ACRM
AMERICAN CONGRESS OF REHABILITATION MEDICINE

Archives of Physical Medicine and Rehabilitation

journal homepage: www.archives-pmr.org

Archives of Physical Medicine and Rehabilitation 2013;■:■■■-■■■

ORIGINAL ARTICLE

Validation of QuickDASH Outcome Measure in Breast Cancer Survivors for Upper Extremity Disability

Mously LeBlanc, MD,[a,c] Jun J. Mao, MD, MSCE,[b,c,d] Margaret Stineman, MD,[a,b] Angela DeMichele, MD, MSCE,[b,c] Carrie Stricker, PhD, RN[c]

From the [a]Department of Physical Medicine and Rehabilitation, [b]Center for Clinical Epidemiology and Biostatistics, [c]Abramson Cancer Center, and [d]Department of Family Medicine and Community Health, University of Pennsylvania Health System, Philadelphia, PA.

Abstract

Objective: To validate the QuickDASH as a patient-reported outcome measure for assessing upper extremity disability in breast cancer survivors.

Design: Large cross-sectional survey.

Setting: Ambulatory care center at a university hospital.

Participants: Postmenopausal women (N=150) with stage I to III hormone receptor−positive breast cancer currently taking a third-generation aromatase inhibitor.

Interventions: Not applicable.

Main Outcome Measure: QuickDASH, an 11-item self-administered questionnaire, assesses global arm function over the past 7 days.

Results: Of 150 surveys, 148 (99%) were scorable. The factor analysis demonstrated 1 factor with an eigenvalue of 6.7, which explains 61% of variance. The score was reliable with a Cronbach alpha of .93. The test-retest reliability was .78 over 2 weeks. The mean QuickDASH score ± SD for all patients was 19±19. Those with upper extremity arthralgias reported higher QuickDASH scores than controls without pain (26 vs 12, $P=.001$). Those with frozen shoulder pain also reported higher QuickDASH scores than controls without pain (37 vs 15, $P=.001$).

Conclusions: The QuickDASH instrument is a convenient, reliable, and valid patient-reported outcome measure to assess upper extremity disability in patients with breast cancer.

Archives of Physical Medicine and Rehabilitation 2013;■:■■■-■■■

While treatment advances have resulted in better 5-year survival rates for patients with breast cancer (74.2% in 1979 vs 89.2% in 2013), upper extremity disability remains a significant morbidity in the growing breast cancer survivor population.[1] Breast cancer survivors continue to experience upper extremity disability as a result of current treatment modalities including surgery, radiotherapy, and chemotherapy despite the development of less invasive treatments such as sentinel lymph node biopsy or image-modulated radiotherapy. Hormonal treatment via aromatase inhibitors poses an additional risk for upper extremity disability, with 33% to 74% of those taking aromatase inhibitors reporting musculoskeletal pain most commonly involving the hand and wrist.[2,3] The most frequently documented impairments after breast cancer treatment are reduction in range of motion of the shoulder (51%), pain (51%), reduced grip strength (33%), and lymphedema (36%).[2,4,5] Thus, we chose to investigate disability in survivors with reduced shoulder range of motion (ie, frozen shoulder) and those with pain from aromatase inhibitor−induced arthralgias.

Optimal arm functioning is vital for independence, return to work, performance of household chores, and overall quality of life. Six years after treatment, upper extremity impairments continue to be evident, having a significant impact on quality of life and precluding full resumption of activities of daily living.[5,6] Levy et al[7] found that >35% of breast cancer survivors report limitations in performing household chores and carrying or lifting items, thus limiting their ability to perform normal activities of daily living. Significant detriment in quality of life was further demonstrated in a large study[8] of 90,000 cancer survivors, which found that the risk

Supported in part by the American Cancer Society (grant nos. IRG-78-002-30, NIH/NCI R01CA158243-03). The funding agencies played no role in the design and conduct of this study.

No commercial party having a direct financial interest in the results of the research supporting this article has conferred or will confer a benefit on the authors or on any organization with which the authors are associated.

0003-9993/13/$36 - see front matter © 2013 by the American Congress of Rehabilitation Medicine
http://dx.doi.org/10.1016/j.apmr.2013.09.016

of psychological distress correlated more strongly with the level of disability than the cancer diagnosis itself.

To date, few published studies assess impairment of functional capacity, otherwise known as disability. Instead, most studies of breast cancer–associated disability are descriptive studies that offer vastly discrepant findings concerning the prevalence of impairments.[5] While the reason for these discrepancies is likely multifactorial, it is clear that the use of diverse and nonvalidated outcome measures across studies likely plays a significant role.[4,5] In an attempt to assess disability, a meta-analysis[4] of breast cancer survivors analyzing the relationship of late impairments to quality of life and performance of activities of daily living initially yielded 1642 articles; however, only 5 met the inclusion criterion of use of valid and reliable outcome measures to assess upper extremity impairment. This is in large part due to a dearth of measures that have been validated in the breast cancer population. Furthermore, function has recently been associated with survival rates in breast cancer.[9] Thus, the development and validation of appropriate instruments to measure upper extremity impairment are greatly needed.

The Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire is one of the most commonly used patient-reported outcome (PRO) measures for upper extremity assessment. It has been validated in the general population and was found to be the most effective instrument for evaluating patients with disorders involving multiple joints of the upper limb.[10] Despite its common usage in breast cancer survivorship research, its psychometric properties have not been investigated in this population.[2] Alternatively, QuickDASH is an 11-item questionnaire assessing upper extremity disability affecting multiple upper extremity joints compared to the 30 item DASH questionnaire. Given clinical time constraints, the shortened version, QuickDASH, would be preferable to use with breast cancer survivors, who are at risk for developing disability involving multiple upper extremity joints, particularly from aromatase inhibitor-induced arthralgias and restriction in shoulder range of motion (frozen shoulder).

Thus, the goal of this study was to determine the validity, reliability, and clinical feasibility of use of the QuickDASH as an outcome measure for breast cancer survivors receiving aromatase inhibitors and experiencing upper extremity disability. We hypothesized that the QuickDASH is a valid and reliable outcome measure with a Cronbach alpha >.70, with acceptable test-retest reliability that is higher than .60. We also hypothesized that QuickDASH could adequately discriminate between the subgroups of those with and without frozen shoulder or upper extremity arthralgias (shoulder, elbow, wrists, and hands) and those with and without recent pain symptoms.

Methods

Participants

This study was conducted in the context of a large cross-sectional survey at the Rowan Breast Cancer Center of the Abramson Cancer Center of the University of Pennsylvania Health System (Philadelphia, PA). Potential participants included all postmenopausal women with a history of stage I to III hormone receptor–positive breast cancer who were currently taking a third-generation aromatase inhibitor (anastrozole, letrozole, or exemestane) and were treated between April and August 2007. Additional inclusion criteria were completion of chemotherapy or radiotherapy for at least 1 month, approval of the patient's primary treating oncologist, and the patient's ability to understand and provide informed consent in English. Research assistants screened medical records and approached potential study subjects for enrollment at their regular follow-up appointments. After informed consent was conducted and obtained, each participant was given a self-administered survey between April and August 2007. The Institutional Review Board of the University of Pennsylvania approved the study.

List of abbreviations:

DASH	**Disabilities of the Arm, Shoulder and Hand**
FACT-B	**Functional Assessment of Cancer Therapy–Breast**
PRO	**patient-reported outcome**
QuickDASH	**Disabilities of the Arm, Shoulder and Hand 11-item questionnaire**

Outcome measure: QuickDASH

The QuickDASH questionnaire was modified from the lengthy 30-item DASH questionnaire via a concept retention approach used on field testing data of 407 patients with various upper extremity pathologies.[11] The Cronbach alpha coefficient was .929, demonstrating high internal consistency. Furthermore, the overall construct validity, test-retest validity, and responsiveness show comparable results between the QuickDASH and DASH.

QuickDASH is graded on a 100-point scale, with higher scores indicating a greater level of disability. The scale assesses upper extremity function using questions that ask patients to rate the level of difficulty in performing several tasks, including opening a tight jar and washing their back, and the level of perceived pain over the past week. The questionnaire consists of 11 questions scored 1 to 5, with patients answering 1 for activities performed with "no difficulty" and 5 for activities unable to perform or performed with "extreme difficulty" (table 1). The final score is calculated by first summing total responses and then dividing this figure by the total number of completed items. This figure is then subtracted by 1 and multiplied by 25. A score can only be calculated with a maximum of 1 omitted item.

$$\text{Score} = ([\text{Sum/No. of responses}] - 1) \times 25$$

Analyses

To evaluate reliability of the scale, we determined item-item and item-total correlations to ensure that all items positively related to one another but were not redundant. We also calculated the Cronbach alpha coefficient. To evaluate scale structure, we performed a principal components analysis exploring the potential number and characteristics of domains of related items. Interpretation of the results of the principal components analysis was guided by identifying eigenvalues >1.0 and the rotated loadings of variables on the identified components.

We evaluated the construct validity by calculating the scores of QuickDASH for stratified subgroups with frozen shoulder or arthralgias (joint pain) and correlated results to a single question asking whether patients experienced pain within the past week. Our primary hypothesis was that the QuickDASH score would be higher for individuals who reported pain from frozen shoulder or arthralgias involving the upper limbs within the previous week. These sets of analyses were performed using Wilcoxon rank sum to compare scores between groups because of the nonnormal nature of the data.