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**Original Research Article**

# Utility of numerical and visual analog scales for evaluating the post-operative pain in rural areas

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## ABSTRACT

**Background:** Under normal circumstances one tries to avoid pain. If incurred, one would like to do something about it, like taking pain killers, seeking medical help or avoiding movements or positions that bring on pain or make it worse. The aim of study was to evaluate the literacy impact on the ability to indicate pain on two rating scales.
**Methods:** This study was a cross sectional study conducted in post-operative patients admitted in tertiary hospital in rural areas of India. This study was conducted between May 2016 to October 2016.
**Results:** In this study, 100 patients were enrolled. illiterate patients were 40 which was the highest and the least was graduate patients which constituted about 8%. Patients who were in upper class was the least which constituted about 6%, patients who were in middle class was the highest which was 65%. P values for age, sex and literacy in VAS scale were 0.642, 0.966 and 0.322 respectively. The P values for age, sex and literacy in NAS scale were 0.711, 0.401 and 0.870 respectively.
**Conclusions:** This study proved that illiterate patients in Indian rural population can easily rate their pain on these scales and thus visual analog scales and numeric analog scales were the simplest tools for assessing the pain.

**Keywords:** Numeric analog scale, Visual anolog scale

## INTRODUCTION

Pain is defined as an unpleasant emotional and sensory experience with potential tissue damage. In all patients, many measurements of pain were developed but none were demonstrated to be easily used.[1] Since few patients have difficulty interpreting pain scales, there arouse a need for at least two equally reliable methods of assessing pain. 7-11% of people were unable to complete the visual analog scale or found it confusing which was shown by international studies. To evaluate the applicability of these scales in India, replication of these studies is needed.[2,3] 74% of population of India are literate and 26% is illiterate according to Indian Government. For females, literacy rate is even lower where illiteracy affects 35% of population in India.[4] Every fourth patient coming to an Indian hospital are illiterate. In rural areas, literacy rates are lower such as the area where the present study was conducted. There is still limited data on the use of pain scales in patient population where illiteracy is prevalent.[5] In managing post-surgical pain, a pain assessment scale which is more appropriate in Indian illiterate population for evaluating post-operative pain. This study was conducted to evaluate the literacy impact on the ability to indicate pain on two rating scales.

## METHODS

This study was a cross sectional study conducted in post-operative patients admitted in tertiary hospital in rural areas of India. Inclusion criteria were patients undergoing

surgical procedures in surgery, obstetrics, gynecology, ENT, urology, neurosurgery. Ethical clearance was taken from Institutional Ethical Committee. From all patients, informed consent was collected. This study was conducted between May 2016 to October 2016. A total of 150 patients underwent surgery during this period and 100 patients were selected in the study who met the inclusion criteria and who participated in the study. All patients who were from rural areas who were post-operative patients, those who were conscious enough to co-operate and who had normal mental status were enrolled into study. Exclusion criteria was patients who came from urban areas, patients with unstable hemodynamic status and unconscious patients were excluded from the study. Cases of surgery under different types of anesthesia such as general, spinal, epidural, and blocks were included in the study. Intra-operative an-aesthetic care was given to the type of anesthesia such as general, spinal and blocks. All cases were standardized by providing post-operative pain control protocols and all patients were administered with paracetamol injection 1000 mg every 8$^{th}$ hour and tramadol injection 50 mg every 8$^{th}$ hour. The demographical and procedural characteristics were recorded. Patients were explained about the evaluation of pain using VAS and NAS. Patients were given a ruler marked from 0 to 10 where 0 indicated no pain and 10 indicated worst pain and this was used for evaluating pain by visual analogue scale. Their pain intensity on this scale for all patients was recorded. The rating of pain was taken every 24 hours after completion of surgery. Immediately, readings on both scales were recorded one after the other with a time gap of not more than five minutes. SPSS software (V: 19) was used for data analysis. Percentages, proportions tests of significance (chi-square), correlation coefficient and linear regression analysis were the statistical measures obtained.

## RESULTS

In this study, 100 patients were enrolled.

**Table 1: Demographic distribution (age in years and sex) in the study.**

| Variables | Numbers | Percentage (%) |
|---|---|---|
| **Age in years** | | |
| <30 years | 45 | 45 |
| 30-49 years | 25 | 25 |
| 50-69 years | 25 | 25 |
| ≥70 years | 5 | 5 |
| **Sex** | | |
| Male | 60 | 60 |
| Females | 40 | 40 |

Most common age group in study are of <30 years (45%) and least common age group was >70 years i.e. of 5%. Of 100 patients, 60 patients were males with male prepondance and ratio of male: female was 3:2.

**Table 2: Demographic distribution (educational status and socio-economic status) in the study.**

| Variables | Numbers | Percentage (%) |
|---|---|---|
| **Educational Status** | | |
| Illiterate | 40 | 40 |
| Primary | 30 | 30 |
| Secondary | 10 | 10 |
| Intermediate | 12 | 12 |
| Graduate | 8 | 8 |
| **Socio-economic status** | | |
| Upper | 06 | 06 |
| Middle | 65 | 65 |
| Lower | 29 | 29 |

Table 2 shows that most of the patients are i.e., 40% which was the highest and the least was graduate patients which constituted about 8%. Patients who were in upper class was the least which constituted about 6%, patients who were in middle class was the highest which was 65%.

**Table 3: Ability to rate pain on VAS and NAS.**

| Variables | Numbers | Percentage (%) |
|---|---|---|
| **Based on VAS** | | |
| Yes | 85 | 85 |
| No | 15 | 15 |
| **Based on NAS** | | |
| Yes | 80 | 80 |
| No | 20 | 20 |

Table 3 shows that ability to rate pain on VAS was possible in 85% patients, the ability to rate pain on NAS was possible in 80% patients.

**Table 4: Multivariate logistic regression analysis of baseline characteristics and ability to rate pain on VAS and NAS.**

| Baseline | | |
|---|---|---|
| **Characteristics** | **VAS (P Value)** | **NAS (P Value)** |
| Age | 0.022 (0.642) | 0.019 (0.711) |
| Sex | -0.005 (0.966) | -0.075 (0.401) |
| Literacy | -0.028 (0.322) | 0.006 (0.870) |

Table 4 shows the P values for age, sex and literacy in VAS scale were 0.642, 0.966 and 0.322 respectively. The P values for age, sex and literacy in NAS scale were 0.711, 0.401 and 0.870 respectively.

## DISCUSSION

Accurate assessment plays a pivotal role in effective clinical pain management. This further is dependent on assessments made by accurate evaluation tools. To yield quantifiable pain measure, many scales have been devised. Pain measure was classified into behavioral and

subjective. The efforts of the health care provider and of the person experiencing pain is dependent on the accuracy of the assessment. It was observed in the present study that no significant association existed between literacy status and the ability to rate pain on visual analogue scale or other numerical scales which indicated the scales utility in the illiterate population. No significant difference was observed between demographic characteristics such as age, sex and socio-economic status and the ability to rate pain.

In Holgate A et al, Chung SM et al, Fadaizadeh L et al, studies similar findings were observed.[6-8] In the present study, between pain scores on the two scales, a moderate correlation was observed. Differences can be explained by the socio-economic differences characteristics of the studied sample.[9-11]

In Nikhil Mudgalkar et al study, a total of 105 patients participated in the study.[12] 43 (41%) of the sample was illiterate. 82 (78.1%) were able to rate pain on VAS while 81 (77.1%) were able to rate pain on NAS. There was no significant association between pain ratings and type of surgery, duration of surgery and nature of anesthesia. In multivariate analysis, age, sex and literacy had no significant association with the ability to rate pain on VAS (P value 0.652, 0.967, 0.328 respectively). Similarly, no significant association was obtained between age, sex and literacy and ability to rate pain on NAS (P value 0.713, 0.405, 0.875 respectively). Correlation coefficient between the scales was 0.693.

In Jaywant SS et al study, a correlation of 0.892 was observed between the two scales.[13] Jayant et al, studied in burn patients where as in the current study, post-operative patients were studied, that's the reason behind the difference. In addition, the current study was conducted in rural population whereas Jayant et al, conducted in urban population. The current study was conducted in rural Indian population which assessed the literacy impact on pain rating by VAS and NAS which further proves the strength of the study. In assessing the management of pain, education is not a hindrance.

## CONCLUSION

This study proved that illiterate patients in Indian rural population can easily rate their pain on these scales and thus visual analog scales and numeric analog scales were the simplest tools for assessing the pain. While correlation between these scales were moderate which thus indicates that both scales can be interchangeably used irrespective of status of literacy of patients.

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