



A New Nominal Scale (Yes-No-Don't Know-YNDK Scale) and Its Correlation with Standard Ordinal Scale (Numerical Rating Scale-NRS): Our Experience Among University Based Pain Clinic Patients

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Abstract

Background: There are variety of pain scales available for use by the health care providers to assess patients' pain. Numerical rating scales (11-point 0-10 NRS) are one of the most commonly used pain scales for pain assessment, although some studies have questioned the adequacy of NRS for pain assessment.

Objectives: To assess how well the standard ordinal scale (11-point NRS) correlates with a simplified nominal scale (3-point expectation score), named by us as Yes-No-Don't Know (YNDK) scale when used in chronic pain patients presenting to our University Based Pain Clinic.

Methods: During the study period, patients in our pain clinic were assessed for pain severity score per NRS, pain relief score per NRS, satisfaction with current pain medication regimen per YNDK scale, expectation of change in current pain medication regimen per YNDK scale, and whether that expectation was eventually met at our pain clinic.

Results: A total of 243 patients were included in our study. It was worth noting that included patients were primarily middle aged (67%); new patients were primarily males (82%), while follow-up patients were primarily females (62%). There was strong correlation (positive or inverse) amongst majority of correlated NRS scores and YNDK scale scoring. Despite more than 3/4th of patients reporting severe pain (NRS 7-10), only less than half of these patients wanted their pain medications changed per YNDK scale.

Conclusions: Despite simplifying the pain assessment, 3-point YNDK score may be an appropriate adjunct for pain scoring wherein it can be used independently, complementarily or supplementary to 11-point NRS score in rapid turnover pain clinics to improve fulfillment of chronic pain patients' expectations.

Introduction

There are variety of pain scales available for use by the health care providers to assess patients' pain¹ and due to their ease of use in clinical practice, numerical rating scales (11-point 0-10 NRS)² are one of the most commonly used pain scales for pain assessment. Use of NRS for pain assessment has been validated in multiple studies although some studies have questioned the adequacy of NRS for pain assessment¹⁻⁶. On one end of the spectrum, NRS may interfere in comprehensive assessment of chronic pain because other pain and symptom descriptors are missing in these simplified NRS scores⁷. On the other end of the spectrum, it is an unsubstantiated yet common belief that many patients presenting to pain clinics solely expect quick-fixes for their chronic pain, primarily with pain medications. At this end of the spectrum lies an opportunity to simplify 11-point NRS further as the other end of the spectrum needs exhaustive list-based complex pain assessment tools that have always been available but are too difficult to use in current day rapid turnover busy pain clinics. Additionally, when patients rate their pain chronically as 4-6 on 0-10 NRS, it is sometimes not clear whether patients are satisfied with their pain control regimen. However, when patients rate their pain chronically as 7-10 on 0-10 NRS and yet do not request/agree with need for change in pain control regimen, physicians often find it difficult whether their patients are appropriately rating their pain when using 0-10 NRS especially for chronic pain. Therefore, it is worthwhile to assess how well the standard ordinal scale (11-point NRS) correlates with a simplified nominal scale (3-point expectation score), named by us as Yes-No-Don't Know (YNDK) scale.

The objective of our study was to ascertain whether scores on 3-point YNDK scale correlate adequately with 11-point NRS scores when used in chronic pain patients presenting to our University Based Pain Clinic.

Materials and Methods

Our institutional review board determined the project as non-human participant research according to the coded definitions in the Common Rule under Code of Federal Regulations Title 45 Part 46 (45 CFR 46) per Food and Drug Administration (FDA) regulations. Subsequently, during the brief study period spanning over one month, patients in our pain clinic were assessed for following: (a) age, (b) sex, (c) type of visit (first time visit or follow-up visit) to pain clinic, (d) pain severity score per NRS wherein from 0 to 10 graded as progressively increasing severity of pain, (e) pain relief score per NRS wherein from 0 to 10 graded as progressively improving pain relief with medications, (f) satisfaction with current pain medication regimen per YNDK scale, (g) expectation of change in current pain medication regimen per YNDK scale, and (h) whether that expectation was eventually met at our pain clinic (Figure 1) by the prescribing physicians who were blinded to YNDK scale scores of their patients.

The limited datasets were tabulated and the only comparisons performed were correlations via regression analysis while designating p value of < 0.05 as significant value.

Results

A total of 243 patients were included in our study and their results have been tabulated in Tables 1-2. It was worth noting that included patients were primarily middle aged, 45-65 years of age (67%). During our brief study period, patients presenting to our clinic for first time were primarily males (82%), while patients following up with our clinic were primarily females (62%). It can be safely said that the patients had easily understood the pain scoring by NRS as well as by YNDK scale because only less than 1/4th among any of the grouped patients (Table 1) responded as DON'T KNOW (NOT SURE) for what the scoring expectations and/or their own expectations were in regards to pain management at our clinic. There was strong correlation (positive or inverse) amongst majority of correlated NRS scores and YNDK scale scoring (Table 2 and Figure 2). On reformatting the distribution of NRS and YNDK scale based responses by the patients into a 3x3 contingency table (Table 3), it became clear that despite more than 3/4th of patients reporting severe pain (NRS 7-10), only less than half of these patients wanted their pain medications changed.

Discussion

Although the patients, who presented for the first time to our pain clinic, were excluded from the correlation statistics due to very small number (n=17), it can be summarized as following: (a) all patients reported NRS for pain severity at 8 (median and mode) irrespective of their type of visit (first time visit or follow-up visit) to our pain clinic; (b) however, the new patients' scores for NRS pain relief were much lower than the follow-up patients' scores; and (c) as compared to the follow-up patients, higher percentages of the new patients convincingly reported (per YNDK scale) that their pain medications were not working hence requiring medication changes that were more likely fulfilled at our pain clinic eventually. All this could reflect why the new patients had sought the pain clinic services in the first place: for the relief of their intractable pain, definitively non-responsive to their current pain management prior to their first time visit to our pain clinic.

When correlation coefficients were deduced among the follow-up patients who were separated per their gender for statistical analysis purposes, it can be summarized as following: (a) NRS scores and age of the patient did not correlate; (b) as expected, NRS pain severity and NRS pain relief significantly correlated inversely although coefficients were not close to (-)1 as one would expect; (c) surprisingly, NRS pain severity did not translate into significant concordance for increased request for changes in their medication per YNDK; (d) however, NRS pain relief and YNDK score for perception of medications working were strongly concordant and positively correlated; (e) YNDK scores for perception of medications working and need for change in medications did NOT turn up correlation coefficients equal to (-)1 because unsure patients who verbalized/responded "DON'T KNOW" skewed up the coefficients to be lower than (-)1 although yet strongly significant and inversely correlated; and (f) finally, female patients on their follow-up visits were significantly more likely to get their wishes fulfilled in regards to verbalized/voiced needs for changes in medications. Henceforth, it would seem appropriate to draw the following inferences: (a) despite NRS pain severity scores being very high, chronic pain patients might not always report very low NRS pain relief scores correspondingly, assumingly due to their acceptance of guarded expectations in terms of relief from chronic pain; (b) concurrently, chronic pain patients do not always request for changes in their

pain medications despite high NRS pain severity scores, assumingly due to their apprehensions against changing their current, imperfect yet somewhat effective pain management regimen; (c) however, reassuringly, chronic pain patients perceptions of medications working and good pain relief reinstated the significant role accrued by the chronic pain patients to the pain medications effectiveness for their pain relief; and (d) lastly, it was ironic that female chronic pain patients were more convincing while conveying their request for change in medications compared to male chronic pain patients exposing the unintentional gender bias during chronic pain management.

Our study has few limitations: The limited data of our local pain clinic's practices and resultant adequacy of the actual pain management was evaluated for our pain clinic's and catered pain patients' self evaluation and reflection; however, our local experience would require validation projects and larger studies in other pain clinics and management institutes. Moreover, the future studies would need to explore whether simplifying pain assessment further via 3-point YNDK scale is warranted either for the ease of the evaluators/assessors or for the ease of documenting chronology of patients' pain management's progress or for the sake of both.

Conclusion

Despite simplifying the pain assessment, 3-point YNDK score may be an appropriate adjunct for pain scoring wherein it can be used independently, complementarily or supplementary to 11-point NRS score in rapid turnover pain clinics to improve fulfillment of chronic pain patients' expectations.

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Illustrations

Illustration 1

Table 1

Table 1: Baseline Datasets Collected

	FOLLOW UP VISIT PATIENTS		FIRST TIME VISIT PATIENTS	
	Males (n=85)	Females (n=141)	Males (n=14)	Females (n=3)
Age (in years) Mean \pm SD	52 \pm 10.2	51.8 \pm 10.6	41.1 \pm 10.7	46.7 \pm 10.6
NRS for Pain Severity Mean \pm SD Median; Mode	7.4 \pm 1.7 8; 8	7.4 \pm 1.9 8; 8	7.6 \pm 1.8 8; 8	8 \pm 0 8; 8
NRS for Pain Relief Mean \pm SD Median; Mode	6.3 \pm 2.4 7; 8	5.8 \pm 2.3 6; 5	3.9 \pm 2.8 5; 5	0.7 \pm 1.2 0; 0
Patients Reporting Pain Medications NOT working	18%	19%	64%	100%
Patients Reporting Pain Medications Need A Change	33%	40%	79%	100%

Pain Medications Were Changed ACUTALLY	21%	23%	71%	67%
Patients NOT SURE if Pain Medications Working	20%	25%	14%	0%
Patients NOT SURE if Pain Medications Need A Change	21%	17%	14%	0%

NRS: Numerical Rating Scale

Illustration 2

Table 2

Table 2: Correlation Coefficients and Their Significance Levels

	FOLLOW UP VISIT MALE PATIENTS (n=85)		FOLLOW UP VISIT FEMALE PATIENTS (n=141)	
	Correlation Coefficient (r)	P-Value (Significant if <0.05)	Correlation Coefficient (r)	P-Value (Significant if <0.05)
Age of Patient vs. NRS for Pain Severity	0.02	0.85	0.14	0.11
Age of Patient vs. NRS for Pain Relief	-0.08	0.47	-0.01	0.91
NRS for Pain Severity vs. NRS for Pain Relief	-0.23	0.03	-0.23	0.005
NRS for Pain Severity vs. Reporting Medications Need A Change	0.14	0.21	0.15	0.08

NRS for Pain Relief vs. Reporting Medications Working	0.48	<0.001	0.53	<0.001
Reporting Medications Working vs. Reporting Medications Need A Change	-0.74	<0.001	-0.7	<0.001
Reporting Medications Need A Change vs. Medications ACTUALLY Changed	0.09 (n=67; 18=NOT SURE if Need A Change Were Excluded)	0.49	0.21 (n=117; 24=NOT SURE if Need A Change Were Excluded)	0.02

NRS: Numerical Rating Scale

Illustration 3

Table 3

Table 3: Reformatted NRS and YNDK Scores Incidence as 3x3 Contingency Table

→ NRS Pain Severity YNDK Medication Change ↓	FOLLOW UP VISIT MALE PATIENTS				χ^2	FOLLOW UP VISIT FEMALE PATIENTS				χ^2
	0-3	4-6	7-10	Total	P-value (Sig. if <0.05)	0-3	4-6	7-10	Total	P-value (Sig. if <0.05)
No	4%	6%	36%	46%	0.66	4%	8%	30%	43%	0.18
Don't Know	0%	5%	16%	21%		0%	4%	13%	17%	
Yes	1%	5%	27%	33%		1%	7%	33%	40%	
Total	5%	15%	80%	100%		5%	19%	76%	100%	

→ NRS Pain Relief	0-3	4-6	7-10	Total		0-3	4-6	7-10	Total	
YNDK Medication Working ↓										
No	6%	9%	2%	18%	0.002	6%	11%	1%	19%	<0.001
Don't Know	4%	9%	7%	20%		4%	13%	8%	25%	
Yes	5%	15%	42%	62%		1%	26%	29%	56%	
Total	14%	34%	52%	100%		12%	50%	38%	100%	

NRS: Numerical Rating Scale

YNDK: Yes-No-Don't Know Scale

Illustration 4

Figure 1: Five Point Questionnaire and Yes-No-Don't Know (YNDK) Scale

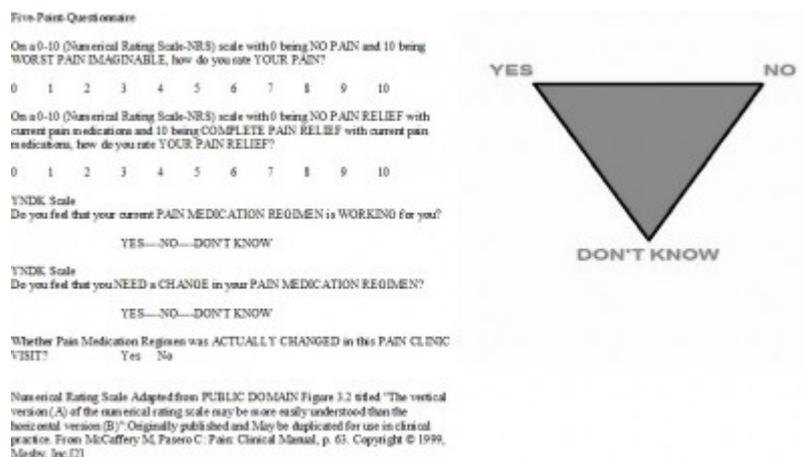


Illustration 5

Figure 2: Trend-lines of Correlated Characteristics as shown in Table 2: (A) NRS for Pain Severity vs. NRS for Pain Relief; (B) NRS for Pain Severity vs. YNDK Reporting Medications Need A Change; (C) NRS for Pain Relief vs. YNDK Reporting Medications Working; (D) YNDK Reporting Medications Working vs. YNDK Reporting Medications Need A Change; (E) YNDK Reporting Medications Need A Change vs. Medications ACTUALLY Changed (Broken Lines: Follow-up Males' Trends; Solid Lines: Follow-up Females' Trends)

