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EVALUATING NUTRITIONAL SURVEY, BIOSTATISTICAL PERSPECTIVE

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ABSTRACT This review evaluates the methodologies of the National Diet and Nutrition Survey (NDNS) and the National Health and Nutrition Examination Survey (NHANES), which are instrumental in assessing the population's health and nutritional status. It is necessary to create additional biochemical techniques that will offer more precise knowledge about the role of nutrients at the cellular level. It scrutinizes the 24-hour dietary recall's efficacy in reflecting habitual intake and explores biostatistical techniques for addressing within-individual variance. The article discusses the challenges of dietary assessment, including bias and the need for methodological adaptation. It concludes with the importance of national dietary surveys in informing public health policy and the potential for integrating innovative survey methods.

Keywords: *Nutritional Assessment; Biostatistical Analysis; Health, Nutrition; Dietary; Adaptation*

INTRODUCTION

As covered in the articles, assessing a nutritional survey from a biostatistical standpoint entails taking into account Bayesian hierarchical models for finite populations with complicated dependencies (Banerjee, 2024). By including demographic information and food considerations that are appropriate for the culture in question, these models can aid in the assessment and management of nutritional needs of people, particularly those that are vulnerable such as refugees and migrants (Bravo, Cordts, Schulze, & Spiller, 2013). A unique source of national statistics on the health and nutritional condition of the population is the National Health and Nutrition Examination Survey (NHANES), which gathers information via regular assessments, interviews, and the collection of biospecimens. The data acquired also contains information difficult for the sample participants or their healthcare professionals to report (Paulose-Ram, Graber, Woodwell, & Ahluwalia, 2021). Questions about diet, health, and socioeconomic status are all part of the NHANES interview. Data will be analyzed to evaluate nutritional status and how it relates to illness prevention and health promotion. The nation's health knowledge will be expanded, health programs and services will be directed and designed, and effective public health policy will be developed by analyzing data from this survey in epidemiological studies and health sciences research (Jaeger et al., 2023). Since 2008, the general UK population has been the subject of an ongoing cross-sectional survey on food consumption and nutrient intake called the National Diet and Nutrition Survey (NDNS) rolling project (Shaw et al., 2021).

Methodology:

There doesn't appear to be an ideal way to evaluate survey data on dietary intake. Various approaches could be suitable for particular goals. When evaluating food intake among communities or individuals, researchers are frequently interested in reporting routine or habitual intakes (Baltar, Cunha, Gorgulho, & Hassan, 2023). Due to the significant intra-individual./. variation in dietary intakes, a 24-hour dietary recall can offer rich insight into the mean food intake for a given day on a population or large-group level. Still, it does not reflect the normal intake over time. As was previously said, in large survey contexts, it is usually not feasible to gather more than two 24-hour recalls per participant (Ahluwalia, Dwyer, Terry, Moshfegh, & Johnson, 2016). Assessing dietary interventions' economic impact faces uncertainties related to consumption measurement, effectiveness evaluation, and economic inputs. Studies on athletes' and coaches' nutritional knowledge often lack critical information like research hypotheses, ethics approval details, and limitations acknowledgment, indicating methodological flaws that need improvement(Kouvelioti & Vagenas, 2015). Therefore, evaluating nutritional survey methodologies requires attention to study design, data collection techniques, ethical considerations, and result interpretation to enhance the quality and reliability of research in the field.

Nutritional survey technique:

To identify national diet surveys, we implemented two main strategies:

(1) being in touch with survey authors; (2) a systematic literature review

Being in touch with survey authors:

We were able to identify the authors of national surveys under the WHO Europe remit by using the contact names mentioned and extra information from two major reports of national survey data on food. The identified contacts were asked to complete a questionnaire (Appendix 1) that included information on nationally representative, individual-level nutrition surveys conducted since 1990, as well as references or links to relevant studies (Rippin et al., 2018).

Systematic literature review:

In the unlikely scenario that no contact was located, a comprehensive search of Web of Science, Medline, and Scopus was carried out to locate dietary surveys that were nationally representative and collected individual data from 1990 to June 2016. Regardless of language, the following search terms were entered: (research* OR survey* [TS]) AND (food* [TS]) AND (diet* OR nutrition* OR diet*) Moreover (Rippin et al., 2018).

Biostatistical Analysis:

This fact has led to the development of statistical methods that aid in accounting for within-individual variance. A key component of these methodological advances is a shift in focus: the goal is now to estimate distributions of usual intake or regression parameters that link usual intake to health outcomes, rather than attempting to estimate usual intake at the individual level (Alkhaldy et al., 2024). In this manner, a notably smaller number of repeated 24-hour recalls—as few as two per person on a subset of the full sample—can be used for statistical modeling. Many methods have been developed over the last few decades to estimate typical intake distributions; the two most well-known are the Iowa State University (ISU) technique and the National Cancer Institute (NCI) method (Ahluwalia et al., 2016). The risk of malnutrition before surgery is influenced by various factors such as age, comorbidities, and treatments taken. Measuring factors such as serum albumin, total cholesterol, and total lymphocyte count are part of nutritional evaluations; these measures have been found to have a strong correlation with nutritional status and can be used as screening tools (Madroño, Mancha, Rodríguez, de Ulíbarri, & Culebras, 2011). Additionally, determining dietary inadequacies and directing therapies for optimal nutrition in both children and adults depend on the assessment of body mass index, body composition, and biochemical indicators.

Strength and Limitations:

Every nutritional assessment method has benefits and drawbacks, as well as a number of potential sources of bias or error. Since methods are typically created for a particular nation or population, they should always be modified, evaluated, and validated before being applied in other contexts (such as a different nation) or to other populations (such as a different age group or gender) (Dao et al., 2019). Dietary assessment frequently faces the difficulty of misreporting. For a variety of reasons, a participant may record dietary intake incorrectly (e.g. memory, social desirability). Systematic bias may be introduced by the method's development process, which includes the meals and drinks included and the response possibilities (Dao et al., 2019).

Discussion:

Numerous factors distinguish national surveys from one another, including food coding systems, survey duration, dietary assessment instrument, food quantification approach, and sample size and recruitment (Okada et al., 2023). The current study's findings demonstrate that for a set of fifteen very diverse test foods, estimates of food portion size across the surveys—which were based on the median intake of a particular food among consumers of the food overall eating occasions—showed remarkably identical results (Gibney et al., 2018). Energy and nutrient intake data were obtained from a primary technique in all surveys that collected dietary intake using several instruments. The other method(s) were used for validation and calibration. There are numerous limitations to consider. The food processing research question was not intended to be addressed by the FFQ that was utilized in this study. The variables that may have led individuals to consume ultra-processed meals were not evaluated by the NHANES III, even though these factors can offer crucial insights into self-selection (Kim, Hu, & Rebholz, 2019)

fruits, vegetables, and whole grains isn't merely a culinary adventure but a strategic health decision, steering us away from the risks of chronic diseases (Jideani et al., 2014).

Conclusion

Evaluating food consumption in any age group can be tough. Because of the high participant and time burdens associated with many recognized nutritional assessment methodologies, they can be hard to put into practice. It is necessary to obtain population and other data. You must become as informed as you can on the demographics before starting the survey. This includes knowing the population's size, demographic features (such as age, gender, and ethnicity), and socioeconomic information (like income and education levels). Previous surveys, statistics, maps, and other anthropological data can all be used to obtain data. Teams for surveys must be chosen and instructed. Before completing the survey, the teams must receive thorough training in data collection from the researchers; however, health experts are not required. To help add to the knowledge base for public health policies, this research topic focused on examining the diet quality or dietary patterns at the overall or meal levels all over the nation surveys. Moreover, it highlights the importance of National Dietary Surveys in enhancing public health policy, which supports ongoing national representative data gathering. For comprehensive dietary surveys, the majority of research employed 24-hour dietary recall; for questionnaire surveys, they used the FFQ or FPQ. Over 50% of the included studies used questionnaires to assess habitual food intake and estimated nutrient intake from thorough dietary surveys. Future national nutrition surveys can incorporate new dietary survey methods based on our results.

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