Nutrition in Health & Disease Course

15 hours, 1 credit.

Course instructor: Dr. Sherzad Ali Ismael

Professor of Community Medicine & Public Health, MBChB, FIBMS/ CM

Email: sherzad.aismael@gmail.com

Module 9: The Role of Nutrition in Cancer Prevention

References:

1. World Cancer Research Fund/American Institute for Cancer Research. (2018). *Diet, nutrition, physical activity and cancer: a global perspective*. Continuous Update Project Expert Report.

2. Mayne, S.T., Playdon, M.C., & Rock, C.L. (2016). Diet, nutrition, and cancer: past, present and future. *Nature Reviews Clinical Oncology, 13*(8), 504-515.

3. Wiseman, M.J. (2019). Nutrition and cancer: prevention and survival. *British Journal of Nutrition, 122*(5), 481-487.

1. The Big Picture: Why Nutrition Matters

Cancer is a leading cause of death globally, but it is not just about genetics. Because cancer patterns change when people move or change their habits, we know that environmental factors—specifically nutrition and lifestyle—play a massive role in whether the cancer develops. As future dietitians, your role is critical because nutrition is one of the most powerful "modifiable" factors we must reduce the global cancer burden**.**

2. From "Magic Bullets" to "Whole Plates"

In the past, scientists tried to find a single "superfood" or "vitamin" that could stop cancer. However, modern research has shifted its focus. We now look at dietary patterns—the way we eat every day—rather than single nutrients.

- The Metabolic Environment: Think of your body as an ecosystem. Your overall nutritional state (what you eat, how much you move, and your body fat) creates a systemic metabolic environment.
- If this environment is healthy, it supports normal cell growth and keeps tissue strong.
- If the environment is poor (due to obesity or poor diet), it can encourage cells to grow and divide uncontrollably.

3. How Nutrition Influences Cancer Biology

Cancer happens when the normal instructions for a cell to grow, copy itself, or die are disrupted. Nutrition can influence these "hallmarks of cancer" in several ways:

- Cell Proliferation: Certain factors can cause cells to multiply too fast.

- Inflammation: A poor diet can keep the body in a state of high inflammation, which "feeds" cancer development.
- Metastasis: Nutrition can even influence whether cancer stays in one place or spreads.
- The Role of Obesity: Obesity is a major driver of these disruptions, impacting many different cancer processes at once.

4. The Evidence: What to Increase and What to Limit

The World Cancer Research Fund (WCRF) utilizes a "Continuous Update Project" (CUP) to monitor the latest scientific developments. Here is the current consensus on what impacts cancer risk:

- **Factors that Increase Risk:**
    - Alcohol: Strongly linked to several types of cancer.
    - Processed and Red Meats: These are associated with higher risks.
    - Aflatoxins: Toxins found in certain moldy foods.
    - Salt-preserved foods: These can be harmful to health when consumed excessively.
- **Factors that Decrease Risk:**
    - Fiber: Specifically associated with a lower risk of colorectal cancer.
    - Plant-Based Foods: A diet rich in legumes, whole grains, pulses, vegetables, and fruits helps maintain a healthy internal environment.
    - Physical Activity: Staying active is a direct way to lower risk.

5. Why Is This Research So Hard?

As dietetics students, it is important to understand that we cannot easily do "quick" experiments with cancer. Because cancer takes decades to develop, most of our knowledge comes from observational studies, which look at how people live over a long time. While these studies are complex and can sometimes be biased, they provide the foundation for our public health guidelines.

6. Nutrition After Diagnosis

Nutrition isn't just for prevention; it is a vital part of survivorship. For example, there is strong evidence that nutrition and physical activity improve outcomes for those diagnosed with breast cancer. Eating well after a diagnosis can improve the quality of life and reduce the risk of other chronic diseases.

7. The Future of Dietetics: "-Omics" and the Gut

The field is moving toward precision nutrition. In the future, you will likely use tools like:

- “-Omics” Technologies: Looking at how nutrition interacts with our genes (genomics) and proteins (proteomics).
- The Microbiome: Understanding how the trillions of bacteria in our gut interact with the food we eat to prevent or promote cancer.

- Biomarkers: Using objective biological markers to measure exactly what someone has eaten, rather than just relying on their memory.

Takeaway message: Think of the human body like a garden. The seeds are our cells. Sometimes, a "weed" (a cancer cell) might try to grow. If the soil is healthy, well-watered, and properly fertilized (a diet rich in plants and fiber, with a healthy weight), it is very difficult for the weed to take root. However, if the soil is neglected or treated with "toxins" (excessive alcohol, obesity, and processed meats), the weeds find it much easier to spread and take over the garden.

End of Module 9..