INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
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UFED
Urban Food Environments and Diets Tool

DIET ASSESSMENT

Global Diet Quality Score (GDQS)

Overview

The Global Diet Quality Score (GDQS) is a standardized, food-based metric developed to assess overall dietary quality across diverse populations and settings. It captures two key dimensions of diet: nutrient adequacy and risk of diet-related non-communicable diseases (NCDs). The GDQS achieves this by scoring both healthy and unhealthy food groups, making it a comprehensive measure for evaluating diet quality in relation to both undernutrition and overnutrition.

The GDQS metric is validated for use with populations including children (24-59 months and 5-9 years), adolescents (10-14 years), non-pregnant and non-lactating women[1] 15 years and older, and men 15 years and older. It performs comparably to the Minimum Dietary Diversity – Women (MDD-W) indicator in predicting nutrient adequacy, and performs similarly to the Alternative Healthy Eating Index (AHEI) in measuring diet-related NCD risks.

Tools for deriving the GDQS

The GDQS metric can be tabulated from various dietary assessment methods, including quantitative 24-hour recalls and food frequency questionnaires (FFQs). To support more frequent and resource-efficient data collection, the GDQS app was developed as a free, electronic tool for use with Android devices. The GDQS app was designed to be a feasible, less resource-intensive approach to support frequent collection of population-level data on dietary quality. When using the GDQS app, data is uploaded to a server and can be integrated with other survey modules.

The GDQS app uses an open recall and a global food database of over 7,000 items pre-classified into their corresponding GDQS food group, enabling automated tabulation of the GDQS and scalable, low-cost monitoring of diet quality – particularly in low-resource settings. The app has been validated in multiple settings, showing that its method of food group portion size estimation using 3D printed cubes had strong agreement with weighed food record (WFR) portion size estimation, and produced equivalent GDQS scores, confirming its accuracy and feasibility for diverse populations and settings.

[1] A study reporting on validation of GDQS for pregnant and lactating women is forthcoming in 2026.

See GDQS results from 20 countries 17+

Rationale

The GDQS is a validated indicator that assesses overall dietary quality by capturing both nutrient adequacy and risk of diet-related non-communicable diseases (NCDs). Importantly, the GDQS is the only indicator that simultaneously predicts both nutrient adequacy and diet-related NCD risk by assessing intake of both protective and harmful food groups. It scores consumption of healthy and unhealthy food groups and is especially relevant in contexts facing the double burden of malnutrition. The GDQS is validated for use with children 2 years and older, adolescents, and non-pregnant, non-lactating women 15 years and older and men 15 years and older and performs comparably to established indicators like MDD-W and AHEI.

The GDQS has been reported in over 50 studies globally, and the GDQS app has been applied in more than 20 research settings. A recent study indicates that GDQS scores collected using the GDQS app predicted metabolic risk outcomes as well as or better than the same metric collected using a 24-hour recall or FFQ.

If you want to use the GDQS metric to measure diet quality, the GDQS app is a practical and efficient way to collect dietary data and provides automatic tabulation of the GDQS.

Type of data

Building on its strong conceptual foundation, the GDQS relies on specific types of dietary data to generate meaningful insights into diet quality across populations. The GDQS metric is based on the collection of information on individual foods, beverages, mixed dishes, and their ingredients, as well as categorical information on the amount of each food group consumed over a 24-hour reference period. Measured at the population or subgroup level, the GDQS can be used to compare diet quality within or across countries, to track population-level changes in diet quality, as well as in the design, monitoring and evaluation of programs and policies to improve diet quality.

Understanding the nature of the data collected helps clarify the strengths and limitations of the GDQS as a dietary assessment tool. As an alternative to using the GDQS app for data collection, the score can also be calculated from quantitative dietary data gathered through other methods, such as a quantitative 24-hour recall or Food Frequency Questionnaires (FFQs).

Indicators

GDQS data provide the ability to report a range of metrics and sub-metrics that offer valuable insights into dietary patterns and health risks. Population-level data can be used to track changes over time in a population, compare differences among population sub-groups, and assess how the population is performing relative to food-based dietary guidelines. Because GDQS data does not track individual foods or nutrient intake, it may be less useful for monitoring the impact of specific nutrition interventions or food-based programs.

Results derived from GDQS data in 23 countries, covering diverse years, regions, and respondent characteristics for individuals aged 15 and older are visualized here.

GDQS metric

The GDQS is a comprehensive, food-based metric with simple quantity-based scoring that serves as a validated proxy for nutrient adequacy and diet-related NCD risk (see Toolkit). When the GDQS app is used for data collection, the GDQS metric is automatically tabulated.

- The indicator uses a food-based scoring system across 25 groups—classified as healthy, unhealthy, or unhealthy when not consumed or consumed in excess —making it scalable, adaptable, and suitable for global dietary surveillance.
- Points are assigned depending on the level of consumption of each food group. For the 16 healthy food groups, points are given for higher intake (up to 4 points), for the 7 unhealthy food groups, points are given for lower intake (up to 2 points), and for red meat and high-fat dairy, points are given for moderate consumption (up to 2 points).
- There are no neutral food groups. However, some foods (insects, alcohol, coconut) are not classified into any of the GDQS food groups.
- This scoring system reflects both positive and negative dietary behaviors, enabling the GDQS to assess overall diet quality in a single, interpretable metric.
- The score (ranging from 0 – 49) corresponds to the following levels of risk of poor dietary outcomes (nutrient inadequacy and NCD-related outcomes): high risk: <15, moderate risk: ≥15 and <23, and low risk: ≥23.

GDQS sub-metrics

- **GDQS (+)**: The GDQS positive (+) is the total score as a sum of 16 healthy GDQS food groups (score ranges from 0-32). A higher score indicates a higher relative contribution of healthy foods to the diet.
- **GDQS (-)**: The GDQS negative (-) is the total score as a sum of 7 unhealthy food groups and 2 food groups considered unhealthy when not consumed or consumed in excessive quantities (high fat dairy, red meat) (score from 0-17). A lower score shows a higher relative contribution of unhealthy foods to the diet.
- While sub-metrics can be more informative for certain research questions (e.g., understanding patterns of unhealthy food consumption), the full GDQS is essential when the goal is to report an overall measure of diet quality. Sub-metrics can help diagnose specific issues, while the GDQS summary score provides a holistic view of diets for tracking and comparison.

Quantity of [food group] consumed

Beyond the GDQS and its sub-metrics, the GDQS app yields useful information about the 25 individual food groups covered. This includes categorical quantities (e.g. "low," "medium," or "high") for each food group, which is assessed using 3D cubes as a visual aid to help respondents estimate their level.

While GDQS and its sub-metrics (GDQS+, GDQS-) provide high-level summary measures for monitoring and evaluation, food group indicators—such as the proportion of the population consuming low, medium, high, or very high (in the case of high-fat dairy) amounts of each group—offer more detailed insights that can be potentially useful for program design. When data are collected via the GDQS app, researchers can even examine individual foods and ingredients consumed within food groups for context-specific strategies. All outputs are important; they serve different purposes along a continuum from broad assessment to targeted intervention.

Proportion of [population group] that consumed [food group]

Similarly, a binary indicator can be generated to measure the presence of food groups (yes/no) in an individual's diet, in any amount. At the population-level, this can estimate the proportion of the population that consumes the food group. These indicators can be created for each of the 25 food groups pre-defined by GDQS.

Additional notes on indicators

Dietary data collected with the GDQS app can be used to calculate other commonly used indicators of diet quality such as the Minimum Dietary Diversity for Women (MDD-W), Diet Diversity Scores (DDS), and the Global Dietary Recommendations (GDR) score (with additional questions added to the GDQS app), among others.

GDQS cannot be used to calculate the intake of specific nutrients that are over- or under-consumed in the population. Quantitative intake data on macro- and micronutrients is needed for this type of analysis as is the use of a food composition table and conversion factors. GDQS cannot be used to calculate the intake of specific nutrients that are over- or under-consumed in the population. Quantitative intake data on macro- and micronutrients is needed for this type of analysis as is the use of a food composition table and conversion factors.

Pros

- Captures a full picture of the diet: it includes both healthy and unhealthy food groups, unlike many diversity-only focused indicators.
- Dual predictive power assesses both risk of nutrient inadequacy and NCD risk, making it ideal for double burden contexts.
- The GDQS was not validated against MDD-W or AHEI; instead, its validation focused on outcomes of interest—nutrient adequacy and risk of NCD-related outcomes—with comparisons made to similar analyses using MDD-W and AHEI for context.
- The GDQS app includes a built-in database that automatically classifies all foods, beverages, and ingredients into the correct food groups. This feature is a major strength, as it removes the burden of manual classification from respondents, enumerators, and researchers.
- Adaptation to local contexts: food items reported during the data collection that are not in the global food database can be added by enumerators during interviews; missing foods are manually classified into GDQS food groups.
- The GDQS can typically be deployed in less than a month of preparation and in-person data collection.
- Efficient data collection and tabulation with the GDQS app: the app streamlines fieldwork (10-20 minutes per respondent), use of open recall, and score calculation, and eliminates food group classification errors (as food items are already matched to food groups within the app).
- The app has been found to be user-friendly and effective for dietary data collection in low-resource settings, with enumerators providing positive feedback in particular on ease of use of the open recall of food items and the 3D cubes as visual guides.
- When data is collected with the GDQS app, a list of all foods, beverages, mixed dishes, and ingredients consumed by each respondent is outputted automatically.
- No need for food composition tables.
- GDQS requires significantly less time and training than a quantitative 24-hour recall; the open recall training and cube use is simple.
- The app and database are available in twelve languages and can be translated into other languages as needed.
- Data collected with the app can be used for other food group classifications or to derive other indicators (e.g., MDD-W).

Cons

- GDQS tracks consumption ranges at the food group level, not individual foods, so it does not provide actual intake data and cannot assess dietary adequacy.
- Does not capture day-to-day variation of within-person diets and therefore cannot be used to assess individual diets or usual intake. For this reason, GDQS data cannot be used to assess the probability of adequate intake of specific nutrients or micronutrients or estimate the proportion of a population with inadequate intake.
- The GDQS app must be used in person to enable participants to visualize quantities of food groups consumed in relation to the different-sized 3D cubes—this cannot be done by phone or self-administered over the computer.

Tool and indicator validation

To ensure these indicators are reliable and meaningful, validation studies have been conducted across diverse settings and populations.

Validation is essential in determining the suitability of a dietary assessment instrument, focusing on its validity, misreporting and measurement errors. Validity assesses how accurately the instrument reflects actual intake, usually in comparison with other methods. Misreporting, influenced by factors like social desirability or memory limitations, can impact accuracy. Measurement errors, either systematic (bias) or random, affect the reliability of findings. Every dietary assessment method has its own set of potential biases and errors – no method is perfect.

A collection of GDQS validation studies is available in the Journal of Nutrition (for adults) and Nutrition Reviews (for children). GDQS indicators were evaluated in relation to nutrient adequacy and NCD outcomes, demonstrating strong predictive capacity. The GDQS app was also validated as a standardized means of collecting data that can accurately assess nutrient adequacy and metabolic risk. The 3D cubes used in conjunction with the app have been validated against WFR as well, finding strong agreement in their portion size estimation.

Additionally, Hanley-Cook 2024 found that standardized sub-metrics for healthy (GDQS+) and unhealthy (GDQS−) food group consumption showed strong agreement and correlation with quantitative 24-hour dietary intake data, reinforcing their validity across diverse dietary contexts.

Lower-resource adaptations

In settings with limited resources, adaptations to the data collection methods can help maintain data quality while reducing costs and logistical burdens.

- Integrate GDQS into existing surveys to reduce fieldwork costs and streamline implementation. As a ready-to-use tool—with app-based modules and automated indicator calculators—it minimizes misclassification and lowers respondent and enumerator burden.
- Use purposive sampling by selecting a limited number of communities or areas to draw a sample of individuals with contrasting characteristics (e.g., urbanicity, market access) instead of full population-based sampling.
- Consider the Diet Quality Questionnaire (DQQ) when time is extremely limited to prepare and adapt tools, and interviews need to be very short (e.g., around 5 minutes).
  - For preparation: the GDQS app usually requires minimal adaptations that can take about 2 weeks, unless translations or needed, which may need 4 weeks. Meanwhile the DQQ questionnaires are available and translated in most languages, having already been administered in over 85 countries (see DQQ for more details).
  - For data collection: the DQQ needs about 5 minutes, while the GDQS can take from 10-20 minutes.

  However, the DQQ has its own limitations: it does not capture portion sizes, cannot estimate nutrient intake, and may be less sensitive to dietary diversity within food groups. Therefore, it does not provide the same depth or specificity of dietary quality information as the GDQS. This more general picture of diet quality may not be suitable for all research or policy objectives.

Higher-resource adaptations

Conversely, in high-resource contexts, expanded data collection and broader geographic coverage can enhance the depth and utility of GDQS findings.

- Increase the frequency of data collection (e.g., to capture seasonal and/or temporal changes in diets)
- Expand the geographic scope of the study by adding other population groups (e.g., rural) for purposes of comparison or for conducting cross-country comparisons.

Sampling and data collection considerations

Regardless of resource level, thoughtful sampling and data collection strategies are essential to ensure representativeness and relevance of GDQS data.

The sampling approach depends on the user's question of interest and target population, but it is crucial to ensure a study's sample is representative of the target population. The two primary sampling approaches are probability and non-probability sampling. There are several methods of probability sampling, including:

1. simple random sampling, where any member of the target population has an equal chance of being selected into the study;
2. interval sampling, in which people of the targeted group are continually available and selected into a sample (i.e., consumers in a market); and
3. stratified sampling, which divides the target population into groups for sampling, and/or cluster sampling which uses groupings from which the sample population is selected.

In urban settings, administrative boundaries and enumeration areas can help organize sampling. In many countries, lists of enumeration areas can be acquired, after which a sample frame or list of households or targeted individuals from each of those areas are developed, from which households or individuals are sampled. Correcting for over- or under sampling through sample weighting is essential to improve data accuracy. If the question of interest is to assess changes at population-level in dietary quality due to a program or policy, it is critical that the sampling frame include populations that have been exposed to those interventions. Non-probability sampling methods, such as convenience and snowball sampling, can be used when ease of access is prioritized.

Careful conceptualization of the relationship between food environments and diets helps guide geographic focus and sampling strategy, ensuring more meaningful and representative results. For example, if your question of interest is to compare between areas of differing levels of urbanization, the geographic frame could include urban, peri-urban, and rural areas, and a sampling strategy would need to select a representative sample of households and individuals.

As the GDQS app is now validated for use in all target groups except 0-23 months, it can be used if there is interest in targeting multiple members of the household that are nutritionally vulnerable.

Other data sources

When primary data collection is not feasible, alternative data sources can complement or substitute GDQS-based assessments, though each comes with its own trade-offs.

While it is ideal to collect primary data, real world limitations to data collection in urban settings may prevent this, including on the implementing side (e.g., budget/resource constraints) and in the field (e.g., difficulty in accessing populations, conflict-affected settings). It may be helpful to examine secondary data sources, either as background to inform primary data collection or in place of it, if data collection is not feasible.

Data Sources	Pros	Cons	Indicators
Household consumption and expenditure surveys (HCES) [Household-level consumption]	Low cost, nationally -representative -Conducted regularly (every 3-5 years) with a large sample -Contains other variables such as data on socioeconomic status, education, and other determinants relevant to nutrition -often also includes acquisition data (food acquired from purchases, production, in-kind)	-Need nutrition and data analysis expertise -Modules are heterogenous across countries, making comparisons challenging -Does not differentiate between subgroups to estimate differences in probability of deficiencies in high-risk groups -Household level (no individual dietary data), does not address intra-household allocation issues that may affect household members -May have issues with accurately recording food consumed away from home (FAFH) which are very important in urban settings (e.g., street foods, meals consumed at school)	-Diet diversity (Household diet diversity score) -Food consumption (Food consumption score) -Nutrient availability: macronutrient and micronutrient availability per capita per day (micronutrient availability requires use of FCT), per capita energy intake. -Consumption patterns (frequency or shares of animal-sourced foods, staple foods, ultra-processed foods)
Global Dietary Database [Individual-level diets]	-Harmonized data (variables, units, food definitions) for individual-level dietary data from nutrition surveys for 188 countries	-Need nutrition and data analysis expertise -Surveys use different designs and tools -Certain food categories excluded (e.g., poultry, dairy-based desserts, highly processed or packaged foods, mixed dishes and recipes, condiments and spice, supplements)	-Includes 51 dietary factors including 14 foods, 7 beverages, 12 macronutrients, and 18 micronutrients

Data Sources	Pros	Cons	Indicators
GIFT Database (FAO) [Individual-level dietary diversity]	-Data are disaggregated by sex and age. -Individual quantitative food consumption data coded with the FoodEx2 classification system, data are screened and formatted using R -dashboards presenting indicators and summary statistics on foods and diets -Can link food groupings to own dietary data (dataset available upon request)	-Need nutrition and data analysis expertise, particularly as outliers and missing data not removed from original datasets and energy and nutrient values are provided directly from surveys (does not link food consumption datasets to food composition data) -Data not available for some countries -Many datasets are old and often not nationally representative -No data on statistical weights	-Statistics on food consumption can be calculated for individual food items or using the nutrition-sensitive food groups (e.g., sources of micro- and macronutrients in the diet, macronutrient contribution to total intake) -Estimated usual intakes of selected nutrients (with SPADE tool) -MDD-W (and Food group diversity score, individual food group consumption) -Food consumption (daily diet g/per person per day, proportion of food groups consumed (%), calories per person per day) -other indicators for food safety (dietary exposure to chemicals) and environmental impacts of food consumption (emission, water, and land use)
Demographic and Health Surveys	-Nationally representative data on dietary diversity	-Need nutrition and data analysis expertise -Alternatively, the DHS StatCompiler and mobile app allows for automatic indicator calculation and disaggregation	MDD-W -IYCF practices (MAD, MDD, MMF) -Percentage consuming food group (PLW, WRA)
Gallup World Poll (GWP) (Global Diet Quality Project)	-Global coverage and standardization (140 countries, including those that lack nutrition surveillance data) -Integration with economic, social and health indicators -Frequent updates (every 5 years) -Samples adults aged 15+ (not just women)	-Other national surveys tend to align more closely with DHS than GWP. -GWP often collects data in lean seasons, potentially underestimating MDD-W compared to DHS. -Validating MDD-W for males aged 15–49 could expand GWP's utility. -Greater variability in GWP estimates than DHS.	MDD-W, DDS -All-5, protective, and unhealthy food consumption -Healthy diet pattern for NCD prevention -Zero fruit or vegetable consumption -Consumption (yes/no) of food groups included in the DQQ

Illustrative research using these tools and indicators in urban settings

- The Global Diet Quality Score is associated with nutrient adequacy and depression among Vietnamese youths (Nguyen 2023)
- Application of the Global Diet Quality Score in Chinese Adults to evaluate the Double Burden of Nutrient Inadequacy and Metabolic Syndrome (Yuna 2021)
- Influence of home and away-from-home food environments on diets in urban and peri-urban Kenya: Insights from the Global Diet Quality Score (Maredia 2024)

GDQS and Dietary Assessment-Related Resources

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