

Spinal Beliefs v Outcomes: The Development of a Questionnaire

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Abstract:

Back pain, and the beliefs associated with it incur significant debts on the NHS and other health systems internationally ^[27]. Negative assumptions made about the back are not only often false but also lead to high levels of disability, anxiety and fear avoidance behaviours ^{[7][14][21][32][45][52][53]}. By understanding a patient's health beliefs about spinal pathology, you may be able to accurately predict their outcome after intervention. This literature review aims to lay the foundation for the creation of a questionnaire that will screen for negative health beliefs and in doing so, recommend treatment solutions for the patient.

The literature review covered the most significant health beliefs that impact patient outcomes. It also looked into patient outcome questionnaires and spinal surgery questionnaires.

The review found that the commonest themes within the literature were depression, anxiety, pain, impact on day-to-day activities and social and working life. It was decided that beliefs about these should be screened for in the questionnaire. Before implementation into clinical practice, the questionnaire will need to be further tested against current patient reported outcome measures and reviewed by the relevant teams within the hospital.

Introduction:

Back pain is one of the costliest conditions in the UK ^[27]. It employs a significant economic burden on the NHS through the direct costs of management and the indirect cost of informal care. This is partly due to the many negative assumptions associated with the condition ^[14]: the spine is considered to be vulnerable; injuries to the spine are suspected to be very serious and outcomes poor. These presumptions can cause high levels of disability, anxiety and depression, catastrophizing and the development of fear avoidance beliefs ^{[7][21][32][45][52][53]}. It is theorized that by determining a patient's health beliefs and the assumptions they hold; you may be able to accurately predict their outcome after spinal intervention. If a patient is found to have non-organic physical signs that may worsen their outcome, offering this patient psychosocial support pre-operatively may better their outcome ⁽⁵⁰⁾. Multi-disciplinary (MDT) pain management and cognitive therapies have been shown to change a patient's beliefs about the nature and treatment of their pain ^[51]. A screening tool for highlighting patients with negative health beliefs would determine whether said patients would benefit from spinal team involvement or wider MDT and psychosocial support.

To date, a pre-operative questionnaire measuring a patient's health beliefs, with an aim to accurately determine their outcome is yet to be developed. This review aims to lay the foundation for the development of that questionnaire.

Methods:

An in-depth literature review was first carried out. The literature review aimed to cover the most significant health beliefs that may impact on a patient's outcome. It also looked at health behaviours (preventive, adherence and clinical behaviours) and what impact they might have. In addition, patient outcome questionnaires and spinal surgery questionnaires were analysed. This was to assemble a list of the commonest themes throughout them all to form a basis of a new questionnaire.

After completing the literature review, the structure of the questionnaire was decided. This is because a greater understanding of the techniques required to accurately determine a patient's health beliefs was gained after having completed the review. Further study, beyond the remit of this review will be required to determine whether the questionnaire is effective.

Literature Review:

1. Health Beliefs:

Health beliefs are longstanding individual characteristics that combine to define a person's behaviour. They are changeable and techniques used to alter these beliefs can cause changes in the associated health behaviours. Typically, there are both demographical and psychological variables at play and their roles can be highlighted as in Figure 1.

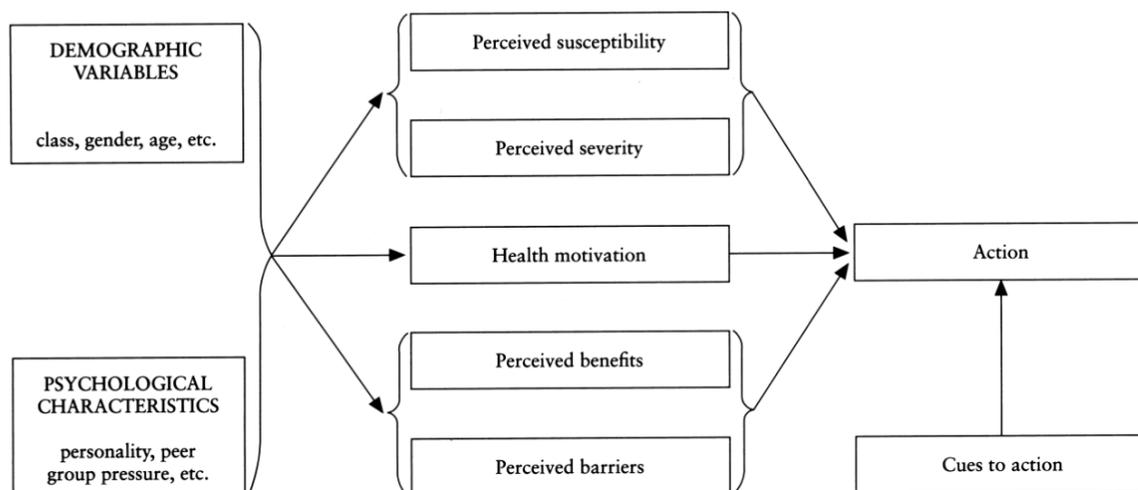


Figure 1 - The relationship between demographic variables, psychological characteristics and health beliefs and their resultant behaviours ^[13]

Demographic aspects to health include class, age, gender, education, nationality and religion. Psychological variables include peer pressure, personality, co-morbid mental health issues, and positivity ^{[13][32]}. These variables set limitations to the patient, forcing them to perceive their own constraints and capabilities, even if they are indeed false. They also combine to define one's health behaviours, or how they react in relation to their health (predicting health behaviour). Examples of these are risk behaviours (smoking or drinking), preventive behaviours (getting vaccinations or going for regular screenings) and adherence behaviours (medication compliance or following treatment plans).

The significance of health beliefs is widely acknowledged; there is a large amount of literature focusing on their relationship with outcome in spinal conditions. In general, lower levels of vitality (feeling strong and full of life) are suggested to be associated with higher-intensity lower back pain and disability (ng et al.). One study sampled 341 patients with chronic lower back pain and highlighted that both organic and psychological pain beliefs were related to disability and depression ^[5]. Disability and depression are related to greater experiences of pain and worse patient reported outcomes ^[4]. Poor outcomes secondary to negatively influencing health beliefs include increased pain intensity, poorer mental health, increased fear of movement and re-injury beliefs, increased chance of disability and overall a much poorer health related quality of life ^[1]. Stronger fear-avoidance beliefs and pain

catastrophizing are also associated with future negative outcomes and later functional disability ^{[1][32]}.

Further, there are many negative beliefs specifically associated with the back. People often have an attentional bias towards the idea that the spine is vulnerable, injury is substantial, and outcomes are poor ^[14]. This leads to very poor and restrictive health behaviours including the avoidance of difficult activities and rehabilitation exercises. One study reported that patients with chronic, high intensity lower back pain reported greater negative beliefs about back pain; a mean reported score of 22.6/70 on the Back Beliefs Questionnaire was calculated ^{[34][47]}. This highlights the effects of these negative beliefs. This was supported further by several other studies ^[49].

Screening patients set to undergo spinal intervention for their health beliefs could be used to predict and later control their outcome. It is believed that simple strategies could be employed to promote positive attitudes and debunk negative beliefs ^{[47][51]}. A multi-disciplinary team management programme could offer useful cognitive-behavioural interventions, which could change a patient's perspective entirely ^[51]. A population-based study shared positive messages about back pain ^[8]; results showed a marked improvement in the beliefs held by both the population and by general practitioners. There were also significant changes in resultant medical management and a reduction in disability and worker's compensation. The importance of designating cut-off levels for patients at risk of catastrophizing behaviours and also those who might have fear-avoidance beliefs was highlighted ^{[52][53]}. This was to ensure that clinicians can intervene to reduce these behaviours and to allow treatment strategies to be modified. While there is currently no conclusive evidence to absolutely recommend the benefit of education preoperatively, the low-risk profile and potential benefits of this suggest that it is something that should be carried out and tested further ^[9].

2. *Scoring Systems & Questionnaires:*

Many scoring systems and questionnaires have been developed to evaluate health beliefs and determine outcomes, however there is currently no questionnaire that combines the two specifically for spinal surgery. Some of the commonest questionnaires currently in use by spinal surgeons include the EuroQuol-5D (EQ-5D), Visual Analogue Scale (VAS), Oswestry Disability Index (ODI), Core Outcome Measure Index (COMI), Generalized Anxiety Disorder Assessment (GAD-7), Patient Health Questionnaire (PHQ-9) and the SF-36. The Back Beliefs Questionnaire is also used by spinal surgeons ^[47].

The Back Beliefs Questionnaire (BBQ) was developed by Symonds, et al. and is composed of 14 items, each marked out of 5 (1 = Disagree, 5 = Agree). It is a disease-specific patient reported outcome measure. Higher scores in the BBQ indicate more pessimistic beliefs about lower back pain ^[20]. It benefits from its simplicity and a lack of significant 'floor and ceiling' effects. Its main focus centres on disability in day-to-day activities, fear avoidance beliefs, anxiety and depression ^[18].

The Oswestry Disability Index (ODI) is a condition-specific outcome measure used in spinal disorders; it is the commonest condition-specific outcome measure alongside the Roland-Morris Score ^[19]. The original ODI is composed of 10 sections, each with a specific focus. Each section has 6 items marked 0-5. The combined total of all scores can be doubled to acquire a percentage, which predicts the likelihood of disability. It is considered to be very

easy to use; it can be used in busy clinical settings and also allows physicians to objectify complaints and monitor the benefits from therapies (typically measured 6 weeks after first testing) [35]. It correlates well with other scoring systems and shows a superior test-retest reliability than other similar systems. Themes include pain intensity, day-to-day activities, personal care, sleeping, sexual activity and travelling. It is recommended in patients with more significant disability.

The Roland Morris Score is similar to the ODI in that it is condition specific; it is considered to be limited by its focus on physical symptoms and lack of coverage of social and psychological problems [12][41]. It does correlate well with other scoring systems, including the ODI and the SF-36. It is composed of up to 24 statements and patients receive one point for each that applies to them. The higher the score, the greater the degree of disability. There are several studies that mark the Roland Morris Score as unreliable [16][41].

The Core Outcome Measures Index (COMI) is a general outcome measurement instrument. It covers the physical and psychometric aspects of spinal disease and while it is very useful, it is not considered to be useful as a disease specific instrument. It focuses on pain, function, social and work disability, general quality of life and symptom specific well-being [28][29]. It is a simple questionnaire and is reportedly very feasible to implement into daily clinical practice; it is able to detect important change. It is short, composed of 11 questions, each with their own scoring framework (7 before intervention and 4 afterwards).

The EQ-5D (EuroQuol-5 Dimensions) is a standardised measure of health status, another general outcome measure. It is not disease specific and provides a generic, but simple, measure of health. It consists of 2 pages, one involving a 5-dimensional descriptive questionnaire and the other containing a visual analogue scale (VAS) depicting a patient's best and worst imaginable pain state on a given day (EQ-5D user guide). Questions include those about mobility, self-care, usual activities, pain and anxiety and depression. Overall, it is thought to be valid, reliable and sensitive [11][42][43].

The PHQ-9 (Patient Health Questionnaire) and GAD-7 (Generalised Anxiety Disorder Questionnaire) are important to consider in this review as many patients seeking intervention for spinal disease suffer from comorbid anxiety and depression. The PHQ-9 is a self-administered and disease specific test of depression severity, which scores DSM-IV criteria on a level of 0-3 (Not at all – nearly every day) [23]. It is scored out of 27 in total, the higher the score, the greater the degree of depression. It has been validated for use in primary care [10] and while it is not a screening tool for depression, it is very useful in the monitoring of disease and uncovering concurrent depression in chronic illness. It has good diagnostic accuracy [6]. The GAD-7 was developed by the Kroenke, Spitzer and Williams, much like the PHQ-9 [24]. It is arranged in the same way: a self-administered and disease specific test of anxiety severity according to DSM-5 criteria. It uses a scoring system of 0-3 and is composed of 7 questions, giving a total possible score of 21. It has both a high sensitivity and high specificity for generalised anxiety disorder and also for panic, social anxiety and post-traumatic stress disorders [24]. It is considered to be effective at diagnosing generalised anxiety disorder [46].

Some of the other questionnaires that were reviewed and that contributed to the tally (figure 2) included, but was not limited to:

- STarT Back Tool

- Back Pain Bothersome Score
- Short Form-36 (SF-36)
- Brief pain Inventory Form (BPI)
- Patient's Specific Activity Score (PSAS)
- Depression, Anxiety & Stress Scales (DASS-21)
- Fear Avoidance Beliefs Questionnaire (FABQ)
- Patient's Global Impression of Change (PGIC)
- Myelopathy Disability Index
- Pain Catastrophizing Scale (PCS)
- Patient Back Pain Assessment

On reviewing the questionnaires above, as well as some of the less commonly used questionnaires a list was created to highlight the most common themes (see figure 2).

Question	Tally	Count
Pain/Discomfort	IIIIIIIIII	13
Anxiety/Depression	IIIIIIIIII	12
Day-to-day activities	IIIIIIIIII	12
Work Life	IIIIII	7
Social Life	IIIIII	6
Mobility	IIIIII	6
Self-care	IIIIII	5
Sleep	IIII	3
Sex life	II	2
Fear avoidance Beliefs	II	2
Satisfaction	I	1
Catastrophizing	I	1

Figure 2 – A table detailing the most frequently occurring themes amongst the commonest questionnaires used in spinal disease (BSR)

This table highlights that pain/discomfort, anxiety/depression and restriction to day-to-day activities were by far the commonest themes amongst both the generic and disease specific questionnaires used in spinal disease. Additionally, a lot of focus was shown towards work and social life as these have a profound effect on overall quality of life ^[37]. It is important to bare this tally in mind as many of these questionnaires have a significant evidence base behind them.

Discussion & Formulation

Several parameters must be set before the finalisation of the questionnaire. The number of questions, the scoring modality, the question contents and whether there is a need for age or sex stratification. Each of these have been explored in the literature review.

1. Number of Questions:

For a questionnaire that will likely be self-administered, one would want fewer questions with less answer options; this is to increase the chances of compliance and test-retest reliability. However, more questions would yield more accurate responses and give more insight. The number of questions within current literature is variable. 10 questions would provide ease of completion for the patient and also allow a good level of insight into a patient's health beliefs. Having 10 questions should also allow for a final score that is concise and easily calculable.

Another common occurrence within the literature were "statements" as opposed to "questions". These questionnaires assessed the extent of agreement with said statements. This allowed the questionnaire to find exact details about the patients and prevented any kind of misinterpretation that might occur from normal questioning. The limitation of it, in this case, is the desire to explore health beliefs in a patient. Having written statements limits the scope of the questionnaire, especially if the number of questions is limited to 10.

2. Scoring Modality:

Scoring in the majority of literature is varied. Some are binary, others use a scale, while some have more precise scoring. The more successful and used questionnaires trend towards the use of a ranging scale, between 0 and 5 (0 usually depicts no agreement, while 5 depicts absolute agreement). While a binary questionnaire is easier to understand for a patient, a ranging questionnaire would provide more accurate answers and a more proficient scoring system could be established. Another issue with a 0-5 range is that the middle values could be considered to be inutile, however this could be corrected with a scoring system that only values answers at the extremes of each range.

3. Age Stratification:

Age stratification would add another level of complexity to the questionnaire. The extent to which people suffer from their back pain can differ between age groups ^[30].

It is an intricate dilemma and would be incredibly difficult to implement some kind of stratification. It is always important to distinguish age in patients within a population, but equally it may be valuable to have the questionnaire means tested before involving this as a factor. Equally, leaving age out of the questionnaire could allow for further studies looking into health belief differences of people of different ages.

4. Question Contents:

As per figure 2, the commonest themes amongst the questionnaires are pain/discomfort, anxiety/depression and day-to-day activities. These are worth including in the questionnaire as they are important themes within the lives of patients with spinal disease. In addition, coverage of work and social life as well as self-care are central to a patient's quality of life. Screening questions for catastrophizing and fear avoidance beliefs and behaviours would also provide good insight. It is important to formulate questions which can help practitioners to understand the patients' beliefs towards each of these elements and which are relevant to them. Of the ten questions, one will be dedicated to the patient's beliefs of each of the following: Pain/discomfort, depression, anxiety, day-to-day activities, social life, work life, fear avoidance behaviours, catastrophizing, self-care and one final question dedicated to their expectations from intervention.

Spinal Beliefs Questionnaire

QUESTION	No	Rarely	Sometimes	Yes	Score
Do you feel your current problem is the worst pain you have ever experienced?					
Do you feel your current problem has caused you to become more depressed?					
Do you feel your current problem has caused you to become more anxious?					
Do you believe your day-to-day life has been affected by your current problem?					
Do you feel your current problem has negatively affected your social life?					

QUESTION	Yes	Sometimes	Rarely	No	Score
Do you feel your current problem has negatively affected your work life?					
Do you feel your current problem has stopped you from taking care of yourself?					
Do you feel your current problem has stopped you from trying new things?					
Do you think that your current problem is the worst possible thing to happen to you?					
Do you think that your current problem cannot be resolved?					

Each question is scored between 0 and 3.

No = 0

Rarely = 1

Sometimes = 2

Yes = 3

To calculate the patient's outcome score, add up the scores to give a total out of 30. This will give a result detailing the likelihood of a negative outcome after surgical intervention. The higher the score, the lesser the likelihood of a positive outcome. The greater the score, the smaller the likelihood of a positive outcome. A higher score may precipitate the need for therapies, education or other MDT input instead/before spinal team intervention.

As an estimate, it may be useful using the following as ranges for decision making:

0-10 - = Suitable for spinal surgery

11-20 = Indeterminate

21-30 = Not suitable for spinal surgery, consider referral to MDT

Conclusion

This literature review was completed in order to generate a questionnaire that can accurately predict a patient's outcome following spinal surgical intervention based on their health beliefs. The literature review covered both common health beliefs and also negative health beliefs associated with the back. It set out to confirm their relevance and ensure that they were suitable for targeting in the management of patients with spinal disease. Beyond that, it was used to summarise and evaluate the current questionnaires in literature and practice and determine which topics were most covered and should be included.

From the review a questionnaire was successfully created. It will need further refinement by relevant teams and also clinical trials alongside another patient reported outcome measure; this is before it can be utilised as an accurate predictor in clinical practice.

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