

## Analgesic Prescriptions Patern Following Abdominal Surgery in A University Teaching Hospital

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### Abstract

*Background:* Pain is an inevitable occurrence following surgery and its control is an important component of post-operative care. Many patients still suffer from poor post-operative pain control which is associated with a lot of secondary undesirable consequences.

*Methods:* We conducted a prospective observational study on 120 patients undergoing abdominal surgery over a 3-year period in a teaching hospital to determine adequacy and pattern of analgesic prescriptions. The patients' case notes were retrieved from the record unit of the hospital following discharge and relevant data extracted.

*Results:* The mean age of the patients was 47.36 ( $\pm 8.933$ ). Twenty-four (20%) were older than 65 years. The most common abdominal surgical procedure performed was appendectomy. Non-steroidal anti-inflammatory drugs only, opiod only, opiod-NSAID combination and NSAID-NSAID combinations were prescribed for 42.5% ,30.83%, 14.16%) and 7.85% of cases respectively and no prescription in 3.3% of cases. Pentazocine was the most commonly prescribed opiod. Females tend to have more opiod prescriptions than males (OR= 3.4,  $p=0.0052$ ). Other factors that favoured opiod prescription include; age <65 years (OR=4.8571,  $p= .0019$ ), patient in high social class (OR= 3.6364,  $p=0.4182$ ), and Yoruba ethnicity (OR=3.2406,  $p= 0.0149$ ). Non-steroidal analgesics were the most commonly prescribed analgesic to patients that underwent major abdominal surgeries.

*Conclusion:* We thus recommend use of analgesic combinations and dose adjustment based on patients' severity of pain in post-operative abdominal pain control.

**Keywords:** Pattern, Analgesic prescription, Abdominal surgery and Postoperative pain.

### Introduction

Pain is an inevitable occurrence following surgery and its control is an important component of post-operative care that has received much attention, [Kehler 2004, White & Kehler 2010] Though not all pain requires drug treatment however analgesic is the main stay of post-operative pain management. This acute form of pain is secondary to direct tissue injury and obligate nociceptive inflammatory mediators resulting from damage to vascularised tissues. Many patients still suffer from poor post-operative pain control. [Mark & Sachar, 1973; Cohen, 1980; Kuhn, 1990] This form of pain is controllable when appropriate mode of analgesia is chosen, and with use of recent analgesia

techniques. [AHCPR, 1992; Torda, 1995; McQuay, et al 1997] Poor post-operative abdominal pain control is associated with a lot of secondary undesirable consequences [Bruster, 1994; McQuay, et al 1997] that may affect interpretation of patients' physiological parameters as well as increased risk of certain post-operative complications following abdominal surgeries such as pulmonary complications, deep venous thrombosis and psychosocial and economic adverse effects among others. [Heyburn, 2003; White & Kehler, 2010; Apfelbaum, et al 2003] It also one of the major causes of delayed recovery of normal bowel function, and prolonged hospital stay. [Rowbotham, 1993; Heyburn, 2003] Various factors such as opiphobia, disparity in pattern of opioid prescriptions are responsible for poor post-operative pain control. Opiphobia resulting from fear of "drug-seeking" behaviour, dependence or addiction and respiratory depression has been identified in various clinical setting. This opiphobic phenomenon has resulted in a situation in which adequate analgesia is difficult to achieve in many clinical conditions. In lieu of present documented evidences for poor post-operative pain control and its effects, surgeons need to be well equipped and versed in pain management especially in an acute setting. The aim of this study was to investigate the extent of opiphobia and other factors that are responsible for disparity in opioid analgesic prescription and administration pattern among patients that underwent abdominal surgery in our centre.

## Methods

This prospective observational study consecutively recruited 120 patients that are undergoing abdominal surgery between May 2014 and May 2017 in Ladoko Akintola University of Technology Teaching Hospital Ogbomosho. Patients admitted to intensive care unit following abdominal surgery were excluded from the study. The patients' case notes were reviewed while on admission and after discharged to obtain other relevant data. The data obtained from the patients' case notes included: Socio demographic characteristics of the patients, clinical diagnosis, definitive surgical procedures patients underwent, analgesic prescribed for the patients, analgesic patients received, drug(s) patients were discharged on. All this were done without the knowledge of all other members of the general surgery units and other surgical unit staffs that were involved in patients' care to avoid bias in their analgesic prescriptions. The data obtained were analysed using Biostatistics for Ipad (Apple inc. USA) and Microsoft Office Excel version 2007. The data were presented in forms of tables and charts. Chi-square was used as test of significance for categorical variable and *P* value less than .05 was considered to be statistical significance.

## Results

One hundred and twenty patients were targeted for the study. The mean age of the patients was 47.36 ( $\pm 8.933$ ). Twenty-four (20%) out of the 120 patients were older than 65 years. The sociodemographic characteristics of the patients were as shown in table 1.

The most common abdominal surgical procedure performed over the study period was appendectomy which constituted 31.66% of the total procedures; other procedures were inguinal hernia repair, small bowel surgery, cholecystectomy (with or without biliary duct exploration), colonic surgery and gastroduodenal surgery. (Figure 1)

Fifty-eight (48.33%) cases were emergencies while 62 (57.40%) cases were elective. Non-steroidal anti-inflammatory drugs (NSAID) were the most commonly prescribed agents and was sole prescription in 51 (42.5%) patients while opioid analgesic only, opioid-NSAID and NSAID/NSAID combination were prescribed in 37 (30.83%), 17 (14.16%) and 11 (7.85%) of the cases respectively with no evidence of prescription in 4 (3.3%) cases. Eighty-two (56.9%) out of 144 number of prescriptions were in generic names.

Analysis of opioid analgesic prescriptions revealed that pentazocine was the most commonly prescribed opioid (Figure 2). Review and analysis of pentazocine prescriptions revealed that in twenty-six (83.87%) out of the thirty-one prescriptions, it was prescribed at a dosage of 30mg 6 hourly.

Twenty-three (31.08%) out of seventy-four males had opioid prescription as part of their analgesic prescriptions as compared to thirty-one (67.39%) females out of 46 females who had opioid as part of their prescribed analgesic. This pattern of differential analgesic prescription between males and females shows statistically significant difference (OR= 3.4, *P* =.0052).

Sixty-four (69.8%) out of ninety-six patients who were less than 65 years had opiod analgesic as part of their analgesic prescriptions as compared to seven (29.16%) out of twenty-four patients older than sixty-five years (OR=4.8571,  $p= .0019$ ). Figure 3 shows variation in opiod prescriptions across different age groups.

When opiod prescriptions were compared among different ethnic groups Yoruba patients had higher frequency of opiod prescriptions as compared to other ethnic groups as sixty-one (69.89%) out of 93 Yoruba patients, 5 (27.27%) out of 11 Igbo patients, and 5 out (18.75%) of 16 Hausa/Fulani had opiod prescription as part of their analgesic prescription (OR=3.2406,  $P= 0.0149$ ).

Five (83.33%) patients belonging to high social class had opiod analgesic in their prescriptions as compared to 66 (57.9%) out of 114 patients in low and intermediate social classes. This pattern of opiod analgesic prescriptions shows a statistically significant difference among the social classes (OR= 3.6364,  $p=0.4182$ ).

Analysis of NSAID prescriptions revealed that diclofenac was the most commonly prescribed NSAID. (Figure 4).

Eighty-seven (72.5%) of the patients were discharged home without evidence of analgesic prescription and in none of the case notes were documented evidence of patients' pain score assessment while in wards and prior to discharge. Most documented evidence of take home analgesic prescription were seen mainly in patients who had elective hernia repairs as seventeen out of the 21 patients who had elective hernia repair were discharged home on same day with five, two, four, one and three patients on paracetamol only, diclofenac only, diclofenac-ibuprofen combination, meloxicam- paracetamol combination and dihydrocodeine-diclofenac combination respectively.

## Discussion

Analgesics are often prescribed in the postoperative period to control postoperative pain following all forms of surgery. Control of post-operative abdominal pain is very important in post-operative setting to avoid unwanted effects of oligoanalgesia such as deranged physiological parameters, restlessness, and poor patients' cooperation among others.

Our study found out that non-steroidal anti-inflammatory drugs were the most commonly prescribed analgesic following abdominal surgery. Further analysis of NSAID prescription revealed that NSAID-NSAID were wrongly combined in about 9% of prescriptions a finding consistent with another study that reported similar pattern of prescription. [Sinan, 2012] This NSAID- NSAID combination is not advisable, however if such occasion should arise due to severity of the pain the rational alternative will be NSAID in combination with other class of analgesic such as opiod or paracetamol which has little adverse effects on the gastro intestinal mucosa.[Becker & Phero, 2005; Becker, 2010] About 57% of the prescriptions were in generic names a finding comparable to what is found in a study on analysis of prescriptions in a teaching hospital. [Raftery, et al 1995] The acts of prescription in brand names is to be discouraged as this will leave the patients to insist on a particular brand of drug that may not even be available when generic alternatives are available and possibly at a lower cost.

Pentazocine was the most commonly prescribed opiod analgesic (figure 2). Possible explanations for infrequent prescriptions of stronger opiod analgesic include unavailability and high cost of morphine and other more potent opiod analgesic agents such as fentanyl, pethidine. The pentazocine, which is the most commonly prescribed opiod analgesic was prescribed in about 84% of occasions at a dosage of 30mg every 6 hours for a drug whose half-life is between 3 to 4 hours; irrespective of the patients' age, weight and severity of pain. Though no statistically significant difference in pattern of opiod prescriptions for males and females, however female are three times more likely to receive opiod analgesic as compared to male. This preferential pattern of stronger analgesic agents for females was previously reported in a study. [Raftery, et al 1995] The possible explanation for this sex preferential prescription in favour of female could be due to observation that females tend to be more sensitive to pain but less responsive to analgesic. A similar study on analgesic prescription between male and female patients revealed that female patients were more likely to show less tolerance to pain than males and thus were perceived by the clinicians to be in more pain than the male patients for similar conditions and thus received higher dosage and more potent analgesic. [Raftery, et al 1995]

This preferential pattern of analgesic prescription pattern was also observed among the younger age groups as patients who are less than 65 years were two times more likely to have opioid prescription in their analgesic prescriptions a finding consistent with Jones JS and co-workers' study finding, which showed that older age group were more prone and at risk of oligoanalgesia for various reasons. [Jones, 1996].

The opioid prescription pattern was in favour of Yoruba ethnic group as opioid prescription was much higher in Yoruba ethnic group as compared to other ethnic groups. The role of ethnicity as one of the major factors contributing to opioid and other analgesic disparity prescriptions pattern has been documented in some studies. [Todd, 1993; Todd, 2000] The preference for opioid analgesic prescriptions for Yoruba ethnic group was probably borne out of non-documented and perceived popular socio-cultural belief among Nigerians that Hausa/Fulani and Igbo tend to be stronger and can withstand pain much better. Though the effects of cultural bias on pain tolerance, cultural differences between patients and the prescriber may also contribute to this bias on analgesic prescriptions. [Todd, 1993; Todd 2000] Other factor identified to favour opioid prescription was patients' social class as patients in high social class received more opioid prescriptions compared to patients in lower and middle social classes. The possible explanation for this could be better purchasing power of patients in high social class and perceived belief that high social class individual tends to be less tolerant to pain.

More than half of the patients who were admitted were discharged home without analgesic prescription as part of take-home drugs however all were given antibiotics in various forms and combinations. This habit of discharging patients' home without analgesic cannot be objectively justified as patients' pain severity were not assessed prior to discharge and thus we cannot assume that patients are pain free at the point of discharge.

Abdominal surgeries are associated with significant pain especially when upper abdomen is involved in the surgical incision. In spite of this recognition control of post-operative pain still remains a major challenge in post-operative setting. [Apfelbaum, 2003; White, 2008; White & Kehler ,2010] Pain associated with abdominal surgeries often predisposes patients to shallow breathing with suppression of deep breathing in an effort to minimize pain thus making abdominal surgeries a risk factor for post-operative pulmonary complications (PPC) with reported incidence ranging from 5% to 40%. [Seiler, 2009; Hemmes, et al 2014].

Though the choice of post-operative pain control is affected by many factors such as availability of drugs and equipment in delivering the analgesic agents a reflection from our study, which shows that morphine constituted only about 2% of opioid prescriptions and possible explanation for this could be due to the cost and unavailability of the drug, a factor not alien to the authors. Also, none of the patients under study received analgesic in-form of patients control analgesia or epidural analgesia as form of post-operative analgesia, this was due to relative unavailability of the equipment for such modality in our setting a factor not uncommon in developing nations. Lack of stronger opioid analgesic agents is still an on-going challenge in many developing nations where opioid consumption and availability is reduced as once reported by World Health Organization (WHO) in 2003 that only 6% of world opioid are in developing nations where over 80% of world population are. [WHO, 2003] This skewed pattern of opioid distribution in favour of developed nations was also confirmed by International Narcotics Control Board 2010 report. [International Narcotics Control Board, 2001] Despite our limited resources, the authors believed that recognition of our deficiencies through routine assessment of our analgesic practices and sincerity of efforts are important factors that can help improve and assist in management post-operative abdominal pain. This is in support of Rawal's resolution who believed that solution to poor and inadequate post-operative pain control lie in optimal utilisation of our limited resources rather than procurement of expensive drugs, equipment and use of novel modalities [Acute pain services revisited, 2002] through a multimodal approach as previously suggested. [Rawal, 2001; Kehler, 2007; Macintyre & Schug, 2007; Buvanendran & Kroin, 2009; White & Kehler, 2010].

## Conclusion

Post-operative abdominal pain control still remains suboptimal as revealed from our study due to lack of understanding of analgesic use coupled with opiphobia and unavailability of stronger opioid analgesic agents. Non-steroidal analgesic agents were the most commonly prescribed analgesic to patients that underwent major abdominal surgeries. We recommend use of analgesic combinations and dose adjustment based on patients' severity of pain, in post-operative abdominal pain control.

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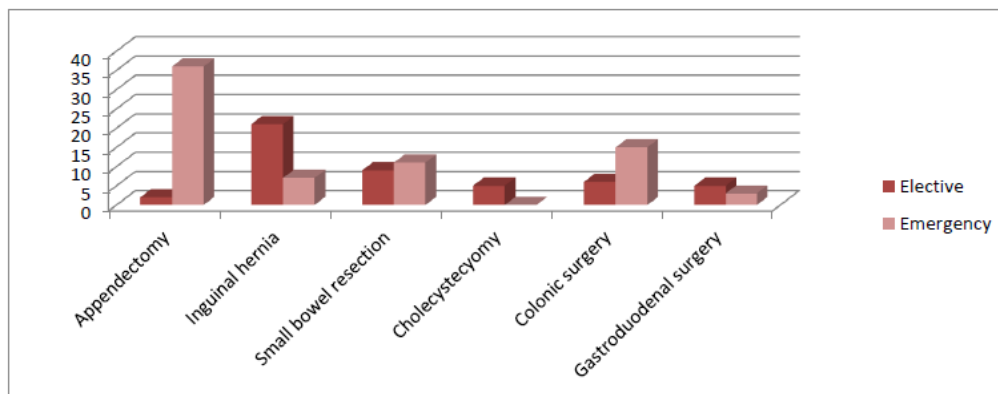
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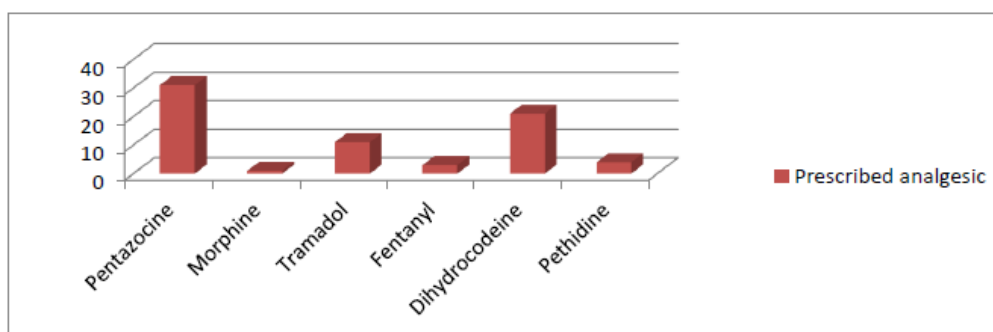
**Table 1.** Showing sociodemographic characteristics of the patients

Patients' parameters	Results
Age: Range (mean SD)	(47.36 ±8.933).
Sex:(Male: Female)	69: 51
Ethnic Group	
Yoruba	93
Igbo	11
Hausa/Fulani	16
Social class	
Low	51
Intermediate	63
High	6

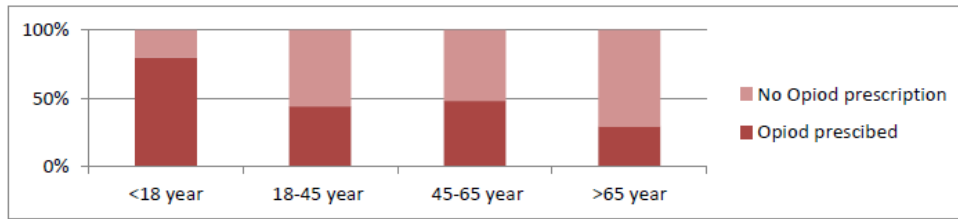
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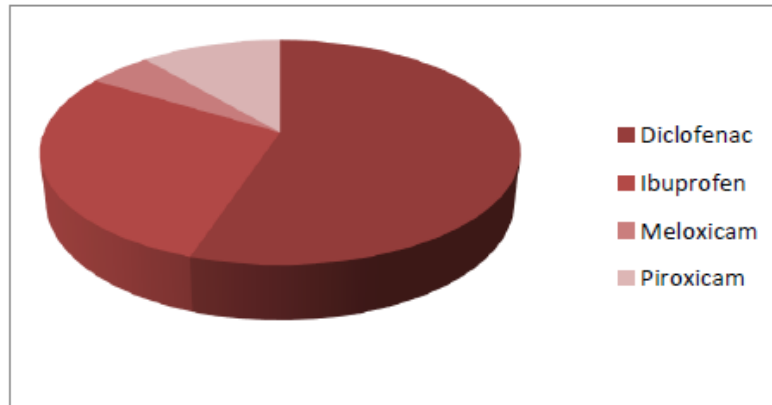
**Figure 1.** Showing spectrum of the operative procedures performed



**Figure 2.** Pattern of Opioid prescriptions



**Figure 3.** Showing differential pattern of opioid prescription across different age groups



**Figure 4.** Showing pattern of NSAID prescriptions