible for these surgeries or at greater risk of direct or indirect mortality from this procedure.[1] Furthermore, a five-year survival rate following these surgeries is only at 60-70% which might discourage some people from undergoing this treatment.

The second intervention utilized in Hungary is radiation therapy, which generally has a more positive outlook with higher survival rates, less recovery time, and less discomfort than surgical methods.[1,2] Radiation therapy directly targets a select region on the body and releases particle/electromagnetic waves that primarily damage cancer cells to reduce and/or eliminate cancer growth.[1,2] The only issue with this treatment in Hungary is that it's underused, either due to personal beliefs or accessibility to the centralized radiation oncology practices.[1]

The third intervention utilized to address individuals with lung cancer is systemic therapy. Systemic therapy includes immunotherapy, chemotherapy, and molecular biological treatments. This intervention has an improved success rate when paired with radiation therapy.[1] Select chemical markers and inhibitors are utilized to boost the body's immune response to fight off the cancer cells, and some treatments will even directly attack cancer cells to stop growth from occurring.[1,2]

Another intervention has been implemented in Hungary but remains only somewhat successful in reducing lung-related diseases like lung cancer. In 2012, the Hungarian government banned smoking in many public places such as bars and restaurants, public transportation, and enclosed workplaces.[1] This helps lower the risk for nonsmokers to develop lung cancer, but these legislative initiatives have not succeeded in significantly reducing the smoking rates in the country. It is estimated that around 36.1% of Hungarians smoke regularly, but not much further action has been taken to lower this proportion of smokers.[1]

SOCIAL DETERMINANTS OF HEALTH

Most studies have found that men are more likely to develop lung cancer in Hungary than women, often due to environmental and lifestyle conditions, most notably being smoking.[1,2] In Hungary two times more men smoke than women.[1] One study analyzed the seven primary regions of Hungary and found that this higher trend of smoking and subsequent lung cancer incidence occurred in regions with lower incomes and lower education levels.[1] As a result, people in these areas were found to be making poorer health decisions and were either not aware of or chose not to participate in any form of lung screenings leading to higher rates of mortality from this disease.[1,2]

The other primary social determinant of health for lung cancer in Hungary was found to be environmental. People living in metropolitan areas were found to have a higher prevalence of lung cancer than their non-metropolitan counterparts due to high concentrations of air pollution.[1,2] The air quality in Hungary, particularly in metropolitan regions like Budapest, exceeds 16 ug/m3 compared to the recommended maximum of 10 ug/m3 by the World Health Organization.[1] The constant inhalation of air in these polluted areas overall exposes people moving to these areas for work to a higher risk of lung cancer and other lung-related diseases, however tobacco usage is believed to override this exposure for risk of developing lung cancer.[1,2]

CONCLUSION

Hungary has one of the highest overall rates of incidence of cancer worldwide, with the highest incidence of lung cancer. There has been some decline in incidence in recent years, however it is still yet to see any drastic decline in the incidence of lung cancer due to numerous lifestyle and environmental changes that need to take place. Hungary has been seen to enact some anti-smoking laws in the past, however it needs to implement more education programs and stricter laws and/or taxes to assist in lowering the prevalence of smoking in the population. As for environmental change, the government needs to push the country towards more clean energy and establish more strict policies on businesses and technological advances to promote less air pollution. For nonsmokers, the high levels of air pollution in metropolitan regions of the country promotes numerous lung-related issues including lung cancer. However, much of this will take a while to take effect because the government has not been seen taking rapid steps to enact this to its full extent; the country has been seen multiple times facing challenges from the European Union for violating the consensus for levels of air pollution and consequences. It remains relatively unchanged, so it is unlikely for this to change without foreign intervention. The other issue with some of these environmental changes could be cost on individuals at a personal level and/or taxes as well as on the government and private businesses which would likely be unfavorable by the general public. Thus, the first steps to lower incidence of lung cancer should be with educational programs and stricter anti-smoking laws, with gradual steps to decrease the high levels of air pollution to improve the general health of Hungarians.

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