

## **“Test-Retest Reliability of Numeric Pain Rating Scale And Visual Analogue Scale with Elderly Patients having Low Back Pain in Rural Areas”**

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### **Abstract**

**Background:** The most prevalent health condition in older adults that leads to functional limitations and disability is LBP. Pain is a primary symptom of the low back problems that are seen in clinical practice. Inconsistent reporting may be misleading and may obscure real changes in pain. The use of standardized instruments with established reliability serves to minimize inconsistencies in the reports of a patient's pain. The most prevalent health condition in older adults that leads to functional limitations and disability is LBP. **Aim:** to assess the comparability of pain scales as measure of pain and identify minimum clinical difference in pain measured using these two scales. **Methodology:** Thirty elderly patients with low back pain were randomly selected from AVBRH. The history and assessment was done by using assessment proforma with the informed consent. They were provided Numerical Pain Rating Scale (NPRS) and Visual Analogue Scales (VAS) to mark their intensity of pain on 1<sup>st</sup> day and procedure were repeated for 2<sup>nd</sup> day. **Result:** Result of the study found to significant for both the scales with p value  $p < 0.005$ . Mean value of NPRS – 0.93 and VAS- 0.71, Standard error of measurement of NPRS- 0.18 and VAS- 0.20 and t-value of NPRS- 5.03 and VAS- 3.45. Correlation between NPRS and VAS at 1<sup>st</sup> and 2<sup>nd</sup> assessment was found to be positive correlation. Both the scales were found to be reliable. However, NPRS was found to be more reliable as compared to VAS. **Conclusion:** This study concluded that both the scales were found to be reliable used for assessing pain intensity on elderly patients with low back pain in rural areas. However, NPRS was found to be more reliable as compared to VAS. The 10 cm VAS on other hand may be difficult for elderly patients to understand and used.

**KEYWORDS:** Numerical Pain Rating Scale, Visual Analogue Scale, Elderly, Low back pain.

### **INTRODUCTION:**

Low back pain is experienced by an estimated 51-80% of the population at some point during their lifetime. Its causes range from musculoskeletal to medical to primarily

psychological, and its consequences vary from minor discomfort to total disability. Pain is a primary symptom of the low back problems that are seen in clinical practice. Patient reports concerning the nature of their low back pain are used to make decisions about management and to determine whether that management has been successful. Because these pain reports are critical to the diagnosis and treatment of low back pain, it is important to determine how consistently patients relate the various aspects of their pain.<sup>1</sup>

The average human life expectancy has increased significantly worldwide due to advances in medicine, health care delivery, and technology over recent years. The United Nations has estimated that the proportion of older individuals aged 60 or over in the world will increase three fold by the year 2050. However, the fast growth of the aging population is accompanied by global increase in the incidence of low back pain (LBP) complaints and associated medical costs. The most prevalent health condition in older adults that leads to functional limitations and disability is LBP. Several population-based studies have estimated that the 1-year prevalence of LBP in community-dwelling seniors ranged from 13% to 50%.<sup>2</sup>

Inconsistent reporting may be misleading and may obscure real changes in pain. The use of standardized instruments with established reliability serves to minimize inconsistencies in the reports of a patient's pain.<sup>1</sup>

A visual analogue scale is a horizontal or vertical line of standard length that typically has verbal descriptors representing extreme aspects of the measurement dimension at either end of the line. It is now common practice to include a visual analogue scale in the evaluation of pain.<sup>3</sup>

Visual analoguescales have been examined extensively and been shown to be reliable, valid, and sensitive to change (3, 4, 5, 6, 7, 8, 9, 10).

The ability to quantify pain intensity is essential when caring for individuals in pain in order to monitor patient progress and analgesic effectiveness. Three scales are commonly employed, the simple descriptor scale (SDS), the visual analog scale (VAS), and the numeric (pain intensity) rating scale (NRS). The NRS has been found to be a simple and valid alternative in some disease states<sup>11</sup>.

The VAS is presented as a 10-cm line, anchored by verbal descriptors, usually 'no pain' and 'worst imaginable pain'. The patient is asked to mark a 100 mm line to indicate pain intensity. The score is measured from the zero anchors to the patient's mark. The NRS is 11, 21 or 101 point scale where the end points are the extremes of no pain and pain as bad as it could be, or worst pain. The NRS can be graphically or verbally delivered. When presented graphically the numbers are often enclosed in boxes and the scale is referred to as an 11 or 21 point box scale depending on the number of levels of discrimination offered to the patient.<sup>12</sup>

Both the Visual Analog Scale for Pain and the Numeric Rating Scale (NRS) for Pain are unidimensional single-item scales that provide an estimate of patients' pain intensity. They are easy to administer, complete, and score.<sup>13</sup>

The purpose of this study to determine the test-retest reliability of measurement of pain intensity as determined by elderly patients in rural areas.

## **MATERIAL AND METHODOLOGY:**

### **Measurement tools:**

**Pain Rating Scales:**

1. Numerical Pain Rating Scale (NPRS/NRS)<sup>13</sup>.
2. Visual Analogue Scale (VAS)<sup>13</sup>.

**Methodology:**

Thirty elderly patients with low back pain were randomly selected from AVBRH. The history and assessment was done by using assessment proforma with the informed consent. They were provided NPRS and VAS Scales to mark their intensity of pain on 1<sup>st</sup> day and procedure were repeated for 2<sup>nd</sup> day.

**Study design:** This was repeated measured design in which the subjects were seen during one session.

**Sample size:** 30 patients.

**Sample technique:** Simple random sampling technique.

**Study Setting:** AVBRH, Sawangi (Meghe), Wardha.

**Inclusion criteria:**

1. Sex: Both male and female.
2. Age: more than 60 years.
3. No h/o trauma to low back region.
4. Patients with low back pain.
5. Patients from rural areas.

**Exclusion criteria:**

1. Age: Less than 60 years.
2. H/o trauma to low back region.
3. Patients other than low back pain.
4. Patients from urban areas.
5. Patient with the h/o cognitive problems.
6. Patient with the h/o disorders of CNS.
7. Inability of patient to hold pencil and make mark.

**RESULT:**

Thirty patients were selected with the inclusion criteria of low back pain. NPRS and VAS given to patient for marking. 1<sup>st</sup> and 2<sup>nd</sup> assessment of pain intensity examined and scores were recorded.

Test-retest reliability were analyzed by using student's paired t-test and it was found to significant for both the scales with p value  $p < 0.005$ . In table 1, showed the Mean value of NPRS – 0.93 and VAS- 0.71, Standard error of measurement of NPRS- 0.18 and VAS- 0.20 and t-value of NPRS- 5.03 and VAS- 3.45

In table 2, showed the correlation between NPRS and VAS at 1<sup>st</sup> and 2<sup>nd</sup> assessment was found to be positive correlation.

In table 3, showed both the scales were found to be reliable. However, NPRS was found to be more reliable as compared to VAS.

## DISCUSSION:

The result of this study found to significant for both the scales with p value  $p < 0.005$ . Mean value of NPRS – 0.93 and VAS- 0.71, Standard error of measurement of NPRS- 0.18 and VAS- 0.20 and t-value of NPRS- 5.03 and VAS- 3.45. Correlation between NPRS and VAS at 1<sup>st</sup> and 2<sup>nd</sup> assessment was found to be positive correlation. Both the scales were found to be reliable. However, NPRS was found to be more reliable as compared to VAS.

**Williamson A. et al (2005)** supported the result of this study who concluded that both pain-rating scales are valid, reliable and appropriate for use in clinical practice, although the Visual Analogue Scale has more practical difficulties than the Numerical Rating Scale. For general purposes the Numerical Rating Scale has good sensitivity and generates data that can be statistically analyzed for audit purposes. Patients who seek a sensitive pain rating scale would probably choose this one.<sup>12</sup>

**Hawker GA et al (2011)** suggested that both the Visual Analog Scale for Pain and the Numeric Rating Scale (NRS) for Pain are unidimensional single-item scales that provide an estimate of patients' pain intensity. They are easy to administer, complete, and score. Of the two, the pain NRS may be preferred at point of patient care due to simpler scoring. In research, the pain NRS may similarly be preferred due to its ability to be administered both verbally and in writing.<sup>13</sup>

**Holgate et al (2003)** concluded that the VNRS performs as well as the VAS in assessing changes in pain. However, although the VAS and VNRS are well correlated, patients systematically score their pain higher on the VNRS, with an unacceptably wide distribution of the differences.<sup>14</sup>

**Price DD et al (1904)** demonstrated that although both simple numerical and M-VAS are internally consistent measures of both experimental and clinical pain and can be used to separately measure pain sensation intensity and pain unpleasantness, only the M-VAS provides ratio scale measurements of pain sensation intensity.<sup>15</sup>

**Kelly AM (1998)** suggested that the minimum clinically significant difference in VAS pain scores was found to be 9 mm. Differences of less than this amount, even if statistically significant, are unlikely to be of clinical significance. No significant difference in minimum significant VAS scores was found between gender, age, and cause-of-pain groups.<sup>16</sup>

**Bijur PE et al (2003)** suggested that the verbally administered NRS can be substituted for the VAS in acute pain measurement.<sup>17</sup>

**Downie WW et al (1978)** indicated that there is evidence that an 11 -point (0-10) numerical rating scale performs better than both a 4-point simple descriptive scale and a continuous (visual analogue) scale.<sup>18</sup>

**Paice, Judith A. et al (1997)** indicated that the verbally administered 0-10 NRS provides a useful alternative to the VAS.<sup>11</sup>

The above studies support the result of this study.

**SUGGESTION:** This study suggested that the same study can be carried out on majority of population.

### **LIMITATION:**

1. The limitation of this study showed that the findings are most significant to those with significant pain and patient's psychological component can affect outcome of the study.
2. The patient from rural areas so more efforts to convince them.

### **CONCLUSION:**

This study concluded that both the scales were found to be reliable used for assessing pain intensity on elderly patients with low back pain in rural areas. However, NPRS was found to be more reliable as compared to VAS.

The 10 cm VAC on other hand may be difficult for elderly patients to understand and used.

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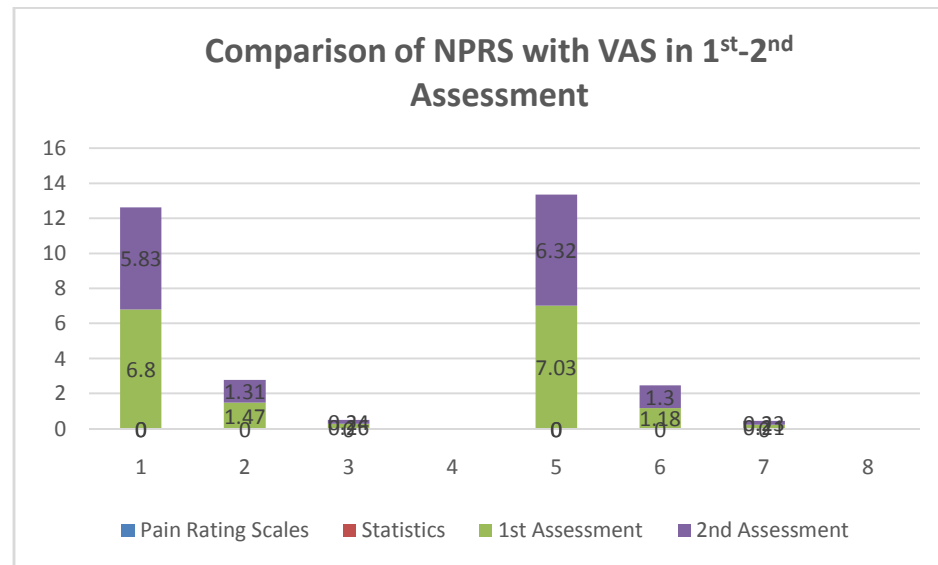
#### TABLES AND GRAPHS:

**Table 1: Comparison of NPRS with VAS in 1<sup>st</sup>-2<sup>nd</sup> Assessment:**

Pain Rating Scales	Statistics	1 <sup>st</sup> Assessment	2 <sup>nd</sup> Assessment
<b>NPRS</b>	Mean	6.80	5.83
	SD	1.47	1.31
	SEM	0.26	0.24
	Range	4-9	4-9
<b>VAS</b>	Mean	7.03	6.32
	SD	1.18	1.30
	SEM	0.21	0.23
	Range	5-9	4-9

**SD-** Standard Deviation

**SEM-** Standard Error of Mean.



**Student's paired t-test:**

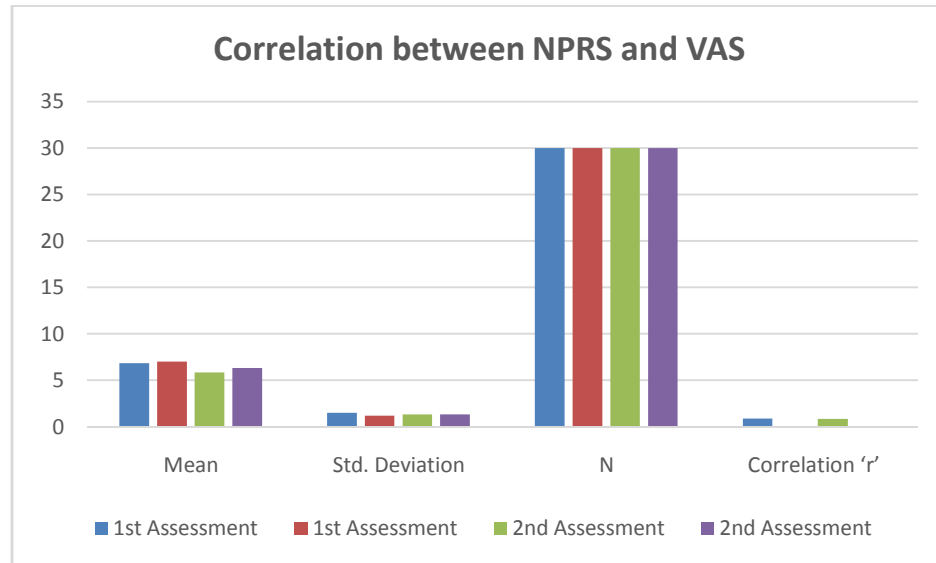
Paired Differences						t	df	p-value
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
NPRS	0.96	0.99	0.18	0.59	1.33	5.29	29	0.000 S,p<0.05
VAS	0.71	1.15	0.21	0.28	1.14	3.36	29	0.000 S,p<0.05

**Table 2: Correlation between NPRS and VAS**

**At 1<sup>st</sup> and 2<sup>nd</sup> Assessment**

		Mean	Std. Deviation	N	Correlation 'r'	p-value
<b>1<sup>st</sup> Assessment</b>	<b>NPRS</b>	6.80	1.47	30	0.87	0.000 S,p<0.05
	<b>VAS</b>	7.03	1.18	30		
<b>2<sup>nd</sup> Assessment</b>	<b>NPRS</b>	5.83	1.31	30	0.85	0.000 S,p<0.05
	<b>VAS</b>	6.32	1.30	30		





**Table 3: Reliability Analysis for NPRS and VAS**

	Alpha	Reliability (%)
<b>NPRS</b>	0.85	91.89%
<b>VAS</b>	0.72	83.72%

