

The Burdens of Non-Communicable Disease, Cancer and Cardio-Oncology in Mongolia.

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Non-communicable diseases are recognized as a growing threat to global health and development. Claiming 71% of all the deaths in 2016, these diseases are also responsible for the majority of the morbidity in the world. Of deaths from non-communicable disease, 75% occur in middle and low-income countries¹. Mongolia is a developing, middle income, cross-cultural country experiencing a rapid economic and epidemiological transition in the last 30 years. This rapid transition modified some crucial aspects of Mongolians' daily life, including their eating habits, means of transportation and levels of physical activity.

In 2005, 2009 and 2013, WHO STEPwise approach to chronic disease risk factor surveillance was conducted in Mongolia, providing an overview of the main risk factors for non-communicable diseases – smoking, low fruit and vegetable consumption, physical inactivity, obesity, alcohol consumption, and hypertension²⁻⁴. The prevalence of the main risk factors remained constant, with physical inactivity and the obesity increasing in the population since 2005 (Figure 1). In the 2013 STEP survey, only 1% of the study population had no risk factors for non-communicable disease, while 36.9% of those surveyed had 3-5 risk factors⁴. This high-risk situation leads to cardiovascular diseases, cancer, chronic obstructive pulmonary diseases, and diabetes.

According to the GLOBOCAN 2018 report by the International Agency for Research in Cancer, there were an estimated 9.6 million cancer deaths and 18.1 million new cancer cases diagnosed worldwide and these consisted of lung cancer (11.6%), breast cancer (11.6%), prostate cancer (7.1%), colorectal cancer (9.2%), stomach cancer (8.2%) and liver cancer (8.2%)⁵. In Mongolia, the cancer prevalence has been increasing significantly in recent years (Figure 2), with liver cancer being one of the most prevalent⁶. Many cancer treatments are extremely sophisticated and the regulatory genetic elements and proteomic aspects of cancer are the subjects of extensive research. Due to early diagnosis and advancements in treatment, the survival rate for some cancers is increasing. Since 2011, in Mongolia the percentage of cancers diagnosed in the late stage declined by 0.9% and the 1-year survival rate increased by 17.9% (National Cancer Center database).

However, emerging studies indicate that cancer chemotherapy and radiotherapy induces long-term cardio-toxic effects in individuals in a context dependent manner. For example, anthracycline and doxorubicin directly damages cardiomyocyte cells in a dose-dependent manner

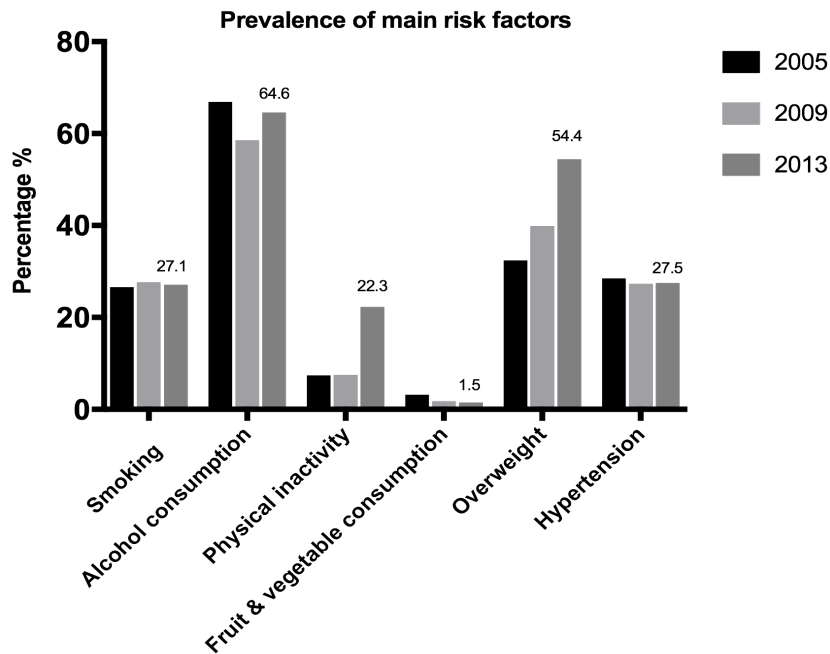


Figure 1. The prevalence of main risk factors for non-communicable diseases in Mongolia.

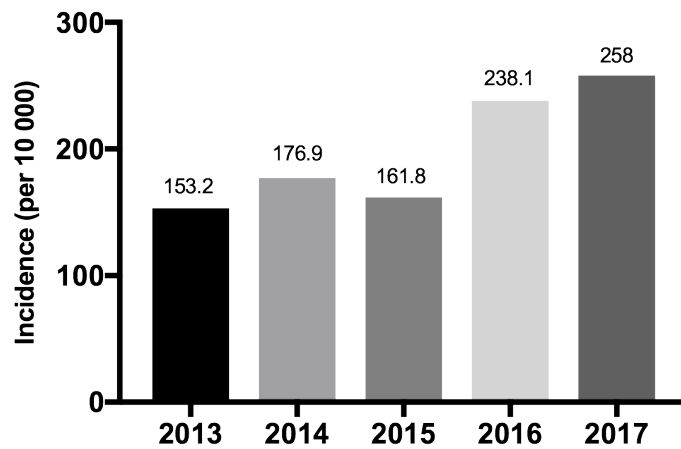


Figure 2. Cancer incidence in Mongolia (per 10,000 population)

and the 5-year heart failure risk differs significantly between the anthracycline and doxorubicin-treated and non-treated groups⁷. There has been a rapid expansion of drug choices triggering various cardiotoxic effects including cardiomyocyte damage, rhythm disturbances, hypertension, fibrosis, thromboembolism, and others⁸. There is considerable evidence showing that patients prone to cardio-toxicity have preexisting cardiovascular disease and high levels of fundamental cardiac risk factors⁹. However, in Mongolia, the cardiovascular health evaluation

for cancer patients is only based on electrocardiography and general examination and meaningful protocols and guidelines to evaluate and mitigate the cardiac toxicity associated with chemotherapy and radiotherapy do not exist.

Tackling this problem at its source requires that we recognize the barriers to a healthy lifestyle in our communities and urgently implement interventions to remove them and thereby decrease the risk factors and reduce the non-communicable disease burden in Mongolia. For patients diagnosed cancer, healthcare

providers at all levels and patients should be aware of the possibility of cardiotoxic side effects of cancer chemotherapies and patients should undergo cardiac evaluation by specialized cardiologists before and after the cancer treatment.

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