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A Measure of Meaningful Daily Activity as an Additional Outcome Measure to Develop Treatment Goals and Monitor Symptomatology in Chronic Pain Patients (CPP)

Abstract:
The International Association of the Study of Pain (IASP) reported the international prevalence of chronic pain (CP) varied from 10.1% to 55.2% (Harstall and Ospina, 2003). The reported Australian population prevalence of CP was 18.5%. (Blyth et al., 2001). In terms of costs to national health service utilization (Blyth et al., 2004, Blyth et al., 2003), work absenteeism and lost productivity, this health disorder is a serious issue (van Leeuwen et al., 2006), requiring further investigation to improve patients’ functioning and quality of life, and to reduce the reliance of these patients on the health care system. Currently the focus of health care in Australia is self regulatory/self management (Blyth et al., 2005, Britt et al., 2005). This is not necessarily consistent with how health practitioners have assessed CP patients. Functionality and activity are routinely assessed in CP treatment. However, the personal meaning of activities that may protect and promote health has not been routinely investigated.

The aim of this presentation will be to report on two studies exploring meaningful daily activity as an outcome domain in CP treatment.

Study 1 With the authors permission the well validated West Haven-Yale Multidimensional Pain Inventory (WHYMPI) (Kerns et al., 1985) 18 Activity Subscale items were included in a measure of meaningful daily activity (MDAQ). The reliability of the measure was established, on a sample of 264 adult participants, who completed the MDAQ (Alpha=.85).

Study 2 Explored the association between 108 Australian CP patients reported participation in MDA, dispositional optimism and illness perceptions and the severity of sensory pain, functional disability, and psychological distress. MDA scores did not predict pain severity or disability. However, MDA predicted psychological distress.


**Study one Introduction**

In a Pilot Study, it was observed that although activities were performed frequently, these activities were not necessarily either meaningful or important, and two parallel measures were generated. The Meaningful Daily Activity Questionnaire (MDAQ), as a measure of meaningfulness of daily activities and the Daily Activity Questionnaire (DAQ), to measure the frequency of participation in daily activities.

The Pilot Study activities that were found to be most meaningful were related to self-care and health maintenance, interacting with others and passive leisure. Previous research supports the Pilot Study findings and emphasises the need for individuals to participate in a range of activities, to maintain their physical, vocational, social and emotional functioning (Argyle, 1997, Baum et al., 1997).

Participants identified spirituality as being meaningful activity. In the research literature, spirituality, or observance of a religion, has been identified as being important and affects the health status of various populations (Koenig, 2007). Structured or purposeful activity, including paid employment, volunteer work, caring for others, hobbies, participation in sports or clubs, passive and active leisure were also important in physical and emotional well-being (Waters and Moore, 2002, Stebbins, 1992, Stebbins, 1996, Patterson, 1997, Comino et al., 2003).

**Study One Aims:**

1. To develop two reliable and valid self report global measures of daily activity:
2. (a) One measure to assess the meaningfulness of various daily activities (MDAQ) and
3. (b) The other measure to assess the frequency of performing a variety of daily activities (DAQ). [Slide 3]
4. To identify factors (subscales) and items for inclusion in revised versions of the measures to test the CP and Meaningful/Daily Activity Models. [Slides 9 & 10]
5. Generate norms for the MDAQ and the DAQ. [Slide 12]

**Study One Methods**

**Participants**

In total, 446 questionnaires were distributed to potential participants, 264 participants, (119 men, 45.1% and 145 women, 54.9%) aged between 19 and 78 completed questionnaires. This is equivalent to a response rate of 59.2%. Thirty cases (11.36%) were excluded due to not meeting the age criteria (25 to 65 yrs), or substantial missing data. Participants retained (N=234) included 107 (45.7%) males and 127 (54.3%) females. The mean age of female participants was 44.1 years (SD=10.60) and for male participants M = 44.6 (SD = 10.60).

**Measures:**

MDAQ and DAQ: both measures included 32 identical daily activities, consisting of the original 18 WHYMPI items and fourteen additional items. [Slide 5]

The additional items were included because of the literature reviewed, and findings of the Pilot Study. Health, and medical issues; passive and active leisure; interpersonal contact and caring for others, intimacy and the practice of a religion were all identified as being meaningful.
**MDAQ Instructions:**
“Listed below are 32 common daily activities. Please indicate how meaningful you currently find each of these activities by placing a number from 0 to 6 in the corresponding question box for each activity”. A rating of 0 indicated the respondent found the activity to be **not at all meaningful** and a rating of 6 indicated that they perceived the activity to be **extremely meaningful**.

DAQ instructions were identical to the WHYMPI:

The method of scoring both measures was the same as the seven point (0-6) Likert scale scoring method used in the WHYMPI. With possible scores ranging from 0 to 192.

Microsoft Word reading age was calculated, the Flesch-Kincaid Grade level reading age of the MDAQ was grade 6.6 and the reading ease was 59.3% and for the DAQ grade 7, reading ease 55.3%.

Visual Analogue Scales Meaningful Daily Activity (MDA) and Satisfaction with Life (SWL)

**VAS MDA Overall how meaningful are your daily activities?**
0 (not at all meaningful) to 6 (extremely meaningful)

**VAS SWL Overall how satisfied are you with your life?**
0 (not at all satisfied) to 6 (extremely satisfied)

**Study One Results**
All 32 MDAQ and DAQ individual item scores were visually compared [Slide 7] Apart from item 5 Go grocery shopping \((r = .13, n =197, p \geq 0.05)\), all items were significantly correlated \((p \leq 0.05)\). The item with the largest significant correlation was item 28 Attend a religious or spiritual service \((r= .73, n =200, p \leq 0.001)\).

**Reliability**
After checking the data for outliers, the internal consistency of the MDAQ and DAQ was examined, using Cronbach's \(\alpha\). The \(\alpha\) coefficient for the MDAQ was 0.87 and DAQ 0.86.

**Content and Face Validity**
Content and face validity was established by obtaining feedback from 10 peers who were either academics or allied health professionals currently treating chronic pain patients. Peer review established that the measures included activities that were often important in the lives of chronic pain patients and would be appropriate to administer to a chronic pain cohort.

Reviewers reported both the MDAQ and DAQ were clear, concise, and measured Meaningful Daily Activity and Daily Activity.

**Factor Analysis MDAQ and DAQ**
Two principal component factor analyses with varimax rotation were performed. Cases were excluded list wise if there was missing data. The number of factors that were selected for extraction in SPSS was four. The four factors identified had eigenvalues greater than 1, and items had factor loadings \(\geq .4\).

1. MDAQ Factors [Slide 9].
2. DAQ Factors [Slide 10].

**Revised Meaningful Daily Activity Questionnaire MDAQ-R (29 Items)**
Item 22 Attend meetings not related to paid work did not load \(\geq .40\) on the factor solution and was omitted from the revised MDAQ-R. Items 8 Visit friends and 14 Wash the car, had a loading of \(\geq .40\) on two separate factors, and were both deleted from the MDAQ-R. The results of the reliability analysis for the 29 item MDAQ-R Alpha= .85 and Standardized Alpha = .85.
Revised Daily Activity Questionnaire DAQ–R (28 Items)
Item 4 Play cards or other games, 20 Hobbies, crafts or making things and 26 Watching TV, listening to music or the radio, reading or relaxing, did not significantly load ≥.4 on any factors and were not retained in the DAQ-R. Item 11 Take a ride in the car, loaded ≥ .4 on two factors, 1 Domestic Chores, and 4 Home Maintenance, and was subsequently excluded. The reliability analysis for the revised 28 item DAQ-R was Alpha=.80 and Standardized Alpha =.80.
DAQ-R 2 Work, Health, Spirituality & Caring, α was less than .70. Cronbach’s Alpha scores if each of the 10 items in the subscale were deleted were calculated. If DAQ-R 24 Work in paid employment, was deleted the subscale reliability would increase from .68 to .74, and the total DAQ-R reliability would increase from .79 to .80 [Slide 10]. Because paid work was frequently performed daily activity, item 24 was included in the DAQ-R 2.

Data Analysis: MDAQ-R and DAQ-R:
Individual items comprising each factor (subscale) were summed, thereby obtaining a score for each of the eight factors. The total possible score for MDAQ-R was 174 and for the DAQ-R 168.
To determine the association between measures a correlation coefficient analysis of all measures (DAQ-R, MDAQ-R, VAS-SWL and VAS-MDA) was performed. The significant demographic variables in the MDAQ-R and DAQ-R subscales were calculated. Gender was significant in the MDAQ-R subscales (1) Support, Caring & Interpersonal Relationships, (3) Sensory & Leisure Activities, and (4) Home Maintenance and Health Maintenance. Age was significant in one subscale, Home Maintenance and Health Care. Gender was significant on all four of the DAQ-R subscales, while age was significant on (1) Domestic Chores, (2) Work, Health, Spirituality and Caring and (3) Interpersonal Contact, Leisure and Sensuality. Being married or single was a significant predictor of Subscale (3) Interpersonal Contact and Social Support. This subscale included going out to eat, visiting hugging and cuddling and sexual activity.

Study One Conclusion
The MDAQ-R and DAQ-R are reliable and valid, and norms were calculated. The activities most frequently performed were DAQ-R 1, Domestic Chores. While the most meaningful activities were MDAQ-R 1 Interpersonal Contact & Social Support. The most meaningful MDAQ-R activities were caring for a friend or family member and visiting relatives. The DAQ-R activities most often performed were household chores, washing and cleaning. Demographics were significant in all of the subscales

Study Two
Study Two aim was to test two research models: (1) The Effects of Meaningful Daily Activity (MDA) on Chronic Pain Symptoms [Slide 16] and (2) The Effects of Daily Activity (DA) on Chronic Pain Symptoms. [Slides 17 & 18]
Study Two Methods

Chronic Pain Participants
There were 175 surveys distributed to a community agency and physical therapy practices in Melbourne, Australia, 115 were returned, the response rate was 65.71%. One hundred and eight surveys satisfied the research criteria. The sample consisted of 46.3% (n=50) physical therapy practice patients and 53.7% (n=58) community volunteers. To compare the demographic characteristics of the two samples $\chi^2$ and $\tau$ tests were performed. Statistically significant relationships were being female and caring for someone (4.97, 1 df, .03 sig.), being a male who is currently litigating (17.52, 1df, .00 sig.) and having sustained a work injury (6.5, 1df, .01sig.).

Measures [Refer to Slide 20]

Study Two Results
Scores and reliability for all measures were calculated. Two correlation coefficients were performed using Pearson’s product-moment correlation, (i) for all of the measures and (ii) for the measures and demographics variables and significant associations were identified.

Testing the MDA and DA Research Models
Six multiple linear regression analysis were conducted using SPSS 14, method of entry was enter, cases were excluded pairwise, the stepping method criteria was a probability of F entry .05 and .10 removal. The dependent variables were the (1) Pain and Disability Factor, (2) Psychological Distress Factor and (3) Positive Life Orientation (Dispositional Optimism).

(1) Pain and Disability
   (i) Meaningful Daily Activity
   Pain and Disability Factor was the Dependent Variable, and the Independent Variables were the four IPQR subscales, MDAQ-R subscales and the demographic variables. In total, 44.4 % (34.5 % adjusted) of the variability in the Pain and Disability Factor was predicted by knowing the scores on the three IVs IPQR 1 ($\beta$=.38), IPQR 2 ($\beta$=-.28) and Marital Status ($\beta$=-.22).
   (ii) Daily Activity
   Pain and Disability Factor was the Dependent Variable, and the Independent Variables were the four IPQR subscales, DAQ-R subscales and demographic variables. In total, 52.5 % (44.6 % adjusted), of the variability in the Pain and Disability Factor was predicted by knowing the scores on the five IVs IPQR 1 ($\beta$=.34), IPQR 2 ($\beta$=-.22), DAQ-R 4 ($\beta$=-.29), Work Status ($\beta$=.20) and Marital Status ($\beta$=.19).

(2) Psychological Distress
   (i) Meaningful Daily Activity
   The Psychological Distress Factor was the Dependent Variable, and the Independent Variables were the four IPQR subscales, MDAQ-R subscales and the demographic variables. In total, 64.7 % (57.4 % adjusted) of the variability in the Psychological Distress Factor was predicted by knowing the scores on the five IVs IPQR 1 ($\beta$=.32), MDAQ-R 3 ($\beta$=-.29), MDAQ-R 4 ($\beta$=.29), Taking Antidepressants ($\beta$=-.19), and Education ($\beta$=-.18).
   (ii) Daily Activity
The Psychological Distress Factor was the Dependent Variable, and the Independent Variables were the four IPQR subscales, DAQ-R subscales, and the demographic variables. In total, 67.2% (61.1% adjusted) of the variability in the Psychological Distress Factor was predicted by knowing the scores on the six IVs IPQR 1 ($\beta = .18$), DAQ-R 3 ($\beta = -.29$), DAQ-R 4 ($\beta = -.20$), Work Injury ($\beta = -.17$), Education ($\beta = -.18$), and Gender ($\beta = -.23$).

(3) Positive Life Orientation (Dispositional Optimism)

(i) Meaningful Daily Activity

Dispositional Optimism was the Dependent Variable and the Independent Variables were the four IPQR subscales, MDAQ-R subscales, and the demographic variables. In total, 39.4% (30% adjusted) of the variability in Dispositional Optimism was predicted by knowing the scores on the two IVs, IPQR1 ($\beta = -.45$ rounded) and MDAQ-R 4 ($\beta = -.37$).

(ii) Daily Activity

Dispositional Optimism was the Dependent Variable and the Independent Variables were the four IPQR subscales, DAQ-R subscales, and the demographic variables. In total, 36.6% (27.6% adjusted) of the variability in Dispositional Optimism was predicted by knowing the scores on the two IVs, IPQR1 ($\beta = -.32$) and DAQ-R 3 ($\beta = -.28$).

Study Two Discussion

Rather than personally attributed meaningfulness to various daily activities predicting pain, disability, psychological distress and optimism, the more relevant finding was whether or not the individual was performing specific daily activities. For example, Support, Caring & Interpersonal Relationships were the most meaningful activities and included items such as caring for friends and family members, hugging and cuddling, and volunteer work, but did not predict CP symptoms or Optimism. Whereas participation in Sensory and Leisure Activities, including going out to eat, going to movies, taking a trip, going to the park or beach, watching TV and movies and sexual activity predicted Psychological Distress. This MDAQ-R Subscale consisted of seven items from the WHYMPI Activities Away from Home and the Social Activities scales. The DAQ-R subscale Interpersonal Contact, Leisure and Sensuality also predicted Psychological Distress.

DAQ-R Home Maintenance (original items from WHYMPI Outdoor Work), and MDAQ-R Home and Health Maintenance also predicted Dispositional Optimism and consisted of similar items, with the addition of three health items. Illness perception cause of illness, IPQ-R1 Psychological Attributions, predicted all variables tested in the CP models: Pain and Disability, Psychological Distress and Dispositional Optimism. This was particularly relevant, given the high number of participants who were receiving income replacement for injuries sustained at work and who were currently litigating because of this injury.

Study Two Conclusion and Recommendations

Meaningfulness of activity is a separate construct to Illness Perception and Daily Activity. CPP perception of the cause of their illness affected their symptoms. Participating in sensory and leisure activities affected CPP symptom severity. The MDAQ-R and DAQ-R can now be refined and used in clinical trials to establish CPP treatment objectives. A clinical trial can now be conducted to establish whether CPP increased participation in Sensory and Leisure Activities, or increasing/decreasing participation in Home and Health Maintenance, reduces the severity of and CP symptomatology.


