Clinical review

A critique of the Barthel Index

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This article provides a critical review of a popular functional index, the Barthel Index. The strengths and weaknesses of the index with an emphasis on its use by nurses is considered and the need to use this and other functional indices for measuring disability is addressed.

The Barthel Index, originally called the Maryland Disability Index, was introduced in 1965 by Mahoney and Barthel. It was developed as a means of measuring the severity of disability in people whose disease interfered with independent movement of the limbs (Wylie and White, 1964). Use of the index has been extended to include most physically disabling conditions. It is widely used in the rehabilitation of people who have suffered a stroke (Gibbon, 1991).

Most critiques of the Barthel Index have stated that it is most useful where those assessed have paralysing conditions (Granger et al, 1979a).

The index measures the functional status in activities of daily living of people who are physically disabled (Jacelon, 1986). Although it does not measure all the activities of daily living, a reasonable selection of functional activities are included. The index contains 10 items. Fig. 1 shows the Barthel Index as it currently stands. The activities in the index have been selected because of their perceived social importance. Similarly, the weighting of the items within the index varies according to the professionals' prioritization of the impact a deficit in each area would have on the person. Although this achieves standardization it may not accurately represent the disabled person's real priorities.

Using the index

The index has been described as simple and easy to use (Bowling, 1991). Scoring can be carried out by any healthcare professional, including nurses. Scorers need to be trained in its use but training has been reported to be quick. One study claimed that scorers became sufficiently familiar with the index after 2 months to become involved in a research study to measure its reliability (Collin et al, 1988).

The scorer can either observe the disabled person and complete the index or ask questions of someone who has given physical care to the person, i.e. the disabled person does not have to be seen directly by the scorer. In one report, scoring was carried out with the help of relatives over the telephone (Shinar et al, 1987). Each of the 10 sections in the index is completed and assigned a score; the scores for all sections are then added together to provide a total score. Scoring takes between 30 seconds and 1 minute to carry out (Bowling, 1991).

The index can be repeated at regular intervals to assess changes within a section and in the overall functional ability of the disabled person.

Reliability

Reliability can be defined as giving the same results for the same test conditions, even if measured by different people over a period of time (Cormack, 1984). The reliability of the Barthel Index cannot be established from the literature as the majority of studies do not include any of the guidelines used by the authors for the scoring of each item. It is possible that each study used different guidelines for scoring, which would affect the scoring system.

Several studies have investigated the reliability of the Barthel Index although their methodologies contain some weaknesses. Shinar et al (1987) examined the interobserver reliability of the index. They used a sample of 18 people who were recovering from a stroke. It should be noted that the sample group contained people who were fully cooperative and had no neglect of the affected side of the body or aphasia. A test and retest method was used to check inter-rater reliability, in which the observers moved between observing and rating different people. The observers were research nurses specifically trained for this study. The results showed general agreement, although some significant differences were found in the scores for personal hygiene and toileting. Granger et al (1979b) has carried out several studies using the Barthel Index but reliability has not been fully established as only medical records were used for scoring (Shinar et al, 1987). This method of observation does not take...
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Jacelon (1986) has stated that the Barthel Index is generally not reliable for use with people who have communication deficits and changes in their mental status.

Fig. 1. The Barthel Index

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**BOWELS**
0 = incontinent
1 = occasional accident
2 = continent

**BLADDER**
0 = incontinent or catheterised & unable to manage
1 = occasional accident (max 1 x per 24 hours)
2 = continent (for over 7 days)

**GROOMING**
0 = needs help
1 = independent, face/hair/teeth/shaving

**TOILET USE**
0 = dependent
1 = needs some help, but can do something
2 = independent (on & off, dressing, wiping)

**FEEDING**
0 = unable
1 = needs help cutting, spreading butter etc
2 = independent

**TRANSFER**
0 = unable
1 = major help (1-2 people, physical)
2 = minor help (verbal or physical)
3 = independent

**MOBILITY**
0 = immobile
1 = wheelchair independent including corners etc
2 = walks with help of 1 person (verbal or physical)
3 = independent (but may use any aid, e.g. stick)

**DRESSING**
0 = dependent
1 = needs help, but can do about half unaided
2 = independent

**STAIRS**
0 = unable
1 = needs help (verbal, physical, carrying aid)
2 = independent up and down

**BATHING**
0 = dependent
1 = independent

**TOTAL**

account of interobserver variations and possible contextual differences.

Collin et al (1988) studied inter-rater reliability (the reliability of seeking information rather than direct scoring) and the reliability of self-reporting from the disabled person. They concluded that the index was a reliable measurement. However, it should be noted that the sample group comprised only people with head injuries or strokes.

Nurses and occupational therapists carried out the scoring. They appear to have been less rigorously trained than the professionals in Shinar’s study, but their scoring abilities may be more representative of those of most clinical staff. However, the setting was a specialist rehabilitation unit.

In the study by Collin et al, differences in scoring were experienced in the items on transferring, feeding, toileting, grooming...
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and dressing. This amounts to disagreement in half the total number of items from the index that were tested. The authors suggested that this may have been due to varying levels of skill between the observers and not having standardized tests to carry out, e.g. with feeding or dressing. These results would appear to question rather than confirm reliability. Self-reporting in this study raised predictable issues relating to self-perceived functional ability and ability as observed and perceived by the professional. The authors concluded that the index is not reliable where there is cognitive impairment. Further to this, Jacelon (1986) has stated that the Barthel Index is generally not reliable for use with people who have communication deficits and changes in their mental status.

Strengths of the index

The Barthel Index is simple to understand. It is a compact index to carry out and is therefore not time-consuming. It is relatively simple to learn how to score and little time is needed to become proficient in using the index. When scored out of 100, the scale provides a metric rating system which is convenient for statistical analysis (Jacelon, 1986). However, some users of the scale now score out of 20 which can cause confusion. The activities of daily living covered by the Barthel Index are generally representative of the overall functional abilities of disabled people. The index also seems to accurately reflect changes in functional abilities to a certain level of sensitivity. Unlike some other measurements, it is sensitive to changes within each item and between items (Jacelon, 1986).

The sections in the index cover most of the functional activities of daily living and provide a baseline for more in-depth assessment by the healthcare team. The index allows professionals and disabled people and their carers to assess progress over a period of time. It is adaptable in that any member of the healthcare team or non-professional carer can be trained to score. The findings of the index are easily communicated, either in writing or verbally, to others (Gibbon, 1991). The index is useful in some research studies. It enables subjects with approximately similar types of functional disability to be selected and allows for comparisons between subjects in the same or different sample groups. It may also provide some information for clinical audit purposes.

The Barthel Index is only one example of a range of measurement scales that are available to assess functional disability. When used with people who are recovering from stroke it appears to be as reliable and valid as any other scale. It measures only physical activities and does not include any qualitative aspects of daily activities of living, such as being able to write or use a telephone. Although the Barthel Index is being more widely used for people with other disabilities and in a range of settings, its use in this way requires further research.

Limitations to the Barthel Index

The index uses a standardized assessment format which does not take into consideration individual factors in people or contextual differences. It assumes that observers are trained in using the scale and have access to the guidelines for completing the index.
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which are not always included on the scoring form. There appear to be several sets of guidelines, which do not always contain the same information or instructions for scorers. In some ways the items on the index are too clear-cut to allow for variations in functional abilities between individuals and over time. For example, the toileting items on bowels and bladder only look at the functioning over the preceding week. The functional abilities of some disabled people may vary over a greater time span than 1 week and may be influenced by the environment and equipment available. The end-points of the scoring system for each item are not true end-points as people's abilities can change after the end-points used by the index (Bowling, 1991). Observers who do not know the people they are assessing may not be aware of the usual functional abilities or the total range of ability of those being observed and may score inaccurately. The index relies on the disabled person performing at their usual level of functioning. It is assumed that this is the maximum level. People who may not be fully aware of the implications of being scored or do not choose to be fully active or fully cooperate, for whatever reason, may be inaccurately scored. The alternative is to score people when they are unaware of it, but this raises ethical questions.

Use of the index

Although the Barthel Index is becoming more widely used, it is still mainly used in specialist rehabilitation units. Members of the healthcare team who do not have any knowledge of the index and its uses may therefore find full participation in care planning discussions difficult (Gibbon, 1991). Professionals who use measurement tools such as the Barthel Index tend to assume, in their verbal and written communications, that other professionals are familiar with the scale in question. This is an unsafe practice because those who are not familiar with it may ignore the information contained within it or take on board this information without a clear understanding of how it was collected, which can then lead to the index being used inappropriately. The use of this index or any other index should not be seen as a substitute for individualized patient-centred assessments.

Implications for nursing

A measurement scale that accurately assesses disability and handicap and can be used by all the healthcare professionals is the ideal tool to contribute to the process of care planning. Unfortunately, such a tool does not yet exist, so nurses are making do with those that are available. Research has shown that the Barthel Index is comparable to other measurement scales. Nurses who work with other professionals who use functional measurement scales or who want to explore the use of them for nursing should adopt a critical approach to such scales. Several issues need to be addressed.

Nurses should be aware of the range of literature and research on measurement scales. They should also develop an appreciation of the quality of the research. The scale to be used should be thoroughly investigated for reliability and validity. The use of any scale in practice needs to be accepted by the nursing team as a whole and not by one member only, such as the senior nurse. Similarly, nurses who are asked to use a measurement scale that is introduced by other professionals should question the use of that scale. It may be that the other professionals are aware of the limitations of the scale but feel that a particular scale is the best available at that time. Other professions cannot expect nursing to adopt measurement scales simply because they choose to use them. However, nursing should openly assess the suitability of any measurement scale regardless of which discipline primarily uses it. It is important to remember that nurses are generally best placed to carry out the majority of functional assessments because of the nature of their contact with disabled people.

Nurses need to develop a critical approach to the most appropriate use of the Barthel Index. It may be that this index could be mistakenly used as a means of calculating patient dependency or as a means of nurse/patient allocation. The index was never intended for such use and it is totally irresponsible for nurses to use it in this way or to collude with other professionals who use it out of context, e.g. as the criteria for admission to nursing/residential homes. Using the index as a means of nurse/patient allocation is simply an elaborate task allocation system. If nurses want to investigate the use of the index for means other than that for which it was devised, they should undertake rigorous testing and evaluations.

A more functional issue needs to be considered by nurses using measurement scales for the assessment of functional ability. There is little or no information contained in these measurement scales that cannot be obtained in normal practice from skilled
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Healthcare professionals. The need to quantify disability and to measure it is a slightly alarming phenomenon. Concentrating on functional ability or disability can mean that nurses and other healthcare professionals are adopting a reductionist perspective to working with people who have disabilities. Attempting to reduce and quantify the experience of disability and handicap in the form of functional indices is following the medical model approach. Nurses need to question why they want to quantify people’s experiences in this way.

McMillen Moinpour et al (1988) state that the concept of functional status is important in nursing because nurses are often involved in maintaining or improving people’s functional levels. These authors refer to functional status as a measure of the level of functioning in any of a variety of areas such as physical status, intellectual status and social activity. While this takes a wider perspective of functional ability, it would require nurses to make use of many indices and assessment tools. The implications of this are that not only would patients be subjected to regular and repeated testing, but also there is the danger that the patient’s perspective would become less important than the test outcomes.

It may be that nurses feel more comfortable measuring functional abilities using indices like the Barthel Index than developing qualitative measures that are centred around the patients’ lived experiences and their perspectives of their own abilities (functional and others). This author would suggest that the latter approach is more compatible with nursing practice. If nurses are to be effective in their role they need to adopt a holistic framework. This includes seeing the experiences of patients as they see them, and not reducing and compartmentalizing them into quantifiable measurable indices. Impairment, disability and handicap must be seen as a set of interrelated problems or needs if people with disabilities are to live independently in the community. Independent living is more dependent on the patient’s perspectives and psychological, environmental and social factors than on functional ability.

KEY POINTS

- There are many measurement scales available for the assessment of functional ability in people with physical disabilities. The Barthel Index is one that is gaining in popularity.

- The index should be used appropriately in the context of individualized patient assessment and management of care and not as a substitute for interdisciplinary care discussions.

- The use of specific indices may exclude some professionals from care planning. Without the use of the correct guidelines and proper training, the index may be incorrectly used and scored.

- The index should be used with patient groups in which reliability and validity have been demonstrated. It has not been tested for use as a dependency system or as a means of nurse/patient allocation.

- Nurses need to consider the implications of using this and other functional indices in their practice.