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Correlative study of 3 pain rating scales among obstetric patients

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Summary

The relationship between pain scores obtained on the Visual Analog Scale (VAS) the Box Numerical Scale (BNS) and Verbal Rating Scale (VRS) was studied. The subjects were 35 volunteer female patients who had their babies through caesarian section 1-3 days prior to the study. Demographic data and pain scores were collected through a questionnaire, which was available in both English and Yoruba, the two most commonly spoken languages in Ibadan where the study was carried out. Data were analysed using Pearson Product-Moment Correlation Coefficient, and One-way Analysis of Variance. Results indicated that there was no significant difference between the pain scores obtained on the 3 pain rating scales. Significant correlations existed between pain scores obtained on the VAS and VRS ($r = 0.48, p = 0.003$); VAS and BNS ($r = 0.74, P = 0.000$); BNS and VRS ($r = 0.74, P = 0.000$). High educational attainment improved correlation between the scales in this study. It was concluded that the three pain rating scales measure the same construct, and could be used for pain measurement in obstetrically related conditions in this environment.

Keywords: Pain rating, Post-Caesarian pain, Correlation

Résumé

La relation entre les chiffres de douleur enregistré sur l'échelle analogue numérique (EAN), la boîte d'échelle numérique (BEN) et l'échelle d'évaluation verbale (EEV) a été étudiée. Les personnes étaient 35 patients femmes volontaires qui ont accouché leurs bébés en césarienne 1-3 jours avant l'étude. Les données démographiques et les chiffres de douleur ont été obtenus à travers un questionnaire, préparé en langues Anglaise et Yoruba, les deux langues les plus parlées à Ibadan où l'étude a été menée. Les données ont été analysées en employant le coefficient de corrélation produit-moment et l'analyse de variance unilatéral. Selon les résultats, Il n'y avait pas de différence signifian entre les chiffres des douleurs obtenues sur les 3 échelles d'évaluation de douleur. Il y avait une corrélation signifian entre les chiffres des douleurs enregistré obtenus sur EAN et EEV ($r=0,48, p=0,003$) ; EAN et BEN ($r=0,74, p=0,000$) ; BEN et EEV ($r=0,74, p = 0,000$). L'atteinte à une éducation supérieur a augmenté la corrélation entre les échelles dans cette étude. On est arrivé à la conclusion que les trois échelles de déterminer la douleur s'opèrent pareillement et pourrait être utilisée pour prendre la mesure de douleur dans des conditions obstétrique relatives dans ce milieu.

Introduction

The International Association for the Study of Pain has defined pain as an unpleasant and emotional experience associated with actual or potential tissue damage or described in such damage [1]. Pain is a highly subjective experience, which is determined not only by the amount of tissue damage, but also the individual's state of mind, past experiences, conditioning influences and sociological factors such as gender and culture [2]. Pain sensation consists of highly complex multifaceted cognitive experiences with strong affective and motivational components as well as

discriminative components [3]. Pain is one of the major reasons why physiotherapy intervention is sought [4]. Physiotherapists often need to measure pain intensity, so as to objectively evaluate the effectiveness of their interventions. Pain measurement, therefore remains an important component of outcome measures in physiotherapy, despite the shift from measures of impairments to measures of disability and handicap in clinical practice.

Measures of pain are classified as behavioural and subjective. The behavioural pain measures rate pain through its effects on the observable behaviour of the person experiencing it. In clinical studies, an approach commonly used is to record reductions in functional performance due to pain, with the pain being graded according to how seriously it limits physical function [5]. Subjective pain measurements include the analogue and the questionnaire methods. The analogue method requires the person to match his 'normal' pain with experimentally induced pain, typically radiant heat or electric shock. Pain questionnaires record verbal or written description of pain [5]. Most pain questionnaires concentrate on intensity and use adjectives or a numerical scale to represent the intensity continuum. A variant from this is the visual analogue scale that represents the intensity dimension by a plain line without verbal or numerical guides [6]. The use of diaries or pain charts adds time dimension to intensity rating. The McGill questionnaire [7] covers more than the intensity and duration of pain. It gives a qualitative description of the pain and the affective response to pain.

The choice of one pain rating scale in preference to others appears to be subjective, often based on the user's familiarity with the scale and sometimes, the ease of translating the pain descriptors to the local language. Attempt at guiding users of pain rating scales in their choice probably led to many correlative studies as well as studies on appropriateness or usefulness of the scales in various populations [8, 9, 10, 11, 12]. Unfortunately, there are not many of such studies from the Nigeria environment. In one such study, Soyannwo *et al* [12] reported good correlation between the visual analogue scale and a verbal rating scale, and that both scales were comprehended by Nigerians, irrespective of their educational status. The present study was intended to contribute to knowledge on relationships among pain rating scales in the Nigerian environment. Specifically, the study aimed at determining the correlation between the visual analogue scale, an 11-point verbal rating scale and an 11-point box numerical scale. The study also examined the influence of educational status on the relationships among the three scales.

Materials and methods

The study was conducted in the obstetrics wards of three hospitals in Ibadan, Nigeria. The subjects were 35 in-patients who had undergone Caesarian section one to three days prior to participation in the study. Subjects who lost their babies or whose babies were sick, those with post-operative complications, post-partum illnesses or disturbance in level of consciousness were exempted. All subjects could speak either English or Yoruba language, the two most commonly spoken languages in Ibadan. Detailed explanation on the purpose of the study and what was required of subjects was given to all patients who met the inclu-

sion criteria. Only subjects who volunteered to participate in the study and who gave their consent were included in the study sample. The sample was therefore purposive.

The instrument consisted of a short questionnaire, which obtained demographic data and included the 3 pain rating scales, each on different pages with the two numerical scales interspersed by the verbal scale [11]. The pain rating scales used in this study were a modified version of a verbal rating scale (VRS) [13], the visual analogue scale (VAS) [6] and the Box numerical scale (BNS) [9]. The verbal rating scale was originally developed in French [14], and later translated into English by Gary et al [13]. The scale lists 11 descriptors of pain intensity. The numerical values assigned to the descriptors were based on the mean ratings of noxious stimuli in an experimental study [14]. In the present study, the scale was modified by adding the word 'pain' to the first 10 descriptors and by substituting the word 'sensation' with 'pain' in the 11th descriptor in order to facilitate the translation of the verbal descriptors to Yoruba language. The numerical ratings of the verbal descriptors were also divided by 10, so that the values ranged between zero and 10 instead of zero to 100. The verbal rating scale was presented to subjects without the numerical ratings. The Yoruba translation of the verbal descriptors was made by the Yoruba department of a print media house in Ibadan (Table 1). The visual analogue scale is a 10 cm horizontal line with the label 'no pain' at one end, and 'worst pain' at the other end [9] (Figure 1). The box numerical scale lists 0 to 10 in boxes, arranged in descending order, with the label 'no pain' at one end, and 'worst pain' at the other end [8] (Figure 2). The three scales used in this study were 11-point (0–10) scales and have been shown to be valid and reliable measures of pain intensities in previous studies [8, 9, 11, 15, 16].

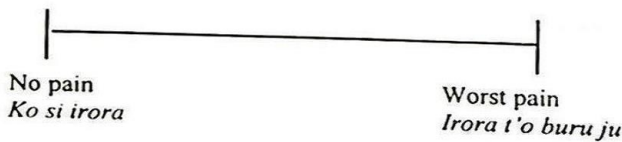


Fig. 1 Visual analogue scale

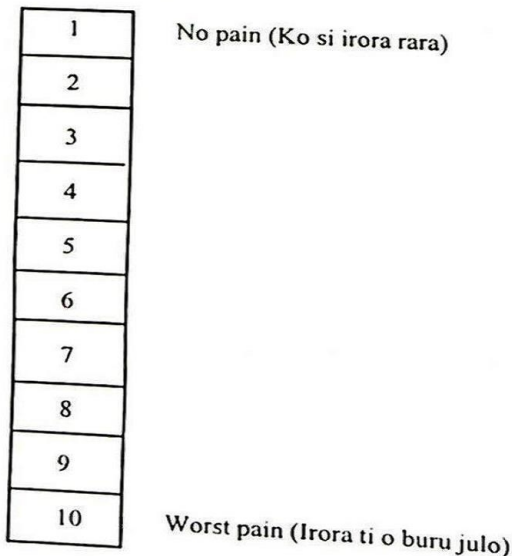


Fig. 2: Box numerical scale

A cross-sectional descriptive study design with a sample of convenience was used. Permission was sought from the obstetricians and the nursing staff in charge of the obstetrics wards in each hospital. Detailed explanation of each pain rating scale was given to the patients. With regards to the verbal rating scale, subjects were asked to respond in either English or Yoruba, as their language fluency would permit. The descriptors were read out to one subject who could not read at all and a few others who could not read very well. Subjects were asked to choose the descriptor that best described their pain intensity. For the VAS, each subject was asked to indicate her pain level by making a mark across the 10 cm line. The length from zero to the marked point was measured in cm and recorded as the pain intensity. Subjects were also asked to choose one of the numerals of the Box Numerical Scale that best described their pain intensity.

The Stat Pac Gold statistical package was used to analyze the data. A significance level of 5% (0.05) was used for all data analyses (Analysis of variance (ANOVA) and Pearson Product-moment Correlation Coefficient). For the purpose of analysing the influence of educational status on the level of correlation between scales, subjects were divided into 2 groups, those with secondary school education and below, and those with post-secondary school education. Data were then analyzed separately for each group.

Results:

Thirty-five women participated in the study. Their mean age was 31.2 ± 5.04 years. One subject had no formal education, 5 had only primary school education, 9 had only secondary school education and 20 had tertiary education (post-secondary school education).

Table 1: Modified verbal rating scale

Verbal description	Numerical rating*	Yoruba translation
No pain	0.00	Ko si irora rare
Barely perceptible pain	0.45	Iroro ti ko to nkan
Very mild pain	1.36	Iroro kinkinni
Mild pain	2.05	Iroro die t'o se f'ara mo
Moderate pain	3.82	Iroro ni iwonba
Barely strong pain	4.48	Iroro ti o po die
Strong pain	6.45	Iroro ti o le
Intense pain	7.26	Iroro ti o po
Very intense pain	8.48	Iroro ti o po lopolopo
Extremely intense pain	9.58	Iroro ti o mini lara
The most imaginable pain	10.0	Iroro ti o po apoju

*Numerical ratings also modified by dividing the original value by 10.

Table 2: Mean pain scores

Scale	n	Mean	Standard deviation	F-ratio	P-value
VAS	35	4.49	1.96	0.47	0.62
VRS	35	4.35	1.30		
BN	35	4.77	1.74		

The mean pain scores of the subjects on the 3 scales are shown on Table 2. The result showed that there was no significant difference in the mean pain scores obtained on the 3 scales. Significant positive correlation existed between scores derived from the scales in all cases (Table 3). The correlation coefficient between BNS and VRS ($r = 0.74$) and that between VAS and BNS ($r = 0.73$) were high. The correlation coefficient between the VAS and VRS, although statistically significant was the lowest ($r = 0.48$).

Table 3: Correlation coefficients between pain scores derived from the 3 scales

	VAS	VRS
VRS	0.48 ($P = 0.003$)	
BNS	0.74 ($P = 0.000$)	0.74 ($P = 0.000$)

The correlation coefficients between the scores of the 3 scales for the two educational levels are on Table 4. For subjects with secondary school education and below, the correlation was significant only between VAS and BNS ($r = 0.57$, $P = 0.02$). For those with post-secondary school education, results showed significant positive correlations in all cases. Again, the lowest (although significant) correlation coefficient was between VRS and VAS ($r = 0.54$, $P = 0.01$).

Table 4: Correlation coefficients between pain scores for the two educational levels

	Secondary school education and below (n = 15)		Post secondary school education (n = 20)	
	VAS	VRS	VAS	VRS
VRS	0.52 ($P = 0.86$)		0.54 ($P = 0.01$)	
BNS	0.57 ($P = 0.025$)	0.48 ($P = 0.69$)	0.75 ($P = 0.00$)	0.74 ($P = 0.00$)

Discussion

The finding that significant correlation coefficients exist between the scores derived from the 3 pain rating scales in the present study is similar to the findings of previous studies carried out in other African clinical settings. Jelsma *et al.* [11] reported significant correlation between pain scores obtained from 3 rating scales (the McGill questionnaire, visual analogue scale and Hower verbal rating scale) when used for a group of post-caesarian women in a Zimbabwean population. Soyannwo *et al.* [12] also reported good correlation between a verbal rating scale and the visual analog scale when used for pain assessment and analgesic usage in Nigerian Physiotherapy patients. However, unlike the findings of Soyannwo *et al.* [12], educational status of the subjects in the present study influenced the correlation between scores. Higher correlation coefficients were obtained between the pain scores by subjects with high educational qualifications than by those with lower educational qualifications. This would imply that education improved the subjects' understanding of

the scales in the present study. The difference between our findings and those of Soyannwo *et al.* [12] might be due to the fact that an 11-point VRS was used in our study and a 6-point VRS was used in the study of Soyannwo *et al.* [12]. Verbal rating scales with few descriptors are probably better understood than those with many descriptors by individuals with low educational status. Jelsma [11] also reported that there were higher correlation coefficients between scores by subjects with higher educational status than by those with lower educational status.

We also observed that the correlations between the 2 numerical scales, the BNS and the VAS were higher in all cases than the correlations between the verbal rating scale (VRS) and each of the numerical scales. This agrees with the general finding that even people with low educational status comprehend numerical scales better than the verbal rating scales [5]. It therefore appears that the numerical scales (VAS and BNS) will be more useful when assessing pain intensity among people with secondary school education and below in this environment. However, studies involving large and random samples of the population will be required to confirm this inference.

Conclusion

The relationships among the 3 pain rating scales used in this study (VAS, BNS and VRS), were significant. It would appear that the 3 pain scales measure the same construct, and can be used for measuring pain in obstetrically related conditions in this environment. Higher educational attainment improved the correlations between the 3 pain scales in this study.

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