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Pain Experience and Pain Control among Trauma Patients in Oral and Maxillofacial Surgery Clinic of Mulago Hospital, Uganda

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ABSTRACT

Background: *Pain is an unpleasant sensory and emotional experience often described as tissue damage, in the presence/absence of actual tissue damage or somatic disease. The aim of the present study was to establish pain experience of trauma patients and pain management practices of health care practitioners during invasive interventions in the Oral and Maxillofacial Surgery Clinic of Mulago Hospital.*

Methods: *This was a cross sectional study on 187 trauma patients scheduled for invasive interventions who were consecutively recruited. Pain experience was evaluated using a horizontal Visual Analogue Scale to ascertain their pain experience before and during invasive procedures. During surgical invasive procedure, no and mild pain were defined as successful whereas moderate and severe pain were considered failed pain control.*

Results: *Before invasive intervention, 74.3% of the participants reportedly experienced either no or mild pain. During invasive procedures, all participants reported feeling some degree of pain; 21.4% being mild in nature. Overall, there was no consistency in pain control techniques applied for any given intervention with the exception of surgical toilet and zygomatic arch elevation, where anesthetic infiltration was the only technique applied. During surgical toilet, pain control was successful in 84.6% of the participants, while splinting of teeth and intermaxillary fixation, infiltration was successful in 50% and <20% of the participants, respectively. Eyelet wire removal was performed in 40.1% (n=75) of the participants with no form of pain control with 70.6% (n=53) of the participants reporting severe pain during the procedure.*

Conclusion: *Most participants reported a higher degree of pain during the intervention compared to their pre-intervention time. No pain control was provided to patients during eyelet wire removal, most of whom reported severe pain. Most interventions had varied approaches to the pain control techniques with the exception of surgical toilet and elevation of the zygomatic arch.*

Keywords: *local anaesthesia, lignocaine, pain control, pain experience, trauma, visual analogue scale*

INTRODUCTION

Pain is an unpleasant sensory and emotional experience often described as tissue damage, in the presence/absence of actual tissue damage or somatic disease[1]. Sensitivity to pain differs between individuals because of modification by factors such as genetics[2], gender, age, anxiety, psychosocial factors[3]. Pain is a very discomforting sensation and the victim may present with one or a combination of the following symptoms: restlessness, trismus, crying, rigid movements and making of abnormal sounds. Such symptoms may present challenges to the clinician in making definitive diagnosis, treatment planning and assessment of expected treatment outcomes. However, pain is a protective mechanism that alerts the body of ongoing tissue damage, which makes the individual to respond by moving or withdrawing from the stimulus[4] or seeking intervention. Through empathy of the patient by the clinician, pain control is a very important aspect of treatment, particularly in patients who are already known to be in pain or where the interventions are known to trigger pain sensation. Clinicians have different techniques of managing pain in any given situation, however, failure in effective pain control has been reported in 1 of every 7 dental patients[5].

Based on medical records, the common procedures performed on trauma patients in the Oral and Maxillofacial Surgery (OMFS) Clinic

of Mulago Hospital include: reduction and fixation of facial bone fractures, surgical toilet, eyelet wire fixation and removal, which require pain control. There are various techniques of managing pain in such invasive procedures like use of local, regional and topical anesthesia as well as conscious sedation, which may be used either singly or in combination depending on various factors. In the OMFS Clinic, these options are limited by factors such as large number of patients, limited equipment and skilled personnel such as anaesthetist /anaestheologist to facilitate the frequent use of options such as conscious sedation (Personal communication, Consultant Oral and Maxillofacial Surgeon). The aim of the present study was to establish the pain experience of trauma patients and the pain control practices of dental practitioners during invasive procedures in the Oral and Maxillofacial Surgery Clinic of Mulago Hospital.

METHODOLOGY

Study Design

This was a cross sectional study using a questionnaire and observation carried out on trauma patients attending Oral and Maxillofacial Surgery (OMFS) clinic in Mulago Hospital.

Study Setting

The study was carried out in OMFS clinic of Mulago Hospital. Mulago Hospital is a national referral and teaching facility located in the capital city, Kampala, with a capacity of 1500 beds. The hospital has many specialized clinics including OMFS clinic that handles oral and maxillofacial surgery patients referred from lower health facilities in Uganda. It has an out patients' clinic and a ward with 21 beds Based on medical records, the outpatients' clinic attends to between 500 to 800 patients per month of which approximately 30 are trauma patients who need invasive interventions. The trauma patients are routinely attended to by a team of oral health workers who include: Oral and Maxillofacial surgeons, Registrars, Dental surgeons, Interns and Nurses

Study Population

The targeted participants were all trauma patients who presented to the OMFS clinic of Mulago Hospital from May to September 2014.

Selection of Participants

Trauma patients (n=187) who were newly registered and scheduled for invasive procedures in the OMFS outpatients clinic were consecutively recruited. The patients were informed about the study, taken through informed consent and those who volunteered to participate were recruited based on the following inclusion criteria: aged between 18 and 74 years, and could communicate either in English or Luganda language. However, patients (=4), who had history of chronic pain, mental health disorder, blind, deaf, dumb or very sick were excluded.

Data Collection Procedure

The patients were administered to a structured questionnaire in form of an interview and their medical records were reviewed to collect the relevant information. In addition, each of the patients was provided with a horizontal visual analogue scale (VAS)[6] on which they were asked to use a pen and indicate their degree of pain before the invasive procedure. Then, pain control interventions with 2% lignocaine hydrochloride and epinephrine in the ratio of 1:80,000 (Adcock Ingram Ltd, South Africa) in form of either infiltration, nerve block or a combination of the two was carried out by one Dental Surgeon previously calibrated by a Consultant Oral and Maxillofacial Surgeon.

After the invasive procedure, the patient was again provided with another copy of horizontal VAS and asked to indicate the degree of pain experienced during the procedure. The two score values were recorded on the data collection form.

Quality Assurance

After duplicating horizontal VAS by photocopying, each copy was checked with a measuring ruler (JMK, Uganda) to confirm that the scale line was 100 mm before use. The data collection forms were checked for errors and completeness before the patient was discharged from the clinic. The data were entered into a computer using Excel spread sheet and again checked for errors and completeness before exporting to Statistical Package for Social Sciences (SPSS) for analysis. A soft copy of the data was secured in a portable hard disc as a backup. The data collection forms were kept under lock and key and will be destroyed 5 years after the study.

Data Analysis

The VAS scores recorded from the study participants were categorized as: 0 =0-4 mm, 1 = 5-44 mm, 2 = 45 - 74 mm and 3 = >74 mm, which were interpreted as no, mild, moderate and severe pain, respectively[6]. In the present study, no and mild pain was defined as

successful pain control while moderate and severe pain, as failure.

The route of administration of local anaesthesia (pain control interventions) were categorized as Infiltration, Nerve block and combination of the two. The nerve blocks were further subdivided into: Gow Gate's technique, inferior dental alveolar nerve, incisive, long buccal nerve and mental nerve blocks. Descriptive statistics were used to summarise the data. The data were analyzed using SPSS Inc., version 17, Illinois, Chicago, USA.

Ethical Considerations

The study protocol was approved by Makerere University School of Health Sciences Institutional Review Board (as per reference no. REC 2013-030) and permitted by Mulago Hospital administration. The participants were taken through the informed consent process in accordance with Helsinki Declaration[7]. All information from study participants was handled confidentially.

RESULTS

Participants' Characteristics

Overall, 187 participants aged 19 – 55 years were recruited into the study; most (48.7%) of them in the age group of 20 - 29 years. About 90% of the participants were males (Table). Most participants (59.9%) had fracture of the mandible followed by dental alveolar bone (11.2%) and soft tissue injuries (6.9%). Eyelet wire removal was the most prevalent invasive intervention followed by inter maxillary fixation done on the participants: 40.1% and 35.8%, respectively (Table).

Table1. *The frequency distribution of the participants according to demographic characteristics (n=187).*

Description	Category	Number	Percent
Age (years)	<20	16	8.6
	20 – 29	91	48.7
	30 – 39	56	30.0
	40 – 49	17	9.1
	>49	7	3.7
Gender	Male	169	90.4
	Female	18	9.6
Occupation	Businessman/woman	63	33.7
	Boda boda rider	31	16.6
	Student	19	10.2
	Driver	13	7.0
	Peasant farmer	12	6.4
	Others	49	26.2
Injury	Mandibular fracture	112	59.9
	Dental alveolar fracture	21	11.2
	Soft tissue injury	13	6.9
	Others	41	21.9
Invasive procedure	Eyelet wire removal	75	40.1
	Intermaxillary fixation	67	35.8
	Tooth splinting	20	10.7
	Surgical toilet	13	6.9
	Others	14	7.5
Pain control	Lignocaine + adrenaline	112	59.9
	None	75	40.1
Route of administration of local anaesthesia (n=112)	IAB + LB + INFIL	47	42.0
	INFIL	42	37.5
	IAB + INFIL	12	10.7
	IAB	8	7.1
	IAB + LB	2	1.8
	IAB + LB + Mental nerve block	1	0.9

IAB- inferior dental alveolar nerve block, LB- long buccal nerve block, INFIL- infiltration

Participants' Pain Experience Before and During Invasive Interventions

Before intervention, 74.3% of the participants reported feeling no or mild pain while 25.7% reported moderate or severe pain (Fig.1). During invasive procedure, 78.6% of participants reported moderate or severe pain, while mild pain was reported in 21.4 % of the cases (Fig. 1).

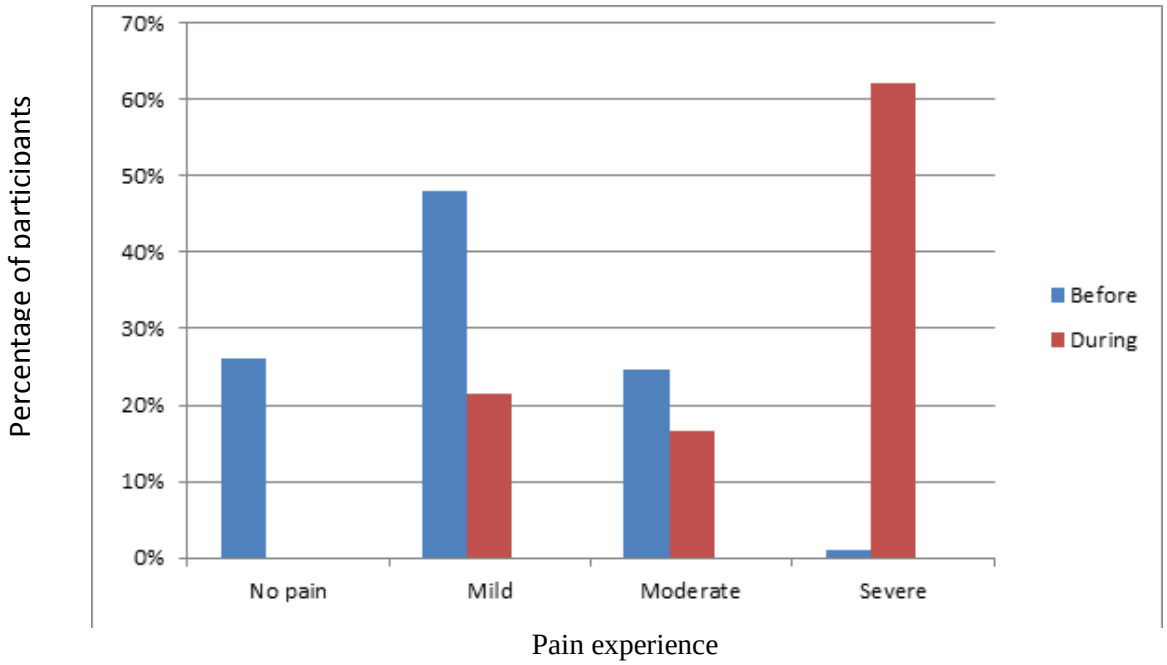

Figure1. *The frequency distribution of participants based on pain experience before and during invasive procedures (n=187)*

Non Intervention in Pain Control

Eyelet wire removal was the most common (40.1%) intervention performed on the participants without pain control. Before eyelet wire removal, 98% (n=73) of participants reported no (64%) or mild (34%) pain, while during the intervention, all the participants reported some degree of pain: 13.3%, mild; 70.6%, moderate and 16.1%, severe pain (Fig. 2).

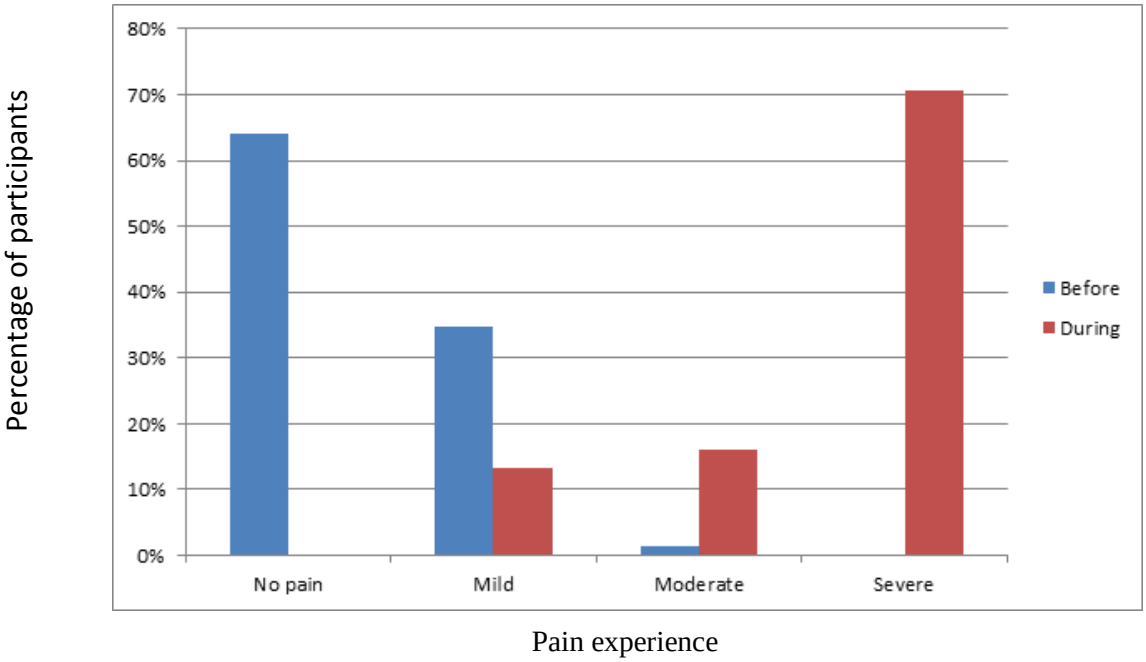

Figure2. *The frequency distribution of participants according to pain experience before and during eyelet wire removal (n=187)*

Inferior Dental Alveolar Nerve Block

The inferior dental alveolar nerve block as a sole method of pain control was used on 4.3% (n=8) of the participants during inter maxillary fixation and tooth splinting. During inter maxillary fixation, all the patients reported severe pain, whereas during tooth splinting, 60% of the participants reported severe and 40%, moderate pain.

Infiltration

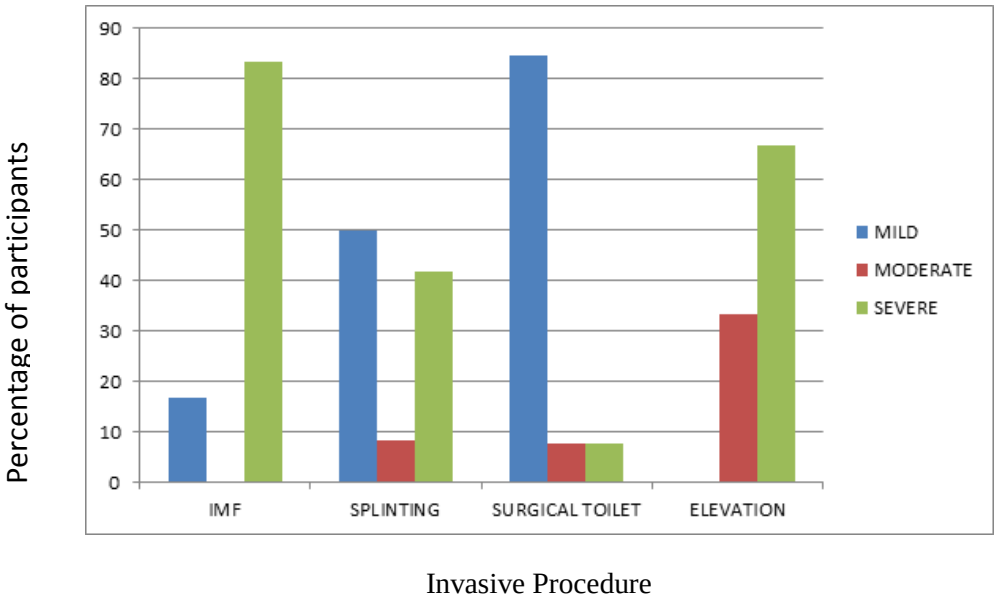

Figure 3. *The frequency distribution of participants according to pain experience when infiltration was used in pain control during inter-maxillary fixation, tooth splinting, surgical toilet and zygomatic arch elevation procedures (n=37)*

Infiltration as a sole method of pain control was used in 22.5% (n=37) of participants for different surgical procedures (Fig. 3). During surgical toilet, 84.6% of the participants reported mild pain, while 15.4% had either moderate or severe pain (Fig. 3).

A half (50%) of the participants had mild pain during tooth splinting and 83.3%, severe pain during inter-maxillary fixation (Fig. 3). About 33.3% and 66.7% of the participants reported moderate and severe pain, respectively, during zygomatic arch elevation.

Inferior Dental Alveolar Nerve Block and Infiltration

A combination of the inferior dental alveolar nerve block and infiltration was used in pain control on 6.4% of participants, all of whom had inter-maxillary fixation. All the participants reported severe pain.

DISCUSSION

The tool used for assessing pain experience in the present study was horizontal Visual Analogue Scale because it is reported to be the gold standard[8]. There is an electronic version of VAS[9], but because of limited funds to acquire the electronic type, we used the paper version. Previous studies[10,11] reported that there could be some limitations of the VAS paper version such as changes in line length during photocopying. However, in the present study, each line was checked with a ruler to confirm that the length was 100 mm.

Patients with cognitive impairment are less likely to use the VAS[12] and accordingly, those with mental health disorders were excluded in the present study. Furthermore, patients aged 75.3years and above have been found to have difficulties in expressing the magnitude of pain on the VAS because of deterioration in abstract ability[13]. In the present study, recruitment of participants was limited to a maximum of 74 years of age.

Furthermore, graphic orientation of the scale may affect statistical distribution of data obtained previously revealed by low agreement between horizontal and vertical VAS scores[14]. It is advisable that the orientation of the VAS should be in line with that of the normal reading of the population under study. It should be noted that the normal reading of the Ugandan population is from left to right, which is the horizontal orientation, thus the horizontal VAS was used in the present study.

Local anaesthetic drugs provide reversible regional body loss of sensation while the patient remains conscious. In the present study, 2% lignocaine mixed with epinephrine in ratio of 1:80,000 (Adcock Ingram Ltd, South Africa) was the local anaesthetic drug used in pain control. When the patient reported no or mild pain based on VAS recording, it was considered

successful pain control and when moderate or severe pain, it was deemed unsuccessful. Adequate pain control is important for good patient care as it ensures both patient and clinician's comfort during invasive interventions. The prevalence of moderate or severe pain during invasive procedures was 78.6% (Fig. 1), which is much higher than 1 of every 7 dental patients previously reported[5].

The majority (90.4%) of the participants were males and about half of the participants were between 20 and 29 years of age, which is similar to what was found in a rural area of southern Punjab, India[15] and in Nigeria[15].

About 98% of the participants with eyelet wires had mild or no pain before intervention, however, during wire removal, all participants reported some degree of pain; 13.3% experiencing mild pain (Fig. 2). This observation highlights the need to regularly apply an appropriate pain control procedure during eyelet wire removal.

In the present study when inferior dental alveolar nerve block as the sole pain control technique was used in 4.3% of the participants during IMF and tooth splinting, all them reported at least moderate pain. Previous documented success rates of this technique (inferior dental alveolar nerve block) with equivalent drug, 4% articaine and epinephrine in ratio of 1:100,000) based on VAS scores were in the order of 23%[17]. Other studies[17-20] reported failure rates as high as 80% of the cases. Failure has been attributed to factors such as accessory innervations, anxiety and inflammation[21] and accuracy of needle placement[22].

Half of participants undergoing tooth splinting reported either severe or moderate pain when drug infiltration was applied (Fig. 3). Presence of a fracture line at the site of drug deposition is possibly a factor thought to enhance better outcome. However, in the present study, it was not possible for the investigator to ascertain the presence of fracture line. About 84.6% of the participants indicated mild pain during surgical toilet following infiltration, which was much higher than earlier reported 45% - 67%[23] and 62%-73%[24].

However, when infiltration was used in elevation of the zygomatic arch, two thirds of the participants reported severe pain. This high failure rate could probably be due to low efficacy of the anaesthetic drug to access hard tissues of the affected area.

Inferior Dental Alveolar Nerve Block and Infiltration

In the present study, although a combination of inferior dental alveolar nerve block and buccal infiltration was applied on a small proportion (6.4%) of the participants during IMF, all the participants reported severe pain compared to a success of 71% previously observed[25].

Conclusion and Recommendations

In the present study, there was no consistency in the techniques of pain control for any invasive intervention except in surgical toilet and zygomatic arch elevation, where infiltration was the only technique applied. There is a need to determine an appropriate technique of pain control for eyelet wire removal and have it applied regularly. There should be further studies involving different clinicians to inform standard operating procedures of pain control for each invasive procedure, which should be regularly evaluated for corrective improvement.

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