

THE DASH AND QuickDASH

Disabilities of the Arm, Shoulder, & Hand

OUTCOME MEASURES e-BULLETIN SUMMER 2013

The Institute for Work & Health (IWH) is pleased to send you the Summer 2013 edition of the DASH and QuickDASH e-bulletin, which is produced and distributed twice a year.

The aim of the e-bulletin is to provide you with information about the following:

- research updates (as available) on DASH and QuickDASH;
- frequently asked questions (FAQs); and
- news on translations, associated tools and products in progress.

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Research Updates



DASH iPad Introduced at Hand Therapy Conference

Institute for Work & Health Scientist Dr. Dorcas Beaton (at left), one of the developers of the DASH Outcome Measure, introduced the new “DASH app” at the recent conference of the Canadian Society of Hand Therapists, held May 3-4 in Calgary, Alberta.

Her presentation, titled *The DASH Outcome Measure App: Now Available on the iPad*, described the development of an app to facilitate

the administration, scoring and interpretation of the DASH in clinical practice. It also described the key features of the DASH app. The following is a summary of the presentation.

The DASH (Disabilities of the Arm, Shoulder and Hand) Outcome Measure is a well-recognized self-report questionnaire designed to measure physical function and symptoms in people with any of several musculoskeletal disorders of the upper limb. The 11-item QuickDASH is a shortened version of the 30-item DASH instrument. Both tools are valid, reliable and responsive and can be used for clinical and/or research purposes (DASH & QuickDASH User’s Manual, 3rd edition 2011; Kennedy 2012).

Surveys of DASH users show they are pleased with the DASH measure, but remain challenged by how to interpret scores for individual patients. Apps are increasingly accessible and relatively easy to develop. This led to the development of the DASH Outcome Measure app (simply referred to as the “DASH app”) for use on an iPad.

The creation of the DASH app was initiated by a physical therapist, Kenneth Wilson, to help busy clinicians track DASH scores (including DASH, QuickDASH and Optional DASH Modules) in their clinical practice. Convenient and easy to use, the app allows clinicians’ patients to directly enter their responses using an iPad touch screen. DASH scores are immediately calculated and summarized in a Summary Report, which includes the calculated score and item-level responses, as well as information about interpreting the score (e.g. comparison to normative data from the general population, score needed to reach Minimal Detectable Change [MDC95%]).

The DASH app allows for multiple assessments of a patient to be conducted over time, linked by a unique patient identification number. Clinicians can then generate a Cumulative Report, which includes a graphical representation of the patient's progress over time with interpretation benchmarks, as well as an item-level overview of the six highest (i.e. greatest disability) items, comparing responses at initial evaluation with those at the most current evaluation.

The Summary Report and Cumulative Report can be viewed immediately on the iPad and also saved (password protected) on the iPad as exportable files. These files can be printed, and they can also be e-mailed to the patient and/or to the clinician for his or her electronic or paper records. The raw data is also saved (password protected) on the iPad and can be transferred by e-mail as a downloadable database (CSV format) to the clinician for further analysis and/or storage.

The DASH app allows for real-time administration, scoring and longitudinal tracking of DASH outcomes. Reports have the potential to help clinicians identify problem areas and monitor progress in a time-saving manner.

References

Kennedy CA, Beaton DE, Solway S, McConnell S, Bombardier C. Disabilities of the Arm, Shoulder and Hand (DASH). The DASH and *QuickDASH* Outcome Measure User's Manual, Third Edition. Toronto, Ontario: Institute for Work & Health, 2011.

Kennedy C, Beaton D, Smith P, Tang K, Van Eerd D, Hogg-Johnson S, Inrig T, Linton D, Couban R. Measurement properties of the *QuickDASH* (Disabilities of the Arm, Shoulder and Hand) Outcome Measure and cross-cultural adaptations of the *QuickDASH*: A systematic review: *Quality of Life Research* 2013; doi 10.1007/s11136-013-0362-4.



Taking the DASH to Another Level: The DASH iPad Application

It was, as Kenneth Wilson (above) puts it, “a moment of temporary insanity.” He is referring to his decision to develop the DASH iPad application without having had any previous experience in the world of “app” development.

But Wilson, the director of Health Occupation Programs at Jefferson College in Hillsboro, Missouri, had a vision: he wanted a DASH app in order to eliminate scoring errors. That vision, along with his determination, persistence and coincidental encounters with a number of “app savvy” people—including a flexor tendon patient with experience in IT, an engineering student who developed the St. Louis University mobile app, and a co-worker's boyfriend who developed apps for a living—gave him the impetus to give developing a DASH app a try.

The idea is born

The benefits of a DASH app became apparent to Wilson some time ago. Prior to joining Jefferson College in 2012, Wilson was the director of research and education at PRORehab, a collection of orthopaedic, sports medicine and hand therapy clinics in St. Louis, Missouri. In this capacity, he embarked on an outcomes-data collection plan for PRORehab's hand therapy program, and the 30-item DASH was the primary outcome measurement tool.

One of the roles developed within that outcomes program was quality assurance—to ensure that only “good data” found its way into the database.

During his assessment of the actual scoring of the pen-and-paper tools at these clinics, Wilson realized that there was a 40 per cent error rate in scoring the DASH.

This discovery pointed to a real need: i.e. the need for a simple, easy and readily accessible tool to eliminate errors and assist busy clinicians. A DASH app, he thought, could be the solution. His thinking went something like this: "What if I took out about three or four steps in the process and built something that would do it automatically? Not only would clinicians not have to take time to do these calculations, but their chances of error would also be removed."

Wilson began work on the app in 2010 and after two years of intermittent work on this project, Wilson had a working prototype ready. The DASH app, which Wilson jovially refers to as "his baby," is now available from the Apple App Store.

Unique features of the DASH app

Wilson identifies two unique aspects of the DASH iPad application. First, the Institute for Work & Health (IWH) was involved in its development from the get-go. The DASH Users Group at IWH participated in and supported all decisions made about the app during its development to ensure the reliability of the app and its compliance with the original mandate of the DASH Outcome Measure. "I'm confident that the application itself is a valid and reliable expression of the DASH," Wilson says.

Second, the application is unique because of its database component. This allows clinicians to access DASH data at any time. The data is compiled in a "CSV file" that can be downloaded via e-mail or via hardware—making a world of difference to the speed in which captured information can be used. No longer will clinicians and researchers need to get paper copies of completed DASH questionnaires out of patients' charts, scan them, compile them and then e-mail them.

While Wilson initially envisioned the DASH application being used in rehab clinics, it is becoming increasingly standard for clinicians to use tablets for their documentation, script writing, communication with other professionals, image

viewing, etc. He now sees the relatively seamless use of the DASH application in these activities and settings.

The way forward

Wilson expects that future versions of the app will need to consider "a virtual plugin," where the information gathered by the DASH app can be immediately uploaded into an electronic health record. "I would love to see this happen in a future generation of the app," he says. "When that happens, the DASH will be seamlessly integrated into patient intake."

Wilson is very proud of the final app product. "I show pictures of it to all my co-workers," he says. Indeed, he says his initial vision for the DASH app pales in comparison to what the final product looks like.

"I imagined a crude representation of the pen-and-paper version," he says. "What we ended up with is a polished, professional-looking application that can be used in multiple formats. It has exceeded my expectations."

The DASH iPad application, which costs \$4.99, can be purchased from the Apple App Store (<https://itunes.apple.com/us/app/dash-outcome-measure/id656696682>).

Note from IWH: Communications with our DASH/QuickDASH users (via e-mail queries and formal surveys) have revealed that they like the DASH measure but remain challenged by how to interpret scores for individual patients. So our goal in collaborating on the development of this app was to integrate methods to improve the ability of our users to interpret DASH/QuickDASH scores (e.g. comparing scores to the general population score for similar age-sex group, providing the score that would need to be achieved to see a change greater than the day-to-day variability in the score). We also felt it was important to include a graphical summary of a patient's progress over time [i.e. taking into account the amount of change, where the person ends up after they have changed (final state) and how fast the change occurred (rate of change)] with markers for interpretation (e.g. minimal detectable change).

FAQs

Q. Does the DASH translate into a percentage impairment for use with the United States Center for Medicare (CMS) G-Codes and corresponding severity modifiers for functional reporting?

A. The DASH was designed as a measure of disability as defined by Verbrugge (1994), specifically of physical function and symptoms. It measures the impact of disorders on the whole person rather than on a specific limb. With this in mind, the DASH could be used as an indicator of the impact of an impairment on that level and type of disability. In many cases that is exactly what is wanted—the whole person's ability to function, even if the person is compensating with the other arm or using devices.

One challenge for the DASH and, likely, other disability outcome measurement tools is that a score of 65/100 does not directly translate into 65-per-cent disability. The scores are numbers on a ruler of low levels of disability (scores closer to 0) through to very high disability (scores up at 100).

We continue to work on the benchmarking of DASH scores, and are keeping this in mind as we do so. Our recent users' survey is helping with that process too! Watch for more information on benchmarking in future publications and e-bulletins. We know it is an urgent need.

References

Verbrugge LM, Jette AM. The disablement process. *Social Science and Medicine* 1994; 38(1):1-14.

Q. Are there cut-points or benchmarks to categorize DASH and QuickDASH scores as indicating mild, moderate and severe levels of disability?

A: At present, there are no divisions to categorize disability scores as excellent, good or fair—or mild, moderate or severe. However, other benchmarks and means of interpretation are available.

One of the most difficult challenges is the ability to interpret an individual's numeric score, because

a lot of confidence and experience with an instrument is required. A parallel could be drawn with understanding a functional range of motion for the elbow. We can take a given restriction in range of motion and fairly confidently predict whether the restriction will impair a patient's ability to use a phone in the usual manner. We can do this because we have clinical experience with the concept of range of motion. Health status instruments, such as the DASH/QuickDASH, require this type of experience.

Like most other instruments, there is rarely a set of established benchmarks for interpreting scores. The DASH and QuickDASH are relatively new instruments, and we are continually gathering information from a variety of studies and users of the DASH. We are not yet at the point of being able to definitively say a particular score represents a mild, moderate or severe level of disability, or determine whether an individual patient is or is not able to work. It will likely take some time to achieve this degree of interpretation.

We have recently undertaken a study that includes feedback from the users of the DASH Outcome Measure, who we surveyed to find out how they are interpreting DASH scores. Some of the results from this survey are summarized below:

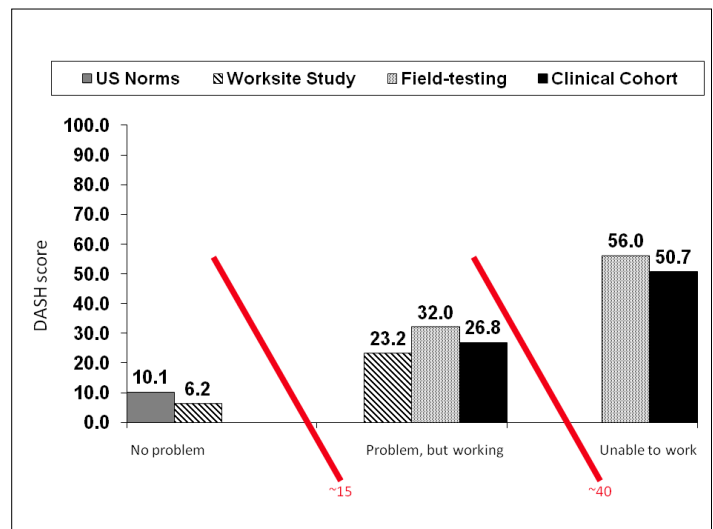
- A DASH score ranging from 0 to 29 was thought by most respondents to be the point where patients/clients were "no longer considering their upper-limb disorder a problem."
- A DASH score ranging from 10 to 29 was thought by most respondents to be the point where patients/clients were "at a threshold for returning to work (full or modified duties)," were "ready for discharge from treatment/therapy," and/or were "aware of their upper-limb limitations but did not consider them a problem."
- A DASH score ranging from 40 to 69 was thought by most respondents to be the point where patients/clients were "having a lot of difficulty."

Normative data for the DASH Outcome Measure has been collected in a large general population survey (n=1800) conducted by the American Academy of Orthopaedic Surgeons (AAOS) (Hunsaker 2002). This data offers a means to compare an individual's score against the United States (US) general population. In this paper, the mean DASH score for the general population is 10.1. The mean *QuickDASH* score for the same general population is 10.9. We have done additional analyses with this data (by age group, sex and a combination of the two). For more information on these values, see the Fall 2012 DASH e-Bulletin (US general population normative data): http://www.dash.iwh.on.ca/system/files/dash_e-bulletin_2012-fall.pdf

Looking at DASH/*QuickDASH* scores from various studies (US norms, worksite study, DASH field-testing, clinical cohorts), we have been able to separate some combination of having no or minimal upper-limb pain, having pain but still being able to work, and having upper-limb pain that prevents work (refer to Figure 1). We are finding that the DASH scores within each of these subgroups are quite similar. This preliminary evidence suggests that individuals who are able to do their work despite their upper-limb pain tend to score approximately 20 to 30 on the DASH, in contrast to scores in the 50 to 60 range for those unable to work because of their upper-limb pain. More work needs to be done to analyze the accuracy of these cut-points to determine whether they are appropriate for different populations at an individual level; therefore, we caution you about using these values until such analyses have been completed.

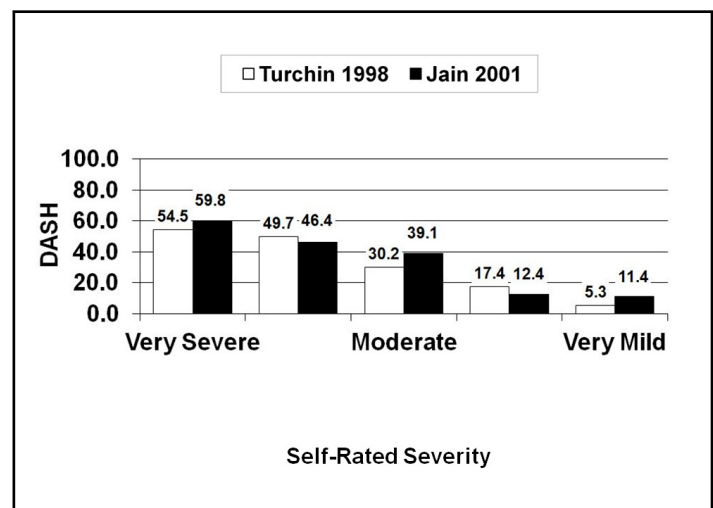
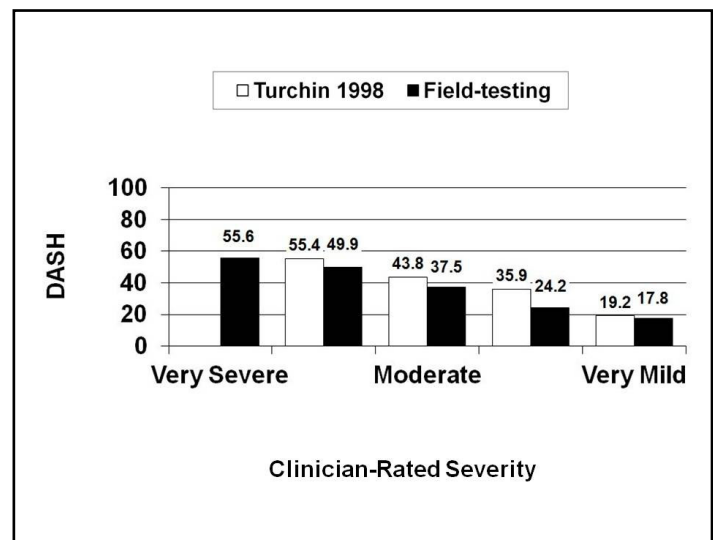
The DASH has also been shown to be able to discriminate between patients with severe and mild ratings. The findings from these research studies indicate a logical and statistically significant gradient exists across levels of self-rated severity (Jain 2000; Turchin 1998) and clinician-rated severity (Turchin 1998; Field-testing). Refer to Figure 2 for a summary of these trends across the severity ratings.

Figure 1. DASH scores from four different studies



Note: * = *QuickDASH* score

Figure 2. Summary of how DASH distinguished groups by severity ratings



We need to continue to apply the concept of benchmarking scores into clinical practice and research in order to further our understanding of how to interpret DASH scores for an individual patient.

References

Hunsaker FG, Cioffi DA, Amadio PC, Wright JC, Caughlin B. The American Academy of Orthopaedic Surgeons' Outcomes Instruments – Normative Values from the General Population. *Journal of Bone and Joint Surgery* 2002;84-A(2):208-215.

Jain R, Hudak P, Vaughan C, Bowen A. Health status following recessional ulnar osteotomy. *Hand Surgery* 2000; 5(1):11-17.

Turchin DC, Beaton DE, Richards RR. Validity of observer-based aggregate scoring systems as descriptors of elbow pain, function, and disability. *Journal of Bone and Joint Surgery* 1998; 80A(2):154–62.

Q. Is there a regulated time period after surgery during which patients should take the DASH?

A. The DASH is commonly used as an evaluative measure (to evaluate or assess change over time). When clinicians ask us how often they should administer the DASH measure, we generally recommend that, at minimum, it be administered at baseline (initial assessment) and at discharge from treatment.

In addition, it would be helpful to obtain measures at important transitional times in recovery. For example, in patients with soft-tissue disorders, measures at four weeks and 12 weeks are advised, since these represent transitions from the acute to subacute phase, and from the subacute to chronic phase. In surgical patients, measures pre- and immediately post-op are advised, as well as at important transitions from subacute to chronic phases (e.g. at six weeks, three months, six months, one year, etc.).

As a patient's recovery plateaus, the period of time between measures would be increased (depending on clinician judgement). Also, if a person reaches the floor (0=no disability, full recovery) then, again, it would make sense to stop administering the DASH measure.

News on Translations of the DASH and QuickDASH

Available Translations

For all available translations:

<http://www.dash.iwh.on.ca/available-translations>

Translations in Progress

The complete list is posted at:

<http://dash.iwh.on.ca/translations-in-progress>

Since the last edition of the DASH e-Bulletin, the following translations were added to this list:

Chinese (Simplified)

Contact: Le Qi, Department of Hand Surgery, China-Japan Union Hospital of Jilin University, China

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English (UK) language

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Please frequently check the DASH website for availability:

<http://www.dash.iwh.on.ca/translate.htm>

Useful Links

DASH Website:

<http://www.dash.iwh.on.ca/home>

Translations:

<http://www.dash.iwh.on.ca/translations>

Conditions of Use for the DASH and QuickDASH:

<http://www.dash.iwh.on.ca/conditions-use>

Information About DASH and QuickDASH Outcome Measures Licences:

<http://www.dash.iwh.on.ca/licences>

Recommendations for the Cross-Cultural Adaptation of Health Status Measures (PDF, 393KB):

<http://www.dash.iwh.on.ca/system/files/X-CulturalAdaptation-2007.pdf>

Translating the DASH Outcome Measure, the QuickDASH and Related Scoring Instructions:

<http://www.dash.iwh.on.ca/translating-guidelines>

Free Scoring Systems Service Courtesy of Orthopaedic Scores, U.K.:

<http://www.orthopaedicscore.com/>



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