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Research Article

Maladaptive Illness Behavior: A Potential Marker for Outcome Success among a Community-Based Chronic Pain Sample

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Abstract

Objectives: The study sought to compare individuals with chronic pain and members of the general community in terms of health, demographic, and psychological characteristics, with a specific focus on illness behavior. Pain participants whose illness behavior responses were elevated were then identified, with a view to determining a predictive model of this subgroup in terms of health, demographic, and psychological characteristics. **Methods:** Community-based chronic pain support group members (N=79) were matched on sex, age, and education with 79 general community members. All participants completed a questionnaire which included a brief revised Illness Behavior Questionnaire. **Results:** Pain participants were less likely to be in paid employment, had poorer perceptions of their general health and visited their general practitioner more frequently than community members. A two-cluster solution revealed one subgroup of participants (n=27) to have higher mean illness behavior scores than other participants (n=52). These individuals also had greater Maladaptive Coping, current pain and functional interference, more Somatic Attributions for illness and a poorer health trajectory. Pain participants identified more readily with a state of physical disorder, illness vulnerability, and general life stressors. **Discussion:** While preliminary insight was provided into the characteristics of pain participants likely to report maladaptive illness behavior, there remains a need to determine its potential relevance to both short and long-term treatment outcomes and the degree to which similar attributes exist in other pain populations.

Keywords: Illness behavior; IBQ-31; Chronic pain; Cluster analysis; Prediction of outcome

Introduction

Maladaptive responses to illness are described as inappropriate thoughts, evaluations and/or actions [1,2], with this conceptualization informed by elements of the sick role [3]. The term maladaptive (or abnormal) is applied to illness behaviors (IB) when self-reported somatic symptoms do not correspond to observed biomedical abnormality [4], suggesting a psychological rather than physical focus. Much original research reflected Pilowsky's interest in chronic pain, [5-9] with many other researchers also exploring IB in this context [10-16]. Contemporary theoretical and empirical developments, detailed below, make it timely to revisit the relevance of IB to understanding chronic pain treatment outcomes.

Pilowsky's Illness Behavior Questionnaire (IBQ) [17] comprised seven primary scales (General Hypochondriasis, Disease Conviction, Psychological versus Somatic Focusing, Denial, Affective Inhibition, Affective Disturbance, Irritability), and two second order scales (Disease Affirmation, Affective State). This complexity has led to the selective use of both items and scales [9,12,18-20] which are rarely accompanied by evidence of validity or reliability [21]. However, more rigorous analyses of the IBQ have resulted in the presentation of a brief 31-item version (IBQ-31) assessing only three dimensions [22,23]. Reflecting their thematic content, they have been termed Affirmation of Illness (AI; the insistence of the presence of an illness), Concern for Health (CH; health-related worry), and General Affective State (GAS; emotional distress irrespective of illness concerns). Reliability of the IBQ-31 has been demonstrated using both healthy community members [22-24] and multiple illness groups (as a measure of reaction and adaptation to chronic illness) [25-27].

Related to the complex structure of the original IBQ has been the difficulty determining the response profile that might constitute 'maladaptive'. However, a unique perspective [28,29] grouped the IBQ responses of stroke rehabilitation patients statistically using cluster analysis. Inspection of IBQ means revealed evidence of elevated IB in one of two clusters, comprising nearly 30% of patients in one study [28] and over 20% in a validation study [29]. Importantly, elevated IB was a key determinant of long-term disability. That is, maladaptive IB proved to be a valuable index of chronic illness management. The potential benefit of this finding is the additional evidence it provides to clinicians in tailoring interventions to assist adaptation and/or recovery.

The aims of the current study were to use a chronic pain sample and matched sample of healthy community members to directly compare IBQ-31 profiles to establish whether elevated scores were generally evident in the pain sample. Further, the patterns of association between cognate psychological constructs and IBQ-31 dimensions provided insight into the profile of those with chronic pain compared with community participants. For example, the measurement of coping offered a preliminary exploration of potential behavioral concomitants of IB, acknowledging the lack of items in the IBQ with an overt behavioral focus [30-32]. Conversely, symptom attributions allowed the consideration of further cognitive and emotional aspects of symptom interpretation, with the quantification of recent somatic symptoms reflecting the degree to which individuals are attuned to physical variations in their bodies [33]. Cluster analysis was then applied to IBQ-31 responses from the pain sample to determine whether a subgroup of participants with elevated means could be identified. The obtained solution was tested by comparing membership across demographic, psychological, health- and pain-related variables. The goal was to identify variables associated significantly with the cluster solution and to use them to build a predictive equation for maladaptive responses. The results have the potential to highlight psychosocial indicators of rehabilitation outcome. That is, motivation for successful rehabilitation or disease management may be either enhanced or compromised depending on specific cognitive and/or affective interpretations of health and illness.

Materials and Methods

Participants

Target participants, who were assured their decision to participate would have no influence on current or future medical care, were at least 18 years of age with sufficient command of receptive and expressive English to allow completion of a self-report questionnaire. Participation was voluntary and unpaid.

The pain sample (n = 79) were required to have a confirmed diagnosis of chronic benign pain of at least 12 months' standing, allowing for initial psychological adjustment and the acquisition of disease-specific knowledge and self-management skills. The mean age was 52.1 years (SD = 10.9, range 23-83), with 47 women (60%). Post-secondary education had been attained by 58%. Participants were matched according to sex, age and education with a pain-free community sample (n = 79) extracted from a parent file [22]. Again, 60% were female and 58% had attained post-secondary education. The mean age was 52.4 years (SD = 10.8, range 23-83). There were no significant group differences in these matching variables.

Questionnaires

Standard demographic details (e.g., sex, age), health-related information, and published scales to measure AIB and related constructs were included.

Pain-specific Health Information

Years since diagnosis, site(s) affected, and whether compensation was being sought or received previously was provided by the pain sample. Two questions assessed current pain, ranging from 0 ('no pain') to 10 ('as bad as could be'), and functional interference with day-to-day activities (during the past six months), ranging from 0 ('no interference') to 10 ('unable to carry on any activities') [34].

General Health Information

Both samples provided two measures of health status. Self-rated health was measured on a 5-point scale ('poor' to 'excellent') with higher scores indicating better health. This global measure has demonstrated strong and consistent associations with adverse health outcomes such as mortality, institutionalization, and hospitalization [35,36]. Health trajectory taps any perceived change in health over a one-year period on a 5-point scale ('much worse' to 'much better') with higher scores indicating improvement. Evidence suggests that health trajectory has an association with adverse health outcomes independent of self-rated health [36]. In accord with common practice, these two measures were dichotomized to reflect poor self-rated health and declining health trajectory, respectively [35]. The frequency of visits to a General Practitioner (GP) during the past two years was also sought, using a 7-point scale ranging from extremely frequent ('at least once a week') to extremely infrequent ('once or less'). The number of common medical conditions with which participants had been diagnosed (cancer, high cholesterol, diabetes, etc.; max. = 18) was also collected.

Illness Behavior

Paralleling the work of Pilowsky [17] two versions of the IBQ-31 have been validated. Form A (which addresses the presence of a chronic condition) was administered to the pain sample whereas the community sample completed Form B which questions whether participants believe they have a compromising medical condition. Three dimensions of IB were calculated from each version [22,23]. Affirmation of Illness (AI; 12 items, range 0-12) reflects the endorsement by respondents that they have a disease (e.g., “Do you think there is something seriously wrong with your body?”, “Does your illness interfere (*Do you have an illness which interferes* [for Form B]) with your life a great deal?”). Concern for Health (CH; 8 items, range 0-8) places emphasis on health-related worry (e.g., “Do you worry a lot about your health?”, “Do you think that you worry about your health more than most people?”), whereas General Affective State (GAS; 11 items, range 0-11) focuses on emotional distress irrespective of illness concerns (e.g., “Do you find that you get sad easily?”, “Do you find that you get angry easily?”). Participants indicated the items true of them (‘yes’/‘no’), scoring a point for each response characteristic of a maladaptive approach to illness interpretation.

Coping Strategies

The Brief COPE [37] comprises 28 items accompanied by a 4-point scale (‘I usually don’t do this at all’ to ‘I usually do this a lot’) indicating the extent to which each strategy is typical for participants. Higher responses (0 to 3) denote greater endorsement of each strategy. In the present study items reflected the *general* way in which people deal with illness (i.e., dispositional). For example, ‘I try to come up with a strategy about what to do’ and ‘I accept the reality of the fact that it has happened.’ While 14 unique subscales are available, in accord with recommendations only two scores were calculated [38,39]. Adaptive Coping (0 to 48) comprised Active Coping, Planning, Instrumental Support, Emotional Support, Religion, Positive Reframing, Acceptance, and Humor. Maladaptive Coping (0 to 36) comprised Venting, Disengagement, Self-Distraction, Self-Blame, Substance Use, and Denial.

Symptom Attributions and Symptom Experience

Symptom attributions refer to the causal interpretations of common, albeit hypothetical, bodily sensations, or physical symptoms (e.g., headache, dizziness, sleep difficulties). The Symptom Interpretation Questionnaire (SIQ) comprises thirteen such items which are accompanied by somatic (i.e., attributed to underlying physical disorder), psychological (i.e., triggered by emotional distress or similar stressor), and normalizing (i.e., attributed to a situational/environmental factor such as transient fatigue, overexertion, or lack of sleep) explanations [40]. Each explanation is endorsed on a 4-point scale (‘not at all’ to ‘a great deal’) with responses for each explanatory style summed (range 13-52). Participants also indicate (‘yes/no’) whether they have experienced each of the 13 symptoms during the past three months. Responses are summed to create a Symptom Experience score (range 0-13).

Procedure

Community-based support groups were the primary participant source, with suitable individuals also recruited through the practices of two pain/musculoskeletal specialists. For both sources, permission was granted for the first author to give a brief verbal outline of the research followed by the provision of a written description and questionnaire booklet to those who expressed interest. Completed questionnaires were either collected at a subsequent session or returned using a reply-paid envelope. The goal for the community sample was to recruit participants who were not current health-care seekers. They were sourced through non-illness-related community groups in a manner parallel to the procedures outlined above for pain participants recruited from community-based self-help groups. A more detailed description of recruitment procedures is provided by Prior and Bond [22].

Statistical Analyses

All comparisons were repeated measures analyses due to the one-to-one matching of pain and community participants. Analyses were routinely non-parametric for nominal and ordinal measures and parametric for scale data. Two-tailed probabilities are reported. IBQ-31 data from pain participants were subjected to a 2-step cluster analysis. This procedure supports auto-clustering to enable the identification of the optimal number of clusters [41]. The obtained solution was then treated as the outcome variable in a discriminant function analysis [42] to assess the predictive utility of pain-specific, general health and psychological variables in the determination of AIB in the pain sample.

Results

Profile of Pain Participants

Time since diagnosis was 9.3 years (SD = 7.4, range 1-52). Multiple sites of pain were common, with lower back (73%), neck (44%), upper back (32%), and limbs (30%) the most prevalent. The mean level of current pain was 5.44 (SD = 2.01, range 1-10), and functional interference was 6.46 (SD = 2.00, range 2-10). Compensation had either been received, was being received, or was being sought, by 33%.

Sample Comparisons

Table 1 summarizes those demographic and health variables that may be compared across the two samples. Significantly more of the healthy sample were married and conversely more of the pain sample were separated or divorced. The samples also differed in terms of employment, with substantially more of the pain sample not currently in the work force, predominantly due to their condition.

	Pain sample		**Community sample**		**z**
Marital status (n, %)					
Married	47	(59.5)	63	(79.7)	
Separated, divorced	22	(27.8)	8	(10.1)	2.18*
Single, widowed	10	(12.7)	8	(10.1)	
Employment (n, %)					
Currently working	27	(34.2)	56	(70.9)	
Not working due to illness	37	(46.8)	2	(2.5)	5.43***
Retired	15	(19.0)	21	(26.6)	
Self-rated health (n, %)					
Poor health	30	(38.0)	7	(8.9)	4.00***
Health trajectory (n, %)					
Declining health	27	(34.2)	7	(8.9)	3.65***
Frequency of GP visits (Mdn., IQR)	5	(2)	3	(2)	6.51***
Medical conditions (Mdn., IQR)	3	(3)	1	(2)	5.03***
Note: $^{*}p \le .05$; $^{**}p \le .01$; $^{***}p \le .001$.					

Table 1: Demographic and health comparisons between pain and community participants.

A significant difference was also evident in participants' health ratings, with the pain sample more likely to report poor health. This was echoed by a declining health trajectory and more medical diagnoses for the pain sample. Finally, on average, members of the pain sample were significantly more frequent visitors to a GP. Table 2 compares the psychosocial profiles of the samples. Scores for the pain participants were significantly elevated for all variables other than Adaptive Coping and Psychological Attributions for illness.

	Pain sample			**Community sample**			
Scale / Variable	***M***	***SD***	**α**	***M***	***SD***	**α**	***t***
IBQ-31							
Affirmation of Illness	7.66	2.7	0.76	1.51	1.78	0.72	17.90***
Concern for Health	2.42	2.12	0.78	1.06	1.55	0.73	4.36***
General Affective State	4.65	2.94	0.78	2.33	2.63	0.82	5.21***
Brief COPE							
Adaptive Coping	26.32	8.02	0.8	24.53	7.83	0.84	1.35
Maladaptive Coping	10.95	4.76	0.72	7.73	4.21	0.68	4.24***
SIQ							
Somatic Attributions	22.09	4.93	0.66	19.68	4.4	0.75	2.92**
Psychological Attributions	21.67	7.74	0.91	20.51	6.01	0.88	0.95
Normalising Attributions	26	5.58	0.76	29.37	7.01	0.87	3.53***
Symptom Experience	7.87	3.19	0.79	3.96	2.91	0.76	8.60***
Note: $^{*}p \le .05$; $^{**}p \le .01$; $^{***}p \le .001$.							

Table 2: Psychosocial characteristics of pain and community participants.

Classification of Maladaptive IB among Pain Participants

The cluster analysis was optimized by a two-group solution, providing a cohesion and separation index (goodness-of-fit) of 0.6 (defined as ‘good’) [43]. The smaller cluster comprised 27 participants (34.2%), with of IBQ-31 scale scores (Table 3) suggesting elevated IB in this group. That is, significantly higher means for all scores, particularly CH and GAS.

	Cluster 1		**Cluster 2**		
	(AIB)		**(non-AIB)**		
IBQ-31	***M***	***SD***	***M***	***SD***	**t**
Affirmation of Illness	9.78	1.6	6.56	2.5	6.94^{***}
Concern for Health	4.59	1.67	1.29	1.29	9.75^{***}
General Affective State	7.78	1.7	3.02	1.96	10.72^{***}
Note: $^{*}p \le .05$; $^{**}p \le .01$; $^{***}p \le .001$.					

Table 3: A comparison of cluster means for IBQ-31 scales.

The nature of this classification was further tested using discriminant function analysis. All variables demonstrating the bivariate potential to discriminate between the two obtained clusters were tested. However, only data pertaining to the final predictive model are reported (following removal of non-significant indicators from the multivariate model due to multicollinearity). Log determinants suggested covariance matrices were equivalent (Box’s M = 35.61, p = .293), while the discriminant function itself was significant ($\chi^2(7) = 51.00$, $p \le .001$). Correct group classification was achieved for 77.8% of those with elevated IB, and 94.2% for non-elevated IB cases). There were seven significant predictor variables (Table 4) indicating that members of the pain sample were more likely to report maladaptive IB if they also reported higher levels of Maladaptive Coping, Somatic Attributions for illness, current pain, functional interference, and more GP visits. They were also likely to have poor self-rated health and a declining health trajectory over the past 12 months.

Variable	**Wilks’ Lambda**	**Structure Matrix**	**Canonical Coefficients**
Maladaptive Coping	$.792^{***}$	.512	.140
Somatic Attributions	$.765^{***}$	.554	.141
Current pain	$.888^{**}$	.355	.206
Functional interference	$.915^{**}$	.305	.119
Self-rated health	$.932^{*}$	.270	.385
Health trajectory	$.928^{*}$	.279	.284
Frequency of GP visits	$.884^{**}$	.361	.110
Constant			-7.276
Note: $^{*}p \le .05$; $^{**}p \le .01$; $^{***}p \le .001$.			

Table 4: Variables contributing significantly to the prediction of cluster membership.

Discussion

The availability of the IBQ-31 demonstrated the continuing relevance of illness behavior in the chronic pain context using contemporary scales with sound reliability and validity. In this instance, a community-based chronic pain sample was evaluated. Future studies may explore the utility of these new scales to presentations in the pain clinic setting, which played such an integral role in Pilowsky's seminal research [5-9].

All three IBQ-31 scale scores were significantly higher among pain participants than matched community members. This finding provides support for the notion that in the presence of a pain diagnosis, individuals identify more readily with a state of physical disorder (i.e., greater AI) because they perceive greater difficulty performing desired activities and are reminded by the constant somatic cues associated with pain. More concurrent medical conditions, poorer overall health and greater health decline among pain participants also suggest that they were more attuned to the presence of physical ill health than community members. Among individuals for whom pain symptoms and impaired functioning are prominent, greater CH may represent a heightened awareness of susceptibility to physical disorder. The unpredictability of chronic pain symptoms would be expected to contribute to a sense of greater vulnerability. Stronger recognition of general life stressors (i.e., higher GAS) may accompany the perception of pain as particularly intense and posing substantial functional disruption. Indeed, a stronger pain experience (with concomitant life restrictions) may be associated with financial and relationship issues, along with poorer psychological wellbeing. The notion that individuals with chronic pain may have difficulty fulfilling their responsibilities (e.g., occupational, personal relationships) was supported by the finding that they were less likely to be in paid employment and more likely to be separated or divorced than community members.

Other noted group differences included stronger somatic attributions and a greater perception of recent somatic symptoms among pain participants, suggesting a heightened awareness of bodily information. Although the two groups could not be distinguished on psychological interpretations of physical symptoms, the greater tendency of community members to dismiss a symptom as relatively innocuous is consistent with them having arguably fewer (and less frequent) physical reminders of bodily functioning than pain participants. Healthy members of the community may be able to more readily attribute a somatic experience to an isolated, non-threatening occurrence rather than perceive it as a potential warning of dysfunction warranting attention. The greater maladaptive coping reported by pain participants suggests that their potential frustration with health challenges may be associated with a stronger inclination to resort to potentially less constructive responses, particularly if other management approaches have not been effective.

Maladaptive coping may also offer (even temporarily) relief from prominent psychosocial implications of the pain experience (e.g., anxiety, depressive symptoms, relationship, and financial difficulties). This latter observation draws attention to the need for future research to augment AIB data, which comprise predominantly cognitive and affective responses to illness, with associated behavioral indicators. To date, behavioral concomitants of pain in the AIB literature have been restricted largely to those available upon clinical examination (e.g., mobility as assessed by a clinician, applying pressure to painful sites) [9,10,44]. Instead, the conceptualization of pain behaviors needs to be broadened to better characterize the diversity of potential responses as they may be indicative of AIB.

The second goal of the current study was to use cluster analysis to identify individuals whose high IBQ-31 responses could be considered to portray maladaptive illness responses. This attempt to classify pain subgroups is not unique. For example, researchers have sought to group patients to aid the selection of therapeutic interventions for low back pain [45-49]. While three key classifications were derived from a combination of patient history, clinical signs and symptoms, patients who were allocated to treatment according to this classification system did not have better outcomes after therapy than those who received standard therapy [47]. Nor were interventions based on this classification algorithm superior to standard care in terms of cost-effectiveness [45].

Unlike this body of research, the current study sought to identify individuals with a maladaptive profile irrespective of pain location. The existence of two groups was supported by the substantially higher IBQ-31 scores for 27 pain participants whose responses were consistent with elevated illness concerns. Notably, levels of concern about the possibility of illness (i.e., CH) and perceived psychosocial distress (i.e., GAS) were markedly higher for members of this group. The percentage of individuals included in this cluster was in fact similar to that reported by previous researchers [28, 29] in the context of stroke rehabilitation. However, despite the encouraging data reported, an assessment of the utility of the putative clusters will be determined ultimately by their ability to distinguish health outcomes for pain participants. For example, an understanding of maladaptive illness responses could help to identify individuals who respond less favorably to a structured pain management program or those who rely more heavily on stronger, opiate based management. Future research may also explore the existence of elevated IB responses in other pain samples, along with the factors that predict this group membership in different pain populations (i.e., community-derived versus pain clinic). A clearer assessment of the reliability and validity of such classifications and how they may vary according to the population of interest may allow clinicians and researchers to eventually nominate cut-off scores for IBQ-31 scales to enable individuals in the elevated group to be more readily identifiable and be treated accordingly.

A more general question to be addressed by future research is the very nature of elevated IB responses within a broader consideration of personality. Based on observations of Clark and Smith's stroke rehabilitation data [28], Prior and Bond [23] proposed that some individuals may have an existing predisposition towards expressing maladaptive responses (e.g., prior to participation in a pain management program) that may be termed dispositional (a personality trait), whereas others may develop their pattern of responses in the course of receiving treatment (e.g., during an intervention for their pain condition) that may be termed situational (a state). This argument is novel in the illness behavior literature and merits longitudinal studies to determine its validity. While difficult to disentangle, such a distinction would allow even greater demarcation of maladaptive responses to illness and treatment.

In summary, the current study has offered a valuable preliminary insight into the characteristics of individuals with chronic pain who exhibit maladaptive illness responses. Consistent with the psychological profile described for pain participants, individuals who reported less constructive forms of behavioral response and preferred physical interpretations of symptoms were more likely to be classified with an AIB syndrome. Further, stronger identification with the experience of chronic pain (e.g., more perceived pain, greater functional disruption, sought GP care more frequently, poorer global health, perceived health decline during the past year) was also associated with the classification of an AIB syndrome. The availability of a reliable algorithm to identify those individuals at greater risk of an AIB syndrome would assist the introduction of more timely and tailored interventions to better match treatment to patient characteristics, thus reducing the well-documented financial, personal, and societal costs associated with the experience of enduring pain.

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