Nutritional Epidemiology and its Impact on Policy Making

Khadija Riaz[1], Sidra Altaf[2]*, Tasawar Iqbal[3] and Ume Salma[4]

1. Department of Epidemiology and Public Health, University of Agriculture, Faisalabad, Pakistan.
2. Department of Pharmacy, University of Agriculture Faisalabad, Pakistan.
3. Department of Physiology and Pharmacology, University of Agriculture Faisalabad, Pakistan.
4. Department of zoology, University of Agriculture, Faisalabad, Pakistan.

*Corresponding Author: **sidra.altaf@uaf.edu.pk**

ABSTRACT

Nutritional epidemiology reveals the impact of environment, lifestyle, and genes on population's nutrition. This approach is vital in assessing the influence of nutrition on healthy aging and chronic diseases. One contribution of nutritional epidemiology is the evaluation of dietary factors, such as assessing diet and describing nutritional exposure. It includes implementing statistical models to explore diet-disease relationship with a focus on managing measurement errors. The objective can be accomplished by using epidemiological methodologies and conducting community-based inquiries on selected subsets of aging demographics.

Introduction:

Nutritional epidemiology is a distinctive subfield in the discipline of epidemiology, offering valuable insights to the domain of nutrition science. Nutritional epidemiology examines the relationship between dietary and nutritional factors and the prevalence of diseases within a specified population. Nutritional epidemiology commonly plays a significant role in providing evidence for informing dietary guidelines aimed at the prevention of diseases. The statistical modeling of diet data and its association with disease refers to comprehensive methodologies that aim to convert quantitative measurements of short-term dietary intake into estimates of individuals' habitual consumption, while also addressing potential errors in the estimation of diet-disease relationships [1].

This is accomplished by incorporating data from validation studies that utilize biomarkers to verify the accuracy of these relationships. In the field of epidemiological research, the analysis of diets can be conducted at various levels, encompassing the examination of individual nutrients, specific foods, larger food groupings, and dietary patterns. The quantification of exposure can be achieved through direct methods such as administering questionnaires to assess individuals' dietary intake, analyzing biological samples to determine markers of intake, or estimating body size and the proportional size of body parts. In the field of nutritional epidemiology, the primary focus revolves around the long-term dietary patterns, predominantly due to the fact that the influence of food consumption on various health outcomes, particularly those pertaining to non-communicable diseases, are anticipated to manifest over prolonged durations. The results derived from epidemiological investigations have the potential to make a valuable contribution towards the formulation of policies pertaining to diet and health. These policies encompass an array of initiatives, ranging from the establishment of government endorsed dietary guidelines to the implementation of practices such as food fortification and the imposition of restrictions related to substances present in food. Randomized controlled trials are widely regarded as the most robust form of research providing compelling evidence in identifying and establishing a causal link between exposure and subsequent health outcomes. Randomized trials of dietary interventions exhibit several limitations and are frequently rendered impracticable due to ethical or practical implications.

Epidemiology: The term "epidemiology" originates etymologically from the Greek term epi, meaning "upon", demos, meaning "people", and logos, meaning "study".

This broad definition of epidemiology can be elaborated further

Terms	Explanation
Study	Includes surveillance, testing hypothesis, analytical study, and experiments
Distribution	Refers to the analysis of the person place and time and curricula of people affected
Determinants	Includes factors that influence health: biological, nutritional, cultural, economic
Health-related states	Disease, cause of death, positive health status, provision and use of health services
Specified populations	Such as occupational group
Application to prevention	Aim to public health to promote protect and restore health

Public health: This text pertains to the domain of biomedical sciences and encompasses various domains such as disease prevention, an extension of lifespan, improvement of physical and mental health, personal and environmental hygiene, control of infectious diseases and the management of health and treatment services. The significance of community-based initiatives in advancing health, averting illnesses, and providing therapeutic interventions is well-established through empirical observations of human interactions in confronting various social challenges. This phenomenon represents a crucial domain within the realm of public health, which has gained increasing recognition and emphasis [2].

Nutrition is the study of food and how they nourish the body
Nutrients are the component of food that is needed for the body to function

Experimental study: The investigator establishes the level of exposure for each individual within a clinical trial, or for every community within a community trial, via a tightly controlled process. The researcher then proceeds to monitor these individuals or communities over a period of time in order to ascertain any effects stemming from the established degree of exposure. In a clinical trial evaluating a novel vaccine, an investigator may employ a random allocation procedure to randomly assign certain participants to receive the experimental vaccine, whereas other individuals may receive a placebo injection. In order to evaluate the efficacy of the new vaccine in preventing the targeted disease, the investigators conducted a thorough monitoring of all study participants and closely observed any incidence of the aforementioned disease in both the vaccine group and the control group. This allowed for comparative analysis and assessment of the effectiveness of the new vaccine. In order to ascertain whether the vaccine group exhibits a reduced incidence of disease, a placebo control group was employed.

Cohort study: An epidemiologist conducting a cohort study examines the exposure status of each participant and subsequently tracks the incidence of the target disease amongst them. It should be noted that in a cohort study, the researcher engages in a process of modest observation followed by the determination of exposure status of the participants, thereby setting it apart from an experimental study. After a designated period of time has passed, the researcher performs a comparative examination of the prevalence of the disease within both the exposed and non-exposed cohorts in order to determine the potential influence of the exposure on the occurrence of the disease. The unexposed population functions as a reference group to provide an estimation of the underlying or expected levels of disease prevalence within the specific geographic area. If there exists a considerable disparity in disease prevalence between the cohorts of individuals who were exposed and unexposed, it can be concluded that the exposure is correlated with the occurrence of the disease.

Dietary intake: Gaining insights into the correlation between one's level of nutritional awareness and their dietary consumption holds great significance, given that a healthy diet plays a pivotal role in promoting optimum health and preventing/manage an array of ailments.

Dietary intake methods: The methods utilized in dietary assessment include the 24-hour dietary recall, food frequency questionnaire, and dietary history since childhood, dairy-specific inquiries, and ascertained food intake.

Folic acid and neural tube defects: A neural tube anomaly (NTA) signifies an innate irregularity affecting the brain, spinal column, or spinal cord that emerges during the embryonic stage of gestation, specifically within the first month. During the initial month of gestation, a fetus is conceived. Frequently, conception occurs prior to recognition of pregnancy. Spina bifida and

encephaly represent two prevalent neural tube anomalies. Typically, in the initial gestational month, the lateral aspects of the developing vertebral column converge to encase and safeguard the spinal cord, its corresponding nerves, and the membranous sheaths encompassing the spinal cord, known as meninges. During this developmental phase, the emerging cerebral and spinal components are commonly referred to as the neural tube.

Types of neural tube defects: Spina bifida

The aforementioned neural tube abnormality (NTA) is considered to be the most prevalent within its class. The phenomenon transpires when the neural tube fails to achieve complete closure throughout a particular section of the spine during the fetal developmental stage.

Anencephaly

This occurs when the neural tube of the developing fetus fails to achieve closure at its cranial end. The aforementioned circumstance leads to impaired growth of the skull, scalp, and brain, consequently resulting in considerable loss of distinct parts of the skull and brain.

Encephalocele

This condition arises when the neural tube in proximity to the cerebral region fails to close, resulting in the formation of perforation within the cranial structure. The cerebral tissue and its corresponding enveloping membranes within the fetal cranium may exhibit a noticeable extrusion, resulting in the formation of a protuberant sac-shaped structure.

Anencephaly

Spinal deformity manifests when there is a severe alteration in the normal curvature of the spinal cord. Frequently observed is the absence of the neck or excessive tilting of the neonatal head in a posterior direction. The integumentary system of a newborn is interconnected such that the skin on the facial area is linked to the thoracic region while the scalp is attached to the posterior portion of the body.

Risk factors for neural tube defects: Several factors have been identified as potential contributors to adverse outcomes during pregnancy. These include the use of certain anti-seizure medications, obesity, and diabetes, early exposure to opioids within the first two months of pregnancy, and elevated body temperature during the early stages of gestation.

Prevention: It is recommended that women of reproductive age be advised to consume a daily intake of 400 micrograms of folic acid, along with incorporating foods rich in folic acid into a diverse diet as a preventative measure against neural tube defects.

Policy-making stage: Epidemiological knowledge plays a critical role in policy-making and intervention selection for public health problems. It helps to understand the complexity of the problem and its context. During implementation, techniques such as epidemiological surveillance and monitoring can aid in follow-up. Public health policy evaluation can take three approaches: justification evaluation, which aims to demonstrate effective policy behavior; credit evaluation shows the achievement of goals. Probability assessment estimates program or policy effectiveness. Legal epidemiology studies laws on public health to link health data sets. Epidemiologists measure outcomes for policymaker decisions on population health, improving health, and reducing negative effects. Epidemiology is vital to public health and deserves attention [3].

Conclusion

Nutritional epidemiology studies nutrition in epidemiology. Nutritional epidemiology studies diet, nutrition, and disease. Nutrition epidemiology helps prevent disease. The study explores diet patterns and finds diet-disease links. Biomarkers verify accuracy. Diet analysis studies nutrients, foods, groups, and patterns. Exposure is gauged via surveys, samples, or estimation. In nutrition epidemiology, long-term diets are critical for good health, particularly for non-communicable diseases. Epidemiology investigations affect diets and health policies. This paper examines dietary guidelines, fortification, and substance restrictions. RCTs link exposure to health outcomes. Diet trials hindered by limitations.

References

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