

# "IT'S NOT PAIN IT'S DISCOMFORT": DEVELOPMENT AND INVESTIGATION OF A DISCOMFORT MEASUREMENT SCALE.

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## **Abstract**

Logically, anecdotally and empirically, there appears to be a shared understanding of the difference between 'pain' and 'discomfort'. Although discomfort is commonly referred to in medical literature, it has never been objectively measured or its properties examined.

This study devised a visual analogue discomfort scale (VAS-D) and obtained a sample of n=128 outpatient musculoskeletal physiotherapy patients who complete it alongside a traditional visual analogue pain scale (VAS-P) and the EQ5D-5L. Demographic data was also collected. The purpose of the investigation was to preliminarily validate the VAS-D as a psychometric index.

Scale scores and correlations are examined in the entire sample and in sub-samples split by gender and pain severity. Scale correlations were primarily moderate indicating the VAS-D measures a related but distinct construct to pain and there was a statistically significant difference between discomfort scores when compared to pain. This indicates the VAS-D measures a related, but distinct construct to pain. 7.8% of respondents endorsed the VAS-D but scored zero on the VAS-P. The relationships between pain and discomfort scores held face validity, adding empirical evidence to a theoretical relationship between the constructs.

As a preliminary study, it appears the VAS-D is a valid scale that is distinct from a VAS-P. Data supports a hypothesis that VAS-P scores may be lower or even absent in the concurrent presence of a VAS-D measure. Clinical implications and direction for future investigation are briefly discussed.

## **Introduction**

Pain measurement is relevant to almost all areas of clinical practice and is a common and important research topic. Pain is known to be multidimensional and a uniquely personal and subjective experience. This means it is not currently possible to measure it objectively <sup>[1]</sup>. Pain measurement therefore relies on the use of self-report measures such as the Visual Analogue Scale (VAS) and Numeric Rating Scale (NRS). Over time the VAS pain scale has become accepted as the 'gold standard' measurement tool despite its outcomes being known to be 'idiosyncratic' <sup>[2]</sup>.

Despite the significant amount of research literature pertinent to pain measurement, and regular use of the term, 'Pain or Discomfort' has not been quantified in the literature <sup>[3,4]</sup>. Discomfort as a distinct construct related to pain has rarely been investigated, and within the confines of an English language literature search has never been quantified. Investigation into discomfort as a relevant pain related construct seems warranted when enduring sociocultural norms exist around the terms 'pain' and 'discomfort', and usage of these terms has been carried into medical information provided to the public, such as the Arthritis UK back pain information and exercise sheet <sup>[5]</sup>.

The term 'pain or discomfort' is regularly used in both medical and research contexts as a distinct term. The NICE guideline entitled 'Chest pain of recent onset' (CG95) <sup>[6]</sup> uses the term 'chest pain or discomfort' and defines angina pain as 'constricting discomfort in the front of the chest, or in the neck, shoulders, jaw, or arms.' without using the term 'pain' at all. Other research papers also continue to use the term(s) interchangeably with a recent study of Orthodontic pain [4] for example using the terms 'pain and discomfort', 'pain or discomfort' and 'pain/discomfort' without clearly defining why the different terms are used or ever defining discomfort.

Common existing measurement tools also use the terms together, with the EQ5D-5L <sup>[7]</sup> using the term 'Pain / discomfort' and the Cornell Musculoskeletal Discomfort Questionnaire commonly used internationally in the occupational health setting using the term 'ache, pain, discomfort' <sup>[3]</sup>. This tool simply records the frequency of symptoms felt in every major joint and doesn't differentiate between the descriptors used, as is the case in the EQ5D.

The difference between pain and discomfort has been tentatively explored within a small number of patient groups. A study of patients with Irritable Bowel Syndrome (IBS) found that the majority reported predominant discomfort rather than predominant pain <sup>[8]</sup>. Similarly, in a study of women undergoing mammography, 35% reported 'discomfort' after

the procedure while 6% reported 'pain' [9]. Additionally, in a study of patients with functional dyspepsia, predominant pain as opposed to discomfort was useful in clinical diagnosis and sub-categorisation. Thus far no English language studies found during literature search have attempted to quantify discomfort or validate any tool designed to measure it. Nor have any studies investigated discomfort in musculoskeletal pain patients, when musculoskeletal conditions are perhaps the most common source of pain or discomfort globally [10]. Anecdotally, musculoskeletal patients when asked to rate or describe their pain sometimes say, "it's not pain, it's discomfort".

The aim of this study was to; 1) Validate use of a visual analogue scale to measure discomfort, 2) quantify discomfort in a general out-patient musculoskeletal pain population, 3) compare and correlate pain and discomfort levels in the measured population, and 4) explore the relationship between pain, discomfort, quality-of-life and gender.

## Method

In this cross sectional study patients attending an out-patient musculoskeletal physiotherapy service were invited to complete three questionnaires including; the discomfort visual analogue scale (VAS-D), the pain visual analogue scale (VAS-P), and the EuroQol , EQ5D-5L, a measure of quality-of-life. Participant age and gender were also collected. Patients were informed about the study by their clinician and at the end of their appointment and were provided with the study information sheet, consent form, and questionnaires to complete. Ethical approval was granted for the study from the National Research Ethics Service (NRES) study number 13/NE/0202 and informed patient consent was obtained.

## Participants

There were no exclusion criteria, all adult patients able to attend for outpatient physiotherapy being potentially eligible, but the questionnaires were only available in the English language.

## Measures

The VAS-D consisted of a 10cm horizontal line asking about discomfort 'today' with the anchor, 'No discomfort' on the left and 'Very uncomfortable indeed' on the right. The VAS-P was visually identical but it asked about pain 'today' with the anchor statements of 'No pain' on the left and 'Worst possible pain' on the right. Quality of life was measured using the EQ5D-5L which has been shown to be a valid and reliable measure of quality of life in patients with musculoskeletal conditions [7].

## Analysis

As an initial investigation of the VAS-D scale and an exploration of its potential face and convergent validity in relation to pain,

gender, and quality of life, statistical analyses are undertaken on the entire sample and also on sub-groups of the sample split by pain severity and gender. Pain sub-groups investigated are those that fall into the established categories of mild, moderate and severe pain as rated on the VAS-P. The cut off points used in this analysis were 0-49 mild pain, 50-69 moderate pain, and 70-100 severe pain [11]. Spearman's correlations and statistical differences between scores using T-Tests are analysed.

## Results

The results section is split into analyses of the entire sample and analyses of the sub-samples identified. Data from 128 consecutive patients attending physiotherapy musculoskeletal outpatients was collected in the first 6 months of 2015.

### Entire sample analyses

The mean age of the sample was 57 (SD=13.3) and 38% were male. Across the entire sample (n=128) the mean VAS-P score was 41.0 (SD= 30.2) and the mean VAS-D score was 50.4 (SD= 28.3). Paired sample t-test reveals a statistically significant difference between these scores (p=.000). The correlation between pain and discomfort was moderate and significant (r= .636, p= .000).

Examination of the data reveals n=10 cases where pain was scored as zero but where discomfort was rated. The mean VAS-D score in these cases was 27.5 (SD= 27.6). There were also n=4 cases where pain was rated but VAS-D was zero. In these cases one case had mild pain, 2 moderate pain, and 1 severe pain. There were n=4 cases where both VAS-P and VAS-D were rated as zero on that day.

Correlations between VAS-P, VAS-D and EQ5D-5L domain scores were calculated and are shown in table 1. Correlation strength between the two measures and the EQ5D-5L domains were very similar except VAS-D correlated weakly with self-care whereas the VAS-P correlation was moderate. VAS-D also correlated moderately with the pain/discomfort scale from the EQ5D-5L whereas VAS-P correlated strongly, though again the difference was relatively small.

### Pain severity sub-samples

When split into pain severity sub-samples mean discomfort scores are significantly more than pain scores in the mild pain group, are similar with no significant difference upon analysis in the moderate pain group, and are significantly less in the severe pain group. Table 2 shows results from this analysis.

Where correlations are concerned, in the mild pain group there was a moderate and significant correlation between VAS-P and VAS-D (r= .540, p= .000). In the moderate pain

group the correlation was weak and was not significant ( $r = .365$ ,  $p = .095$ ). In the severe pain group the correlation was weak and, marginally, not significant ( $r = .376$ ,  $p = .053$ ).

## Gender sub-samples

Compared to the overall population mean, male participants scored lower on both VAS-D and VAS-P scores. Female VAS-D and VAS-P scores were higher than the overall population. Both male and female VAS-D and VAS-P scores correlated moderately and significantly with each other. There was no significant difference between male VAS-D and VAS-P scores, but there was a significant difference between mean scores in the female sample. Table 3 shows results from the gender analyses.

## Discussion

Using a visual analogue measurement scale, discomfort was explored in relation to pain and quality of life in an out-patient musculoskeletal physiotherapy population. Pain and discomfort were moderately correlated, but discomfort scores were also statistically significantly different from pain scores. From a validity standpoint finding moderate correlations between VAS-P and VAS-D scores is encouraging. When other variables explicitly different from, but commonly associated with pain are examined, such as disability and catastrophising, moderate correlations are also found <sup>[12,13]</sup>. Had this study shown strong correlations between VAS-P and VAS-D it could have been argued that the VAS-D scale was measuring the same global construct as the VAS-P scale, but this does not seem to be the case.

When the group was split into those with mild, moderate and severe pain, those with mild pain reported on average higher discomfort scores than pain scores, those with moderate pain reported similar levels of pain and discomfort, and those with severe pain reported higher pain scores than discomfort scores. This pattern of associations between pain and discomfort appears to have face validity. When pain is low it is logical that discomfort must have become significant enough for pain to begin to be perceived. In this scenario it follows that discomfort scores would be higher than pain scores. When pain is severe it is also logical that individuals may no longer strongly endorse a discomfort scale, as pain will dominate to a level where fewer of the sensations would be perceived as discomfort. At moderate pain levels discomfort scores vary producing a moderate mean number. These sub-categorised empirical relationships support the tool from a face validity perspective.

A number of patients ( $n = 10$ , 7.8%) provided a score above zero on the discomfort scale but scored zero on the pain scale. Within this group discomfort scores ranged from 3 to 90.

This confirms that given an opportunity to use a discomfort scale alongside a pain scale some patients will describe discomfort but not pain. Hypothetically, had this population only been asked to endorse a pain scale they may have scored in a positive range, not having been given the opportunity to describe what they felt in other terms that made more sense to them. This adds empirical data to the validity of the phrase 'It's not pain it's discomfort' which is anecdotally reported by patients within the clinical setting. There were only 4 cases that reported some pain but no discomfort, with the VAS-P scores of these cases varying.

There has been considerable study of gender differences and pain and it is commonly understood that women demonstrate greater pain sensitivity <sup>[14]</sup>. The gender scores shown for both VAS-P and VAS-D follow this trend and this is encouraging when the convergent validity of the VAS-D scale is being examined.

When the relationship between VAS-D and quality of life domains using the EQ5D-5L is examined correlations are predominantly moderate. The pattern of correlation strengths is very similar to that shown upon examination of VAS-P, though VAS-P correlated a little more strongly with the pain/discomfort and self-care domains. These results are also encouraging from a convergent validity standpoint.

From a validity perspective this initial investigation of a mixed musculoskeletal pain population attending physiotherapy shows that there are many signs that a VAS-D scale is both valid and measures a construct independent of, but related to, pain. Most importantly the examination reveals a group of patients who endorse discomfort much more strongly than, or even instead of, pain. Although this study cannot say if pain scores would have been higher in some patients had they not been given the opportunity to endorse a discomfort scale, the nature of the scores and relationships found provides evidence that this may be worthwhile investigating.

Patients undoubtedly use and understand the concept of 'discomfort' and it appears a visual analogue scale may be a valid way of measuring this. The potential clinical importance of discovering that pain scores may vary or even be absent in the presence of a discomfort scale is significant. It is possible for instance, that both clinical and research participation decisions that use pain cut off scores are skewed because patients are not being given the opportunity to describe their symptoms in terms of both pain and/or discomfort. The findings of this initial exploration imply a need to further examine the subject and suggest that discomfort is valid and perhaps useful to measure as an independent construct using a visual analogue scale.

## Limitations

For the purposes of this study a convenience consecutive sample of mixed out-patient musculoskeletal patients attending physiotherapy was used. Under these circumstances, although the data collected supports use of a VAS-D tool and suggests avenues for further study, it is not possible to generalise results to other pain populations. Various different examples of VAS-P tools exist with different wording. This study chose to use the version that asks about pain 'today' rather than 'on average over the last week' and it is difficult to predict how use of a different version of the tool may affect results. In this sample by using 'pain today' wording 4 cases failed to endorse either the VAS-P or VAS-D scales. It is also possible that use of different anchor(s) for the VAS-D could change results. Finally the sample size, though adequate, was not large. Larger samples in different populations are needed before the importance of measuring discomfort can be established more definitively.

## Conflict of interest statement;

The authors hereby confirm there is no conflict of interest to declare regarding this research or paper.

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**Table 1:** Correlations between VAS-P, VAS-D and EQ5D-5L domain scores.

	EQ5D-5L Mobility	EQ5D-5L Self-care	EQ5D-5L Usual activities	EQ5D-5L Pain/ Discomfort	EQ5D-5L Anxiety depression	EQ5D-5L Health Today
VAS-P	.546 (n=124)	.496 (n=127)	.563 (n=126)	.724 (n=126)	.410 (n=126)	-.512 (n=128)
VAS-D	.571 (n=124)	.394 (n=127)	.544 (n=126)	.663 (n=126)	.373 (n=126)	-.445 (n=128)

n=numbers vary due to missing data

**Table 2:** VAS-P and VAS-D scores in pain severity sub-samples.

	VAS-P	VAS-D	T-Test
Mild Pain (n=78)	20.6 (sd=16.8)	39.4 (sd=24.4)	P=.000
Moderate Pain (n=23)	59.9 (sd=4.5)	60.6 (sd=24.8)	P=.882
Severe pain (N=27)	84.1 (sd=9.9)	73.3 (sd24.9)	P=.022

**Table 3:** CVAS-P and VAS-D scores in gender sub-samples.

	VAS-P	VAS-D	T-Test	Correlation
Male (n=47a)	36.2 (sd=26.4)	41.0 (sd=27.1)	p=.185	r=.577 (p=.000)
Female (n=76a)	44.0 (sd=32.5)	55.3 (sd28.3)	P=.000	r=.669 (p=.000)

a total n=123 due to some missing gender data

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