

THE DASH AND QuickDASH

Disabilities of the Arm, Shoulder, & Hand

OUTCOME MEASURES e-BULLETIN WINTER 2012

The Institute for Work & Health (the Institute) is pleased to send you the Winter 2012 edition of the DASH and QuickDASH e-bulletin which is produced and distributed on a bi-annual basis.

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

- research updates (as available) on DASH and QuickDASH;
- news on translations; and
- associated tools and products in progress

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New DASH publication

The *DASH and QuickDASH Outcome Measure User's Manual, Third Edition* is now available at: www.dash.iwh.on.ca/dash-manual

Kennedy CA, Beaton DE, Solway S, McConnell S, Bombardier C. *The DASH and QuickDASH Outcome Measure User's Manual, Third Edition*. Toronto, Canada: Institute for Work & Health, 2011.

The much-anticipated third edition of the DASH and QuickDASH Outcome Measure User's Manual features a number of upgrades and new chapters, including:

- the latest research on the reliability, validity and responsiveness of the DASH measure, incorporating over 60 new published articles;
- information on the development and measurement properties of the QuickDASH;

- guidelines on the cross-cultural use of DASH measures;
- an overview of two optional modules offered by DASH, one for athletes and performing artists, and the other for workers whose jobs require a high degree of physical functioning; and
- the results of a 2009 survey of DASH and QuickDASH users.

Learn more about the new *DASH and QuickDASH Outcome Measure User's Manual, Third Edition*: <http://www.iwh.on.ca/media/2012-jan-24>

New DASH Referred Publications

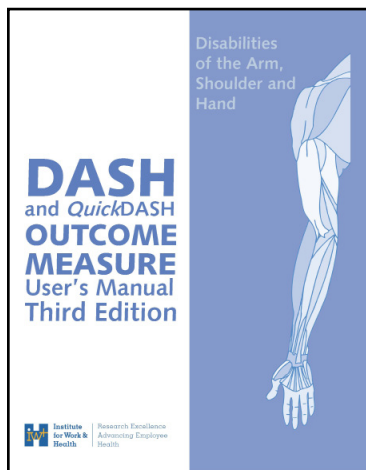
Beaton DE, van Eerd D, Smith P, van der Velde G, Cullen K, Kennedy CA, Hogg-Johnson S. Minimal change is sensitive, less specific to recovery: A diagnostic testing approach to interpretability. *Journal of Clinical Epidemiology*. 2011; 64(5):487-496.

Research Updates

Usefulness of the Disabilities of the Arm, Shoulder and Hand (DASH) to Assess Patients with Peripheral Nerve Injury

As DASH users, we are aware of the information available on reliability and validity of the DASH, as well as the DASH normative data from the US general population. However, the DASH has not been tested in every population and we need that information. This issue of the e-Bulletin highlights work done by Christine Novak in her PhD using the DASH Outcome Measure in people with peripheral nerve injuries.

Few studies have used the DASH to measure disability in patients following traumatic upper extremity nerve injury.¹⁻⁴ Ahmed-Labib et al.¹ administered the DASH, SF-36 (a measure of general health status) and a measure of pain intensity to 31 patients following an injury to the brachial plexus (defined as a network of nerves which originate from the fifth, sixth, seventh and



eighth cervical and first thoracic spinal nerves and innervate the muscles and skin of the shoulder, arm and hand). In these patients, the mean DASH score was 70/100 that indicated substantial disability. Patients with more severe nerve injuries had higher levels of disability, more pain and lower health status. In a study by Davidson², high levels of disability were reported in patients with brachial plexus nerve injuries (mean DASH score 72). Ekholm et al.³ evaluated 33 patients with radial nerve injury following a fracture to the humerus and included assessment of disability using the DASH. Most patients had spontaneous recovery of the radial nerve function and therefore low levels of disability were reported.

Novak et al.^{5,6} recently used the DASH to assess disability in patients with longstanding traumatic upper extremity nerve injury. Internal consistency is a measure of how item responses compare in a measure and it is estimated with Cronbach's alpha coefficient. The internal consistency of the DASH was high (Cronbach alpha = 0.96) and thus supporting the use of this questionnaire in these patients.⁶

In a preliminary study by Novak et al.⁵, a retrospective chart review showed high levels of disability in patients at least six months after a traumatic upper extremity nerve injury and explored the factors associated with higher levels of disability. The final multivariable regression model accounted for 47% of the total variance. Higher DASH scores were associated with the following factors: higher SF-36 bodily pain domain, older age and having a brachial plexus nerve injury.⁵

A second study by Novak et al.⁶ included 158 patients with upper extremity traumatic nerve injury and assessed the biomedical and psychosocial factors associated with disability (as measured by the DASH score). The following variables remained in the final multivariable model (unstandardized beta coefficient significant at $p < 0.05$): pain intensity, brachial plexus injury, time since injury, pain catastrophizing score, age, work status, cold sensitivity, depression score, workers' compensation or litigation and gender. This means each variable was still significant when considering, or controlling for, all other variables in the model.

The final model indicated that higher levels of disability, as measured by the DASH score, were associated with the following factors (refer to Table for the unstandardized beta coefficients and p-values): higher pain intensity, having a brachial plexus injury, less time since injury, higher pain catastrophizing score, older age, being unemployed, higher cold sensitivity, higher depression score, having a workers' compensation claim or litigation, and being female. The final model explained 53% of the variability in the outcome.

In summary, the DASH is a useful measure to assess disability in patients after traumatic nerve injury and is associated with both biomedical and psychosocial factors.

Submitted by Christine B. Novak, PT, PhD

Table: Final multiple regression model: Factors associated with higher DASH scores (n=158)

Variable	β	p-value
Higher pain intensity	0.23	0.01
Having a brachial plexus injury versus distal nerve injury	-0.22	< 0.001
Less time since injury	-0.198	0.002
Higher pain catastrophizing score	0.192	0.02
Older age	0.187	0.002
Being unemployed	0.179	0.01
Higher cold sensitivity	0.171	0.02
Higher depression score	0.133	0.07
Having a workers' compensation claim or litigation	0.116	0.05
Being female	-0.104	0.09

Unstandardized beta coefficient (β) can be interpreted directly because the amount of change in the dependent outcome variable (DASH) results from a change of one unit in the independent variable.

References

1. Ahmed-Labib M, Golan JD, Jacques L. Functional outcome of brachial plexus reconstruction after trauma. *Neurosurgery* 2007; 61:1016-1023.
2. Davidson J. A comparison of upper limb amputees and patients with upper limb injuries using the Disability of the Arm, Shoulder and Hand (DASH). *Disability and Rehabilitation* 2004; 26:917-923.
3. Ekholm R, Ponzer S, Tornkvist H, Adami J, Tidermark J. Primary radial nerve palsy in patients with acute humeral shaft fractures. *Journal of Orthopaedic Trauma* 2008; 22:408-414.

4. Topel I, Pfister K, Moser A, Stehr A, Steinbauer M, Prantl L, Nerlich M, Schlitt H-J, Kasprzak PM. Clinical outcome and quality of life after upper extremity arterial trauma. *Annals of Vascular Surgery* 2009; 23:317-323.

5. Novak CB, Anastakis DJ, Beaton DE, Katz J. Patient reported outcome following peripheral nerve injury. *Journal of Hand Surgery* 2009; 34A:281-287.

6. Novak CB, Anastakis DJ, Beaton DE, Mackinnon SE, Katz J: Biomedical and psychosocial factors associated with disability after peripheral nerve injury. *Journal of Bone & Joint Surgery (Am)*. In press, 2011; 93(10):929-936.

DASH Survey

We recently conducted a survey of registered DASH users in which we asked them about which regions of the upper limb they are using the DASH/QuickDASH and what types of patient/clients they were using the DASH/QuickDASH?

Regions of the upper limb

We were interested in knowing whether the DASH/QuickDASH was being used among clients/patients with disorders in various parts of their upper limb, thus fulfilling the goal of being useful for any part of the upper limb. Figure 1 above shows the proportion of respondents using the DASH/QuickDASH as part of their assessment of clients/patients with disorders in each region of the limb. The figure shows that the DASH/QuickDASH is being used across the entire upper extremity, including for neck pain.

Regions DASH/QuickDASH being used

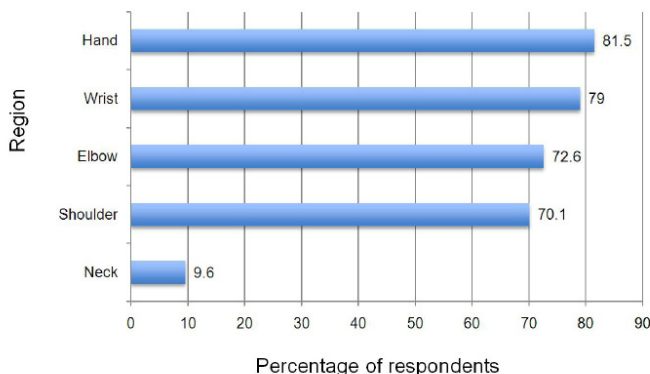


Figure 1. Percentage of respondents (n=157) who reported using the DASH/QuickDASH in clients/patients within each of the listed regions.

Types of disorders

We were also interested in the types of disorders for which the DASH/QuickDASH was being used. A list of diagnoses was included in the survey. Figure 2 shows the proportion of respondents who reported using the DASH/QuickDASH with each of the diagnoses. The respondents also identified other diagnoses for which the DASH/QuickDASH was being used. These included the following: replantations/revascularisations, post surgery (e.g. following mastectomy, chest wall

Types of disorders DASH/QuickDASH being used

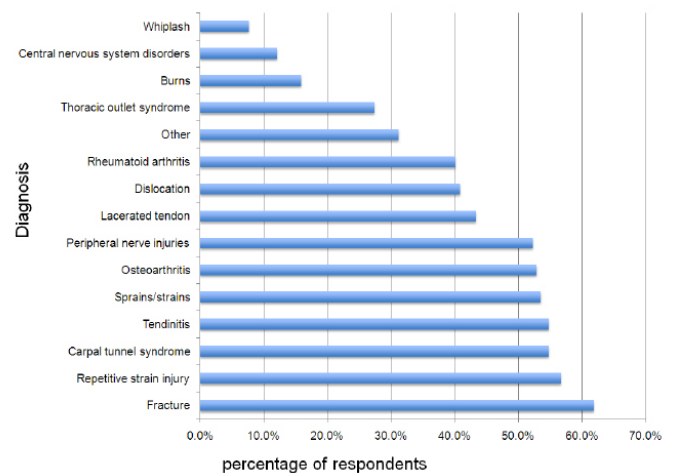


Figure 2. Percentage of respondents surveyed (n=157) who reported having used the DASH/QuickDASH in patients with each of the listed diagnoses.

The "Other" category included the following diagnoses: Replantations/revascularisations, post surgery (i.e. mastectomy, chest wall reconstruction, radical neck dissection, rotator cuff repair, total shoulder replacement, wrist surgeries), lymphadema, scleroderma, hemodialysis, complex regional pain syndrome, trigger finger, Dupuytren's contracture, rotator cuff tear, adhesive capsulitis and other UE trauma.

reconstruction, radical neck dissection, rotator cuff repair, total shoulder replacement, wrist surgeries), lymphadema, scleroderma, hemodialysis, complex regional pain syndrome, trigger finger, Dupuytren's contracture, rotator cuff tear, adhesive capsulitis and other upper-extremity trauma.

Measurement testing of the DASH/QuickDASH in Non-Musculoskeletal Populations

In updating the *DASH and QuickDASH Outcome Measure User's Manual, Third Edition*, we identified some gaps in measurement testing on the DASH/QuickDASH Outcome Measure in non-musculoskeletal populations. We were unable to identify any studies that evaluated the measurement properties of the DASH/QuickDASH in the following populations: v1) people with central nervous system disorders (e.g. neurological disorders such as stroke) or 2) people with lymphedema and/or post-mastectomy. The measurement studies that have been published include populations with primary musculoskeletal and arthritic disorders across the upper limb, also including peripheral nerve injuries and carpal tunnel syndrome. There has also been one recent publication evaluating the reliability and validity of the DASH in people with multiple sclerosis (Cano 2010).

However, in our survey of DASH users (see Figure 2), 12% (19/157) of respondents reported using the DASH/QuickDASH in patients with central nervous system disorders and 6% (10/157) used it in people with lymphedema and/or post-mastectomy. We have also identified several publications that describe the application of the DASH in studies involving patients with upper extremity disability after stroke (Lannin 2007), multiple sclerosis (Nociti 2008) and lymphadema and/or post mastectomy (Lim 2006; Lau 2009; Smoot 2010; Kaya 2010; Swisher 2010).

It would be an interesting to see how the DASH/QuickDASH performs in people with these disorders and to compare it with other measures that have been previously validated in these populations. We encourage testing of reliability and validity in these new populations.

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- Swisher AK, Davison C, Aranda R, Eye D, Erickson M. Frequency and severity of self-reported upper extremity impairments, activity limitations, and participation restrictions following breast cancer treatment. *Rehabilitation Oncology* 2010; 28(1):3-9.

News on translations of the DASH and *QuickDASH*

Translations in Progress

Translations of the DASH and *QuickDASH* into the following languages are currently in progress:

Estonian language

Contact: Mati Merila, Tartu University Hospital, Tartu, Estonia
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Filipino language

Contact: Emmanuel P. Estrella, University of Philippines, Manila, Philippines
estee96@yahoo.com

Hindi language

Contact: Saurabh Mehta, McMaster University, Hamilton, Ontario, Canada
mehtas8@mcmaster.ca

isi-Xhosa language

Contact: Elizabeth Pegram, University of Stellenbosch, Cape Town, South Africa
liz.pegram@gmail.com

Latvian language

Contact: Karolina Laudobele, SANARE- RRC Jaunkemeri Ltd., Riga, Latvia
karolina.laudobele@gmail.com

Slovak language

Contact: Peter KL'OC, Fakultná Nemocnica s Poliklinikou J. A. Reimana, Prešov, Slovakia
klocpeter@hotmail.com

Tamil (India) language

Contact: Dr. Praveen Bhardwaj, Ganga Hospital, Coimbatore, India
drpb12@yahoo.co.in

Thai language

Contact: Dr. Jeeranan Rapipong, Department of Rehabilitation Medicine, Chiang Mai University, Thailand
meow_jr@hotmail.com

Ukrainian language

Contact: Olya Mangushev, Occupational Therapy Department, University of Indianapolis, IN, USA
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Please check the DASH website frequently for availability:
<http://www.dash.iwh.on.ca/available-translations>

Links

DASH website:

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

Translations:

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

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

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

How to translate the DASH and *QuickDASH* Outcome Measure:

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

Scoring

QuickDASH Scoring e-Tool

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

Orthopaedic Scores:

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



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