ความสัมพันธ์ระหว่างการรับรู้ความเจ็บป่วย ความเชื่อว่าควรหลีกเลี่ยงกิจกรรมเพราะกลัว และความทุพพลภาพของผู้ป่วยอาการปวดหลังเรื้อรังในเมืองดานัง ประเทศเวียดนาม*

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บทคัดย่อ

การศึกษาแบบภาคตัดขวางนี้มีวัตถุประสงค์เพื่อศึกษาความสัมพันธ์ระหว่างการรับรู้ความเจ็บป่วย ความเชื่อเกี่ยวกับความกลัวและการหลีกเลี่ยง และภาวะทุพพลภาพในผู้ป่วยปวดหลังส่วนล่าง เมืองดานัง ประเทศเวียดนาม กลุ่มตัวอย่างเป็นผู้ป่วยที่มีอาการปวดหลังช่วงล่างจำนวน 85 คน เครื่องมือวิจัยประกอบด้วย แบบสอบถามข้อมูลส่วนบุคคลและพื้นฐานทางสังคม แบบสอบถามการรับรู้ความเจ็บป่วยฉบับปรับปรุง แบบสอบถามความเชื่อเกี่ยวกับความกลัวและการหลีกเลี่ยง และแบบประเมินภาวะทุพพลภาพของออสเวสทรีฉบับปรับปรุง วิเคราะห์ข้อมูลโดยสถิติเชิงพรรณนา และสถิติสหสัมพันธ์เพียร์สัน ผลการศึกษา พบว่าคะแนนความเชื่อว่าควรหลีกเลี่ยงกิจกรรม (เมื่อต้องมีกิจกรรมทางกาย) เท่ากับ 69.4 และคะแนนความเชื่อว่าควรหลีกเลี่ยงกิจกรรม (เมื่อต้องทำงาน) เท่ากับ 37.3 ตามลำดับ กลุ่มตัวอย่างมีการรับรู้ต่อภาวะปวดหลังส่วนล่างที่ชัดเจนว่า เป็นภาวะเรื้อรังและส่งผลกระทบอย่างมาก ร้อยละ 62.3ของกลุ่มตัวอย่างมีภาวะทุพพลภาพระดับรุนแรงจนถึงนอนติดเตียง และพบความสัมพันธ์เชิงบวกระดับปานกลางระหว่างภาวะทุพพลภาพกับความเชื่อว่าควรหลีกเลี่ยงกิจกรรม ($r=0.488$, $p<0.01$) การรับรู้ว่าเป็นภาวะเรื้อรัง ($r=0.378$, $p<0.01$) การรับรู้ผลกระทบ ($r=0.495$, $p<0.01$) ภาพสะท้อนทางอารมณ์ ($r=0.418$, $p<0.01$)

โดยสรุปพบความสัมพันธ์เชิงบวกระหว่างการรับรู้ความเจ็บป่วย ความเชื่อว่าควรหลีกเลี่ยงกิจกรรมกับภาวะทุพพลภาพในผู้ที่มีอาการปวดหลังส่วนล่าง พยาบาลหรือทีมสุขภาพควรให้ความสนใจตัวแปรดังกล่าวเมื่อให้การดูแลผู้ป่วยกลุ่มนี้

คำสำคัญ: ภาวะทุพพลภาพ การรับรู้ความเจ็บป่วย ความเชื่อเกี่ยวกับความกลัวและการหลีกเลี่ยง ภาวะปวดหลังส่วนล่าง

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The relationships among illness perceptions, fear-avoidance beliefs and disability in patients with chronic low back pain in Da Nang, Viet Nam*

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Abstract

This cross-sectional study aimed to examine relationships of illness perceptions (IP), fear-avoidance beliefs (FAB), and disability in chronic low back pain (CLBP) patients in Da Nang, Vietnam. Sample included 85 patients with CLBP. Data were collected using a socio-demographic questionnaire, Modified Illness Perception Questionnaire-Revised, Fear-Avoidance Beliefs Questionnaire, and Modified Oswestry Disability Questionnaire. Data were analyzed by descriptive statistics and Pearson's correlation coefficient.

The results showed that the score for FABpa (physical activity) and FABw (work) were 69.4% and 37.3%, respectively. The patients perceived that CLBP was chronic condition and had great consequences. Severe disability to bed-bound was found in 62.3% of the participants. Furthermore, significant moderate positive correlation were found between disability and FAB total ($r=0.488$, $p<0.01$), perception of chronic condition ($r=0.378$, $p<0.01$); perception of consequences ($r=0.495$, $p<0.01$), emotional representations ($r=0.418$, $p<0.01$).

In conclusion, there are positive correlations among illness perceptions, fear-avoidance beliefs, and disability in patients with chronic low back. Nurses or health care providers should concern these variables while caring for these patients.

keywords: disability; illness perceptions; fear-avoidance beliefs; chronic low back pain

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Introduction

Low back pain (LBP) has appeared to be one of the major health concerns in the recent past. It is a common disorder of pain, muscle tension, or stiffness localized below the costal margin and above the inferior gluteal folds, with or without leg pain (sciatica)".[1] LBP is known to affect people of all ages, from children to the elderly, and is a frequent reason for medical consultations as well.[2] Importantly, around 20% of people experiencing LBP develop Chronic LBP (CLBP), which is defined as a persistent LBP for 12 or more weeks.[3] Published report indicate that CLBP is the main cause of global disability with estimated prevalence to be 9.4%.[4]

Disability in LBP is complex with many causes. Bio-psychosocial factors such as disease beliefs, fear-avoidance beliefs (FAB), illness perception (IP), disaster, anxiety, depression, maladaptive coping, social support, and occupational biomechanical variables related to functional disability in LBP have been described previously.[5] Of these factors, FAB and IP play an important role in predicting disability.[5] Excessive FAB in LBP patients is known to have severe consequences such as decreased mental well-being, physical inactivity, assumption of the role of the sick, decline in family dynamics, reliance on medicines, and excessive use of medical facilities.[6] Therefore, understanding and addressing FAB is vital to the health care system.[6] FAB screening can be useful in identifying patients at risk of prolonged disability.[7] Altered therapy strategies in LBP patients with FAB makes treatment more effective rather than ignoring them.[8]

IP are the way that patient's cognitive and beliefs about their illness through cognitive and emotional reactions. It is an important determinant of behavior that has close connection with outcomes such as treatment adherence and rehabilitation in CLBP.[9] The CLBP patients have special perceptions about their illness such as back pain would last longer, little control over pain and low effectiveness of treatment.[10] Negative IP can lead to different negative effects, such as higher disability, lower quality of life, anxiety, etc. Therefore, it is important to evaluate IP to treat patient's perceptions adequately, in order to influence the illness process positively.[11]

Disability and LBP expenses are expected to be greater in the low-and middle-income nations because of the poor health care system.[12] In Viet Nam, back pain accounted for 44% of the musculoskeletal disorders, which was soared by 28.7% between 2007 and 2017.[13] Currently, LBP is ranked as the first cause for the most disability and the sixth of causes the most death and disability combined in the country.[13] Consequently, it is important to concentrate in major factors associated with disability to achieve goals in the management of LBP. We, therefore, aimed to investigate the relationship between FAB, IP, and disability among patients with CLBP in Da Nang, Viet Nam.

Objectives of study

The objectives of the study was to measure the levels of FAB, IP, and disability; as well as their association in patients with CLBP.

Materials and methods

Study setting, design, and participants: This cross-sectional study was conducted in Da Nang Orthopedic and Rehabilitation Hospital, which is a specialized orthopedic, trauma, and rehabilitation center located in central Viet Nam. The hospital has

a total capacity of 350 beds. The study population consisted of the patients receiving treatment for CLBP. A simple random sampling technique was applied to enroll the participants. The inclusion criteria were CLBP (LBP>12 weeks) confirmed by a physician, age ≥18 years, able to read, write and understand the Vietnamese language. On the other hand, patients with cancer, fractures, psychiatric disease, stroke, or a history of spine surgeries such as scoliosis surgery, surgery for spinal compression fractures, surgery for collapsed discs, and unwilling to participate were excluded. The sample size was estimated using the formula of Hulley[14] with correlation-coefficient as mentioned by Cohen.[15] The correlation sample size is calculated by the formula: N = [(Zα+Zβ)/C]2 + 3. Where: N: Sample size, Zα: The standard normal deviate for α, Zβ: The standard normal deviate for β, C = 0.5. ln [(1+r)/(1-r)] with r: The expected correlation coefficient. The researcher determined the confidence level 95%, α = 0.05, Zα = 1.96, the power 80%, β = 0.2, Zβ = 0.842 and correlation coefficient r = 0.3. The estimated sample size was 85. Data were collected between February to March 2020. This study was approved by the Institutional Ethics Committee of Hue University of Medicine and Pharmacy, Viet Nam (H2019/386), and Center for Ethics in Human Research, Khon Kaen University, Thailand (HE622256) and Da Nang Orthopedic and Rehabilitation Hospital, Viet Nam. The participation was completely voluntary with right to refuse at any time.

Research instruments: The questionnaire was designed to collect the socio-demographic data and a Vietnamese version of Fear Avoidance Beliefs Questionnaire (FABQ) developed by Waddell et al., (1993) was applied to assess FAB.[16] The FABQ consisted of 16 items and patients were asked to mark their answers in each item on a 7 point Likert scale from 0 (fully disagreed) to 6 (fully agreed). This questionnaire had two sub-scales: FABw (work) and FABpa (physical activity). FABw was calculated by adding the score for questions 6, 7, 9-12, and 15, such that the maximum score possible was 42, and score above 34 was considered as high. FABpa score was calculated by adding the score for questions 2-5, such that the possible maximum score was 24 and score more than 15 was regarded as high. A high score indicate stronger FAB. Questions 1, 8, 13, 14 and 16 were not the part of scoring procedure as they were validated in previous studies.[16,17]

We modified IP questionnaire (IPQ-R) to fit with CLBP on approval from the author.[18] The part 1 of IPQ-R is the 'identity' dimension. It was changed to fit symptoms specific to LBP patients. After literature review and discussions with experts, 14 items designed to be replied in "yes" or "no" by the patient in IPQ-R were replaced by 8 items in CLBP. They were dull or achy pain at the low back; stinging, burning pain that radiate to other parts; pain that include numbness or tingling; sleep difficulties; muscle spasms and tightness in the low back, pelvis, and hips; stiff joints; pain that worsens after prolonged sitting or standing; loss of strength, difficulty standing up straight, walking, or going from standing to sitting. Total items of part 2 of IPQ-R is 38. It includes 7 dimensions which includes Timeline (including acute/chronic-6 items); Timeline cyclical (4 items); Personal control (6 items); Treatment control (5 items); Illness coherence (5 items); Emotional representations (6 items) and Consequences (6 items) of CLBP

were answered based on 5 point Likert scale as completely disagree=1, disagree=2, uncertain=3, agree=4, completely agree=5. As suggested by the authors, the word 'illness' was replaced with 'LBP' throughout the questionnaire.

The IPQ-R causal items of illness include 18 items were answered based on 5 points Likert scale as completely disagree=1, disagree=2, uncertain=3, agree=4, completely agree=5. There were 18 items included in the study to measure perception on the cause of illness namely 1. Stress or worry; 2. Overwork; 3. Aging; 4. Poor medical care in my past; 5. Smoking; 6. Alcohol; 7. A germ or virus; 8. Pollution in the environment; 9. Accident or injury; 10. Physical activities; 11. Sitting in the same posture for a long period of time; 12. Poor posture; 13. Spinal disease; 14. Poor posture while lifting heavy objects; 15. Poor working conditions; 16. Sleeping on a bad mattress; 17. Job dissatisfaction; 18. Altered immunity. These were further classified into 3 group: Psychological attributions with items 1, 2, 17; Risk Factors with items 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, and Immunity with items 7, 8, 18.

The internal consistency (alpha) and the Content Validity Index for items of the IPQ-R was proved to be reliable (Cronbach's alpha: 0.83; I-CVI: 1.0). The mean score of each domain was calculated by mean of each item. A high score of the questionnaire represented strong perceptions of a particular dimension.

Next, the oswestry disability questionnaire (MODQ) was used to measure the level of disability, where the sex life category was replaced with the employment/homemaking category.[19] The questionnaire were designed to assess the impact of back pain and ability to perform everyday activities. The participants were asked to respond to each question by checking (√) the line that best described their present condition. It included 10 items such as pain intensity, personal hygiene, lifting, walking, sitting, standing, sleeping, employment/homemaking, social activity, and traveling, which were scored on a six-point scale, from 0 to 5, higher values representing greater disability. The total score was multiplied by 2 and expressed as a percentage. When a respondent was not able to complete one or more questions, the average of all other items was added to the completed items. The scores was reported in percentage as 0-20% (minimal disability), 21-40% (moderate disability), 41-60% (severe disability), 61-80% (crippled) and 81-100% (bed-bound). The questionnaire used was translated into Vietnamese language using a recommended technique and a committee approach.[20]

A pilot study was conducted among the 30 CLBP patients to validate the reliability of the instruments when the reliability of FABQ, Modified IPQ-R, and MODQ resulted in a Cronbach's alpha coefficient of 0.77, 0.83, and 0.95 respectively. The content validity was evaluated by using a panel discussion with three experts including a medical doctor specialized in CLBP; an expert nurse lecturer in CLBP and one nurse experienced in patients with CLBP.

Data collection and analysis: Initially, the nurses who had training on inclusion and exclusion criteria of participants and dealing with CLBP patients in the hospital helped the researcher to identify the potential participants. Next, the researcher introduced herself, explained about

the study, asked patients for their willingness to participate, and a consent form was signed. The researcher introduced research instruments to the participants in detail and informed them that it may take about 40 minutes to complete all the questions. Finally, the questionnaire was distributed to participants and requested to drop them upon completion into a collection box. In case of pain and discomfort during the data collection, nurses were contacted to take care of them and the process was continued later upon participant's availability and comfortness. Data were processed using Statistics Package for Social Sciences (SPSS) version 23.0 and analyzed by descriptive statistics including frequency, percentage, range, mean, and standard deviation (SD). Pearson's correlation was applied to measure the correlation between FAB, IP, and disability. The normal distribution of data was checked by histogram and Q-Q plot. A p-value of <0.05 was considered statistically significant.

Results

Socio-demographic data: The socio-demographic characteristics of the participants is shown in Table 1. The mean age of participants was 56.6 ±14.9 years, ranged from 25 to 90 years. The majority of participants (65.9%) were female, married (94.1%), educated up to medium level (43.5 %). Regarding the activity during work, 48.2% of the participants were involved in physical activity such as bending, lifting, walking, and driving; whereas 31.8% were involved in long-standing or long sitting activities.

Table 1 Description of the socio-demographic data among participants (N=85)

Characteristics	Frequency	%
Age Mean ± SD = 56.6 ± 14.9 Min: 25; Max: 90		
< 45 years old	19	22.4
45 – 60 years old	30	35.3
> 60 years old	36	42.4
Gender		
Male	29	34.1
Female	56	65.9
Marital status		
Single	4	4.7
Divorced	1	1.2
Married	80	94.1
Educational level		
Low Educational level	14	16.5
Medium Educational level	37	43.5
High Educational level	34	40
Work status		
The work requires physical activity such as bending, lifting, walking, driving	41	48.2
The work requires long standing or long sitting	28	31.8
The work does not require the two above factors	17	20

FAB, IP, and disability levels: The score of FABpa was 16.7±5.5 (mean ± SD) with the range of 3 to 24 and that of FABw was 30.2 ±8.4, ranging from 8 to 42. The prevalence of CLBP patients was in the high level as indicated by FABpa and FABw percentages of 69.4 and 37.3, respectively. The detailed findings on the "identity" dimension of IP among participants are shown in Table 2. The percentage of participants who recognized symptom "dull or achy pain at the low back and pain that worsens after prolonged sitting or standing" was the highest (88.2%). Furthermore, strongest held belief was for the Timeline Acute/chronic dimension with mean ±SD score of 3.9±0.9, followed by Consequences (3.6 ±0.9), Illness Coherence (3.4 ± 1.0), Treatment control (3.3 ± 0.6), Personal Control (2.9 ± 0.6), Timeline Cyclical (2.8 ± 0.6) and Emotional Representation (2.7 ± 1.2) was the lowest. Regarding the perception on the cause of CLBP, Risk Factor category scored the highest value 3.6 ± 0.5 (mean ± SD), followed by Psychological Attributions 2.3 ± 0.7 and Immunity (1.4 ± 0.6), the lowest. The mean ± SD for disability was 47.8 ± 17.6. Severe disability was prevalent in 37.6%, moderate disability in 30.6%, crippled were 20%, minimal disability in 7.1%, and bed-bound disability in 4.7% of the participants.

Table 2 Description of the "identity" dimension among participants (N=85)

Identity	Frequency	%
Dull or achy Pain at the low back	75	88.2
Stinging, burning pain that radiate to other parts	47	55.3
Pain that include numbness or tingling	37	43.5
Sleep difficulties	60	70.6
Muscle spasms and tightness in the low back, pelvis, and hips	37	43.5
Stiff joints	40	47.1
Pain that worsens after prolonged sitting or standing	75	88.2
Loss of strength, difficulty standing up straight, walking, or going from standing to sitting	49	57.6

Analysis of association between FAB, IP and disability: We found a significant positive correlation between disability and FAB total (r=0.488, p<0.01), FABpa (r=0.468, p<0.01), FABw (r=0.405, p<0.01) as well as IP in Timeline Acute/chronic (r=0.378, p<0.01); Consequences (r=0.495, p<0.01) and Emotional Representations (r=0.418, p<0.01). Moreover, Consequences was positively associated with FAB total (r=0.414, p<0.01), FABpa (r=0.304, p<0.01) and FABw (r=0.403; p<0.01). Similar association was observed between Emotional Representation, and FAB total (r=0.451; p<0.01), FABpa (r=0.449, p<0.01), FABw (r=0.364, p<0.01) (Table 3)

Table 3 The relationship among IP; FAB and disability in the study (N=85)

Categories	II.1	II.2	II.3	II.4	II.5	II.6	II.7	FAB Total	FABpa	FABw
II.1										
II.2	0.033									
II.3	0.495**	0.008								
II.4	0.173	0.166	0.183							
II.5	-0.056	0.114	-0.058	0.338**						
II.6	0.208	-0.050	-0.088	-0.023	-0.062					
II.7	0.318**	0.000	0.504**	0.074	-0.065	-0.118				
FAB Total	0.293**	0.062	0.414**	0.047	-0.003	-0.068	0.451**			
FABpa	0.207	0.075	0.304**	0.014	0.055	-0.089	0.449**	0.812**		
FABw	0.291**	0.041	0.403**	0.060	-0.040	-0.040	0.364**	0.925**	0.529**	
MODQ	0.378**	0.194	0.495**	-0.050	-0.190	-0.212	0.418**	0.488**	0.468**	0.405**

*Dimension of IPQ: II.1: Timeline acute/chronic; II.2: Timeline cyclical; II.3: Consequences, II.4: Personal control; II.5: Treatment control; II.6: Illness Coherence; II.7: Emotional representations; ** P<0.01; *P<0.05*

Discussion

The current study was aimed to find out the level of IP, FAB, disability, and their relationship among patients wwith CLBP in Viet Nam, as there was no existing data available. In the study, we modified some of the available research instruments reported previously. It was revealed that severe level of disability exists in the majority of the patients. Furthermore, disability was positively associated with IP and FAB. Our socio-demographic data showed that CLBP was most prevalent in women aged above 60 years. It may be due to the age factor and nature of the daily activities/work of women. A published report has mentioned that Vietnamese women are engaged mostly in agricultural works or unskilled job.[21] In our study, the prevalence of CLBP among participants with high level of education was 40%. This may be linked to the nature of office work. It has been mentioned that the predominant sitting posture during work is a risk factor for LBP.[22,23] Evidence suggests that prolonged sitting may lead to lumbar stiffness and performing full lumbar flexion movements after extended periods of sitting may increase the risk of low back injury.[24]

FAB was an important psychological factor discovered to impact disability in our participants. FAB total score in the study including that of FABpa was higher than some reported research.[25-27] It has been mentioned earlier that high physical activity at work is associated with higher levels of FAB.[28] This explains our finding as 48.2% of participants were involved in the work requiring physical activity such as bending, lifting, walking, and driving. Moreover, there are other factors that may impact FAB level in LBP such as level of education, maximal pain, and current pain.[29] It is important to mention here that only 40% of our participants had high level of education.

The symptom such as "Dull or achy pain at the low back" and "Pain that worsens after prolonged sitting or standing" by majority of participants assures that they were suffering from CLBP.

According to Moss-Morris et al., (2002), beliefs about the seriousness of the illness are strongly related to chronic timeline beliefs.[18] Moreover, it was found that our participants considered their condition to be chronic, leading to moderate to high belief in the consequences. CLBP has a negative effect on patient's life through daily activities, family, work, and quality of life reduction.[30] In fact, pain makes the patient difficult in daily activities and may impact professional activities and reduce social contact leading to reduced self-efficacy and increased depression.[31] As more than half of the participants (57.7%) were of the working age group in the current study, it might have resulted in strong belief in the Consequences domain. Importantly, participants showed a moderate to high belief score in treatment. A mild to moderate belief score of participants in personal control indicates that they were unable to control their condition by themselves, and preferred to visit the hospital for treatment. It has been stated that beliefs about the treatment control and personal control of the illness were negatively associated with chronic timeline beliefs and seriousness.[18] The score in the Illness coherence dimension revealed that the ability of CLBP patients in understanding their illness was moderate to high despite 60% having low to medium education status. They believe that their disease is in relatively stable condition and showed low to mild negative emotions as measured on the emotional perception subscale.

Regarding the participants' belief for the cause of their condition, the highest belief was for Risk Factor category that included aging, poor medical care in my past, smoking, alcohol, accident or injury, physical activities, sitting in the same posture for a long period of time, poor posture, spinal disease, poor posture while lifting heavy objects, poor working conditions, sleeping on a bad mattress. It clearly indicates that the participants were aware of the causative factors for their condition, which could be beneficial for precautionary measures and management of CLBP. The belief in other groupings such as Immunity and Psychological Attributions was low, similar to the findings in the previous study.[10] However, the prevalence of severe disability in the current study was different than the reports from other countries.[31-33] This could be due to the socio-demography and healthcare system of a country/region.

We found a positive correlation between disability and total FAB including FABpa and FABw. Corroborating to our findings pain-related fear showed an association with disability in different studies that assessed CLBP patients.[31,34] This has been explained by van Wilgen et al., 2013, mentioning that the fear of movement is a risk factor leading to inactivity, psychosocial dysfunction and CLBP, and thus, related to disability.[10] FAB is therefore crucial in the management of pain and disability caused by LBP.[16] A study on women with CLBP has also published positive association between disability, and both FABpa and FABw.[35] However, Guclu et al., (2012) revealed no significant relationship between disability and FABpa ($p>0.05$), but a weak-moderate positive relation with FABw and FAB total in CLBP patients.[26]

IP has been reported to associate significantly with work disability in the chronically ill patients.[36] It has been explained that patients

who presumed their back problems to last a long time, perceived serious consequences, and held weak beliefs in the controllability of their back problems are more likely to have poor clinical outcomes.[11] Accordingly, our research finds a positive correlation between disability and dimension of illness perception such as Timeline acute/chronic; Consequences and Emotional Representations, FAB and IP, FAB, and Emotional representation. Perception about serious consequences and more negative emotional representation are associated with more imitated activities.[37] However, the relationship between negative perception and disability has not been reported in LBP previously. There are some limitations in this study. First, a cross-sectional designed study limits the observation of change over time and cannot be applied to predict the causal relationship. The other limitation was a single setting for data collection and it might be the generalizability to other settings in Viet Nam. Finally, our sampling time coincided with the outbreak of COVID 19 and therefore, only patients who had serious problems were allowed to visit the hospital. This may have affected the level of FAB, IP, and disability. Finally, the data were collected through a self-report questionnaire, which may not have to reflect the real findings.

Conclusions

The majority of the patients with CLBP had high level of FAB and, strong belief in Timeline Acute/chronic and Consequences of illness. There were positive correlations between FAB total, FABpa, FABw, Time Acute/chronic, Consequences, Emotional representations, and Disability. To our knowledge, this is the first study on Viet Nam's people with CLBP. It is recommended that healthcare practitioners should focus on FAB and IP, especially in CLBP patients with high disability. The healthcare practitioners should use FABQ, IPQ-R as a useful screening tool in identifying high-risk patients to tailor interventions, long-term monitoring, or promoting health in CLBP patients with high disability.

Implications

The positive correlations between FAB total, FABpa, FABw, Time Acute/chronic, Consequences, Emotional representations, and Disability was demonstrated in this study. The current findings can be beneficial to the healthcare practitioners in Viet Nam for enhanced treatment of CLBP patients. Moreover, further intervention research can be applied to our findings for enhanced patients care.

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