Scandinavian Journal of Pain 16 (2017) 105–111

Contents lists available at ScienceDirect

Scandinavian Journal of Pain

journal homepage: www.ScandinavianJournalPain.com

Clinical pain research

Pain anxiety and fear of (re)injury in patients with chronic back pain: Sex as a moderator

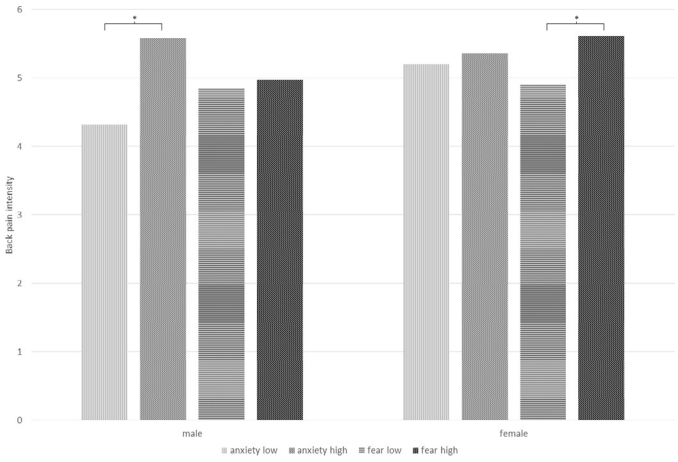
Nina Kreddig*, Monika I. Hasenbring

Department of Medical Psychology and Medical Sociology, Faculty of Medicine, Ruhr-University of Bochum, Universitätsstrasse, 44780 Bochum, Germany

HIGHLIGHTS

- Sex as a moderator in anxiety/fear and pain is suggested for the first time.
- Anxiety and fear are discussed as related, but distinct concepts.
- Pain anxiety is associated with pain intensity in men, but not in women.
- Fear of pain is associated with pain intensity in women, but not in men.

GRAPHICAL ABSTRACT



ARTICLE INFO

Article history:
Received 6 January 2017
Received in revised form 17 March 2017
Accepted 29 March 2017

Keywords:
Sex
Pain
Anxiety
Pain anxiety
Fear
Fear of pain

ABSTRACT

Background and aims: Anxiety and fear are increasingly seen as related, but distinct concepts, with anxiety describing a reaction to unclear or future threats, and fear to immediate threats. Anxiety and fear both play influential roles in pain. Yet, the two concepts have not been clearly distinguished in pain research. Their reported intensity differs between the sexes, and sex differences in the way pain anxiety and fear of (re)injury relate to pain intensity have been found separately in previous studies. However, they seem to be of a curious nature: In one study, pain anxiety was associated with elevated pain intensity in men, while in another, fear of (re)injury was associated with elevated pain intensity in women. This indicates a moderator effect of sex. The present study is the first to unite previous findings, and to show a more integrative picture, by examining and discussing this moderator effect of sex in a joint study of both pain-related anxiety and fear in both sexes.
Methods: In 133 patients (mean age 43.6 years, 62% female) with chronic low back pain (mean duration 7.7 years), sex differences were examined with correlations and a multiple linear regression analysis with interaction terms. Differences between subgroups of low and high anxiety/fear were explored via *t*-tests, following previous studies.

DOI of refers to article: http://dx.doi.org/10.1016/j.sjpain.2017.04.003.
* Corresponding author at: Ruhr University Bochum, Department of Medical Psychology and Medical Sociology, Universitätsstrasse 150, 44780 Bochum, Germany.
E-mail addresses: kreddig@medpsych.rub.de (N. Kreddig), hasenbring@medpsych.rub.de (M.I. Hasenbring).

http://dx.doi.org/10.1016/j.sjpain.2017.03.009

Results: Sex was supported as a moderator in the association of pain intensity with pain anxiety (PASS-20), and fear of (re)injury (TSK). Higher pain intensity was linked to higher pain anxiety only in men, and to higher fear of (re)injury only in women. A basic regression model with fear, anxiety, sex and disability as predictors ($R^2 = .14$, $F(4,123) = 3.24$, $p = .042$) was significantly improved by the addition of the interaction terms Fear × Sex and Anxiety × Sex ($R^2 = .18$, $F(2,121) = 4.90$, $p = .001$), which were both shown as significant predictors for pain intensity. Further *t*-tests revealed a significant difference in pain intensity between high and low anxiety in men ($t(47) = -2.34$, $p = .023$, $d = -.43$), but not in women. Likewise, a significant difference in pain intensity between high and low fear showed in women ($t(80) = -2.28$, $p = .025$, $d = -.42$), but not in men.
Conclusions: The results support a moderator effect of sex and suggest differential mechanisms between the sexes in pain anxiety and fear in development and maintenance of back pain. The current study is the first to report and analyse this moderator effect. As potential underlying mechanisms, evolution and socialization are discussed, which may elucidate why fear might be more relevant for pain in women, and anxiety more relevant for pain in men.
Implications: The results indicate the need for a more cautious conceptual separation of fear and anxiety in research. Future studies on fear and anxiety in pain should be aware of the distinction, in order to avoid reporting only half of the picture. The next step would be to solidify the results in different samples, and to examine whether a distinction between anxiety and fear in the sexes could have any benefit in pain treatment.

1. Introduction

Chronic back pain, with a reported lifetime prevalence of about 20% [1], is considerably linked to disability, personal discomfort [2,3] and work absence [4]. Chronic pain interacts with cognition, behaviour and emotion, whereby especially emotional aspects like anxiety and fear are known to play an important role in its onset and maintenance [5].

Fear and anxiety are often considered as synonymous, an approach that is increasingly challenged by studies presenting evidence for anxiety and fear as distinct concepts [6–8]. Anxiety is described as a diffuse worry about a future threat, preparing the individual for its potential arrival, and is characterized by behavioural inhibition, risk assessment and a hypervigilant surveillance of the surroundings ("stop, look and listen"). Fear, by contrast, represents a concrete reaction to an already present threat, preparing the individual for "fight-flight-freeze" [6,7]. This distinction leads to different opportunities for action, which could benefit from being treated differently in pain treatment. Anxiety, being diffuse and future-oriented, concentrates on negative cognitive biases, worries and rumination, and it comprises a lot more possibilities, as the threat has not arrived yet. Fear, on the other hand, with a concrete, present threat, is limited to the three options of fight-flight-freeze. In treatment, the distinction between fear and anxiety could help improve the outcomes. If a patient is suffering from a concrete, present-oriented fear of pain, a treatment approach with confrontational techniques may be helpful. A patient suffering from pain-related anxiety, which revolves around uncertain, future-directed worries, may benefit more from techniques of cognitive restructuring and fighting rumination.

To measure specifically pain-related anxiety and fear, different concepts are employed. Among the most commonly used are "pain anxiety", "fear of pain", "kinesiophobia", or "fear of (re)injury". Pain-related anxiety and fear are linked with pain severity and pain-related disability in patients with pain [9–11]. The concepts represent anxiety and fear with an emphasis on one or the other, but are rarely constructed to sharply mirror the differences [6,12]. The lack of clear distinction could also be a potential reason for inconsistent results in research, which is the reason why looking deeper into these theoretical concepts is a worthwhile endeavour in untangling the issue.

In both sexes, pain-related anxiety and fear play a role in pain experience and pain behaviour, and sex differences are reported for both pain and anxiety/fear. In women, higher prevalences for most pain disorders, and higher pain intensity [13,14] as well as lower pain tolerance, and pain threshold [15,16] are reported frequently, but not consistently [17,18]. While sex differences were also shown in several concepts of anxiety and fear [19–21, for a review see 22], the exact interaction of fear and anxiety with pain in the sexes appears curious. Using the Pain Anxiety Symptoms Scale (PASS), Edwards et al. [14,23] found that men with high pain anxiety reported significantly stronger pain than men with low pain anxiety, while no such difference appeared in women. Bränström and Fahlström [24] studied fear of (re)injury with the Tampa Scale of Kinesiophobia (TSK) and found that women with high fear of (re)injury reported significantly stronger pain than women with low fear of (re)injury, while no such difference showed in men.

This discrepancy in how anxiety and fear relate differently to the sexes has not received a lot of attention yet, and none so far in pain research. It appeared as an incidental finding in the Bränström and Fahlström study, where it was subsequently not discussed, while Edwards et al., following their results, naturally assumed a unilateral influence. Each study may only paint half of the picture. To fill this gap, the present study is the first to examine the differential effect of anxiety and fear on pain intensity in the sexes. To this end, the relations of both pain-related anxiety and fear of (re)injury with pain intensity are examined in a single sample of chronic low back pain patients. The main question is: Is there a moderator effect for sex in the relationship of pain-related anxiety and fear with pain?

2. Methods

2.1. Participants

From 8 orthopaedic practitioners, 133 patients with chronic (>3 months) lower back pain and none or minor organic findings were consecutively recruited for this study. Inclusion criteria were pain without distal radiation, age above 18 years and ability to read German fluently. Exclusion criteria were severe injuries of the back (e.g., neoplasms, fractures and herniated discs that required immediate surgery) and major psychiatric illnesses, the latter were assessed via medical records. Prior to their participation, written informed consent was obtained from all individual participants included in the study. The study protocol was approved by the medical ethics committee of the Ruhr University of Bochum.