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Barriers in Cancer Prevention: Burdens in the Cancer Therapy

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Description

Cancer prevention is a critical goal in order to maintain sustainable public health systems around the world, given the steady rise in cancer incidence and the high costs of new therapies. Carcinogenesis is a multistep process that allows for active intervention using natural or synthetic medicines to stop or reverse the disease process. Treatment of premalignant cells or pre neoplastic situations might be called cancer prevention medication. Clearly, such interventions necessitate a well-defined risk classification so that individualized tactics and treatments can be deployed to cohorts with a confirmed higher cancer risk, rather than the whole population. Investment in the creation and validation of surrogate cancer biomarkers with both prognostic and predictive value to identify and monitor the efficacy of therapies in clinical trials and beyond are required to further improve these techniques in an efficient and timely manner. Breast and colon cancer have the strongest clinical evidence that pharmaceutical intervention can reduce cancer risk in the field of cancer preventative medicine.

The global burden of cancer and cancer-related deaths are rising. Every year, more than 14 million instances are reported, with the number expected to rise to approximately 22 million by 2030. The rising expenses of diagnosing and treating cancer are unsustainable for public health systems, especially given the high cost of modern cancer treatments. Importantly, the problem is not limited to high-income countries; cancer incidence is rising in low and middle-income countries, with low and middle-income countries expected to account for 60% of global totals by 2030. Although geographic variety in cancer incidence is still visible, a more 'globalized' cancer burden has demonstrated a rapid increase in malignancies linked with a Western lifestyle, such as lung, colon, and breast cancer worldwide.

The need to rectify this situation is urgent, and one of the most feasible ways to do so is to increase early identification and prevention methods.

Early diagnosis has played a key role in reducing the economic burden of cancer, thanks to lower treatment costs, as well as lower morbidity and fatality rates when tumours are detected early rather than late. To attain their full potential, preventive treatments, such as lifestyle and behavioral modifications and the use of preventive medicine or therapies, require significantly greater work in terms of development and implementation from basic research to educational and communication levels.

Because preventive medicines are typically given to healthy people who do not have cancer, they must be safe and well tolerated. As a result, candidate therapies are limited to vaccines, repurposed, established (typically generic) drugs, and certain dietary-derived compounds with strong safety evidence. All of these choices are far more economical for a cancer patient than normal health care, especially when the newest target therapy is included. Furthermore, avoiding the devastating psychological effects of a cancer diagnosis on patients and their families is priceless.

Michael Sporn coined the term "chemoprevention" to describe a method of reducing cancer incidence that addresses the entire disease process rather than simply the final invasive manifestation. It is described as the application of natural, synthetic, or biological agents to reverse, suppress, delay, or prevent carcinogenesis or the progression of premalignant cells to invasive illness. Intriguingly, it has been observed that the name "chemoprevention" can generate improper connotations with cancer and chemotherapy, reducing uptake by eligible individuals; consequently, alternatives such as therapeutic or medical prevention are advised.

Despite the fact that long-term follow-up data confirm the initial positive findings of all preventative trials, primary prevention is still used seldom, which limits its effectiveness at the community level. It is estimated that 2 million women in the United States and 5 million women in the United Kingdom fit the criteria for tamoxifen preventive medication, but only one in every six accepts the offer, with rates much lower in non-trial settings. Concerns about side effects, a lack of awareness among potential prescribers that tamoxifen can reduce the risk of breast cancer and that guidelines advocating its use in this setting exist, and the requirement to prescribe off-label in countries where tamoxifen is not licensed for prevention all contribute to low uptake.

Clinical evidence has firmly proven that the use of preventive medicine can reduce cancer incidence, at least for breast and colorectal cancer. Despite these facts, many doctors are hesitant to recommend this option to people who are eligible. Furthermore, patients who potentially benefit from cancer prevention drugs have low acceptance rates and poor programmed adherence. There could be several causes for this, but the most important is the paucity of surrogate endpoint biomarkers. Because simple and accessible surrogate biomarkers, such as high blood pressure or cholesterol, are straightforward to monitor and provide a clear readout of treatment efficacy, they are credited with the success of cardiovascular prophylaxis.