Cross-Sectional Study

Concordance of Patient Expectations Regarding Guideline Recommendations for Management of Psychosocial Factors in Low Back Pain: A Cross-sectional Study

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Background: Guidelines for low back pain (LBP) management recommend addressing psychosocial risk factors such as stress and depression, which have been shown to play a prognostic role in nonspecific LBP. LBP management has been found to diverge from published recommendations. The reasons why remain unclear and may be related to patient views and expectations regarding the causes and treatment of LBP.

Objectives: We examined the degree to which patient views regarding psychosocial factors coincided with core recommendations and statements of the German national guideline for nonspecific LBP, as well as factors affecting those views.

Study Design: Cross-sectional study.

Setting: Data were gathered from June 2018 through September 2018 in 13 general practices in Mecklenburg-Wets Pomerania, Germany.

Methods: Practice staff approached all patients entering the practice, regardless of the reason for consultation, during 3 consecutive days and offered study participation. After providing informed consent, patients received a questionnaire to complete prior to consultation. Nonresponse bias was addressed by using inverse probability weights. Descriptive analysis and multivariate logistic regression models were performed.

Results: A total of 977 patient questionnaires were included in the analysis. One-third to one-half of the patients disagreed and one-third agreed that psychological problems and their treatment play a role in LBP management. A significant proportion (13-25%) was undecided. However, relaxation techniques were well accepted. Patients with higher education levels, poorer health status, and more severe LBP but no pain medication in the last 12 months were more likely to expect psychosocial diagnostics and treatment and regarded relaxation techniques as potentially helpful. More severe pain and lower levels of education were associated with disagreement with guideline recommendations and statements regarding management of psychosocial factors.

Limitations: Recall bias is possible, as patients were asked to recall their LBP history. However, we limited the recall time to the last 12 months. Data on income, employment status and co-morbidities were not collected and may have affected the responses. However, educational status, health status, and age were collected.

Conclusion: A significant portion of patients did not agree that psychosocial aspects should be addressed in LBP. Pain severity, health status, level of education, and previous treatment experience appear to affect patient views. These results highlight the importance of careful patient counseling regarding psychosocial factors and screening for psychosocial problems in LBP, when indicated. Additionally, educational initiatives may help bring patient expectations into agreement with recommendations.

Key words: Low back pain, psychosocial treatment, distress, relaxation techniques, national disease management guideline for nonspecific low back pain, low back pain management, patient expectation, agreement with guideline recommendations

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Psychosocial factors, commonly summarized as "yellow flags," play an important role for developing chronic low back pain and long-term disability (1,2). Most guidelines for managing low back pain (LBP) recommend assessing the presence of psychosocial risk factors early and to take them into consideration in treatment plans (3). Such risk factors include behavioral aspects such as a lack of coping mechanisms, catastrophizing, fear avoidance behavior regarding physical activity, cognitive aspects such as beliefs that back pain is severely debilitating, as well as social and financial problems (4,5). A systematic review and meta-analysis found an increased risk for the development of chronic LBP in patients with depression, with the increase in risk correlating to the severity of depression (6). Another study found significantly increased anxiety and depression scores in patients with LBP compared with the general population (7). The advantage of multidisciplinary interventions, which also target yellow flags, over one-sided treatments have been shown in the literature (5,8).

Despite the availability of numerous national and international guidelines for the treatment of nonspecific LBP, diagnostic and treatment approaches for LBP are widely performed in a nonstandard manner that diverges from recommendations (9-11). Multiple reasons for this phenomenon have been identified. Insufficient physician knowledge regarding published recommendations, lack of time and resources for adequate patient counseling and involvement in treatment decisions, as well as the physician's desire to avoid confrontation and preserve a harmonious patient-doctor relationship all play a role in diverting from guideline-oriented LBP management (10,12,13).

Despite acceptance of the established role of psychosocial factors in LBP by the medical community, patients experiencing LBP may not be aware of or agree with guideline statements and recommendations. Patient expectations and preferences for diagnostic and therapeutic steps can affect their treatment: dissatisfied patients utilize more health care services, seek care from multiple physicians, and tend to experience less favorable disease courses than satisfied patients (14-16). A better understanding of patient expectations and preferences relating to diagnostic and therapeutic steps in LBP can help increase patient satisfaction and positively influence treatment success (9,14,17,18). Previous studies on beliefs about LBP ("back pain myths") focused on biomechanical issues, imaging, and prognosis (19,20) rather than on psychosocial aspects.

The aim of our cross-sectional study was to determine the degree to which patient expectations coincided with 5 core recommendation and statements of the German national guideline for nonspecific LBP (Nationale Versorgungsleitlinie Nicht-spezifischer Kreuzschmerz, NVL-Nicht-spezifischer Kreuzschmerz [21,22])regarding management of psychosocial factors. The association of patient expectations with characteristics such as educational level, treatment experience, previous diagnostic imaging, and history of LBP was investigated.

Methods

Study Design and Setting

Data for this cross-sectional study were gathered in 13 general practices in Vorpommern, Germany. Practice staff approached all patients entering the practice during 3 consecutive days, regardless of reason for consultation.

Informative brochures and consent forms were made available to patients by practice staff. After providing informed consent, patients received a questionnaire to complete prior to consultation with their physician. To protect patient privacy, questionnaires were completed anonymously and placed in a sealed container. Practice staff completed a list of all patients entering the practice using anonymous, consecutive numbers. The list contained birth year, gender, participation/refusal to participate, and reason for refusal.

Exclusion Criteria

Patients who were unable to provide written consent, who were < 18 years old, and those with insufficient German language skills were excluded from the study (Fig. 1).

Questionnaire

The questionnaire was based on core recommendations and statements from the national guideline for nonspecific LBP (21) and the Back Beliefs Questionnaire (23). Information was gathered regarding demographic data, subjective health status, information about LBP within the past 12 months, as well as pain intensity, limitations in activities of daily living, diagnostic imaging, and use of pain medication. A filter question was used to allow patients who reported LBP in the last 12 months to answer further questions. Agreement between patient beliefs regarding diagnostic and therapeutic steps in LBP and recommendations in the nation-

al guideline was measured on a 4-point Likert scale ranging from "completely agree" to "completely disagree." Areas tested included psychosocial interventions, imaging, pain medication, and injection therapy. Although there was no option for a neutral answer, patients had the option to select "Don't know."

A thorough literature search found no previously validated questionnaires. Thus, we first piloted our questionnaire with 12 patients reading the statements aloud and explaining their understanding. In a second step, we piloted our questionnaire in 3 general practices (139 patients). Based on patient feedback, we reformulated and removed several questions and changed the order of questions presented. An English language version of the questionnaire and the national guideline recommendations, upon which it is based, are available in the Appendix.

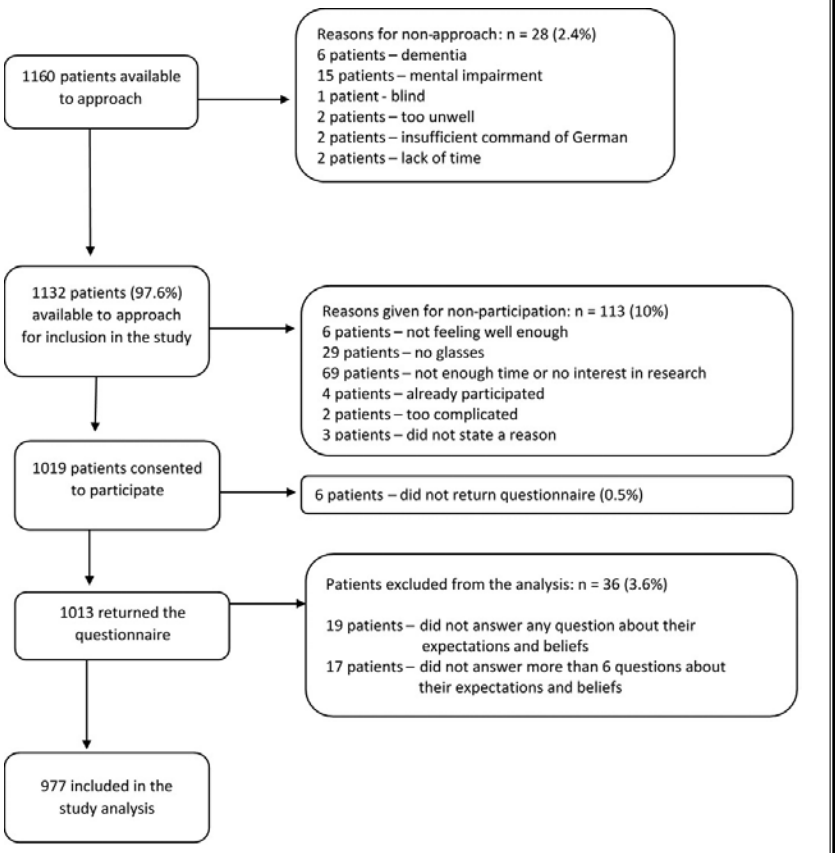

Fig. 1. *Flow chart of participant recruitment.*

Statistical Analyses

Bias

From a total of 1,160 patients seeking consultation with their primary care physician, 1,013 participated and completed the questionnaire (response rate: 87%) (Fig. 1). Age and gender differences between patients who participated and those who didn't were investigated using Mann-Whitney-U and χ^2 tests. Those who did not participate were older and more likely to be men (Table 1). Inverse probability weights were calculated to take this nonresponse bias into account. To do so, a logistic regression model with the endpoint study participation (yes/no) and the predictors age and gender was performed. The inverse of the probability of study participation was considered in statistical analyses.

Table 1. *Age and sex differences of patients and nonpatients.*

	Patients n = 1013	Nonpatients n = 147	*P* Value
Median age in years (Q1; Q3)	57[1] (41; 68)	66 (52; 80)	< 0.0001
Gender Men, n (%)	402 (39.7%)[2]	79 (53.7%)[3]	0.001

[1] missing: n = 4, [2] missing: n = 3, [3] missing: n = 2

Endpoints and Predictors

The endpoints were patient beliefs regarding the following: whether psychological factors could play a role, whether a referral to or co-treatment by a psychologist or psychotherapist could be helpful, whether physicians should ask about stress in the context of LBP, and whether learning relaxation techniques is appropriate to reduce LBP (Fig. 2).

Endpoint variables were generated by dichotomizing answer categories into tend to agree (combination of "strongly agree" and "agree") and tend to disagree ("strongly disagree" and "disagree"). Patients who selected "Don't know" or left questions blank were excluded from the respective regression

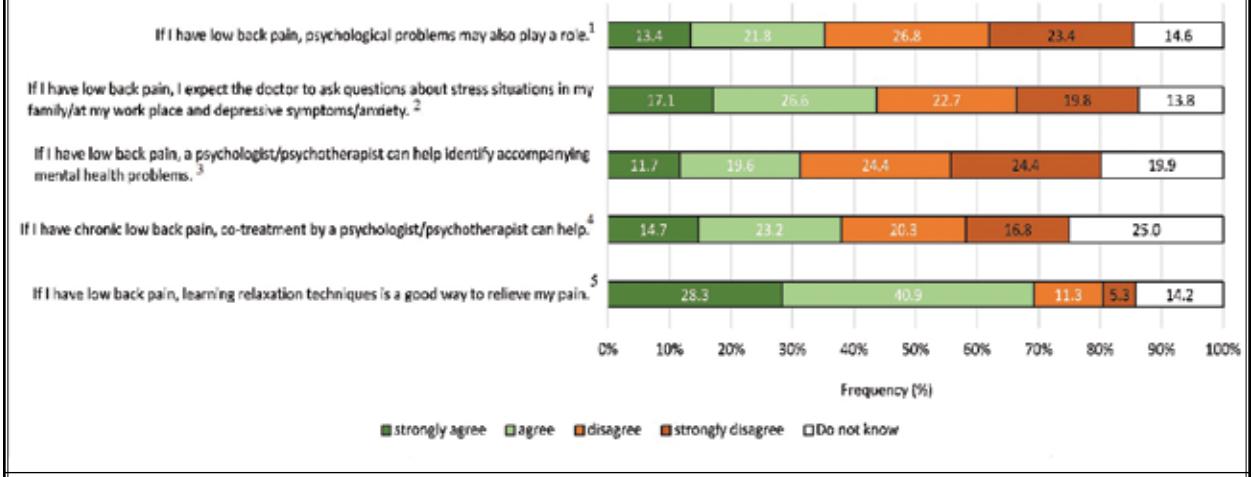

Fig. 2. *Patient agreement with core guideline recommendations for management of low back pain, weighted percentages (ipw), missing were not considered.*
[1] missing: n = 6 (0.4%); [2] missing: n = 8 (0.6%); [3] missing: n = 11 (0.8%); [4] missing: n = 12 (1%); [5] missing: n = 11 (1%)

analyses. The predictor "education" was summarized in categories of < 10 years, 10 years and > 10 years. Subjective health status was grouped into excellent/very good, good, fair/poor. Average LBP severity over the past 12 months on an 11-point scale was summarized into the following categories according to Boonstra et al (24): minimal/none (0-5 points), moderate (6-7 points) and severe/very severe (8-10 points). Diagnostic imaging included x-ray, magnetic resonance imaging, and computed tomography within the last 12 months. The predictor "no effective treatment" refers to the agreement of the patient with the statement, "There is no effective treatment for LBP." The predictors for the 2 multivariate logistic regression models were selected based on a) questions which were answered by all study patients (Table 2) and b) questions which could only be answered by patients with LBP in the last 12 months. Other endpoints such as patient expectations regarding general LBP treatment aside from psychosocial factors were addressed in the questionnaire; the results were published elsewhere (25).

Statistical Methods

Patients who left more than 6 questions regarding their beliefs about diagnostics and therapies blank (n = 36) were excluded from analysis. The agreement of patient beliefs with national guideline recommendations was analyzed using descriptive statistics (Table 4). The data were of a clustered structure because patients were drawn from 13 practices (clusters). Because the expectations and beliefs of patients may be influenced by their physician, patient answers within a cluster may correlate to one another (26).

Intraclass correlation coefficients (ICCs) were calculated to evaluate the proportion of variation in the outcomes. The ICCs of the outcomes ranged from 0-0.05, indicating a very low cluster effect. Multivariate generalized logistic mixed regression models were used to calculate a sensitivity analysis in which no meaningful differences were found. Therefore, the clusters were ultimately disregarded from the analysis and logistic regression models were used. Predictor multicollinearity was investigated using Pearson correlation coefficients. Predictors with correlation coefficients > 0.5 were excluded. The analyses were carried out using SAS Version 9.4 (SAS Institute Inc.).

Results

Patient Characteristics

A total of 977 questionnaires (median age 57 years; 39% men) were included in the analysis (Table 5, Fig. 1). The number of patients per practice ranged from 31 to 96. More than half (55%) judged their health status to be good and 25% as fair or poor. Nearly 21% had current LBP and 55% had experienced LBP in the last 12 months. Less than 5% reported ever having surgery due to LBP and 44% reported ever having injection therapy for LBP.

Of the patients with LBP during the last 12 months (75%, 712/977), 64% (457/710) were women, 75% had

Table 2. *Multivariate logistic regression, factors associated with expectations and beliefs regarding management of low back pain, including only the subgroup of patients endorsing LBP in the last 12 months; inverse probability weights are included.*

	Psychological Problems May Play a Role (n = 403/712)	Questions About Stress, Depressive Symptoms/Anxiety (n = 403/712)	Referral to Psychologist/ Psychotherapist (n = 385/712)	Cotreatment by Psychologist/ Psychotherapist if LBP is Chronic (n = 364/712)	Learning Relaxation Techniques (n = 407/712)
Independent variable	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
Age in years (continuous)	0.98 (0.98 to 0.99)	0.99 (0.98 to 1.00)	0.99 (0.99 to 1.00)	1.00 (0.99 to 1.00)	1.00 (0.99 to 1.01)
Gender					
Men	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Women	0.90 (0.77 to 1.05)	1.07 (0.92 to 1.24)	1.13 (0.97 to 1.33)	0.84 (0.71 to 0.98)	2.63 (2.23 to 3.11)
Educational level					
< 10 years of school	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
10 years of school	0.57 (0.47 to 0.69)	1.05 (0.87 to 1.28)	0.79 (0.64 to 0.97)	0.54 (0.44 to 0.67)	1.85 (1.48 to 2.31)
> 10 years of school	1.60 (1.29 to 1.98)	1.91 (1.54 to 2.37)	1.65 (1.32 to 2.07)	1.06 (0.84 to 1.33)	2.30 (1.78 to 2.98)
Self-assessed health status					
Excellent/very good	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
good	1.34 (1.12 to 1.60)	1.61 (1.36 to 1.90)	1.16 (0.97 to 1.39)	0.89 (0.75 to 1.07)	0.37 (0.28 to 0.47)
Fair/poor	3.18 (2.55 to 3.96)	3.53 (2.85 to 4.37)	3.87 (3.09 to 4.84)	2.22 (1.78 to 2.77)	0.82 (0.60 to 1.11)
Prior Imaging					
Yes	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
No	0.84 (0.71 to 0.98)	0.73 (0.63 to 0.85)	0.88 (0.75 to 1.03)	1.14 (0.97 to 1.35)	1.82 (1.53 to 2.16)
LBP on an 11-point scale in the last year					
mild (0-5)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
moderate (6-7)	0.85 (0.72 to 1.00)	0.94 (0.81 to 1.09)	1.26 (1.06 to 1.48)	1.18 (1.00 to 1.40)	1.28 (1.05 to 1.56)
severe (8-10)	1.69 (1.38 to 2.07)	1.04 (0.85 to 1.27)	1.07 (0.87 to 1.33)	1.69 (1.37 to 2.09)	0.85 (0.67 to 1.08)
Analgesics for LBP in the last year					
Yes	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
No	1.84 (1.59 to 2.12)	1.98 (1.72 to 2.27)	1.95 (1.68 to 2.27)	2.32 (1.99 to 2.69)	1.36 (1.14 to 1.62)
No effective treatment for LBP					
disagree	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
agree	1.95 (1.64 to 2.32)	1.65 (1.39 to 1.95)	1.79 (1.50 to 2.13)	2.01 (1.68 to 2.40)	0.93 (0.75 to 1.14)

10 or fewer years of schooling, 25% had undergone diagnostic imaging, 57% took pain medication, 65% reported a mild pain intensity (0-5 of 10), and 74% reported little or no interference (0-5 of 10) of daily activities in the last 12 months (Table 5).

Concordance With the National Guideline

Descriptive Statistics

One-third of patients (35%) agreed and half (50%) disagreed that psychological problems may play a role in LBP (Fig. 2). Forty-four percent of patients expected their physician to ask questions regarding stressful situations at home or work as well as screening for depression and anxiety; 42% disagreed that this should be done. One-third (31%) agreed and 49% disagreed to a referral to a psychologist or psychiatrist for the diagnosis of comorbid psychiatric conditions. Thirty-eight percent agreed and 37% disagreed that co-treatment by a psychologist or psychiatrist could help in chronic LBP; 25% did not know whether co-treatment would help. Two-thirds (69%) of patients considered learning relaxation techniques for LBP reduction to be appropriate. Twelve percent (126/955) of the patients agreed with the statement, "There is no effective treatment for LBP"; 32% indicated that they did not know.

Table 4. *Multivariate logistic regression, factors associated with expectations and beliefs regarding management of low back pain, including all patients with available data, inverse probability weights are included.*

	Psychological Problems May Play a Role (n = 749/977)	Questions About Stress, Depressive Symptoms/ Anxiety (n = 757/977)	Referral to Psychologist/ Psychotherapist (n = 703/977)	Cotreatment by Psychologist/ Psychotherapist if LBP is Chronic (n = 649/977)	Learning Relaxation Techniques (n = 755/977)
Independent variable	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
Age in years (continuous)	0.99 (0.98 to 0.99)	0.99 (0.99 to 1.00)	1.00 (0.99 to 1.00)	1.01 (1.00 to 1.01)	1.00 (0.99 to 1.00)
Gender					
Men	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Women	1.07 (0.96 to 1.18)	1.23 (1.11 to 1.36)	1.41 (1.27 to 1.58)	1.15 (1.03 to 1.28)	2.33 (2.06 to 2.63)
Educational level					
< 10 years of school	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
10 years of school	0.65 (0.57 to 0.74)	0.86 (0.75 to 0.98)	0.64 (0.56 to 0.74)	0.79 (0.69 to 0.91)	2.16 (1.86 to 2.52)
> 10 years of school	1.43 (1.24 to 1.66)	1.51 (1.31 to 1.75)	1.43 (1.23 to 1.67)	1.61 (1.37 to 1.89)	3.29 (2.74 to 3.94)
Self-assessed health status					
Excellent/very good	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Good	1.18 (1.05 to 1.34)	1.26 (1.12 to 1.42)	1.05 (0.93 to 1.20)	0.84 (0.74 to 0.96)	0.65 (0.55 to 0.77)
Fair/poor	2.24 (1.92 to 2.60)	2.45 (2.11 to 2.84)	2.58 (2.21 to 3.02)	1.59 (1.37 to 1.86)	0.79 (0.65 to 0.97)
LBP					
Not in the last 12 months	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
In the last 12 months	0.92 (0.79 to 1.06)	0.77 (0.69 to 0.87)	0.66 (0.58 to 0.75)	0.74 (0.66 to 0.84)	1.14 (0.98 to 1.32)
Now	0.92 (0.82 to 1.04)	0.74 (0.64 to 0.86)	0.67 (0.58 to 0.78)	0.91 (0.78 to 1.06)	1.27 (1.05 to 1.54)
Prior injection therapy					
Yes	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
No	1.07 (0.97 to 1.18)	0.96 (0.87 to 1.06)	1.13 (1.02 to 1.26)	1.31 (1.18 to 1.45)	0.79 (0.70 to 0.89)

Multivariate Logistic Regression Models

Role of Psychosocial Factors in LBP

Patients with fewer years of schooling disagreed that psychological problems may play a role. In comparison, patients with more than 10 years of schooling tended to agree (Tables 2 and 4). Patients with a fair-to-poor health status were also more likely to agree (odds ratio [OR]: 2.24, 95%CI: 1.92 to 2.60), as were patients with severe pain intensity (OR: 1.69, 95%CI: 1.38 to 2.07), patients with LBP in the last 12 months who had not taken pain medications (OR: 1.84, 95%CI: 1.59 to 2.12), and patients who believed that there is no effective treatment (OR: 1.95, 95%CI: 1.64 to 2.32). Patients with LBP in the last 12 months who had not undergone diagnostic imaging also did not agree.

Expectation of Screening for Stress Situations, Depressive Symptoms and Anxiety

Women patients, patients with more than 10 years of schooling and those with a good health status expected their physician to ask questions regarding stressful situations at home or at work as well as depressive symptoms and anxiety. This expectation was stronger in those with a fair-to-poor health status (OR: 2.45, 95%CI: 2.11 to 2.84) (Table 4). Patients who had experienced LBP in the last 12 months but had not taken pain medication (OR: 1.98, 95%CI: 1.72 to 2.27) and patients who believed that there is no effective treatment, expected their physician to assess stress situations, depressive symptoms, and anxiety (Table 2). In comparison, patients with 10 years of schooling, those with current LBP or LBP in the last 12 months, as well as those who had not undergone diagnostic imaging did not expect such questions.

Acceptance of Psychologist/Psychotherapist Referral

Women patients, patients with more than 10 years of schooling, those with fair-to-poor health status (OR: 2.58, 95%CI: 2.21 to 3.02) (Table 4), patients with LBP who were not taking pain medication (OR: 1.95,

95%CI: 1.68 to 2.27) and those who believed there is no effective treatment (OR: 1.79, 95%CI: 1.50 to 2.13) (Table 2) were more likely to agree to a referral to a psychologist or psychiatrist. Patients with 10 years of schooling as well as those with current LBP or LBP in the last 12 months declined referral to a psychologist or psychiatrist.

Acceptance of Co-treatment by a Psychologist/ Psychotherapist

Patients with more than 10 years of schooling, those with fair-to-poor health status, those who were not taking pain medication (OR: 2.32, 95%CI: 1.99 to 2.69), and those who believed that there is no effective treatment (OR: 2.01, 95%CI: 1.68to 2.40) agreed to cotreatment by a psychologist or psychotherapist in chronic LBP. Patients with 10 years of schooling, good health status, and those with back pain in the last 12 months tended to disagree that cotreatment could be helpful in managing LBP (Tables 2 and 4).

Learning Relaxation Techniques

Women were more likely than men (OR: 2.33, 95%CI: 2.06 to 2.63) to agree that learning relaxation techniques was appropriate for LBP reduction (Table 4). Similarly, patients with 10 years of schooling (OR: 2.16, 95%CI: 1.86 to 2.52) agreed. Those with more than 10 years of schooling (OR: 3.29, 95%CI: 2.74 to 3.94) (Table 4), those who were not taking pain medication, and those who had not undergone diagnostic imaging (OR: 1.82, 95%CI: 1.53 to 2.16) (Table 2) strongly agreed. Patients with good or fair-to-poor health status and those who had not received injection therapy did not view relaxation techniques as appropriate.

Discussion

We investigated the concordance of patient expectations regarding the role of psychosocial factors in LBP management with national guideline recommendations and statements as well as factors affecting patient beliefs. Between one-third and one-half of respondents disagreed with the national guideline regarding the role of psychosocial aspects in the workup and treatment of LBP. A significant proportion (13%-25%) was undecided. Nearly 70% agreed that learning relaxation techniques could help reduce LBP. Higher pain severity, lower health status, higher levels of education, and previous LBP treatment experiences were associated with agreement with guideline statements and recommendations.

Table 5. *Demographics and low back pain characteristics of study patients.*

Characteristics	n, %
Age in years (median, Q1; Q3)[1]	57 (40; 67)
Gender	
Men	381/974 (39.1)
Educational level	
< 10 years of school	198/961 (20.6)
10 years of school	519/961 (54.0)
> 10 years of school	244/961 (25.4)
Self-assessed health status[2]	
excellent	23/954 (3.3)
very good	126/954 (17.2)
good	527/954 (54.6)
fair	234/954 (21.0)
poor	44/954 (4.0)
Low back pain[2]	
currently experiencing LBP	211/960 (20.6)
LBP in the last 12 months	501/960 (54.8)
LBP not in the last 12 months	248/960 (24.6)
Ever surgery for LBP[2]	61/968 (4.7)
Ever injection therapy[2]	472/961 (43.9)
Only patients with current LBP or during the last 12 months (n = 712)	
LBP on an 11-point scale in the last 12 months[2]	
Median (Q1; Q3) [3]	5.0 (3; 6)
mild pain (0-5)	439/687 (64.7)
moderate pain (6-7)	162/687 (22.9)
severe pain (8-10)	86/687 (12.4)
Analgesics for LBP in the last 12 months[2]	406/712 (56.7)
Interference of daily activity on an 11-point scale in the last 12 months[2]	
Median (Q1; Q3)[3]	4.0 (3; 6)
mild interference (0-5)	498/687 (74.0)
moderate interference (6-7)	114/687 (15.8)
severe interference (8-10)	75/687 (10.2)
Imaging for LBP in the last 12 months[2]	194/705 (25.1)

[1] missing: n = 4, [2] weighted percentage, [3] missing n = 25, Q_1: first quartile, Q_3: third quartile

Patient Beliefs About the Role of Mental Health

Less than half of the respondents agreed that psychological problems may play a role in LBP. This implies a biomechanical understanding of LBP, which is in line with the repeatedly observed strong patient preference for imaging (19,20,27,28). Patients often feel unable to or do not wish to approach their physicians for help with psychological issues (29-31). This provides a possible explanation for the significant proportion (42%-48%) of patients in our study which considered the assessment of psychosocial factors to be unhelpful in LBP. A further 13%-25% remained undecided. This poses a practical problem for physicians seeking to

adhere to the guideline-recommended biopsychosocial model (3,22) and an obstacle to the promotion of behavioral therapy and multidisciplinary treatment for chronic LBP (3,21).

Physicians address psychological and work-life issues with only every second patient seen (11). For patients with acute and uncomplicated LBP with a presumed good prognosis, a systematic assessment of yellow flags seems unnecessary, unless the treating physician suspects that psychosocial factors are present. However, in recurrent care seekers and patients with chronic LBP, assessing yellow flags may be beneficial. Data regarding the effectiveness of interventions for yellow flags is mixed, but implies that psychosocial interventions provide prognostic and small-to-moderate clinical benefits (32-34). If a physician suspects the presence of psychosocial factors and wishes to refer a patient to a psychologist/psychotherapist for further assessment or treatment, our data imply that this will be met by even higher patient resistance than simply asking about psychosocial factors.

In comparison, most patients (70%) accepted relaxation techniques as a method of pain relief. This may reflect the more socially acceptable nature of relaxation techniques (35). This finding is in line with another German survey on LBP treatment expectations (36). While relaxation techniques are considered an effective treatment by patients (37), this approach alone may not provide sufficient assistance to patients with severe and/or chronic LBP who may need psychosocial assistance such as coping techniques.

Factors Affecting Beliefs About Mental Health and LBP

Fair-to-poor health status, severe LBP (8-10 on the Numeric Rating Scale), not currently taking pain medications, and the belief that there is no effective treatment for LBP were strongly associated with agreement that the identification and treatment of mental health problems play a role. These factors may be related to extensive previous contact with the health care system and may imply treatment failure, as there is evidence that pain medications have limited clinical effectiveness in LBP (37). This may explain the belief in a lack of effective treatment and the understanding of the need for a multifaceted approach, i.e., one that addresses psychosocial factors. Evidence shows that cotreatment of psychological problems (e.g., risk-oriented cognitive behavioural therapy) as part of a multidisciplinary approach to LBP management leads to an improvement in pain symptoms, quality of life, and a decrease in chronification and disability (33,38,39).

Patients with a lower level of education disagreed with the guideline recommendations and statements regarding mental health diagnostics and management. Additionally, patients in our study with a lower educational level had a higher prevalence of LBP (in our sample 75% of those with LBP had 10 or fewer years of school). This is in line with other studies in which individuals with a lower educational level were at a significantly higher risk of LBP and simultaneously possessed less knowledge about the management of LBP compared to their more highly educated counterparts (19,27,36). Also, health inequalities can partly be explained by work-related risk factors, where lower-skilled and unskilled workers are subjected to more adverse working conditions (40).

Lack of information regarding evidence-based LBP treatment likely contributes to guideline-divergent patient expectations. A biomechanical understanding of LBP and lack of knowledge of the role of psychosocial factors may cause patients to expect imaging diagnostics rather than psychological screening as part of the workup of nonspecific LBP (19,23). This may imply that patients in our study without previous imaging need reassurance in the form of imaging before accepting psychosocial influences on their LBP. Studies report that patients expected diagnostic tests such as imaging in order to receive a diagnosis of LBP (41,42). Diagnostic testing was shown to result in dissatisfaction because the desired or expected solution or diagnoses did not result (41). In comparison, patients with a higher level of education were more likely to seek evidence-based therapeutic options such as relaxation exercises, resulting in better outcomes regarding pain reduction and functionality (36). There is evidence that LBP treatment carried out in accordance with guidelines enables patients to achieve a better health status with higher functionality and satisfaction while minimizing the costs of treatment (43).

Strategies to Change Patient Expectations

Because a large proportion of patients disagree with or are undecided about recommendations, it seems advisable that health care providers carefully explain why they are eliciting psychosocial history when indicated in LBP. Physicians should be prepared for resistance when recommending referral to a psychologist/psychotherapist. Ideally, counseling regarding psychosocial factors in LBP should take place in the context

of an established patient-physician relationship. Of particular importance is counseling patients of lower educational status (44). Educational material such as leaflets (45,46) provided by guidelines or "The Back Book" (47) can be promoted by physicians to improve a patients' knowledge and adherence to treatment. Mass media campaigns have shown promise in improving beliefs of both patients and practitioners regarding yellow flags, although the effects on clinical outcomes in LBP resulting from these educational campaigns were mixed (48). Future studies should involve detailed investigations into which educational interventions improve patient outcomes.

Strengths and Limitations

While other studies focus primarily on patient perspectives regarding biomechanical issues (15,19,36), our study fills a gap in the literature concerning patient perspectives and acceptance of psychosocial factors in relation to LBP. The large sample and response rate of 87% represent other considerable strengths of this study. Inverse probability weights were implemented to take potential nonresponse bias into account (49). Our results remained robust in a sensitivity analysis accounting for the clustered structure of our data. We piloted our questionnaire with 12 patients reading the statements aloud and explaining their understanding as well as in 3 general practices with 139 patients. In order to minimize potential physician influence on patient answers, patients completed the questionnaire prior to being seen by their general practitioner. We limited the recall time to the last 12 months in order to limit the potential influence of recall bias. Social desirability bias may be a cause to underestimate patient disagreement with guideline recommendations (50). Differences between health systems regarding aspects such as access to care and copayments should be kept in mind when generalizing our data. Of note, the design of the study is cross-sectional, thus limiting conclusions about causality.

We did not collect data on mental health, on whether patients were undergoing mental health treatment at the time of participation/in the past, on chronicity of LBP in our sample, whether patients had specific or nonspecific LBP, or whether patients already had received counseling/education regarding guideline-appropriate LBP treatment.

Conclusions

Our data show that a significant proportion of patients do not believe that psychosocial factors should be investigated or treated in the context of LBP. The link between LBP and psychosocial factors such as behavior and perception should be made more socially acceptable. We identify specific patient beliefs which can be addressed during patient consultations for LBP when screening for and treatment of psychosocial aspects is indicated. Informing patients about psychosocial factors and their role in LBP treatment and prognosis might increase their general acceptability and may contribute to improved compliance with treatment approaches targeting psychosocial factors in LBP.

Availability of Data and Material

Data are available on reasonable request.

Code Availability

The statistical codes are available on reasonable request.

Authors Contributions

JFC, CR and PK designed and performed the study. Data collection was performed by CR and PK. SK was a major contributor in data analysis. SK and ES were the major contributors in writing the manuscript. All authors discussed the results and commented on the manuscript.

Ethics Approval

Ethics approval for this study was given by the ethical review board of the University Medicine Greifswald (approval no.: BB148/16).

Consent to Participate

All patients provided written informed consent before participation.

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Appendix. ***German national guideline recommendations upon which questionnaire is based*** [21]

	Statement	**Strength of Recommendation** [a]
3-2	Psychosocial and work-related risk factors should be addressed at onset and during the entire treatment period of LBP. (Expert consensus)	⇧⇧
4-8	If psychosocial burdens are suspected, a referral to a psychologist for further diagnostics and therapy can take place after medical consultation. (Expert consensus)	⇔
4-9	In patients with comorbid psychiatric condition(s), an appropriate, guideline-based therapy should be initiated.	⇧⇧
5-8	The relaxation technique "progressive muscle relaxation" (PMR) should be used in the treatment of chronic nonspecific LBP.	⇧

[a] Double arrow: strong recommendation; single arrow: recommended, double headed arrow: optional

umber of practice

consecutive number

Survey on Low Back Pain (Translation)

ParticipantQuestionnaire

Please complete all pages of this questionnaire and use a pen or fine liner. Answer each question and use the option “Cannot answer” if needed. You are asked to skip questions that do not apply to you. This is indicated with the note: “Please proceed with question 13”. If you have accidentally ticked an incorrect answer, please blacken the wrong selection and mark the correct box.

mark as follow:
correct as follow:

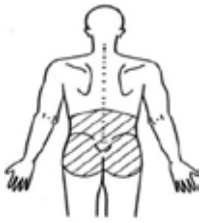
blinded manuscript

1	Year of Birth:	_ _ _ _ (year)

2	Gender:	Male	Female

3	What is the highest level of education that you have completed?	Lower secondary school	
		Secondary school	
		Polytechnical institute	
		Advanced college entrance qualification	
		High School	
		Other school graduation	
		No school graduation	

4	How would you rate your current health status?				
	excellent	very good	good	fair	poor

5	Have you experienced low back pain? (pain anywhere in the area between the lowest rib and the buttock crease, as pictured)		Now	
			In the last 12 months	
			I have not experienced low back pain within the last 12 months: please proceed with question 13	

6	Are you presenting to your General Practitioner for low back pain today?	No	Yes

		0=No Pain 10=Pain as bad as it could be										
7	How would you rate your low back pain on a 0-10 scale at the present time?	0	1	2	3	4	5	6	7	8	9	10
8	How intense was your low back pain on average on a 0-10 scale in the last 12 months?	0	1	2	3	4	5	6	7	8	9	10

		No	Yes
9	Have you taken analgesics for low back pain in the last 12 months?		

		0=No pain 10=Pain as bad as it could be										
10	How much does low back pain currently interfere with your daily activity?	0	1	2	3	4	5	6	7	8	9	10
11	In the last 12 months, how much has low back pain interfered with your daily activities?	0	1	2	3	4	5	6	7	8	9	10

12	Which diagnostic imaging for low back pain have you had in the last 12 months? (multiple answers possible)	x-ray	MRI	CT	None

13	Have you ever had surgery for low back pain?	No	Yes
14	Have you ever had injection therapy for low back pain?	No	Yes