Original Article ISSN (O):2395-2822; ISSN (P):2395-2814

Gender Differences in Pain Perception.

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ABSTRACT

Background: Gender differences in pain perception have been widely reported, with women typically displaying greater pain sensitivity than men, but the mechanism underlying these differences remain unclear. The aim of this study was to investigate the gender differences in pain perception/responses during propofol injection in an adult Nigerian population. **Methods:** The incidence and intensity of pain were assessed using a four point Verbal Rating Scale 0 to 3 during propofol injection. **Results:** The outcome of gender pain differences, revealed that 100% (4 patients) who experienced pain in group A were female (no male subject was found); while group B had 4 male patients (36.4%) and 7 female patients (63.6%) experienced pain. Thus, female patients had statistically significant greater pain responses/perception than men in both groups, $P < 0.05$ using the Chi-square test. **Conclusion:** Women had significantly greater pain perception than men during propofol injection.

Keywords: Pain perception**,** gender differences, propofol injection pain.

INTRODUCTION

Pain is defined by the International Association for the Study of Pain (IASP) "as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage".[1] Pain is a complex perceptual experience which may be influenced by several factors including gender, age, educational background, religion, memory of past experiences, fear, anxiety, depression, extroversion/introversion and state of neurosis.[1,2]

Multiple studies have investigated gender differences in experimental pain perception using a wide variety of stimuli.[3-7]

Gender differences in pain perception have been widely reported, with women typically displaying greater pain sensitivity than men, but the mechanism underlying these differences remains unclear.[3-7]

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One possible explanation suggests that men are more motivated to tolerate and suppress expressions of pain because of the masculine gender role, whereas the feminine gender role encourages pain expression and produces lower motivation to tolerate pain among women.[3] Fillingim[3] concluded that women show greater perceptual responses than men to mechanical pain, ischaemic pain and cold pressor pain. To measure the difference in pain tolerance between men and women, Fillingim[4] uses something called effect size, which compares the differences between the groups to the differences within each group: on a scale of small, moderate and large, the pain tolerance difference between men and women is considered moderate.

As a result of this multi-dimensional aspect, assessment and measurement of pain are problematic for both patients and researchers. Yet, accurate measurement is necessary in order to facilitate proper management, evaluate different methods of treatment and prognosis. Assigning a measure of pain gives patients some sense of control over their condition and has positive effects on their coping abilities.[2] In clinical research, various methods have been devised for assessment of pain. The uni-dimensional (or self-evaluative) scales such as the Visual Analogue and Verbal Response Scales are popular, the choice of one over the other being dependent on several factors such as memory capacity and the inherent fluctuating quality of the pain experience.[2,8]

Multi-dimensional (or observer) scales such as the McGill pain questionnaire remain the gold standard in pain measurement. The McGill Pain Questionnaire (MPQ) is a checklist of words describing symptoms.

Different scores of pain measurement (mostly VAS or VRS) were used in the systematic review, on propofol injection pain by Picard and Tramer.[9]

Previously, a simplified scoring system of mild, moderate, severe was adopted for postoperative pain assessment in preference to the VAS by Famewo,[10] owing to the low level of literacy of Nigerian patients. The Visual Analogue and Verbal rating Scales have been validated in Nigerian patients by Soyannwo and colleagues,[2] to include the impact of psychosocial and cultural factors on pain perception and also demonstrated that Nigerians are able to use the more complicated tools. The study concluded that both VAS and VRS constitute useful tools for pain assessment in Nigerian patients.

The purpose of this study therefore is to investigate the gender differences in pain perception by

evaluating pain scores (using VRS).

MATERIALS AND METHODS

The approval of the Research and Ethics Committee of the Lagos University Teaching Hospital (LUTH), and informed consent of each patient was obtained. This Interventional study was designed to examine the analgesic effect of lignocaine / metoclopramide combination and compare the effect with that of lignocaine alone, during propofol injection.[11] The objectives are-

1. To investigate the incidence of pain following propofol injection after pretreatment with lignocaine/metoclopramide combination compared with lignocaine alone by VRS, the outcome of which was published in a previous study by this author.[11]
2. To investigate the gender differences in pain perception/responses using VRS, this is the focus of the present study.

Design: This was a comparative prospective randomized double blind control Interventional study conducted over a period of six months among adult elective surgical patients at the Lagos University Teaching Hospital (LUTH). Settings/ participants: Seventy (70) American Society of Anesthesiology (ASA) physical class I or II adult elective surgical patients participated in the approved study. Excluded from the study were: patients < 18 and >65 years, ASA class > II, patients having difficulty with communication or educationally challenged, those with a history of adverse response, allergy to any drug used in the study (propofol, lignocaine, or metoclopramide), and those who had received any analgesic drug within the 24 hrs preceding surgery. Excluded also where emergency surgery and patients with a full stomach, patients with compromised airway for whom intravenous induction will be a contraindication, anticipated difficult venous access, cardiac conduction defects and absence of informed written consent. A total of seventy (ASA physical status, class I and II) patients was studied, comprising twenty-seven men (38.57%) and forty-three women (61.43%), 35 patients in each group; who came in for various elective surgical procedures under intravenous general anaesthesia were randomly assigned to two different groups, A or B. The effectiveness of a combination of i.v lignocaine 20 mg/ i.v metoclopramide 10 mg (group A, n=35) when mixed with i.v propofol 2.0 mg, $^{-kg}$ in reducing pain on injection at induction of anaesthesia was compared with using i.v lignocaine 20 mg alone mixed with i.v propofol 2.0 mg^{-kg} into a dorsal hand vein (group B, n=35). During a ten-second pause after the first 25% of the calculated propofol dose (mixed with study drugs) was given, the patients were asked standard questions regarding pain on injection before induction of anaesthesia. The incidence and intensity of pain were assessed using a four point Verbal Rating Scale 0 to 3 during propofol injection. Thereafter, the induction of anesthesia was continued and completed with the remainder of the calculated propofol dose and endotracheal intubation facilitated with 0.1 mg/kg Pancuronium in the two groups. In all other respects, except for the surgery the patients had the same treatment. Data entry and analysis were done with the computer analytical package; SPSS 14.0 Inc. Chicago, Illinois.

Categorical variables: Pain intensity, Pain Recall and the Gender were measured and recorded.

RESULTS

A total of seventy patients from various surgical specialties, were studied, comprising twenty-seven men (38.57%) and forty-three women (61.43%), 35 patients in each group.

Group A had thirteen males (37.14%) and twenty-two females (62.86%), Group B had fourteen males (40.0%) and twenty-one females (60.0%), one patient was dropped from the study in each group due to painful cannulation and for lack of further co-operation to continue with the study.

The demographic data was compared between the two groups, as shown in [Table 1]. Using the students T-test for paired data, there were no significant differences between the groups with respect to age, gender, weight, and ASA Classification. There was no significant differences (P>0.05) in age (P=0.33), sex (P=0. 25), weight (P=0. 19) and ASA Classification (P=0. 42), between the two groups.

Table 1: Demographic data and Clinical characteristics.

Variable	Group A (Intervention) n = 35	Group B (Control) n=35	P Value Level Of	Significance
Age/years Mean ± SD	39.09 ± 12.11	36.14 ± 12.97	0.33	N.S
Weight (kg) Mean ± SD	68.49 ± 10.61	65.16 ± 10.60	0.19	N.S
Gender Ratio(M:F)	13:22	14:21	0.25	N.S
ASA Classification Ratio of (I:II)	24:11	27:8	0.42	N.S

Values are mean ± SD or ratio; M = Male; F = Female;
Group A= Intervention =Metoclorpramide + Lignocaine;
Group B = Control = Lignocaine only.
N.S = not significant

The mean age was 39.09± 12.11 years using the students T-test for paired data in group A and 36.14 ± 12.97 years in group B (P=0.33, P>0.05) .
The mean weight was 68.49 ± 10.61 kg in group A and 65.16 ± 10.60 kg in group B (P=0.19, P>0.05).
ASA Classification I/II, in group A= 24/11 and in group B =27/8(P=0.42).
Male / Female ratio, in-group A =13/22 and in-group B= 14/21 (P=0.25).
The incidence of pain on intravenous injection of propofol was 11.77% in-group A whiles the incidence in-group B was 32.35%, as shown in [Table 2].
Group A showed a statistically significant less incidence of pain than group B, (P= 0.041, P< 0.05) using the Chi-square test and Fishers exact test (0.038) for categorical data.
Group A had one patient with severe pain (pain intensity scores 2 or 3) compared with Group B (with 7 patients), though there was no statistical intergroup differences in pain intensity scores (P= 0.118, P > 0.05) using the Chi-square test for categorical data; as shown in [Table 2] and [Figure 2]. Thirty patients in-group A and twenty-three in-group B gave a median pain score (VRS) of 0. There was no statistical difference in verbal pain (intensity) response scores (VRS) between both groups (P= 0.118, P > 0.05) using the Chi-square test, as shown in [Table 2].

Table 2: Comparison of pain scores (VRS-4) in the two groups.

Group (n)	Score 0	I	II	III	Presence of pain (%)
A(34)	30(88.23%)	3(8.82%)	1(2.94%)	0	4 (11.77%)
A(34)	23(67.64%)	4(11.76%)	4(11.76%)	3(8.82%)	11(32.35%)

Pearson chi-square for pain incidence is 0.041 (p< 0.05); Pearson chi-square for pain intensity score is 0.118(p >0.05).

The Odds Ratio (OR) Odds A/B = 3.552, is statistically significant at 95% CI Level (1.005-12.552), the intervention (treatment) is of relative benefit over control.
Gender pain differences- The outcome of gender pain differences, revealed that 100% (4 patients) who experienced pain in group A were female (no male subject was found); while group B had 4 male patients (36.4%) and 7 female patients (63.6%) experienced pain. Thus, female patients had statistically significant greater pain responses /perception than men in both groups, P < 0.05 using the Chi-square test- [Table 3].

Table 3: Gender pain differences.

Group (n)	Presence of pain (%)	Female(n)	Male(n)	Significance (P)
A(34)	4 (11.77%)	4 (100%)	0(0%)	P < 0.05, S
B(34)	11(32.35%)	7 (63.6%)	4(36.6%)	P < 0.05, S

S = significant

DISCUSSION

Multiple studies have investigated gender differences in experimental pain perception using a wide variety of stimuli.[3-7] The stimuli used in our study, is the pain elicited by the injection of propofol at induction of anaesthesia.
In this study many confounding factors associated with propofol injection pain, including the temperature of the solution, the size of the vein and speed of injection, were controlled between the groups by using veins of similar size on the hand, 0.5 ml/s injection rate and propofol at room temperature.[12-14]
Observed intragroup gender pain perception differences, revealed that female patients had statistically significant greater pain perception than men within both groups, supports the observation of Fillingim[3] that women show greater perceptual responses than men to mechanical pain, ischaemic pain and cold pressor pain. Sex differences in experimental pain perception using a wide variety of stimuli have been widely reported; with female typically displaying greater pain sensitivity than male, but the mechanism underlying these differences remain unclear.[3,5,6] One possible explanation is that men are motivated to tolerate and suppress expressions of pain because of the masculine sex role, whereas the feminine sex role encourages pain expression and produces lower motivation to tolerate pain.[3] To measure the differences in pain tolerance between men and women, Fillingim[10] used “effect size”, which compares the differences between the groups to the differences within each group: on a scale of small, moderate and large, the pain tolerance difference between men and women is considered moderate. We found a large female cohort in group A and a moderate effect size in group B, which supports the hypothesis that women have greater pain sensitivity than men.

CONCLUSION

Women had significantly greater pain perception than men during propofol injection.

Acknowledgement

Professor O.T. Kushimo supervised the work and approved the final manuscript (HOD / consultant at the University of Lagos and LUTH in Nigeria).

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How to cite this article: Orilonise OO, Olatosi JO. Gender Differences in Pain Perception. Ann. Int. Med. Den. Res. 2016; 2(3):25-8.

Source of Support: Nil, **Conflict of Interest:** None declared