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An Investigation of the Repeatability of the Multidimensional Affect and Pain Survey (MAPS) for Neck and Back Pain

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Abstract

The Multidimensional Affect and Pain Survey is a 101 item questionnaire. It describes the impact of pain at three levels: sensory pain, emotional pain and well being. The questionnaire returns a score for each of these between zero and five. Its test-retest reliability was tested in a neck and back pain population. The Multidimensional Affect and Pain Survey was posted to 167 people with neck pain and 167 people with back pain to be completed on two occasions. There were 119 (38%) Test One and Test Two pairs of questionnaires returned that were fit for analysis (Neck: 41 women, 19 men, mean age 51.85 1SD 14.48, Back: 35 women, 24 men, mean age 44.90 1SD 14.48). All questionnaires were completed prior to attending physiotherapy. The mean difference was close to zero for sensory pain, emotional pain and well being in both the neck and back pain groups. The 95% limits of agreement for sensory pain were neck –0.97, 0.83; back –1.04, 1.12: emotional pain neck –1.17, 1.27, back: -1.16, 1.2: well being neck: –1.48, 1.54; back: -1.75, 1.55. The results support the repeatability of the Multidimensional Affect and Pain Survey for investigating neck and back pain under similar circumstances to those in this study.

Keywords: *MAPS, Neck pain, Back pain, Repeatability*.

Introduction

The Multidimensional Affect and Pain Scale (MAPS) is a questionnaire that uses verbal descriptors to assess the impact of pain (1). It is generally self-administered and belongs in the same family of measures as the McGill Pain Questionnaire (2). MAPS contains 101 descriptors such as "The pain is OVERWHELMING and I feel MISERABLE". The respondent is required to indicate how each descriptor applies to them on a 6-point scale ranging from 0 = Not at all, to 5= Very much so. The responses are grouped together in three main categories or

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superclusters labeled, sensory pain, emotional pain and well being. Each supercluster can be subdivided into smaller categories or clusters. (The terms supercluster and cluster are used because the groupings were devised using cluster analysis).

MAPS has previously been used with other populations with pain-related problems (3-8). It has shown a high level of validity with the McGill Pain Questionnaire and it has been argued that it gives richer information than that questionnaire (3). MAPS has also demonstrated good construct validity (3), internal consistency (9) and criterion validity (10). To date, no study has examined the repeatability of MAPS. Therefore, the aim of this study (carried out in the context of overall work comparing the impact of back pain with that of neck pain) was to investigate the repeatability of MAPS for two conditions – neck pain and back pain.

Methods

An observational cohort study with serial testing at two time points. Local research ethics committee approval was obtained. Consecutive sampling, during a six-month period of referral to the West Lothian Healthcare Trust physiotherapy service, United Kingdom (UK), was used to select people with neck pain with/without associated upper quadrant symptoms and people with low back pain with/without associated leg pain lasting a month or longer. Men and women aged 18 years and over, were eligible for inclusion into the study if they were new referrals and were classified as "routine".

People with spinal pain are referred by consultants at the hospital, and GPs based in the surrounding community to the NHS Healthcare Trust physiotherapy service. The people are categorised as urgent, soon or routine. Urgent patients receive an appointment within a week. Those classified as soon receive an appointment within two-three weeks while those classified as routine receive an appointment within four to ten weeks. Routine patients were chosen to allow time to complete two questionnaires prior to commencing physiotherapy treatment.

Exclusion criteria were an outstanding claim for compensation, pain that was related to areas other than the spine and current attendance at physiotherapy or other type of therapists out with the clinical setting for the trial. Prospective participants were identified from their referral documents by the team of physiotherapists within the service. The team had received prior training about the protocol.

The Multidimensional Affect and Pain Survey was included within a composite questionnaire pack that contained the Extended Aberdeen Spine Pain Scale (11) and the Örebro Musculoskeletal Pain Screening Questionnaire (12) and was posted to all prospective participants (n=334) to be completed at home with the request that the questionnaires be returned to the principal researcher in the enclosed pre-paid stamped addressed envelope. A further copy of all questionnaires and a pre-paid stamped addressed envelope were posted to all potential participants who had not replied after two weeks. 221 questionnaires were returned. 32 of these returned questionnaires were rejected:

- Three questionnaires were rejected as they were returned blank or with only a few questions answered.
- 12 questionnaires were rejected as the participants had a claim pending.
- One participant was reclassified as urgent and did not satisfy the selection criteria of routine.
- One participant had started physiotherapy before receiving the first questionnaire.
- One participant had started private physiotherapy while waiting for the NHS physiotherapy appointment.
- Seven participants had non-related hip and/or knee or foot pain.
- One participant's symptoms were related to the menopause.
- One participant did not have neck or back pain.
- Two participants did not wish to be part of the trial.
- One questionnaire was returned torn up.
- Two participants were less than 18 years.

These participants were not sent questionnaire two. A second copy of the questionnaires was posted to the remaining 189 subjects (118 women, 71 men) by the principal researcher to complete at home and

return using a pre-paid stamped addressed envelope. As before, a further copy of the questionnaires and a pre-paid stamped addressed envelope were posted to participants who had not replied after two weeks. In a further follow-up those who had not replied to the reminder (n=13) were phoned to ask them to complete questionnaire two.

136 questionnaires were returned by a pre-paid stamped addressed envelope. The mean (1SD) time between completion of questionnaires was neck 15.73 (8.20) for the neck group and 15.78 (9.50) for the back group. Six participants reported that they had received Questionnaire Two after they had commenced treatment and one participant no longer wished to be part of the trial. Another eleven participants (6 neck, 5 back) returned questionnaires, in which MAPS was completely/almost completely blank. Therefore, this left 119 (38%) pairs (60 neck, 59 back) of Test One and Test Two questionnaires returned that were fit for analysis (Neck: 41 women, 19 men, mean age 51.85 1SD 14.48, Back: 35 women, 24 men, mean age 44.9 1SD 14.48).

All questionnaires were completed prior to attending physiotherapy.

Recruitment to the back group was faster than recruitment to the neck group. Therefore, recruitment to the back group was stopped but continued in the neck group until comparable numbers were reached.

The questionnaires were scored manually by the authors and entered into SPSS (Version 11) for analysis. The neck data was analysed separately from the back pain data. Bland and Altman (13) 95% limits of agreement between Test One and Test Two were then calculated for each of the three MAPS superclusters of sensory pain, emotional pain and well being.

Results

In each of the three superclusters, for both back and neck pain, the mean difference was close to zero (see table 1). The respective 95% limits of agreement between Test One and Test Two for sensory pain, emotional pain and well being in back pain are shown in figures 1a-c. Those for neck pain are shown in figures 1d-f. In the back pain group the 95% limits of agreement were –1.04, 1.12 for sensory pain; -1.16, 1.2 for emotional pain; and –1.75, 1.55 for well being. In the neck pain group the 95% limits of agreement were -0.97, 0.83 for sensory pain; -1.17, 1.27 for emotional pain; and –1.48, 1.54 for well being.

Table 1. Mean and median of the three MAPS superclusters (sensory pain, emotional pain and well being) and respective mean differences

	Back (n=59)		Neck (n=60)	
	test 1	test 2	test 1	test 2
Sensory Pain				
mean (1SD)	1.7 (0.75)	1.6 (0.81)	1.7 (0.84) 1.4 (1.1)	1.7 (0.97) 1.5 (1.2)
median (IQR)	1.6 (0.9)	1.6 (0.9)		
mean difference (1SD)	0.04 (0.04)		-0.07 (0.46)	
95% confidence intervals	-0.10, 0.19		-0.18, 0.53	
Emotional Pain				
mean (1SD)	1.5 (0.96)	1.5 (1.03)	1.6 (1.17)	1.6 (1.23)
median (IQR)	1.4 (1.4)	1.3 (1.6)	1.4 (1.9)	1.5 (1.8)
mean difference (1SD)	0.02 (0.60)		-0.05 (0.62)	
95% confidence intervals	-0.13, 0.18		-0.21, 0.11	
Well being				
mean (1SD)	2.1 (0.99)	2.0 (1.03)	2.4 (1.12)	2.4 (1.16)
median (IQR)	2.1 (1.4)	2.2 (1.1)	2.3 (1.6)	2.4 (2.0)
mean difference (1SD)	-0.10 (0.83)		0.03 (0.77)	
95% confidence intervals	-0.32, 0.12		-0.16, 0.23	

This table shows each Test One and Test Two mean and one standard deviation; median and interquartile range. The table also shows the mean difference of Test One and Two and one standard deviation for back pain and neck pain separately.

Figure 1a-e shows Bland and Altman plots of 95% limits of agreement between Test One and Test

Two of the three MAPS dimensions of sensory pain, emotional pain and well being for neck (n=60) and back data (n = 59).

The y axis shows the difference scores: Test One - Test Two.

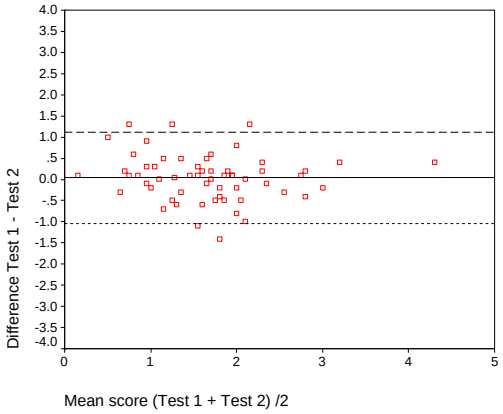

Figure 1a. Sensory Pain (Back) n = 59.

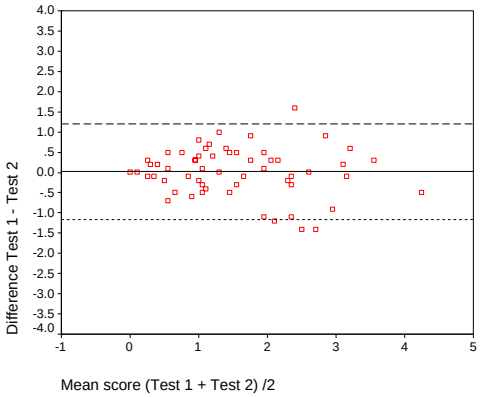

Figure 1b. Emotional Pain (Back) n = 59.

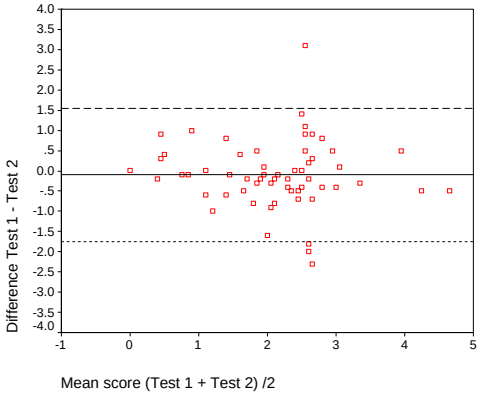

Figure 1c. Well being (Back) n = 59.

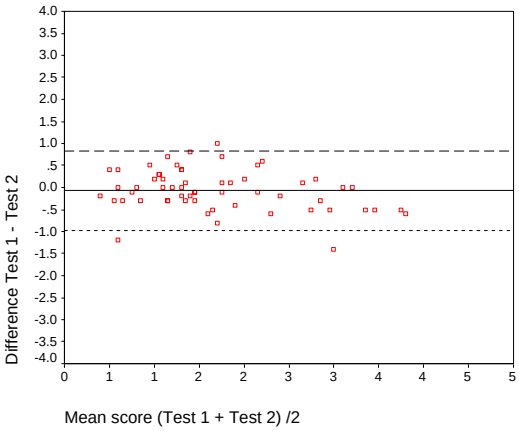

Figure 1d. Sensory Pain (Neck) n = 60.

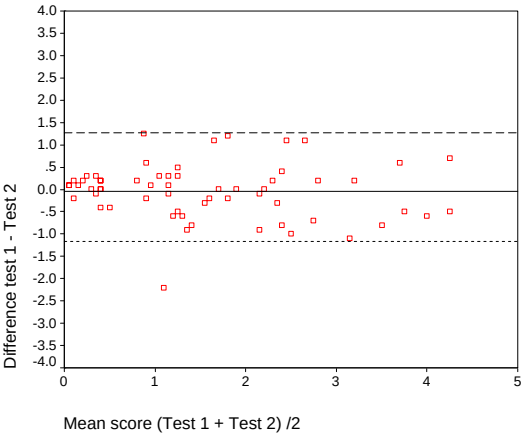

Figure 1e. Emotional Pain (Neck) Test n = 60.

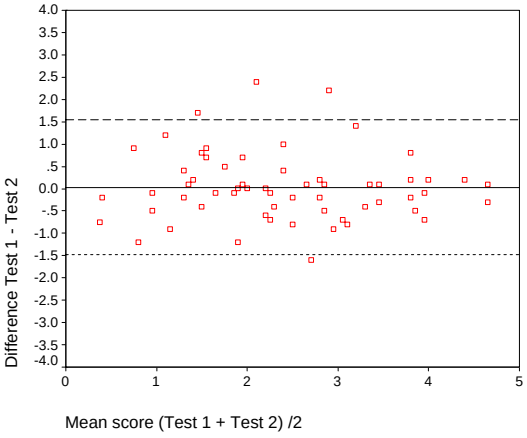

Figure 1f. Well being (Neck) n = 60.

Discussion

The results of the study showed the repeatability, in terms of the 95% levels of agreement, for the sensory pain, emotional pain and well-being superclusters of MAPS, when the questionnaire is administered under circumstances similar to those in this study. This information is important in planning studies to investigate the effects of intervention.

The mean difference was very close to zero with narrow confidence intervals in each of the three superclusters for both back and neck pain. This suggests that there was no substantial systematic error between measurements. The 95% limits of agreement were similar for both back and neck pain and they were relatively narrow.

The figures show that in the back pain group, the change in scores between the two tests, under circumstances similar to those in this study, is expected to be around +/-0.5, +/-0.6 and +/-0.8 scale points for sensory pain, emotional pain and well being respectively. In the neck pain group those estimated changes are also +/-0.5, +/-0.6 and +/-0.8. Without evidence as to what may constitute a clinically significant change in MAPS scores it is difficult to make any further comment. However, it is worth noting that some commentators have previously discussed figures in the realms of 30% change in VAS scores as representing clinically significant changes (14,15).

The difference scores were clearly independent of the mean scores, with the possible exception of sensory pain scores in the neck group in which there was a low but marginally statistically significant negative correlation between difference and mean scores (Spearman's rho $p = 0.049$). There appeared, visually, to be lower difference scores with mean scores in the higher end of the scale. There were, however, relatively few data points at this end of the scale and exploratory analysis of the data showed that when the two highest mean scores were removed, the subsequent correlation was not significant. We were thus satisfied to continue with the analysis.

The study adds evidence of repeatability to the growing body of work that supports the credibility and usefulness of MAPS as a tool in assessing the impact of pain. As this is the first study of its kind with MAPS, however, we cannot compare our findings with others and without that reference to similar studies the current results should be viewed as preliminary and within the context of the circumstances of our study.

The study has a number of other limitations. Only 120 questionnaires of the original 344 were available for analysis due to successive return rates of 66% and 72% plus specific reasons for rejection outlined above. We do not have data on the reasons why people did not return the questionnaires. For example, for both groups the gender ratio of questionnaires sent out was similar to that for the analysed questionnaires so gender was unlikely to be factor. MAPS was administered as a part of a larger set of measures: it is not known how this affected the scoring of MAPS and if the results would have been different if MAPS had been administered on its own. The inclusion as part of a set of measures reflected the context of this study as a precursor to further work that uses that set of measures.

Questionnaire fatigue is often an issue of concern when using surveys and the larger set of questionnaires used in this study took an estimated 20 minutes to complete, which may have been considered to be lengthy by some people (16-19). Anecdotally, some participants in this study commented that the number of questions [101] in MAPS was large. On the other hand, previous use of MAPS has not shown this to be a significant problem (7,8) although work is ongoing to develop a shorter version of MAPS (9).

The sampling strategy did not differentiate between people who considered themselves to have improved, worsened or remained the same during the period of assessment. Other studies (11) have used this approach in determining responsiveness to change. That was not an aim of the study. Analysis of the EASPS scores did show that for both the neck pain and back pain groups there were no statistically significant differences between Test One and Test Two. This provides evidence that the impact of pain did not change significantly between the two time periods in either group.

The inclusion criteria was wide in terms of age (>18 years) and length of symptoms (>1 month) to reflect the population for our wider work. The wide inclusion criteria is reflective of the population of people with back and neck pain (20-25). The wide

inclusion criteria could mean that there were sub-groups within the sample, a possibility consistent with opinion that the back pain population consists of several homogenous groups and should be sub-classified to optimise the response to intervention and management (26-31). We did not, however, observe patterns in the results indicating subgroups.

The Bland and Altman limits of agreement method requires the assumption that the distribution of the differences is approximately normal. The data for the back pain group were clearly normally distributed although exploratory analysis questioned this for the neck pain group in the sensory pain and well being superclusters where there was the suggestion of some positive skew. The limits of agreement, therefore, may not be as accurate as those for the other superclusters.

Finally, it is worth noting that while the Bland and Altman method has become widely used there have been some recent criticisms (32).

Conclusions

As MAPS is a relatively new tool there is much scope for further work. Some suggestions are offered below. More comparison with the McGill Pain Questionnaire would further establish the concurrent validity of MAPS in populations with back pain and neck pain. Work is underway to explore the use of a shortened version of MAPS (9) and this will require subsequent testing.

The repeatability of MAPS under the circumstances of this study support the use and continued development of MAPS as tool to assess the impact of neck and back pain.

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