

C **Measures of dispersion:**

A child's weight for age is given as a percentile score of 20% of standard. What does that mean? (20% of healthy children have a weight for age the same or lower than this child; 80% of healthy children have a higher weight for age). Does this tell us anything about what percentage of other children in the sample have higher or lower weight for age?

**Step 4:** Distribute **Handout 6.3** and display **Transparency 6.5**. Divide participants and facilitators into four groups.

Group 1: Numeric Data, Discrete

Group 2: Numeric Data, Continuous

Group 3: Non-numeric Data, Nominal

Group 4: Non-numeric Data, Ordinal

Write the following instructions on a flipchart or overhead sheet:

For each of the data summaries described in **Handout 6.3**, decide whether or not this summary is appropriate for your type of data. Explain why or why not.

If the summary is appropriate, explain its limitations.

**Step 5:** During plenary, discuss relationships between different types of data and different situations in which some summaries are and are not meaningful for different types of data. Emphasize those summaries that are never appropriate for non-numeric data.

Distribute **Handout 6.4** (matrix of summary/statistic use for different types of data).

**Session 4 Interpretation of M&E Data/Information . . . . . 90 minutes**

**Step 1:** Explain to participants that once we produce summaries of the data through analysis, we need to interpret the results we obtain. Ask participants what tools we use to interpret data and ensure that the following points come out:

- Logic
- Knowledge of the programme
- Knowledge of nutrition, health, other programmes
- Experience

**Step 2:** Explain to participants that experience is the best teacher, so we are going to interpret some examples together so that we can get a sense of the process of interpreting results. Divide participants into 3 groups and provide each group with one of the following scenarios to interpret. Allow 30 minutes for interpretation.

### Scenario 1: Interpretation of Qualitative Analysis Results

You have just completed the analysis of baseline data for a program with the **goal of promoting improved feeding practices among young children**. One **objective** of the data collection was to **describe mothers' introduction of soft baby foods to their youngest child in the programme area**.

The **method of data collection is qualitative using two focus group discussions among young mothers (20-30 years old) and two focus group discussions among older mothers (> 45 years)**.

You obtained the following results (G1=focus group 1; G2=focus group 2)

#### ***Young Mothers***

Focus Group	Age at introduction of soft food	Type of foods first introduced	Frequency of feeding/day
G1	Range 4-7 months	< soft porridge < soft porridge sometimes with groundnuts < soaked biscuits	1-2 depending on availability of the mother
G2	Mean 6 months	< soft porridge with sugar < mashed potatoes < mashed fruits	1-2 depending on availability of the mother/caretaker and the appetite of the child

#### ***Older Mothers***

Focus Group	Age at introduction of soft food	Type of foods first introduced	Frequency of feeding/day
G1	Range 5-11 months	< soft porridge < soft fruits	1-2 depending on food availability
G2	Mean 8.5 months	< soft porridge < soft fruits	1-2 depending on food availability, availability of mother/caretaker, age of child, and whether child is sick

Summarize the information from the four focus group discussions, and make conclusions on the findings given the specific baseline objective.

Scenario 2: Interpretation of Quantitative Analysis Results

You have just completed analysis of baseline and follow-up data from a program with the **goal of reducing under-5 child mortality**. Two of the programme's **objectives** were to **reduce severe malnutrition** (weight/age) and, since the number of deaths due to moderate malnutrition is greater than those due to severe malnutrition, to **reduce moderate malnutrition** (weight/age).

The method of data collection was quantitative. **At baseline and at follow-up, weights were measured for a representative random sample of children in the programme and comparison areas using the same methodology for all assessments.** The findings of your analysis are presented below.

**Baseline and follow-up data for children with severe and moderate malnutrition in the programme**

Assessment	Programme		Comparison	
	Severe	Moderate	Severe	Moderate
Baseline	13.2	30.0	12.6	31.0
Follow-up	6.2	37.5	16.2	30.5

Summarize your results and make specific conclusions based on the programme's objectives for severe and moderate malnutrition. Recommend future action.

Scenario 3: Interpretation of Quantitative Evaluation Results

You have been asked to help an NGO evaluate the effects of their home gardening intervention in Jadini Division of Ocean District. The **goal** of their programme is to reduce vitamin A deficiency among pregnant women, and one of their objectives is to **increase the consumption of dark green leafy vegetables (DGLV) in their programme area**.

The NGO's intervention has been to extend home gardening at the beginning of the vegetable growing season, which starts with planting in November, throughout the country. Prior to planting, they established a vegetable seed distribution network and posted extension workers who train women's groups in vegetable cultivation and provide nutrition education.

The method of data collection was quantitative. To evaluate their intervention, the NGO has conducted **bi-monthly dietary assessment among pregnant women to determine their daily DGLV intake in grams starting three months prior to**

**vegetable planting time and continuing until the present.** To provide a **comparison population**, they conducted **identical dietary assessment** in Africana Division of Mountain District, where they have another programme that provides nutrition education for consumption of DGLV but no home gardening inputs. They have provided you with the following data for conducting your evaluation.

**Mean dark green leafy vegetable intake by pregnant women, Jadini Division of Ocean District and Africana Division of Mountain District, 1997-1998**

Area	Aug	Oct	Dec	Feb	Apr	Jun
	--grams--					
Jadini Division, Ocean District (Home Gardening and Nutrition Education Intervention)	10.2	10.5	30.6	30.3	25.2	18.7
Africana Division, Mountain District (Nutrition Education Intervention)	10.1	10.6	20.4	18.7	13.8	10.4

Summarize your findings based on the NGO's objectives for increasing DGLV consumption among pregnant women. Recommend future action.

**Step 3:** Conclude this session by asking participants if they have any further questions about qualitative or quantitative data analysis.

**Session 5 Data Presentation . . . . . 60 minutes**

**Step 1:** Introduce this session by reminding participants that we have 1) prepared our data for analysis by organizing it into a usable form and by cleaning it to ensure quality, 2) analysed the data to summarize our findings, and 3) interpreted the findings.

The next step is to present the data in a meaningful way that will support the conclusions and recommendations we will include in our report.

**Step 2:** Ask participants to brainstorm about the important factors to consider when presenting our findings and interpretation. Record their suggestions on a flipchart. The following points should come out:

- easy to understand;
- appropriate for the audience;
- appropriate for the data;
- supports the point we wish to convey.

**Step 3:** Ask participants what formats they would use to present qualitative data to support their interpretations. The following formats should be mentioned:

- matrices
- diagrams
- taxonomies
- decision charts
- narrative descriptions
- a list of quotations and key phrases
- figures
- case studies

Refer back to the flipchart summarizing important factors to consider when presenting findings and remind participants that these factors apply to qualitative results as well as quantitative results.

Distribute **Handout 6.5** on formats for presenting qualitative data and ask participants to read through it. Answer any questions they have about formats for presenting qualitative data.

**Step 4:** Ask participants how they would present quantitative data to support their interpretations.

**Step 5:** Review the use of tables for presenting quantitative data. Remind participants about the need to use tables for presenting a clear message.

Display **Transparency 6.6** which shows a table with too much information. Ask how it can be improved to bring out the issue of deaths related to malnutrition. Then display **Transparency 6.7** and ask participants to give a title for the table. Write it on the transparency.

Display **Transparency 6.8**, showing the top table first as a presentation of the data as they were summarized from the questionnaire. Then show the centre table which emphasizes reported practices and, finally, the bottom table which shows the actual use of iodized salt. Emphasize:

- C the use of highlighting effects or factors of interest;
- C the simplicity of presentation;
- C the limitations of tables for use with community groups;
- C the need for clear and descriptive titles;
- C the need to present all information in the table to enable readers to make their own calculations.

**Step 6:** Review the use of line graphs and how they can be used to present a clear message. Display **Transparency 6.9** which shows a line graph that emphasizes trends related to intake of dark green leafy vegetables by pregnant women. (This transparency shows data from Scenario 3).

Ask participants how this graph could be altered for use with community groups. They should mention the use of pictures for planting, harvesting, and other events.

Display **Transparency 6.10** which shows a line graph using a numerical scale but cross sectional data (and multiple lines).

Display **Transparency 6.11** which shows a line graph but has too large a scale on the Y-axis. Discuss the:

- C need for a meaningful scale on the Y-axis to improve understanding, so that it is not misleading;
- C use of time scale on the X-axis that shows trends;
- C use of pictures to highlight time events that can facilitate presentation with community groups;
- C importance of axis labelling.

**Step 7:** Review the use of bar charts to present a clear message. Display **Transparencies 6.12 and 6.13** and discuss the different message each emphasizes. (These transparencies show data from Scenario 2. One transparency emphasizes changes in malnutrition status within the programme and control, while the other emphasizes comparisons between programme and control for each category of malnutrition). Emphasize the following:

- pairing of bars to emphasize particular results;
- comparison with same data presented by line graph.

**Step 8:** Review the use of pie charts to present a clear message. Display **Transparency 6.14** (from Scenario 2). Discuss the following points:

- pie charts provide visual summaries of the relationship of parts to a whole (e.g., severe malnutrition in relation to overall nutritional status);
- “exploding” a pie segment provides emphasis;
- as the number of categories increases, pie charts become less useful.

**Step 9:** Summarize the session by reviewing the steps from data collection to reporting. Answer any questions participants may have about data presentation.

## QUALITATIVE DATA ANALYSIS

Qualitative data may be collected through open-ended questions in self-administered questionnaires, individual interviews, focus group discussions, or through observations during fieldwork. Data requested in open-ended questions include respondents' opinions on a certain issue, reasons for a certain behaviour and description of certain procedures, practices or beliefs/knowledge with which the evaluator is not familiar.

The data can be analysed in three steps:

1. List the data for each question. Take care to include the source for each item you list so that you can place it in the original context if required. How you will categorize qualitative data depends on the type of data requested.

In the case of data on opinions and reasons, there may be a limited number of possibilities. Opinions may range from very positive to neutral to very negative. Data on reasons may require different categories depending on the topic and the purpose of the question.

2. To establish your categories, first read through the whole list of answers. Then start giving codes for the answers that you think belong together.

3. Next, try to find a label for each category. After some shuffling you usually end up with 4 to 6 categories. You should enter these categories on the questionnaire and on the master sheet.

If you categorize your responses to open-ended questions in this way you can:

- report the percentage of respondents giving reasons or opinions that fall in each category;

- analyse the content of each answer given in particular categories, to plan what actions should be taken.

Questions that ask for descriptions of procedures, practices, beliefs/knowledge are usually not meant to be quantified although you may quantify certain aspects of them. The answers rather form part of a puzzle that you have to put together carefully. When you are analysing questions of this type you may find it useful to list and categorize responses.

The analysis of information from focus group discussions should be prepared and reflect the discussion as completely as possible, using the respondents' own words. List the key statements, ideas and attitudes expressed for each topic of the discussion.

After transcribing the discussion, code the statements right away using the left margin. Write comments in the right margin. Formulate additional questions if certain issues are still unclear or controversial and include them in the next FGD to check the quality and validity of the responses.

Further categorize the statements for each topic, if required. Compare answers of different subgroups.

The findings should be coherent. If findings contradict each other, conduct additional FGDs or bring together representatives from two different subgroups to discuss and clarify the differences.

Summarize the data in a matrix, diagram, flow chart or narrative and interpret the findings.

Select the most useful quotations that emerge from the discussions to illustrate the main ideas.

A plan for the processing and analysis of data includes:

- a decision on whether all or some parts of the data should be processed by hand or computer;

- preparation of dummy tables for the description of the problem, the comparison of groups if applicable or the establishment of relationships between variables, guided by the objectives of the evaluation;

- a decision on the sequence in which tables should be analysed or in what order data should be analysed;

- a decision on how qualitative data should be analysed;

- an estimate of the total time needed for analysis and how long particular parts of the analysis will take;

- a decision concerning whether additional staff are required for the analysis;

- an estimate of the total cost of the analysis.

## DEFINITIONS OF DESCRIPTIVE STATISTICS

<b><i>Descriptive Measures</i></b>	
proportions	number of observations with a given characteristic divided by the total number of observations (e.g., prevalence of vitamin A deficiency among children age 6-71 months)
frequencies	arrangement of values from lowest to highest with a count of the number of observations sharing each value; counts often converted into a percentage of the total count
rate	occurrences per a certain constant, often over a fixed time period
ratios	1) number of observations in a given group with the characteristic divided by the number of observations in the same group without the characteristic 2) a total divided by a number of units or items, e.g., the cost-delivery ratio (costs divided by number of outputs delivered) or the cost-effectiveness ratio (costs divided by the number of outcomes achieved)
<b><i>Measures of Central Tendency</i></b>	
mean	the average; calculated by totalling the values of all observations and dividing by the number of observations
median	the middle observation - half the observations are smaller and half are larger; calculated by arranging the observations from lowest to highest (or from highest to lowest), counting to the middle value, then taking the middle value for an odd number of observations and the mean of the two middle values for an even number of observations
mode	the value of the distribution that occurs most frequently
<b><i>Measures of Dispersion</i></b>	
range	difference between the largest observation and the smallest; often expressed as the largest and smallest observation rather than the difference between them
standard deviation	a measure of the spread of data about the mean
percentiles	a number that indicates the percentage of the distribution that is equal to or below that number; often used to compare an individual value with a set of standards (e.g., growth references)

## TYPES OF DATA

Type of Data		Definition
Numerical		Values for which numeric magnitude has meaning.
	Discrete	Restricted to certain values that differ in fixed amounts. No intermediate values are possible. Examples: the number of times a woman has given birth or the number of beds available in a hospital.
	Continuous	Not restricted to whole number values. Examples: height, weight, or age.
Non-numerical		Values for which numeric magnitude has no meaning.
	Nominal/ Categorical/ Class	Values are arbitrary codes with no inherent meaning. The order and magnitude of the values are unimportant. Examples: sex (1=male, 2=female), nutritional status (1=underweight, 2=adequate weight), district.
	Ordinal	Values have inherent meaning based on order but not magnitude. Examples: ratings of quality or agreement (1=high, 2=low or 1=low, 2=high; 1=very good, 2=good, 3=bad, 4=very bad).

## DATA SUMMARY USE FOR DIFFERENT DATA TYPES

DATA TYPE		SUMMARY TYPE									
		Descriptive measures				Measures of central tendency			Measures of dispersion		
		Proportion	Frequency	Ratio	Rate	Mean	Median	Mode	Range	Standard deviation	Percentiles
Numeric											
	Discrete	Depends on situation	Depends on situation	Depends on situation	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Continuous	Depends on situation	Depends on situation	Depends on situation	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Non-numeric											
	Nominal/ Categorical/ Class	Yes	Yes	Yes	Depends on situation	No	No	No	Depends on situation	No	No
	Ordinal	Yes	Yes	Yes	Depends on situation	No	No	No	Depends on situation	No	No

## FORMATS FOR PRESENTING QUALITATIVE DATA

A wide variety of charts and graphics are used to organize, summarize, compare, and illustrate the data. This is especially important with qualitative data, because it usually is not appropriate to summarize and interpret using statistical methods. Charts, graphics, and examples help those who were not involved in the research to see the results and understand the implications. Charts and other graphics are used to provide overviews of general concepts and trends and to illustrate specific points, as discussed below.

These formats are used to present an overview of general trends, practices, and beliefs using different formats.

- A *matrix* is used to link practices with perceived benefits and costs. Matrices are more informative than simple lists of practices because they provide insights into the motivations and constraints underlying those practices.
- A *diagram* of the usual sequence of practices related to different aspects of child feeding is instructional and more informative than textual descriptions.
- A *taxonomy* of perceived feeding problems is used to summarize reported symptoms, causes, and actions or treatments.
- A *decision chart* is used to outline feeding problems or conditions that affect observed behaviours. The chart shows the sequence of decisions that lead to different behaviours, depending on different conditions and outcomes.
- Prepare similar charts or graphics for different groups and compare them. Similar charts for health workers, mothers with more and less experience, or mothers from rural and urban areas can be prepared and compared. Use specific examples to illustrate points and help the audience understand.
- Brief *case studies* describing feeding practices and how they changed over time among one or two children illustrate transitions in feeding at high-risk age periods.
- A *table or chart* describing foods consumed by two children of the same age (one with good practices, the other with poor ones) demonstrates the variation in foods and practices among the population. This comparison also illustrates just how little some children eat and how much others in similar homes consume.
- A *list of quotes* and key phrases about beliefs and local names for practices is also informative. Peoples' actual expressions provide clues on how to phrase effective nutrition messages.

TRANSPARENCY 6.1a

Respondent number	Q1: Age (months)	Q2: Sex		Q3: Breastfed?			Age at introduction of solid food (months)
		Male	Female	Yes	No	Don't Know	
1	7	x		x			3
2	3		x		x		0
3	6		x	x			4
4	3		x	x			4
5	10		x			x	
6	2	x			x		0
7	4		x		x		8
8	3	x			x		0
9	7		x			x	
10	9	x		x			6
11	4		x		x		0
12	3		x			x	
13	1	x			x		0
14	9		x	x			4
15	14	x				x	
16	6		x			x	
17	8	x		x			6
18	7		x	x			3
19	12	x		x			4
20	3		x			x	
<b>Total</b>	<b>mean 6.0 years</b>			<b>8 40%</b>	<b>6 30%</b>	<b>6 30%</b>	

TRANSPARENCY 6.1b

Respondent number	Q1: Age (months)	Q2: Sex		Q3: Breastfed?			Age at introduction of solid food (months)
		Male	Female	Yes	No	Don't Know	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
<b>Total</b>							