Figure 1. Stepwise Process for Applying the Alpha-if-item-deleted Method for Estimating Number of Items Missing

1. Determine the number of items with missing data.
2. Calculate the alpha for the full item set.
3. Identify the item with the smallest alpha-if-item-deleted.
4. Remove the item identified in Step 3.
5. Recalculate alpha for the remaining items.
6. Repeat Steps 3-5 until the alpha falls below the threshold.

Table 1. Comparison of Number of Items Missing Across Three Epidemiological Instruments

Instruments | Cases | Subjects | Number of Items Missing | Overall Alpha | Alpha-if-item-deleted
--- | --- | --- | --- | --- | ---
Brief Pain Inventory | 100 | 50 | 5 | 0.89 | 0.79
Center for Epidemiological Studies Depression Scale | 200 | 100 | 10 | 0.91 | 0.74
Irritable Bowel Syndrome Quality of Life Questionnaire | 250 | 125 | 20 | 0.91 | 0.74

Table 2. Comparison of Test-Retest Reliability for Three Epidemiological Instruments

Instruments | Cases | Subjects | Number of Items Missing | Overall Alpha | Alpha-if-item-deleted
--- | --- | --- | --- | --- | ---
Brief Pain Inventory | 100 | 50 | 5 | 0.89 | 0.79
Center for Epidemiological Studies Depression Scale | 200 | 100 | 10 | 0.91 | 0.74
Irritable Bowel Syndrome Quality of Life Questionnaire | 250 | 125 | 20 | 0.91 | 0.74

Table 3. Summary of Missing Data Rules for Patient-Reported Outcomes: Alpha-If-Item-Deleted

Rule 1: If the alpha-if-item-deleted for an item is less than 0.70, the item is removed.
Rule 2: If the alpha-if-item-deleted for an item is greater than 0.70, the item is retained.

Discussion and Conclusions

• It is important to consider the reliability of the scale and its effect on item-level missing data when calculating missing items and scores.
• The alpha-if-item-deleted is a useful method for determining the number of items missing and can lead to more reliable scale scores.
• The alpha-if-item-deleted method is recommended for use in clinical practice and research.

References