Scoring Algorithm of CDC Symptom Inventory

Introduction

The new version of the CDC Symptom Inventory (SI) collects information about the presence, duration, frequency, and intensity of 19 fatigue and illness-related symptoms that are listed by alphabetical letters from A to S. Nine sets of questions query the information regarding the following CFS-defining symptoms:

- Sore throat (Question A)
- Tender Lymph Nodes and Swollen Glands (Question B)
- Fatigue After Exertion (Question D)
- Muscle Aches and Pains (Question E)
- Joint Pain (Question F)
- Unrefreshing Sleep (Question I)
- Headaches (Question K)
- Memory Problems (Question L) or Concentration (Question M)

The pattern of questions is the same for each symptom. The symptom is introduced in the first question (capital letter), followed by 6 subquestions (decimal 1 through 6). Using "sore throat" as an example, the first question is A, followed by A.1, A.2, A.3, A. 4, A.5, and A.6. The subquestions address the frequency, intensity and duration of the symptom. A skip pattern is used to avoid asking questions about symptoms that the participant has not had in the past month. In this situation only the introductory question and the last question (addressing symptom in the past) are answered. The response choices for these subquestions about frequency, intensity, and duration of a symptom are as follows:

- Frequency of each symptom - question X.1
    - a = a little of the time
    - b = some of the time
    - c = a good bit of the time
    - d = most of the time
    - e = all of the time
- Intensity of symptoms - question X.2
    - a= very mild
    - b= mild
    - c = moderate
    - d = severe
    - e = very severe
- Duration of symptoms - question X.3
    - a = less than 6 month
    - b = 6-12 months
    - c = more than 12 months

where X represents the letter of each symptom; X=A, B, …, T.

The 5 choices for frequency are converted into 4 values to match prior version of the SI using the following assignments:

       A little of the time = 1   Some of the time = 2
       A good bit of the time = 3
       Most of the time = 3
       All of the time = 4

For the same reasons the 5 choices for intensity are converted into 3 values using the following assignments:
Very mild = 1
Mild = 1
Moderate = 2.5
Severe = 4
Very Severe = 4

To meet the case definition criteria for a symptom must be present for more than 6 months, the 3 choices for duration are converted to two values as follows:

       Less than 6 months = 0
       6-12 months = 1
       More than 12 months = 1

To summarize the severity of each symptom, individual symptom score is c calculated by multiplying the frequency response value by the intensity response value by the duration value. , For example if sore throat was present "some of the time", intensity was "severe" and duration was less than 6 months, the score for sore throat would be 2 X 4 X 0 = 0. The same responses for frequency and intensity, but duration of 6-12 months or more than 12 months would give score of 2 X 4 X 1 = 8.

The CDC SI sub-scales are calculated from the symptom scores as follows:

       CFS Symptom Score = Sum of symptom scores A, B, D, E, F, I, K, and maximum of score of L or M.
       Non-CFS Symptom Score = Sum of the symptom scores of C, G, H, J, N, O, P, Q, R, and S
       Total score = Sum of CFS Symptom Score + Non-CFS Symptom Score
       Number of CFS Symptoms = Number of symptoms used in CFS Symptom Score with value greater than 0. Note that only L or M can be counted, not both. Number of CFS symptoms ranges from 0 to 8.
       Number of Non-CFS Symptoms = Number of symptoms used in Non-CFS Symptom Score with value greater than 0.
       Total number of symptoms = Number of CFS Symptoms + Number of Non-CFS Symptoms

How to handle missing values

- This depends on the specific analysis requirements. In general, if an SI symptom has a missing value in frequency, intensity, or duration, the corresponding sub-scale should be set to missing.
- Below is how CDC CFS research program handled the missing values in SI data set collected in GA Registry Study:
  - For sub-scales: CFS case definition symptom, non-CFS symptom, and total score, if any required item had a missing value, the corresponding sub-scale score was set to missing
  - For sub-scales: Number of CFS symptoms and Number of symptoms, the items with missing values were ignored and not counted into these two sub-scale scores.

Reference

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