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Original Research Article

What Triggers an LBP Flare? A Content Analysis of Individuals' Perspectives

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Abstract

Objective. For many, low back pain (LBP) is a lifelong condition with symptoms varying over time. Previous studies have investigated long-term risk factors and triggers for onset of LBP. No study has examined causes for less distinct fluctuations of symptoms, such as "flares," which individuals with LBP identify as a significant and worrisome part of LBP. As little is known about what triggers this type of fluctuation, we aimed to investigate individuals' perspectives on LBP flare triggers. **Methods**. We conducted an online survey of 130 people with LBP, asking what they think triggers their flares. Data were qualitatively examined using content analysis. **Results**. Most participants identified biomedical (84.8%) triggers, endorsing physical/biological factors to explain the flare occurrence. Themes included active movements (35% of participants), static postures (28.1%), overdoing a task (5.3%), biomechanical dysfunction (4.4%), comorbidities (4%), lack of exercise (3.3%), work (1.8%), and medications (1.5%). Nonbiomedical triggers were reported by 15.2% and included psychosocial and contextual factors, including psychological state (6%), weather (5%), sleep (2%), diet (1.2%), and fatigue (1%). These results indicate that individuals consider biomedical factors to be the main triggers of LBP flares, but some acknowledge nonbiomedical triggers. **Conclusions**. Study findings contrast with current pain theories, which suggest that there is a need for a reduced emphasis on biomedical causes of LBP pain, especially when persistent. Recognition of patients' views on causes of LBP flares is crucial to better guide clinical practice and inform further research. The validity of triggers identified by LBP patients requires further investigation.

Key Words: Low Back Pain; Flare; Triggers; Content Analysis

Introduction

Low back pain (LBP) is the most common and burdensome musculoskeletal condition globally in terms of years lived with disability [1]. Along with individual and social impact of activity limitation, the economic impact of this condition is considerable, including high costs associated with health care and work productivity losses [2,3]. LBP has been described by patients as characterized by fluctuations in intensity [4]. Although not all fluctuations are bothersome, flares are a fluctuation with a major impact on LBP outcome. For example, greater disability and work absenteeism are associated with the occurrence of LBP flares in individuals with persistent symptoms [5], and after an acute episode, higher flare frequency is associated with worse disability outcomes [6]. Qualitative studies have also revealed that the occurrence of flares disrupts work ability [4,7–9].

LBP flares are considered different than LBP episodes [5,6,9,10]. Flares generally represent an increase in symptoms/bothersomeness, not necessarily preceded by at least a month without symptoms, a requirement used to define a new LBP episode [11,12]. People who experience

LBP consider a flare of their condition to be an increase in pain and/or other symptoms associated with impaired function and emotional and cognitive changes [13]. Although some work has been conducted to better understand factors that increase risk of a new LBP episode, little attention has been directed to understanding what causes LBP to fluctuate and trigger a flare.

People with LBP believe their symptoms persist and recur mainly due to anatomical/biomechanical causes [14]. Patients and physiotherapists agree that lifting, bending, and prolonged sitting are the most important triggers for LBP episodes [15]. Health care clinicians in general consider triggers for new LBP episodes to be mainly biomechanical and rarely endorse individual and psychological/psychosocial factors [16]. A recent study confirmed that patients can reliably identify a number of biomechanical factors as triggers for their LBP episode (e.g., tasks involving heavy loads and vigorous physical activity), but they underestimate the risk associated with behavioral and psychological triggers [17], even though the latter play an important role in development of a new LBP episode [18]. It is unknown whether people with LBP similarly emphasize biomechanical factors as triggers for their LBP flares. As an LBP flare is different than a new episode, it may have different triggers. For instance, weather parameters have been shown to not increase the risk of developing an LBP episode, yet patients commonly argue that certain weather conditions influence their symptom severity [19]. Although individuals' perspectives on what constitutes a flare [13] and their views on why symptoms persist/recur have been previously investigated [14], what people think triggers their symptoms to flare remains undetermined. We argue that views of people with LBP on potential triggers for flares may provide insights into triggers not discussed in the literature regarding triggers for episodes.

This study aimed to investigate individuals' views on triggers for LBP flare, as distinct from causes of an episode. Addressing this gap in the literature is important as the identification of potential flare triggers can help manage this bothersome aspect of the LBP experience.

Methods

Study Design

A mixed-methods online survey examined individuals' experiences and understanding of LBP flare. Details of this online survey are reported elsewhere [13]. To specifically investigate patients' views on triggers for LBP flare, we asked the following question: "What do you think causes your low back pain to flare up? For example, things that you do, things that happen to you, or things that change in your environment." Eight text boxes without word limits were provided for answers. Data were analyzed using content analysis to identify themes of triggers highlighted by participants.

Participant Selection

Participants were recruited through advertisements placed on social media, local community and health centers, promotion through pain-related consumer organizations, and by contacting participants from previous studies. Participants were considered eligible when the following criteria were met: 1) age of 18 years and above, 2) ability to communicate in English, and 3) self-identification as having experienced LBP. There was no exclusion for LBP duration, other coexisting pain, or comorbidities. If participants chose to answer the questionnaire and complete the study after reading the study information page, consent was implied. A total of 622 participants enrolled to participate in the study. Four hundred ninety-two incomplete questionnaires were received and excluded from analysis. The remaining 130 complete questionnaires were included. Sample size was determined by response rate. Saturation was achieved with data from 130 questionnaires; that is, there was sufficient depth and repetition of identified themes for flare triggers, and no new themes were emerging from preliminary content analysis [20].

Theoretical Underpinnings

Our study is underpinned by relativist assumptions, that is, reality is understandable through an individual's knowledge and interpretation [21]. We sought to better understand triggers for LBP flares based on individuals' views. In this context, we used content analysis to systematically analyze the data and code the occurrence of triggers for LBP flares. In content analysis, a code is most often a summative, salient, and essence-capturing word/phrase symbolically assigned to a portion of language-based data [22]. Themes are groupings of codes into broader summative categories. These analytical groupings of concepts in the data enabled us to report individuals' views of what triggers LBP flare. We used an inductive approach to analysis, which means we did not predetermine codes but created them from our reading of the data. Therefore, we minimized interpretation and drew meaning from participants' responses.

Data Analysis

Demographic and clinical data were summarized using descriptive statistics. Data for content analysis were obtained from the words and short sentences used by individuals to answer our survey questions. Content analysis was conducted independently by two investigators (NC and JS). First, NC and JS independently read the entire data set and made notes on the main concepts, scope, and breadth of the data in relation to the research questions. Second, researchers reread the entire data set, manually coding data extracts into data management

software (Microsoft Excel) and developing provisional overarching themes, themes, and codes. Third, coding was refined after discrepancies were discussed to agree with each other and subsequently with PH. During this process, we developed a set of coding rules to guide data analysis: 1) when participants' answers related to two or more codes, investigators decided which code was predominant, and thus each trigger was coded only once; 2) answers with unclear meaning were excluded from coding analysis (e.g., "everything," "bad choices"); 3) all codes were included in the results, regardless of the frequency of which codes were mentioned.

Trustworthiness and Rigor

NC and JS coded the entire data set independently, and discrepancies were discussed to agreement with PH providing an additional perspective. All other authors reviewed data set and agreed upon results and analysis. A researcher external to the project (TH) confirmed the trustworthiness of the coding. TH is an occupational therapist with both clinical and qualitative research experience. Qualitative rigor was secured through STROBE [23]. All relevant categories of the checklist were satisfied in research design and reporting.

Results

The characteristics of the participants are described in Tables 1 and 2. Almost all participants lived in Australia, they varied considerably in age (mean [range] = 43 [22–72] years), and over half were female (74.6%). Eighty-two percent of the sample experienced LBP daily, and for over a half of participants symptoms varied daily (55.4%).

One hundred twenty-eight of 130 participants (98.4%) listed at least one factor they thought triggered their LBP flares. Most people provided short answers, using one or two words to describe triggers. Only a few people answered in a phrase, making some additional clarifying comments to their answers. Of the 676 triggers, 23 (3.4%) were excluded from coding for lack of precision (e.g., "bad choices," "pressure," "too little"). The remaining 653 triggers were clustered for existence and frequency into several themes and codes (Table 3), and then these were further categorized into two overarching themes, biomedical triggers (N = 554, 84.8%) and nonbiomedical triggers (N = 99, 15.2%). The overarching themes were intended to give a broad overview of how the data fit into these categories, and it is acknowledged that some themes and codes could cross over into both overarching themes. More than half of participants provided four or more potential triggers for their LBP flares (55%), and 24% used all text boxes, citing eight or more flare triggers. Nearly half of participants (N = 59, 45.5%) discussed both biomedical and nonbiomedical triggers. All percentages reported for overarching themes, themes, and codes were calculated as a proportion of the total number of responses. Overarching themes, themes, and codes are discussed below.

Table 1. Demographic characteristics of study participants

Age, mean ± SD, y	43.2 ± 12.05
Gender, %	
Female	74.6
Male	25.4
Country, %	
Australia	98.5
Other	1.5
State, %	
Queensland	56.9
New South Wales	16.9
Victoria	15.4
Other	10.8

Table 2. Characterization of study participants' low back pain

Duration of LBP, mean ± SD, y	13.09 ± 10.33
LBP every day, %	
Yes	82
No	18
Time frame of LBP variation, %	
Daily	55.4
Weekly	23.1
Monthly	7.7
Other	13.8
Periods of no LBP, %	
Yes	29.7
No	70.3

LBP = low back pain.

Overarching Theme 1: Biomedical Triggers

Overwhelmingly, people discussed biomedical factors as triggers for their LBP flare. Fifty-three percent of participants mentioned only biomedical triggers. Within biomedical triggers (N = 554, 84.8%), a multitude of different factors were clustered into 11 themes (Table 3). Active movement (N = 228, 35%) and static postures (N = 183, 28.1%) were the most common themes. Larger themes included several codes; all are described below.

Active Movement

Active movement was the most common theme of biomedical trigger discussed by participants. Participants discussed many types of active movement (Table 3). These were grouped into four codes: moving in a particular way (N = 77, 11.8%), physical activity (N = 65, 10%), life's daily tasks (N = 49, 7.5%), and lifting (N = 37, 5.6%). Within the code moving in a particular way, "bending" was the most common trigger, followed by "twisting." Some participants specifically addressed the quality of movement (e.g., "sudden," "wrongly," and "repetitive"), highlighting that their flare causes were not simply movement but also how movement happens. The

Table 3. Summary of qualitative analysis findings

Overarching Themes, Themes, and Codes	Frequency, No.	Frequency, %
Biomedical triggers	554	84.8
Active movements	228	35
Moving in a particular way	77	11.8
Physical activity	65	10
Life's daily tasks	49	7.5
Lifting	37	5.6
Static postures	183	28.1
Sitting	65	10
Posture	36	5.5
Standing	35	5.4
Travel/driving	24	3.7
Types of mattresses/seats	23	3.5
Overdoing a task	35	5.3
Biomechanical dysfunction	29	4.4
Changes in motor control	15	2.3
Damage to the spine	14	2.1
Comorbidities	26	4
Lack of exercise	22	3.3
Work	12	1.8
Medications	10	1.5
Sex	4	0.6
Type of shoes	3	0.4
Medical treatment	2	0.3
Nonbiomedical triggers	99	15.2
Psychological state	39	6
Weather	33	5
Quality of sleep	14	2
Diet	8	1.2
Fatigue	5	1

code physical activity included length, type, and intensity of exercise, with most participants clearly defining their own thresholds (e.g., "walking for longer than an hour," "long distance running," "strenuous exercise"). Within the code life's daily tasks, a variety of tasks were mentioned, such as "gardening," "vacuuming," "carrying," and activities "where arms are above head." In the code lifting, the idea of the load was implicit in most responses (e.g., "lifting heavy things," "constant lifting").

Static Postures

Static postures were the second most common response. Among participants' answers used to describe static postures, most could be coded as sitting (N = 65, 10%). Sitting was often mentioned as a trigger, with a qualifying description of length of sitting (e.g., "for too long," "over thirty mins," "all day," "too much"). Similarly, exposure to prolonged standing (N = 35, 5.4%) was considered a potential trigger. The code posture (N = 36, 5.5%) covered impressions of bad postural habits during both waking and sleeping hours (e.g., "not sitting straight while biking," "sleeping in a bad position"), as well as maintenance of a certain position for a long period of time (e.g., "static posture"). The code travel/driving (N = 24, 3.7%) incorporated both car and airplane trips, overlapping with sitting but adding other components to it, as there are possible effects of factors such as changes in air pressure and whole-body vibration. Type of mattresses/seats (N = 23, 3.5%) included sitting or lying on unfamiliar surfaces (e.g., "different bed for a few nights," "sitting in other people's houses as with uncomfortable sofas").

Overdoing a Task

The theme overdoing a task (N = 35, 5.3%) clustered answers provided by participants that referred to behaviors such as not pacing and/or overdoing a task or activity. This relationship is captured well by one participant's comment: "It's a fine line between doing as much as you can re: exercise, social, home and that a tiny bit too much. Some days you can get away with doing something and the next day it will stop you." Answers provided by patients alluding to overdoing a task at their workplace were clustered exclusively within the theme work (discussed below).

Biomechanical Dysfunction

The theme biomechanical dysfunction incorporated code changes in motor control (N = 15, 2.3%) and damage to the spine (N = 14, 2.1%). In the group of codes emphasizing changes in motor control (N = 15, 2.3%), participants identified poor core strength and overuse of lower back muscles as causes for their flares. An interesting finding in this code was that some participants discussed a lack of cognitive control over movements as a potential trigger (e.g., "moving without thinking," "not paying attention to how I move"). The second code clustered triggers that referred to structural spinal changes, often portrayed as recurrent or irreversible (e.g., "recurring bulging disk," "I have lumbar osteoarthritis. It is constant.").

Other Biomedical Themes

There were eight smaller themes with no codes (Table 3). In the theme comorbidities (N = 26, 4%), a range of other conditions such as knee pain, endometriosis, and constipation were highlighted by participants as potential triggers for their LBP flare. For example, one participant highlighted "flare-ups in other places causing chain reaction." Lack of exercise (N = 22, 3.3%) arose as a theme in two different contexts: inactivity (e.g., "being too sedentary," "reduced walking") and lack of specific exercises, highlighting the idea of exercise as medicine (e.g., "lack of correct exercise," "not doing specific strengthening exercises"). The theme work (N = 12, 2%) was also identified from participants' responses, indicating that they believed their work triggered their flares. Some responses overlapped with the theme overdoing a task, described above (e.g., "work too hard at the office," "increased workload"). The theme medications (N = 10, 2%) was mainly associated with medicine intake as part of management of LBP, which participants discussed as a

trigger for flares when failed (e.g., "forget pain medication," "cortisone injections wearing out"). The themes sex (N = 4, 0.6%), shoes (N = 3, 0.4%), and medical treatment (N = 2, 0.3%) were cited only for a few people.

Overarching Theme 2: Nonbiomedical Triggers

Participants identified considerably fewer nonbiomedical (N = 99, 15.2%) than biomedical triggers (N = 554, 84.8%). Only two participants (one male and one female) reported only nonbiomedical triggers without any concomitant biomedical parameters. Both participants reported stress and weather as the only triggers of their LBP flares. In the overarching theme nonbiomedical triggers, among five identified themes (no codes as themes were not large), the most frequently discussed were psychological state (N = 39, 6%) and weather (N = 33, 5%).

Psychological State

Within this theme, participants most frequently reported "stress" as a trigger for LBP flares. Some also discussed other mood states such as "anxiety" and "emotional lows." Some answers were more specific and outlined specific reasons for emotional and psychological repercussions, for example: "life complications," "money problems," "family issues," and "attitude to pain." A few people associated occurrence of flares with the necessity to be productive: "need to feed my creativity," "need to do anything constructive."

Weather

Within the theme weather, participants mostly pointed to cold weather and barometric pressure changes as potential triggers (e.g., "cold weather," "being too cold especially in air conditioning," and "barometric pressure changes"). Temperature changes, rainy weather, and warm weather were each mentioned by at least one participant.

Other Nonbiomedical Themes

Quality of sleep (N = 14, 2%) clustered responses referring to "lack of or restless sleep" and "poor sleep quality." Only a few participants referred to triggers that could be classified under the themes diet (N = 8, 1.2%) or fatigue (N = 5, 1%). We classified fatigue separately from psychological state as most responses were ambiguous as to whether this referred to mental or physical exhaustion. One participant referred to both: "When I'm mentally and physically exhausted, its [*sic*] the first thing to flare up."

Discussion

This study surveyed people who have experienced LBP to determine what they believe to be triggers for their LBP flares. Our primary finding is that participants considered biomedical factors to be the main triggers of their LBP flares, but some also cited nonbiomedical triggers. The most frequently reported reasons for experiencing this type of fluctuation of symptoms were active movements and static postures. When considered together, these triggers represent over half of the total number of participant-identified causes for an LBP flare.

Predominance of Biomedical Triggers

Although our study is the first to seek patients' perspectives of what triggers flares of LBP, our finding of a prevalence of biomedical triggers is not surprising. Previous literature indicates that people with LBP emphasize biomechanical causes for their symptoms [7,24]. A cross-sectional survey investigating triggers for new LBP episodes revealed that individuals hold biomedical/biomechanical beliefs about causes for a new LBP episode and rarely endorse psychosocial aspects [15]. The most common types of triggers were also unsurprising (e.g., bending, twisting, and prolonged sitting) and largely coincide with those of a new LBP episode [15]. However, our data revealed a layer of complexity regarding the role of movement in triggering LBP flares: Lack of exercise was believed to be a trigger, indicating that some participants might consider maintenance (rather than avoidance) of physical activity to be an important factor to reduce LBP flares. This perspective agrees with previous research, which found that a lack of regular physical activity predicts future sick leave due back pain [25]. To our knowledge, no other research has shown that people with LBP recognize lack of exercise as a risk factor for their LBP flares.

Our data also revealed that participants may not always be able or willing to avoid triggers or their consequences. This is captured well by one participant's comment: "Some experiences are worth the pain you know you will get later—it's your choice." Another participant stated: "Making love with my partner will always make it worse the next day—something I prefer to accept." These responses highlight the need to recognize the complex interaction between flares and patients' quality of life as part of management strategies and indicate that individuals may be able to exert control over certain triggers better than others, which might play a role in their coping strategies.

Potential Underestimation of Nonbiomedical Triggers

Within the group of nonbiomedical triggers, the theme psychological state revealed stress as a potential trigger. This has been reported in the literature related to LBP flares [5]. Other psychological factors such as anxiety, changes in mood, and emotional lows were identified as triggers in our content analysis. Those factors have been discussed as long-term exposure risk factors for LBP. There is evidence that distress, depressive mood, and

somatization are predictors of disability and chronicity of LBP [26]. A bidirectional relationship has been suggested between back pain and mental health, as back pain symptoms are associated with increased odds of depression, psychosis, anxiety, stress, and sleep disturbances [27]. However, whether psychological factors have a causal relationship to fluctuation of symptoms such as flares remains unknown.

Few participants endorsed the theme sleep as a potential flare trigger. This contrasts with research that outlines a bidirectional relationship between sleep disturbance/quality and LBP pain intensity [28]. A study conducted with people with LBP showed that a night of poor sleep quality, difficulty falling sleep, waking after sleep onset, or low sleep efficiency is followed by a day with higher pain intensity [28]. Weather was also identified as a potential trigger for LBP flare in our analysis. Past research has demonstrated that changes in weather parameters (i.e., temperature, humidity, pressure) are not associated with risk of developing a new LBP episode after a period without pain [19]. Whether weather changes can trigger a fluctuation of severity of ongoing pain is unknown and cannot be excluded.

Fatigue was the least commonly reported nonbiomedical trigger for LBP flare. People who experience a new episode of LBP rarely consider fatigue to be a trigger [17]. However, it is likely that the risks associated with this psychosocial trigger have been underestimated. Previous research has shown that manual tasks involving heavy loads and engaging in physical activity are more likely to cause a new onset of back pain when fatigued [18]. For other musculoskeletal conditions, fatigue has been identified by patients as an important domain of flare, in addition to being considered a potential trigger for this experience [29–31]. Whether there is an association between feeling fatigue and an increase in the likelihood of experiencing LBP flares is undetermined, and therefore further investigation is warranted.

Contextualizing Findings

This study adds to our previous investigation of individuals' perspectives on what constitutes an LBP flare [13] and their explanations for why symptoms persist and recur [14]. It is important to understand not only what flares are [13], but also why [14] and when they occur. There is a current life course conceptualization of LBP as an underlying condition with histories of LBP across multiple life stages, in which the unpredictable fluctuation course differs from the course marked by recurrent episodes [32]. It has been argued that there is a back pain subtype (with flares) that is etiologically distinct from LBP without flares [33]. Thus, triggers for LBP flares might differ from risk factors for prevalence and recurrence of LBP. The bias toward biomedical triggers for LBP in our findings contrasts with current evidence, which argues that psychosocial factors such as negative beliefs and pain catastrophizing are associated with persistence of LBP [26,27,34]. In order to enhance education and management of this condition, it is imperative to test the validity of the triggers identified in our study. As this study provides insights about what people believe triggers their LBP, the results are likely to be a valuable source of information for clinicians who work with individuals with LBP. These findings provide insights into how clients conceptualize their condition, and also work toward a better understanding of triggers for LBP flares. Both elements are likely to help with clinical management of LBP and its fluctuations.

Although this exploratory study provided insights into individuals' beliefs about what triggers their LBP flares, a number of factors should be considered when interpreting the findings. The study was conducted online in a survey format. Although this means that participants are likely to have felt comfortable expressing their thoughts anonymously, and that it therefore likely represents what participants believe triggers their LBP flares, the methodology is not intended to determine causation (i.e., it does not investigate whether a specific factor actually triggers a flare). Further research designed to investigate causation could utilize the triggers reported in this study. We also acknowledge that the phrasing of our question may have led participants to provide certain answers. We acknowledge that our use of the terms "biomedical" and "nonbiomedical" are somewhat restrictive in their division of the data discussed in our study; yet the dominance of biomedical themes remained clear regardless of occasional potential anomalies. There was a large difference between the number of people who commenced the survey and those who completed it and were included in the sample. We believe this was due to survey length (55 questions). Those completing the survey might have been individuals with a greater personal interest in the topic; this may be one reason why our sample had a high representation of people with daily and severe symptoms. There are also limitations to transferability of findings to be considered when applying findings to different populations. For example, most of the participants live in Australia. Thus, although there may be similarities, our findings may not be entirely transferable to individuals with LBP from other countries. Further, the sample was mostly female, and participants frequently had severe and persistent symptoms; thus perhaps not all people who experience LBP would describe similar triggers. Future studies could be designed to test possible differences between such subgroups. Data on education level and socioeconomic status of participants were not collected. Whether such parameters influence an individual's conceptualization of triggers for flare is unknown and could be considered in future work. Finally, we did not provide participants with a definition of flare, but rather relied on participants' interpretation of the term. This can be considered both a strength and a limitation of our study. By not constraining participants to a specific definition,

we allowed them to highlight triggers that matched their own unique experience of LBP flares. However, this also means that we might have identified triggers for flare that mean different things to different individuals. Recent work has identified that individuals with LBP regard flares of LBP as more than an increase in pain, including other elements such as interference with function and emotions [13]. This could be considered in future work.

Conclusions

Participants believed that the triggers for their LBP flares are primarily biomedical. Nevertheless, some participants recognized the existence of nonbiomedical triggers. As both clinical practice and research should be guided by a person-centered perspective, the triggers identified in this study should be investigated further. Future research assessing symptoms over time would be valuable to quantitatively identify the biomedical and nonbiomedical triggers that increase the likelihood of experiencing an LBP flare. The examination of LBP triggers helps develop optimal prevention strategies in clinical practice and better guides how to modify maladaptive illness perceptions. Management of LBP flares may lead to an increase in productivity and less time off at work, with the potential to contribute to a decrease in the large LBP burden on health care systems worldwide.

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