VALIDITY AND RELIABILITY OF THE VERBAL DESCRIPTIVE SCALE IN NON-MYOGENIC LOW BACK PAIN PATIENTS

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Abstract

Introduction: Pain is the most common problem in patients with low back pain (LBP) non-myogenic. There are many tools to measure pain, one of which is the Verbal Descriptive Scale (VDS). It needs validity and reliability to evaluate pain in patients with non-myogenic LBP. Therefore, this study aimed to determine the validity and reliability of VDS to evaluate pain in patients with non-myogenic LBP. **Method:** This research was an observational study method with a methodological research approach and a purposive sampling technique. The total sample was 55 people. **Results:** The validity of VDS showed well with $p<0.001$ and r calculated was higher than 0.9. Intra-rater and inter-rater reliability of VDS revealed excellent with Cronbach Alpha and Intra Class Correlation were more than 0.9 and $p<0.05$. While the SEM=0.068 and MDC=0.188. **Conclusion:** The VDS was valid and reliable for measuring pain in patients with non-myogenic low back pain

Keywords: Reliability, Validity, Low Back Pain Non Myogenic, Verbal Descriptive Scale

Introduction

Low back pain (LBP) is a common problem experienced by around 50-80% of adults in their lives. According to WHO (2022), there are 1.71 billion musculoskeletal disorders worldwide, and LBP is the third most common health problem in the world, with the number of sufferers reaching 17.3 million people in 2022. According to Jalaluddin (2008) in (1) The prevalence of LBP during life in adults is 70% and the prevalence within 1 year is around 15-45%, with peak prevalence occurring in the age range between 35 and 55 years. According to Kumbea (2021) in (2). The prevalence of people suffering from LBP in Indonesia is 18%, which tends to increase with increasing age. LBP is a sign that can be caused by various disorders, which can originate from conditions that have been recognized or that have not been diagnosed. Symptoms include pain in the lower back area, namely between the ribs and the lower buttock crease (3). Often, this pain is accompanied by discomfort in one or both legs and is associated with neurological symptoms in the lower limbs. This condition often has comorbidities with other problems, such as psychological, social and biophysical aspects, which can influence the pain propagation process and the individual's pain experience (4).

There are 2 types of problems with LBP, namely myogenic LBP and non-myogenic LBP. Myogenic LBP occurs due to tension in the back, tendons and ligaments which often feels uncomfortable after too much activity, for example carrying heavy objects in an incorrect position and for too long in an ergonomic position and without neurological disorders (5). Meanwhile, non-myogenic LBP can be interpreted as specific LBP. Specific LBP can be described as a clinical symptom that appears as a result of a disease with a pathological cause, such as a hernia of the nucleus pulposus (HNP), infection, arthritis, fracture, or tumour (6).

The most important problem with LBP is pain because if the pain cannot be overcome it will be very disturbing and hinder the sufferer's physical activity. According to Patrianingrum et al (2015) in (7). Even though the pain experienced by LBP patients is not fatal and causes death, the impact is that individuals experiencing pain lose productivity, which in turn will cause a significant economic burden for individuals, families, society and the government.

A measuring instrument must meet the requirements of reliability and validity. In the context of research, reliability refers to the degree of consistency maintained by the measurements of a test when repeated on the same subjects and in similar situations (8). The Verbal Descriptive Scale (VDS) is one of the instruments that can be used to evaluate pain, especially in non-myogenic LBP patients, so the VDS must meet the criteria as a reliable and valid instrument. According to Chun-hua VDS obtained ICC results on test-retest reliability for elderly patients with LBP of 0.543, which means moderate reliability. However, in Indonesia, there has been no research regarding the reliability of VDS in non-myogenic LBP patients. Therefore, this study aims to determine the reliability and

validity of the Verbal Descriptive Scale measuring instrument in terms of intra-rater and inter-rater for non-myogenic LBP patients.

Methods

This research was carried out based on a research permit and was approved by the Research Ethics Committee of RSUD Dr Moewardi and received a letter of ethical suitability number 112/I/HREC/2024. The type of research used was an observational study with a methodological research approach to determine the reliability of the Verbal Descriptive Scale in non-myogenic LBP patients. This research was conducted at Pandan Arang Boyolali Hospital from February to March 2024. Sampling was carried out using non-probability sampling, namely purposive sampling and looking at inclusion and exclusion criteria. The inclusion criteria are as follows (1) age 40-75 years, (2) male and female gender, (3) low back pain with moderate or greater pain during lumbar flexion and extension, (4) patient suffering from low back pain > 3 months or chronic. Meanwhile, the exclusion criteria are as follows (1) unable to communicate well, (2) patients suffering from neurological diseases (stroke, Parkinson's, cerebral ataxia, coordination disorders), (3) post-surgery, (4) patients suffering from spinal disorders such as tumours and infection (spinal TB), (5)receive corticosteroid injections at least 24-48 hours after administration, (6) patients take corticosteroid medications at least 5-6 hours after taking, (7) do not suffer from complaints of other musculoskeletal diseases. The sample size calculation is based on the formula from Arifin in 2023 using the minimum acceptable formula of 0.6. Acceptable reality 0.8, significance level 0.05, power 80%. Drop out is 10% so there is a sample size of 55 (9). The instruments in this research are the Verbal Descriptive Scale, paper, pen, and informed consent.

Reliability in this study will use intra-rater reliability and inter-rater reliability VDS tests in non-myogenic LBP patients. This test will be carried out as follows (1) Intra-rater: repeated measurement of pain in lumbar flexion and extension movements in non-myogenic LBP patients using the VDS scale by 1 rater with a time interval of 15 minutes between the first and second measurements. Patients were asked to describe the pain during lumbar flexion and extension as "no pain," "mild pain," "moderate pain," "severe pain," or "very severe pain."*(2)Inter-rater*: measurement of pain in lumbar flexion and extension movements in non-myogenic LBP patients using the VDS scale carried out by 2 raters (examiners) simultaneously. Patients were also asked to describe pain during lumbar flexion and extension. This inter-rater test was carried out and supervised by physiotherapists at Pandan Arang Boyolali Hospital. Meanwhile, the validity carried out in the research was calculating the value of the intra-rater and inter-rater VDS validity. The research flow is explained in Figure

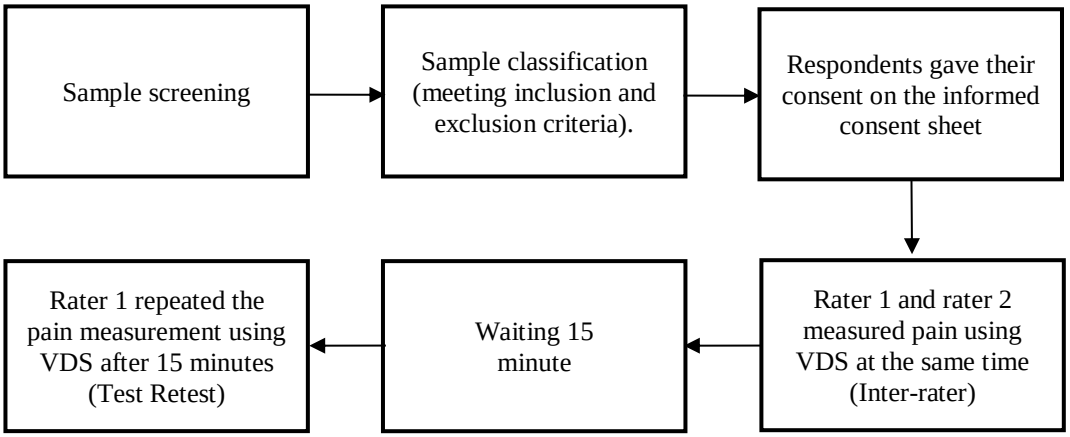

Figure 1. Flow of sample screening and implementation

The data analysis technique used in this research is (1) univariate test, namely using the application of descriptive statistical methods to illustrate the characteristics of each variable. These parameters consist of the middle value (mean, median, mode) as well as distribution values such as variance, standard deviation and range (10). (2) reliability testing consists of intra-rater and inter-rater who present data in the form of Cronbach Alpha, which is used to determine the consistency of repeated testing and measurements. The interpretation of Cronbach alpha is as follows (11)<0.5 unacceptable 0.5-<0.6 poor, 0.6 ≤ - <0.7 doubtful, 0.7 ≤ - <0.8 acceptable, 0.8 ≤ - <0.9: good, ≥ 0.9 very good. Intra Class Correlation (ICC) is used to see the relationship between 2 or more raters with an interpretation of <0.5 low reliability, 0.5-0.75 medium reliability, 0.75-0.9 high reliability and > 0.9 very high reliability (12). The validity test uses the Pearson Product Moment test. In this study, we looked at the validity of the VDS scale factors. It is said to be valid if the Pearson Product Moment test has p<0.05 and *r*-value> r-table. Where r-table = 0.260 with a sample size of 55 people (13).

Results

Table 1. Data characteristics of non-myogenic LBP patients

Variable	Min	Max	Mean±SD	N%
Age (years)	45	75	62.02±7.04	
Gender				
Woman				28 (50.9%)
Man				27 (49.1%)
Work				
Work				25 (45.5%)
Doesn't work				30 (54.5 %)
Diagnosis				
HNP				54 (98.2%)
Spondylolisthesis				1 (1.8%)
Pain Scale (VDS)	2	4	2.24±0.50	

Table 1 shows that the average respondent is 62 years old, with 28 female respondents and 27 male respondents, almost equal female and male respondents. Non-working status is higher than working status. The cause of LBP is dominated by HNP (98.2%) with an average VDS pain scale of 2.24.

Non-myogenic LBP has the characteristic that there is radicular Myers, or the presence of Specific examinations was positive for Straight Leg Raise (SLR), bragard and neri or there is supporting examination using MRI, x-ray, with results of spinal abnormalities such as HNP, Spondylosis, Spondylolisthesis, and Spondylitis.

Table 2. Intra-rater & inter-rater reliability test results

Test Variable	*Cronbach's Alpha*	ICC	95%CI	*p-value*	*r*-value
Intra rater (T1-T2, with interval 15 mins)	0.963	0.963	0.936-0.978	<0.001	
Inter rater (R1 & R2)	0.982	0.982	0.969-0.989	<0.001	
Intra Rater Validity				<0.001	0.928
Inter-Rater Validity				<0.001	0.964

Table 2 shows that the intra-rater reliability and inter-rater reliability tests are significant ($p<0.05$) with excellent reliability with Cronbach Alpha values above 0.9 and ICC above 0.9. The Pearson Product Moment test shows $p<0.001$ for intra-rater and inter-rater and the calculated r-value is above 0.9 (greater than r-table), while the r table value for the sample of 55 is 0.260. This shows that the VDS is a valid scale for measuring pain in non-myogenic LBP patients.

Table 3. SEM and MDC_{95} values

	Nilai
SEM	0.068
MDC_{95}	0.188

VDS obtained SEM results of 0.068, which means the error rate is small and has very good reliability.VDS gets MDC_{95} 0.188, which means it has a very small rate of change.

Discussion

The characteristics of respondents are mostly 60 years old with a minimum age of 45 years and a maximum of 75 years. According to Yelmaiza M (2021) in (14) age plays a significant role in the incidence of non-myogenic low back pain, especially HNP, namely in the age range 47 to 67 years. This occurs due to spinal degeneration caused by changes in the shape or structure of the bones. Bone changes result in changes in the structure of the vertebrae and they become stiffer and the density of the nucleus pulposus decreases (15). The gender was 27 (49.1%) men and 28 (50.9%) women. Gender differences can have an impact on the risk of musculoskeletal complaints caused by physiological differences in women's muscle abilities which tend to be lower than men's (16). Apart from that, women also experience menopause which has an impact on decreasing bone density (14). In terms of employment, more respondents did not work, namely 30 (54.5%) and 25 (45.5%) who worked. Heavy work can increase the risk of non-myogenic LBP. However according to(14)there was no significant correlation between work and the incidence of non-myogenic LBP. Another factor is a person's attitude when sitting or standing, an uncomfortable body position can also increase the risk of complaints (14). Judging from the respondents' diagnoses, 54 (98.2%) had HNP and 1 (1.8%) had spondylolisthesis. According to Martin et al (2007) in (17) HNP is among the most common health problems causing LBP and is often the main reason for spinal surgery worldwide.

The VDS pain scale felt by respondents was a minimum of 2 (moderate pain) and a maximum of 4 (severe pain) with an average of 2.24 with the interpretation of moderate pain. There was no difference in the pain felt by respondents with diagnoses of HNP and spondylolisthesis. Pain felt in the L4-S1 area (18).

Characteristics of non-myogenic LBP include radicular pain. Radicular pain in HNP refers to pain that radiates from the lower back to the back of the thigh and then the buttocks to the feet (18). Meanwhile, spondylolisthesis is more or less the same, the pain is felt from the lower back then down the legs to the feet. Sometimes there is tingling and weakness in the legs due to pressure on the nerves (19). Apart from that, if there is a positive result on specific examination of Straight Leg Raise (SLR), bragard and neri or present supporting examination using MRI, x-ray, with results of spinal abnormalities such as HNP, Spondylosis, Spondylolisthesis, and Spondylitis.

The intra-rater reliability test showed that it was significant with a p-value <0.001 and obtained a Cronbach Alpha value used to see reliability consistency of 0.963, meaning it had very high reliability (11). The Cronbach Alpha results in this study stated that the VDS had high consistency in measuring pain in non-myogenic LBP patients. Intra-rater reliability with a repetition of 15 minutes got an ICC value of 0.963, which means that VDS has a very high-reliability value according to the interpretation of (12) and is significant with p-value <0.001. This research is in line with (20) where the ICC value for VDS intra-rater reliability has a value of 0.543, which means moderate reliability. Even though the results are moderate, they are still said to be reliable (12).

The inter-rater reliability test obtained results from the ICC which functions to see the agreement between 2 raters and obtained a result of 0.982, meaning very high reliability based on the interpretation of (12). Meanwhile, Cronbach Alpha is used to see the consistency of reliability, which is 0.982, meaning it has very high reliability (11). There has been no research regarding the inter-rater reliability test of VDS in non-myogenic LBP patients.

To see the validity of a measuring instrument, it can be determined using factor validity. Factor validity is a correlation test or value (r) on intra-rater reliability which is the correlation between raters 1 and 2 and inter-rater reliability VDS is the correlation of test 1 and test 2, getting a calculated r result greater than 0.9 for both of which the intra rater got r value = 0.928 and the inter-rater got a value of r = 0.964. So it can be concluded that the VDS has very high validity because the calculated r is greater than the r-table for a sample size of 55 people (r=0.260) (13).

Regarding reliability, there is another thing that needs to be considered, namely looking at the SEM and MDC values. SEM (Standard Error Measurement) can measure measurement accuracy and indicate absolute reliability. The smaller the SEM, the absolute reliability and the better the measurement (21). SEM estimates measurement error on repeated measurements for a group of individuals (22). VDS obtained SEM results of 0.068, which means the error rate is small and has very good reliability. MDC (Minimum Detectable Change) is defined as the smallest amount of change that can be detected not due to inherent variations or problems in measurement(21). To get the MDC value, you can use the formula =SEM X 1.96 X p$\sqrt{2}$ (21). VDS obtained an MDC result of 0.188, which means it has a very small level of change. Second, this is in line with research (23) where VDS got an SEM value of 0.21 and MDC of 0.58, which means that VDS has a small error rate and has excellent validity, in knee OA patients.

Conclusion

From the results of research on the reliability of the Verbal Descriptive Scale in non-myogenic LBP patients at Pandan Arang Boyolali Hospital which has been described, it can be concluded that the Verbal Descriptive Scale is reliable and valid in terms of intra-rater and inter-rater in non-myogenic-low-back-pain-patients.

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