

BRIEF

Introduction

Presenting data to decision makers in clear and engaging ways is vital to inspiring evidence-informed policies and programmes in Nigeria. Data visualization—the process of graphically displaying data to tell a story—can be used to transform data into information for different audiences. Data are commonly visualized in reports, presentations, and increasingly in online dashboards and applications for mobile devices. However, there have been few efforts in Nigeria to assess whether data visualizations are understood and preferences among the audiences they are trying to reach. **The aim of our research was to explore data visualization literacy—defined as the ability to read, interpret, extract, and translate information from data visualizations—as well as data visualization preferences among stakeholders working in the nutrition sector in Nigeria.**

Methods

Between September 2021 and January 2022, we conducted an online survey (n=177) and follow-up interviews (n=8) with stakeholders working in the Nigeria nutrition sector at federal and state levels. We recruited online survey participants through email outreach to nutrition stakeholder groups including the Nutrition Society of Nigeria, States’ Committee on Food and Nutrition, Civil Society Network, Development Partner Network, and Twitter. In Section 1 of the online survey, respondents interpreted data visualizations based on tasks identified from data visualization literature. In Section 2, respondents ranked their preference among two graphs using different visualization approaches to communicate the same data and key message. We conducted follow-up interviews with eight online survey participants to expand on responses and get feedback on different ways of presenting data. They were asked to “talk aloud” (e.g., narrate) as they interpreted data visualizations. All examples featured nutrition-related data from Nigeria.

Key Findings

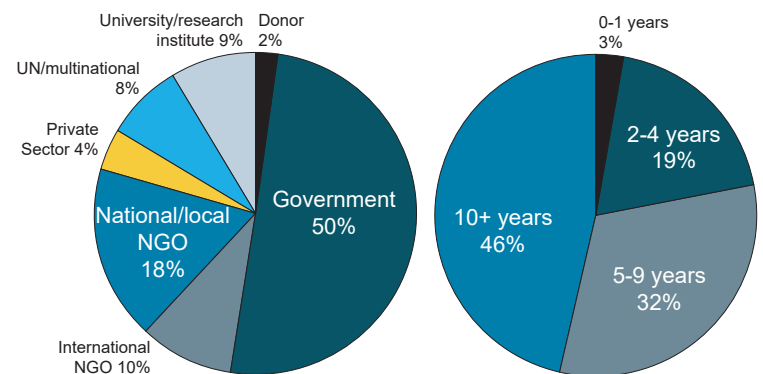
Participant Demographics

A majority of online survey respondents represented government, identified advocacy (planning or implementing an effort to raise awareness for an issue) as part of their nutrition-related role, and reported using data to inform decision-making.

Key Messages

- Basic data visualization literacy is high among nutrition sector stakeholders in Nigeria
- Identifying actionable insights from data visualizations remains challenging
- Bar charts are frequently preferred, but stakeholders are open to new approaches
- Simple design steps can improve understanding of data visualizations

Online Survey Organization Affiliation & Years of Experience (n=177)



Interview Respondents (n=8)

- 5 worked for government
- 5 worked in health sector
- 7 had 10+ years of experience
- Equally divided between federal and state levels

Basic data visualization literacy is high; Interpretation of key messages is a challenge

Most participants correctly answered questions used to assess basic interpretation skills (e.g., retrieve values, identify ranges, notice trends). Furthermore, 81% of participants correctly identified statistical significance of an estimate within a graph – a skill beyond basic-level data literacy. Respondents struggled with information retrieval from the visualization in Example 2 (see below), which featured multiple data sources.

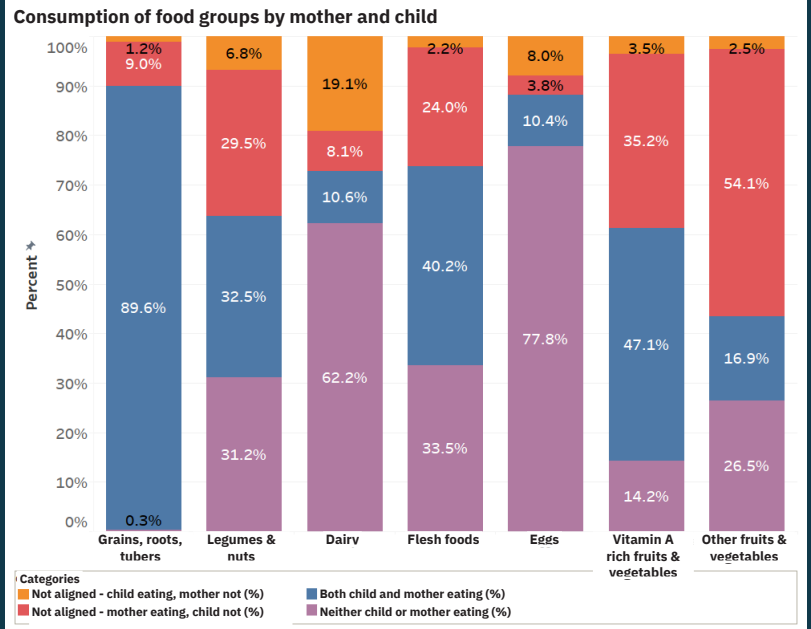
Interview respondents experienced challenges with more advanced data literacy skills including identifying overall key messages of data visualization. Some participants described a specific data visualizations as “easy” to interpret but then offered an incomplete or incorrect interpretation.

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| 71% Health or Agriculture sector | 72% Self-rated as being at an intermediate level working with data | 70% At least Master’s degree |
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Example 1: Making Sense of New Indicators

Why was this figure included? The Nigeria DHS 2018 includes data on food groups consumed by women and children 6-24 months. DataDENT developed new indicators to compare mother and child food group intake and wanted feedback on how to visualize them.

Most online survey respondents (82%) had seen a stacked bar chart before and were able to correctly identify specific values within the figure. Most identified the proportion of mother-child pairs that both ate legumes & nuts and whether consumption of Vitamin A rich fruits and vegetables is aligned vs. not aligned. In interviews, some participants were unclear about what the colours represented, the meaning of “aligned” and “not-aligned,” and were overwhelmed by the volume of information depicted. Participants suggested a basic bar graph as a better approach. We presented them with an alternative version using pattern fill and fewer colours in the stacked bar and revised category labels (“neither child or mother eating,” “both child and mother eating,” “only mother eating,” and “only child eating.”) Interview respondents preferred the original four-colour shading but liked changes to the category names.

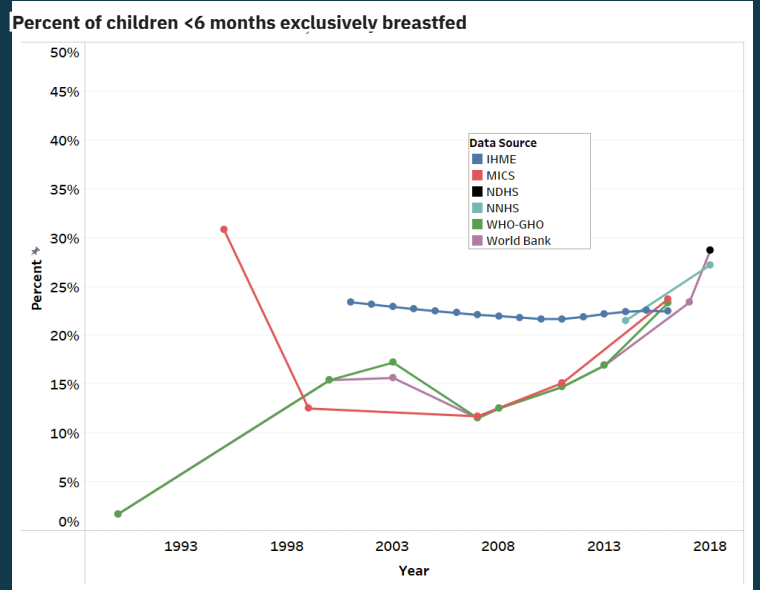


“I could spend some time with my own experience to try and understand it. And again. I come back to ‘who is this dataset intended for?’ If it is for me, it takes me some while I guess to understand it. But if it is for someone...say policymakers who... may not have the background that I’m privileged to have so they can’t interpret the data.” – Respondent, International NGO

Example 2: Making Sense of Multiple Data Sources

Why was this figure included? This graph is from the Federal Ministry of Health Multi-Source Data Analytics and Triangulation Platform (MSDAT), a dashboard developed and managed by the Department of Health Planning Research, and Statistics. The study team wanted to assess how individuals interpret a graph with multiple data sources—particularly since some estimates are not aligned. One quarter (24%) of the online survey participants reported that they found this figure difficult to interpret. Most (89%) had previously seen data visualizations that present multiple trend lines in a single figure. The multiple data sources appeared to complicate sensemaking.

- Most (92%) correctly identified that exclusive breastfeeding (EBF) was higher in 2013 than 2008
- Majority (74%) correctly identified that EBF was similar across data sources in 2016
- Only a third (36%) correctly identified that EBF in 2003 was 12-24%
- Only (18%) correctly identified that EBF stayed constant between 1999 and 2006



In interviews, respondents focused on reading specific estimates and trends for each data source, and noted discrepancies in estimates across data sources. Few individuals shared an overall takeaway message from the graph. Most individuals said they were unfamiliar with Institute for Health Metrics and Evaluation (IHME) as a data source and preferred using NDHS, NNHS, and MICS. When the research team presented interviewees with two different descriptions of the data sources, one that is currently included in MSDAT and a second abbreviated version that emphasizes the type of data source (e.g., survey, modelled estimates, etc.), there was no clear preference. One participant pointed out that policymakers would not care to see information about data sources. It is unclear whether individuals understood distinctions between the sources and their implications for using the data.

“I think it is easy to interpret, although I don’t think it will be that easy for someone who is not very much used to data. But I mean for me, I think it’s very easy to interpret. But for someone who is not very used to data, maybe I would say medium because the numbers... I mean you’d have to for example trace the numbers to see exactly which one refers to.” – Respondent, Government

“If I have to use this data, I would rather use one or two [data sources] that are similar. For example, this IHME does not tell (continued next page)

me a story. Sorry I'd remove it. I would rather stay with WHO-GHO and MICS and World Bank. Yes, data is good. We could present everything like this, but you have to ask yourself at the end of the day. Does it not really confuse those that you want? So I would stay with fewer data." –Respondent, International NGO

Preference for bar charts and maps but open to innovation

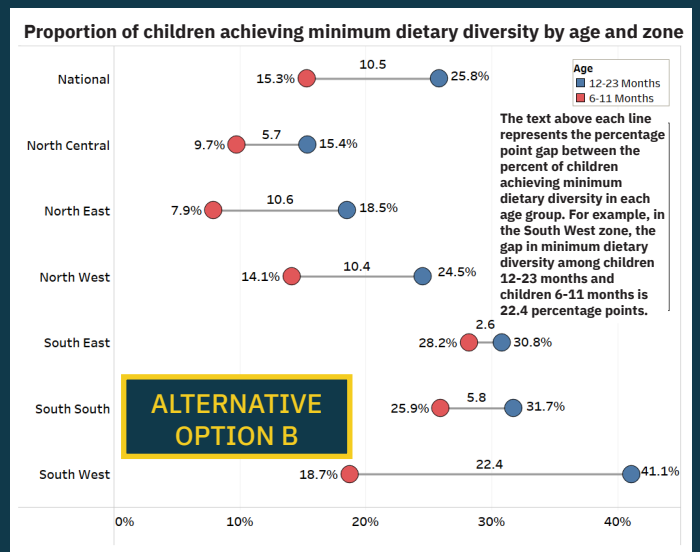
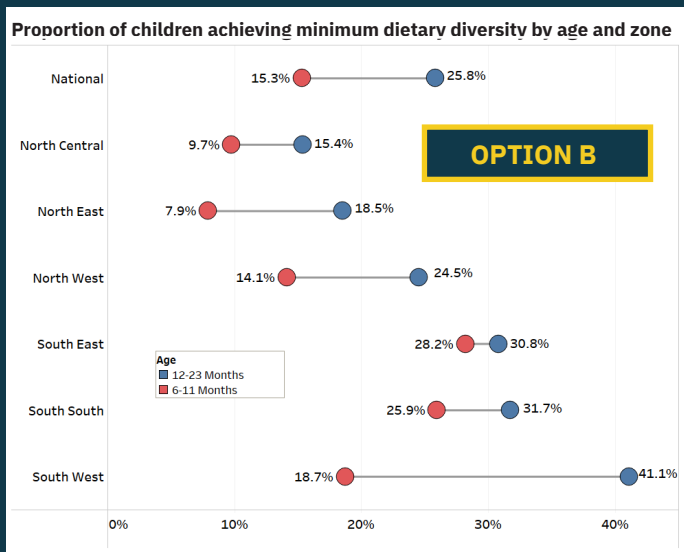
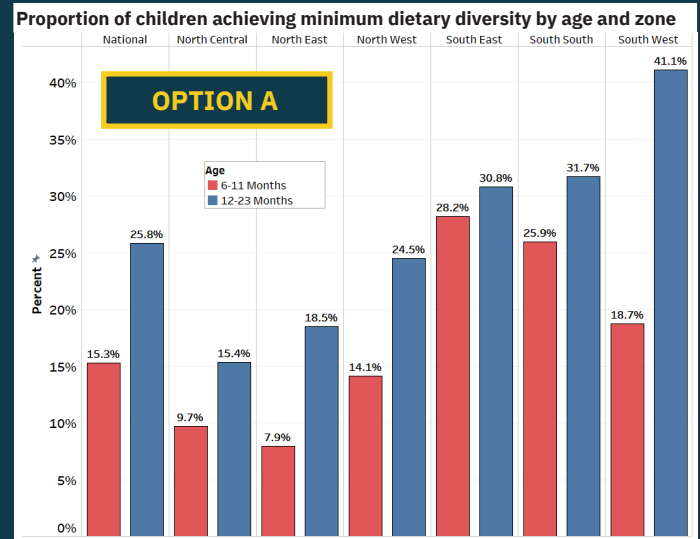
In section 2 of the online survey, participants generally chose bar charts over alternative options. The alternative options represented more unique data visualization approaches—a dumbbell plot, bubble plot, and map. In the third set, preferences were split between the bar chart and map options.

Example 3: Preferences when visualizing gaps

Why were these figures included? The study team included a connected dot plot as these are increasingly being used to emphasize gaps in estimates and to visualize equity.

A majority of online survey (93%) had seen option A (bar graph) before, while only half (48%) had seen option B (connected dot plot/dumbbell plot) before. Most preferred option A (81%). In interviews, individuals felt strongly about option A being a superior option for facilitating quick interpretation. Participants acknowledged that the added text box and data labels in alternative option B reflected an improvement. One individual described option A, the bar graph, as “business as usual” and described the connected dot plot as “contemporary.”

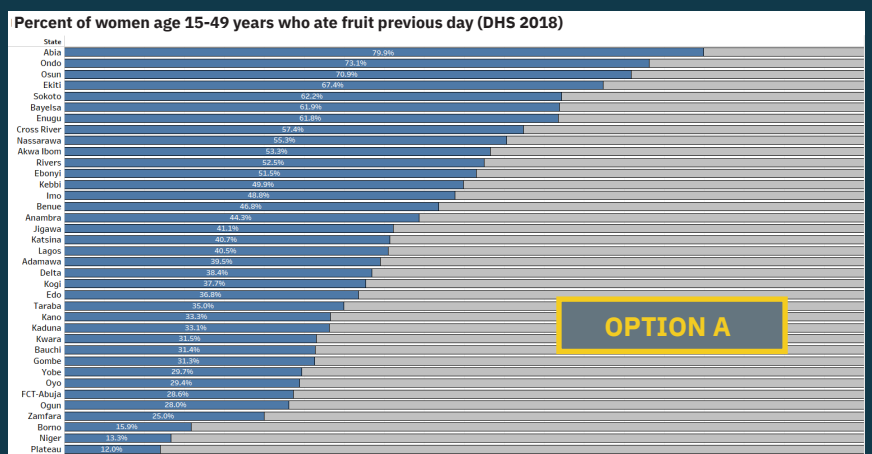
“I think they will prefer to see a newer version of interpreting—a new version of presentation. It attracts attention. It makes people want to listen and curious to understand what exactly is being presented.”
–Respondent, International NGO



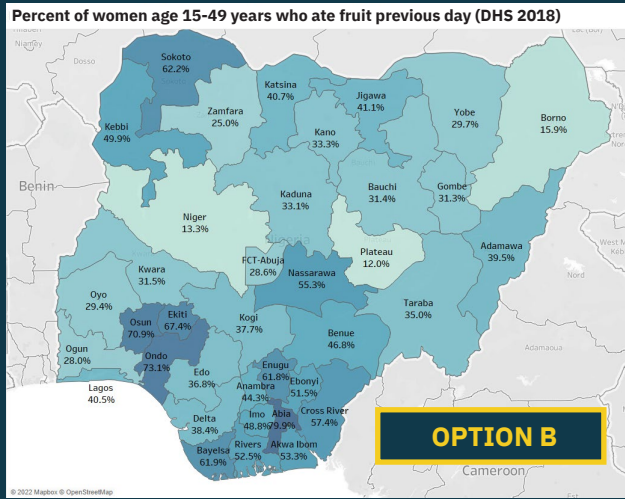
Example 4: Preferences when visualizing subnational data

Why were these figures included? Subnational data are commonly presented in Nigeria given the focus on state-level planning and implementation of nutrition programmes and policies.

Most online survey respondents had seen graphs like both option A (bar graph) (88%) and option B (map) (92%). Just over half respondents (56%) preferred option A. During interviews, three individuals discussed how maps enable policymakers to quickly compare performance of states – both in the context of neighbouring states and states of certain political parties. (continued on next page)



“So there are two dimensions to read, for us they’re interested in what’s the neighbouring state does because usually neighbouring states have similar political and administrative climates. Also, they like to compare across political parties. So say if for example you want to know how the PDP states are faring compared to how the APC states are faring”
 – Respondent from Government



How should I visualize my data for nutrition audiences in Nigeria?

Based on our findings and global best practices, we recommend the following steps when choosing how to visualize data for nutrition audiences in Nigeria.

1. Identify your target audience and communication goals

There is no “one size fits all” approach to data visualization. It is important to identify your target audience and how you expect them to use the information visualized. Generally, data visualizations should be as simple as possible and include the minimum amount of data needed to communicate effectively to the audience. Questions to consider when thinking about an audience: Who is the data visualization trying to reach? How familiar are they with the data and concepts being communicated? How comfortable are they when it comes to interpreting figures, tables and other data visualizations?

“Especially these policymakers we interact, some of them don’t have time. So when it is a bit difficult, they will not understand what you are saying. It has to be a clear graph that they can pick at a glance and say ‘OK this is my situation. This is what is happening in my state. Ok I see it compared to other states.’” – Respondent, Government

Visualizations like Example 2, which include trends from multiple data sources, assume that the audience appreciates the implications of the different data sources and can draw their own conclusions from the data. Many audiences may not be prepared to do this. They are best served by visualizations that include a more focused set of data where key messages are clearly articulated in the visualization. Policy makers are an audience with specific needs. They are pressed for time and their subject matter expertise around nutrition varies.

2. Prioritize comprehension over aesthetics

A complex or artistic data visualization can be visually impressive, but it is most important that the visualization is understandable to the intended audience.

“We look at the people that we’re trying to pass that information to. So we try to design a bar chart or graph that can help their comprehension rather than ones that may be very beautiful...The context of the data is critical. It’s important.” – Respondent, International NGO

“People’s curiosity tend to be aroused when something new is presented to them in a new technique...it should also move from the traditional method of presenting to more contemporary methods, techniques and styles.”
 – Respondent, International NGO

Balance between bar graphs and other visualization strategies
 Study participants had a strong preference for bar graphs, except when visualizing subnational data, where there was a split between preferring a bar graph and a map. A similar preference for bar graphs was seen in a study of health and nutrition decision-makers in Tanzania. This does not mean, however, one should only use bar graphs when visualizing data for Nigerian nutrition audiences. Some participants preferred maps over bar charts to facilitate quick comparisons of data from adjacent states. People are generally attracted to new ways of visualizing data – but may require support with interpretation. Example 3 shows one way that interpretation support can be embedded within a data visualization.

Use a clear title and appropriately label data visualizations
 Interview respondents used a common set of steps to review a data visualization: they first read the graph title, then axes labels, followed by legend titles. These elements functioned as guideposts to help facilitate interpretation. Therefore, it is very important that these elements are visible, accurate and clearly labelled. Including the key message in the graph title can help audiences focus on the intended key messages.

3. Involve key audiences in the design process

Engaging your key audiences while developing a data visualization is one of the best ways to ensure that it is comprehensible. Something as simple as asking a colleague to try to interpret it before you include it in your output can help you improve it. Involving stakeholders may also help facilitate buy-in and use of the output