The Barthel Index

- one of the oldest developed measures of basic activities of daily living
- originally developed to assess the severity of disability in personal care and mobility in stroke patients.
- consists of 10 domains:
  1) Bathing
  2) Grooming
  3) Feeding
  4) Dressing
  5) Toilet use
  6) Ascend/descend stairs
  7) Bowel management
  8) Bladder management
  9) Bed/wheelchair transfer
  10) Mobility (level surface)

ICF Domain:

Activity – subcategory: Self-Care.

Number of Items:

10

Instructions for Administration and Scoring:

Administration:

- Scores are obtained primarily from using direct observation
- Self-report, or proxy responses (from family/friends) have been reported.
- Scores based on performance in the past 48 hours are preferred.
- Administration takes:
  - 20-30 minutes to complete by direct observation
  - 2-10 minutes to complete for self-report or proxy

In the original version, each item is scored in three steps. **A modified Barthel Index (MBI) with a five-step scoring system, developed by Shah et al. was found to achieve a greater sensitivity and improved reliability compared with the original version. It has been tested in the SCI population by Kucukdevici et al. 2000 – measurement properties are described below.

Equipment: None.

Scoring:

- item scores are summed to give a total score ranging from 0 to 100 (0: fully dependent; 100: fully independent).

Interpretability:
**MCID:** not established for the SCI population, but for a stroke sample (n = 43; mean (SD) age = 55.4 (14.6) yrs; Taiwanese adults post-stroke mean (SD) of 7.04 (64.1) days):
BI MCID = 1.85 points
Reference: Hsieh et al. 2007, “Establishing the minimal clinically important difference of the Barthel Index in stroke patients” Neurorehabil Neural Repair 21(3): 233-238

**SEM:** not established for the SCI population, but for a stroke sample (n=56, Taiwanese adults post-stroke mean of 1197.1 days):
BI SEM=1.45 points
Reference: Hsieh et al. 2007, “Establishing the minimal clinically important difference of the Barthel Index in stroke patients” Neurorehabil Neural Repair 21(3): 233-238

**MDC:** not established for the SCI population, but for a stroke sample (n=56, Taiwanese adults post-stroke mean of 1197.1 days):
BI MDC = 4.02 points
Reference: Hsieh et al. 2007, “Establishing the minimal clinically important difference of the Barthel Index in stroke patients” Neurorehabil Neural Repair 21(3): 233-238

- Higher scores indicate a higher level of independence
- Scores reflect the nursing burden and social acceptability of the activity.
- Cut scores have been established for the stroke population and are not necessarily representative for the SCI population. Scores of 0-20 indicate total dependence; 21-60: severe dependence; 61-90: moderate dependence and 91-99: slight dependence.
- Published data for the SCI population is available for comparison (see the Interpretability section of the Study Details sheet).

**Languages:**
The 10 item English version has been assessed for the SCI population.

**Training Required:**
No training is required though clinical experience/practice is beneficial.

**Availability:**
See the ‘How-to use’ page of this tool.

**Clinical Considerations:**
- The BI is one of the best-researched ADL tools and has been used with a number of patient populations. Use of adaptive aids is permitted with a score of ‘independent’.
- The BI covers very basic functional abilities and while a score of 100 suggests independence, assistance may still be required with other higher order tasks such as cooking/cleaning and therefore other measures are needed to assess these areas.
- Though the test items are deemed important to society, they may not reflect activities that are of importance to individuals with SCI.
- There is minimum patient burden unless the entire test is scored by observation. Floor and ceiling effects makes the scale less useful for the SCI population.
**Measurement Property Summary for the Barthel Index:**

# of studies reporting psychometric properties: 2

**Reliability:**
No values were reported for the reliability of the Barthel Index for the SCI population.

**Validity:**
- Correlation of the Barthel Index is **adequate** with:
  - the Walking Index for Spinal Cord Injury (Spearman's $\rho=0.67$)
  - the Rivermead Mobility Index (Spearman's $\rho=0.6$)
  - the Spinal Cord Independence Measure (Spearman's $\rho=0.7$)
  - the Functional Independence Measure (Spearman's $\rho=0.7$).

  [Morganti et al. 2005, Plantinga et al. 2006]

**Responsiveness:**
- Total score effect size (ES) for all participants = 0.98 (items: 0.38 to 1.16)
  [O'Connor et al. 2004]

**Floor/ceiling effect:**
- Ceiling effects were detected at discharge for the Barthel Index score (24.1% of subjects had the highest score).
  [O'Connor et al. 2004]

**Measurement Property Summary for the Modified Barthel Index (MBI):**

# of studies reporting psychometric properties: 1

**Reliability:**
- Internal consistency of the Modified BI is **excellent** at admission (Cronbach's $\alpha=0.88$) and discharge (Cronbach's $\alpha=0.90$).
- Inter-rater reliability for MBI items range from **adequate to excellent** (ICC= 0.50-0.78).
- Inter-rater reliability for the total MBI scale is **adequate** (ICC=0.77)
  [Kucukdeveci et al. 2000]

**Validity:**
- Correlations between the MBI and ASIA (American Spinal Injury Association) motor scores were **adequate** at admission ($r=0.55$) and **excellent** at discharge ($r=0.76$).
- Correlations were weaker between the MBI and ASIA sensory scores; **adequate** at both admission ($r=0.43$) and discharge ($r=0.51$).
  [Kucukdeveci et al. 2000]

**Responsiveness:**
No values were reported for the responsiveness of the Modified Barthel Index for the SCI population.

**Floor/ceiling effect:**
No values were reported for the presence of floor/ceiling effects for the Modified Barthel Index for the SCI population.

Reviewer:
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Date Last Updated:
Feb 1, 2013