RELIABILITY AND DOMINANT FACTORS OF THE INDONESIAN VERSION OF SOCIAL PARTICIPATION IN NON-MYOGENIC LOW BACK PAIN PATIENTS

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Abstract

Introduction: Low back pain (LBP) reflects pain between the lower edge of the ribs and the buttocks. LBP can affect mental well-being, quality of life, and work activities. Therefore, this study aimed to determine the reliability, validity and dominant factors of social participation in patients with non-myogenic LBP using the PSSS scale. **Method:** This research used an observational study with a cross-sectional and predictive approach. Used purposive sampling data collection techniques, the total sample was 55 respondents. **Results:** The reliability of the PSSS scale in non-myogenic LBP patients with a Cronbach alpha value = 0.982 (excellent), the ICC value shows >0.9 (very high agreement) for all items. Construct validity was <0.05 (valid) and >0.40 for all items, except item number 13 (r=0.277 or poor validity). Multiple linear regression showed no significant association between pain and range of motion to social participation (p>0.05). **Conclusion:** The PSSS questionnaire is reliable regarding intra-rater as a tool for measuring social participation in non-myogenic LBP patients. Pain and range of motion did not associate with social participation in patients with non-myogenic LBP.

Keywords: reliability, validity, pain, range of motion, social participation, non-myogenic LBP

Introduction

Low back pain (LBP) reflects pain between the lower edge of the rib cage and the buttock crease. Low back pain can affect mental well-being, quality of life and work activities (1) Low back pain is divided into two, namely non-myogenic LBP and myogenic LBP. Non-myogenic LBP is pain caused by certain diseases or structural problems in the spine or when pain radiates from other parts of the body. Myogenic LBP occurs when the specific disease or structural problem that explains the pain cannot be identified. About 90% of patient cases are myogenic LBP and 10% are diagnosed with non-myogenic LBP. 619 million individuals worldwide have been diagnosed with LBP, which is the primary cause of disability. LBP is frequently linked to lower work productivity, which costs both individuals and society a great deal of money (2). Pain during activity is the main problem with this disease. Pain caused by calcification of the spine or erosion of the lumbar intervertebral discs, which makes the nerves pinched, causes chronic back pain and tingling according to (3).

Disability due to LBP pain increases by 54% with age and is the leading cause of disability worldwide (4) According to Ashby (2012) that LBP can result in limited activity and social participation, due to limitations when performing activities such as running and bending, standing, sitting as well as sports activities and activities in the family and community. LBP patients are uncomfortable when sitting because it causes numbness and tingling in the legs. The pain also affects sleep quality due to discomfort or pain in the back (5) The World Health Organization (WHO) considers participation to be important for human life and as a parameter of human quality of life. Participation is a person's involvement in a life situation whether in group, family or community life. Participation limitation is the difficulty to participate in life situations, and this concept is often considered as an important indicator in assessing the effectiveness of rehabilitation programs in people with disabilities (6) One of the tools for measuring participation is the participation scale (P-Scale) developed by Van Brakel (2006), and is a popular tool for measuring (social) participation for use in rehabilitation, stigma reduction, and social integration programs. This scale has been adapted to the International Classification of Functional (ICF) framework. Nowadays, the Participation Scale Short Simplified (PSSS) with 13 items is developed. The PSSS has undergone a cross-cultural adaptation process by Komalasari in 2020 in patients with type 2 diabetes mellitus and with vestibular disorders in Indonesia to become PSSS-Ina (Indonesian version of PSSS). The results of the study stated very high reliability with Cronbach's alpha 0.84 and Intraclass Correlation 0.93 (7)

The social participation questionnaire has never been tested for reliability in non-myogenic LBP patients. LBP patients are likely to experience a decrease in social participation function due to pain and limited movement in their lower back. In a systematic review study reported from 99 articles only reported the relationship between work activities and precipitating factors (pain, limitation of movement and others), but did not analyze the causal relationship (8) So, this study aimed to

determine the reliability and validity of the Social Participation scale in non-myogenic LBP patients and the dominant factors (between pain and movement limitations) that affect the social participation of non-myogenic LBP patients.

Methods

a. Study Design

This study was conducted based on a research permit and was approved by the ethics commission of Dr. Moewardi Hospital with number 209 / I / HREC / 2024. This study used observational study type of research using cross-sectional and predictive studies. This method was used to evaluate the reliability of the measuring instrument of the research conducted. The study was conducted at Pandan Arang Boyolali Hospital, Central Java from February to March 2024. The population taken in this study were all non-myogenic Low Back Pain patients at Pandan Arang Boyolali Hospital. Patients were briefly explained about the use of the PSSS questionnaire and pain measurement using a numeric rating scale (NRS) in expressing the pain value experienced by respondents.

b. Numeric Rating Scale (NRS)

Numeric Rating Scale (NRS) is used to measure the level of pain when the patient performs trunk flexion and extension movements. The NRS value taken is the dominant pain. NRS is the most commonly used tool for measuring pain. Patients who are above 9 years of age can use this pain scale. They can rate their pain intensity at the start of treatment or periodically after treatment. Patients are asked to give a score of 0-10 or 0-5 when measuring this pain scale. The more numbers selected, the more severe the pain felt (9) The limitation of joint motion in the thoracolumbar region is measured by trunk flexion and extension using the midline (mita line). For trunk flexion LGS measured from cervical distance 7 - sacrum 1 in a normal (anatomical) sitting or standing position. Usually, the difference between the normal and flexion or extension positions is about 4 - 8 cm (10).

c. Questionnaire PSSS

The PSSS Questionnaire instrument consisted of 13 items If the participant answered no or sometimes, the follow-up question asked to specify the problem area as 0: irrelevant, 1: no problem, 2: small, 3: medium, or 5: large. The scores were summed to get the total participation rate. The total score is 65 with recommended interpretations of insignificant restriction (0-6), mild restriction (7-13), moderate restriction (14-30), severe restriction (31-50), and extreme restriction (51-65) (7). Respondents were educated before taking measurements on how to systematically use the tool, in this pain measurement the researcher used NRS numbers (0-10) if the higher the pain, and the PSSS questionnaire that had been translated into the

previous language. Before the interview, the patient was asked to move the flexion and extension that had been disassembled, and the researcher was replaced by the physiotherapist in turn, then the patient was asked to mention the NRS value as described according to the pain felt when doing flexion and extension movements. Initial sampling was carried out by pre-screening through a sample assessment process that had been made and adjusted to the inclusion criteria and exclusion criteria.

d. Criteria Respondents

The researcher has set inclusion and exclusion criteria for the classification of samples needed, as follows: Inclusion criteria; a) Age ranges from 40 to 75 years; b) Diagnosed with HNP, spondylitis, Spondylosis, Spondylolisthesis; c) Diagnosis confirmed by x-ray or MRI; d) Pain in the L4-S1 area with a value of more than 3 using the NRS scale; e) Feeling pain when moving (flexion and extension); f) Chronic back pain for more than three months; g) and male and female. For exclusion criteria; a) Receiving corticosteroid injections at least 24-48 hours after administration; b) patients who take corticoid drugs at least 5-6 hours after administration; c) patients who experience neurological disease (stroke, Parkinson's, cerebral ataxia); d) patients who experience abnormalities in the spine (tumours and bone tuberculosis); e) no other musculoskeletal diseases; f) postoperative; g) and patients who cannot communicate well.

e. Outcome Measurement

This research was conducted based on previous studies and field conditions that required further investigation. The results are presented in tabular form to summarize the findings and facilitate understanding for the readers. Data analysis in this study used univariate test analysis and bivariate test. The univariate test displays the characteristics of respondents in the form of minimum, maximum, frequency (n), mean and standard deviation values. Bivariate tests include reliability and validity tests of the PSSS questionnaire and prediction tests using multiple linear regression tests. The reliability test uses (1) Cronbach Alpha, used to determine the internal consistency of a test and measurement, said to be reliable if it has Cronbach Alpha, with an α value <0.5 (not reliable), 0.5-0.6 (low reliability), 0.6-0.7 (medium reliability), 0.7-0.9 (high reliability), >0.9 (high/excellent reliability). (2) Intra Class Correlation (ICC), to determine the reliability (agreement) between 2 or more raters (observers). ICC values are as follows <0.5 (poor), 0.5-0.75 (medium), 0.75-0.9 (high), 0.9-1 (excellent) (11) The validity test uses the Pearson Product Moment test between the total value of the questionnaire and the value of each question item. It is said to be valid if $p<0.05$ and correlation coefficient ($r>0.40$) (12) Before conducting multiple regression tests, regression normality tests and multicollinearity tests were carried out, where the results of these tests stated that the data were normally distributed ($p>0.05$) and there was no multicollinearity ($p<0.05$). The Multiple Linear Regression test is used to determine the effect of pain and movement limitations on social

participation in non-myogenic LBP patients with a p-value of <0.05, meaning that it has an effect and >0.05, meaning it has no effect. The confidence interval value used is 95%.

Results

Table 1 shows that the average respondent is 62 years old, with 28 female and 27 male respondents, female and male respondents are almost balanced. Non-working status is higher than working status. The cause of the LBP condition was dominated by HNP (98.2%) with an average pain scale of 5.4. The difference in LGS in respondents averaged 6.4 cm and the PSSS questionnaire obtained an average of 27.98.

Table 1. Data characteristics of non-myogenic lbp patients

Variables	Min	Max	Mean±SD	N%
Age of Respondent	45	75	62.02±7.049	
Gender				
Female				28 (50.9%)
Male				27 (49.1%)
Jobs				
Work			25 (45,5%)	
Not Working			30 (54,5%)	
Medical Diagnosis				
HNP			54 (98.2%)	
Spondylolisthesis				1 (1.8%)
LGS	2	9	6.44±1.989	
NRS	3	9	5.40±1.461	
PSSS Questionnaire	6	52	27.98±11.464	

Table 2. Reliability and validity of PSSS questionnaire items

Question item	*Cronbach alpha*	p-value	*Correlation coefficient*
1	0,905	<0,001	0,747
2	0,901	<0,001	0,759
3	0,906	<0,001	0,683
4	0,904	<0,001	0,706
5	0,906	<0,001	0,680
6	0,907	<0,001	0,681

7	0,913	<0,001	0,518
8	0,904	<0,001	0,718
9	0,906	<0,001	0,666
10	0,903	<0,001	0,722
11	0,903	<0,001	0,773
12	0,916	<0,001	0,410
13	0,918	<0,001	0,277*

correlation coefficient <0.3 (invalid)

Table 2 shows that each item in the PSSS questionnaire is reliable and valid with Cronbach alpha >0.9 and correlation coefficient (r>0.40). However, item 13 showed very low validity with a value of r<0.40.

Table 3. Internal consistency of the PSSS questionnaire in patients with non- myogenic LBP

Test Type	Cronbach'Alpha	ICC	95% CI	Correlation
Intra Rater	0,982	0,982	0,969-0,989	<0,001

The reliability of the PSSS scale in non-myogenic LBP patients with a Cronbach alpha value ($\alpha = 0.982$) means excellent, the ICC value shows> 0.9 which means it has a very high relationship between test 1 and test 1 by the same rater.

Table 4. Multiple Regression Linear Test Terms

Variables	Value	Description
Normality Test	0,200	Normal distribution
Durbin Watson (heterogeneity)	1,703	No heterogeneity
Collinearity (multicollinearity)	1,011	No multicollinearity

Table 4 shows the prerequisite test of multiple linear regression test with data normality, durbin watson, and Colliniarity tests. The results show that the three conditions are met and the multiple linear regression test can be continued.

Table 5. Linear Regression Test of Dominant Factors of PSSS in Non-Myogenic LBP Patients

Variables	p-value	R	95% CI
Pain (NRS)	0,355	0,996	-1,148-3,140
LGS	0,236	-0,941	-2,516-0,633

Table 5 shows that pain and LGS do not affect social participation in non-myogenic LBP patients because each variable shows a p-value> 0.05.

Discussion

The results of the study at Pandan Arang Hospital with 55 respondents had characteristics with an

average age of 60 years, 45 years of minimum age and 75 years of maximum age on the criteria. Lee (2018) stipulates that the elderly are a group of individuals over the age of 60. In addition, the age limit of the elderly can also be divided into three main groups, namely: Elderly: 60-74 years old. Old age: 75-90 years old. Very old: above 90 years old. The elderly are an age group that is vulnerable to health problems. The reason is, that as we age, humans will experience physical and psychological changes that can affect the health of the body. People who have previously experienced LBP have an increased risk of LBP recurrence (13)). LBP is often associated with decreased work productivity, which poses a significant economic burden to individuals and society. Pain during activity is the main problem in this disease. Pain caused by calcification of the spine or erosion of the lumbar intervertebral discs makes the nerves pinched, causing chronic back pain and tingling (3) The gender population is not one of the different characteristics because there are 28 female respondents and 27 male respondents, the majority of 54 (98.2%) have HNP and only 1 (1.8%) have spondylolisthesis. In the measurement of lumbar flexion and extension ROM, a difference of 6.44cm was obtained, which means the majority is normal. Pain measured using NRS is an average of 5.4 which means moderate pain. Disability due to LBP pain increases by 54% with age and is the leading cause of disability worldwide (4) A total of 30 respondents (54.5%) of respondents did not work and 25 respondents (45.5%) worked, because the pain and limitations due to non-myogenic LBP experienced affected daily activities. The results of the PSSS questionnaire obtained an average of 27.98 which means moderate restrictions on social participation. The total score is 65 with the recommended interpretation of insignificant restrictions (0-6), mild restrictions (7-13), moderate restrictions (14-30), severe restrictions (31-50), and extreme restrictions (51-65) (7) Each question item and the PSSS questionnaire as a whole were declared reliable (tables 2 and 3), with Cronbach Alpha >0.9. This result follows previous research conducted by Komalasari et al (2022) but with the object of type 2 diabetes mellitus patients with vestibular disorders (7) The validity test shows that item 13 shows a correlation coefficient of less than 0.3, which means that the item is invalid. Item 13 describes the patient's comfort when meeting new people. The elderly may feel anxious when meeting new people for various reasons such as uncertainty, social anxiety, and environmental changes. They may not be sure how to interact with new people, including the topic of conversation or the prevailing social norms. This can make them feel uncomfortable and worried about making mistakes. In addition, older adults may also feel less confident in new social situations and worry about how others will judge them. Changes in environment, such as moving to a new place or attending an event in an unfamiliar location, can also increase discomfort. All of these things can cause stress and tension, which ultimately reduces the comfort and confidence of the elderly in interacting with new people (13) Intra rater is one of the reliability measurements of the social participation scale which is repeated by one rater or examiner in non-myogenic LBP patients using the social participation scale (PSSS). This scale is very easy to use and requires a time interval of

about 10 minutes. If doing test-retest reliability, the time needed is about 15-30 minutes between the first and second measurements to see the constant value of the measuring instrument (14). The results of this study on the intra-rater reliability test of the PSSS in non-myogenic LBP patients have very high reliability with a Cronbach's alpha value of 0.982 (15) In addition to the Cronbach's alpha value, the resulting ICC value is 0.982 which means excellent (Koo & Li, 2016). With these results, the PSSS is reliable on Cronbach's alpha in line with previous research, resulting in consistency reliability with a Cronbach's alpha value of 0.94, which means very high reliability (16) The multiple linear regression test showed that the variables of pain and movement limitations did not affect social participation in non-myogenic LBP patients in this study. It is possible that pain and movement limitations are not the main factors that prevent the elderly from limiting themselves in their social life. Although previous literature states that pain is the main factor in reducing mobility for people with LBP. In addition, the social culture in Indonesia is very high so pain is suppressed so that the elderly can still participate in community activities. Social participation is very important for elderly individuals as it plays an important role in maintaining their overall well-being and quality of life. Engaging in social activities can provide opportunities for the elderly to have meaningful interactions, foster relationships with others and reduce feelings of loneliness and isolation. These social interactions can contribute to their mental and emotional health by providing companionship, emotional support and a sense of belonging (17) Furthermore, staying socially active is associated with cognitive benefits, such as improved memory and cognitive function, helping to keep the mind sharp as we age. Furthermore, participating in social activities often promotes physical activity and mobility, which are important for maintaining physical health and independence in old age (18)). Overall, social participation increases the sense of purpose and fulfilment in older individuals, contributing to their overall happiness and well-being as they move through the later stages of life.

Conclusion

From the research results on the reliability of the social participation questionnaire (PSSS) in non-myogenic LBP patients at Pandan Arang Boyolali Hospital, it can be concluded that the PSSS Questionnaire is reliable and valid in measuring the level of social participation.

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