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## Preference Of Analgesic Drug For Pain Control Following Extraction Of Teeth - A Retrospective Study

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**Abstract:** The aim of this retrospective study was to assess the preference of analgesic drugs administered for pain control following dental extraction of teeth. The study was conducted in a University based setting. The study group of this research were patients who reported to the clinics with moderate to severe toothache/ dental pain who required tooth extraction. Case sheets were reviewed between June 2019 to March 2020. Data were analyzed using SPSS software (IBM SPSS Statistics, Version 24.0, Armonk, NY: IBM Corp). Chi square test was applied to find the association between the parameters and the level of significance. A total of 7888 patients were involved in this study. 45.7% were female patients and 54.3% were male patients. About 70.3% of the population falls in the age category 21-60 years. Around 45.8% of the population were prescribed with Paracetamol. The commonly prescribed combination analgesic of choice was Paracetamol and Aceclofenac for 26.6% of the patients. We conclude that middle aged patients in the age group 21-60 years were prescribed Paracetamol as the first analgesic of choice for postoperative dental pain control.

**Keywords:** Analgesics, Paracetamol, Dental pain, Innovation, Tooth extraction

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### INTRODUCTION

Pain is defined as “ an unpleasant sensory and emotional experience associated with actual or potential tissue damage”. (Edward Wallis, 1909) Pain control, included in the musculoskeletal pain category, is one of the greatest challenges in dentistry. (Vadivelu, Mitra and Narayan, 2010; Patturaja and Pradeep, 2016) Persistent dental pain leads to increase in stress, release of endogenous catecholamines and unexpected cardiovascular responses. (Kumar and Rahman, 2017) Dental extraction, commonly known to be in other words as tooth extraction, exodontia is nothing but the surgical procedure involving the removal of teeth from the dental alveolus/ socket in the alveolar bone. (Seymour, 1982; Rahman and Mp, 2017)

Extractions are performed for various reasons, in both young and old patients. (Patil et al., 2017) But mostly, extraction is employed to remove teeth which have extensive decay, lose in vitality and are difficult to restore. Other reasons for extractions are indicated in periodontal disease or dental trauma, especially when they are accompanied with moderate to severe toothache. (Abhinav et al., 2019; Jain et al., 2019) They are also done in conditions where wisdom teeth are impacted ( includes vertical, horizontal, mesial and distal impactions). (Folayan et al., 2014; Jesudasan, Wahab and Sekhar, 2015; Kumar, 2017a; Packiri, Gurunathan and Selvarasu, 2017) In orthodontics corrections, bicuspid such as 2nd premolars are often extracted to create space in the arch, thus allowing the movement of other teeth leading to proper alignment of the arches. Extractions are classified into 2 types: non surgical/ non invasive procedure and surgical/ invasive procedure. (Barden et al., 2004) Type of extraction is determined based upon the tooth indicated for extraction and other associated factors. (Piot et al., 2002) It is important that prior extraction of any tooth, local anaesthesia has to be administered, to ensure the tooth and surrounding tissue structures are anesthetized. (Chen and Chen, 2015) This helps us to achieve a painless and smooth dental extraction. (Forbes et al., 1990; Bryce, Bomfim and Bassi, 2014; Mp, 2017)

Post operative dental pain is a commonly encountered issue by a dentist as a complaint from the patients. This acute pain sensation can be managed by prescribing oral analgesics either as a single drug or combination drug. (Ahlström et al., 1993; Kumar and Sneha, 2016) (Kumar, 2017b) NSAIDs ( Non Steroidal Anti Inflammatory Drugs) which may be either opioid/ non opioid analgesics, are proven to be more effective in dental pain relief. (Ahlström et al., 1993) Few well known drugs used in management of post operative dental pain are,

Paracetamol, Aceclofenac, Diclofenac, Ketorolac, Ibuprofen, Naproxen, etc.(Au, no date; Ram, 2007; Rao and Kumar, 2018)

Our department is passionate about research we have published numerous high quality articles in this domain over the past years (Abraham et al., 2005; Devaki, Sathivel and BalajiRaghavendran, 2009; Neelakantan et al., 2010, 2015; Arja et al., 2013; Ramshankar et al., 2014; Sumathi et al., 2014; Surapaneni and Jainu, 2014; Surapaneni, Priya and Mallika, 2014; Ramamoorthi, Nivedhitha and Divyanand, 2015; Manivannan et al., 2017; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; J et al., 2018; Ravindiran and Praveenkumar, 2018; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Krishnaswamy et al., 2020; Samuel, Acharya and Rao, 2020; Sathish and Karthick, 2020)The primary objective of this study was to examine the preference of analgesic drugs for pain control in post operative dental extractions in a dental hospital.

## MATERIALS AND METHODS

The study was conducted in a university setting. Ethical approval from the Institutional ethical committee (ethical approval number: SDC / SIHEC / 2020 / DIASDATA / 0619-0320) was obtained prior to the commencement of the study. The study group of this research were patients who reported to the clinic, with moderate to severe toothache/ dental pain requiring tooth extraction. We analyzed data of 86000 patients attending the clinics between June 2019 to March 2020.The sample size of the study is 7888 patients consisting of both male and female participants. Patients with incomplete prescriptions and case records were excluded from this study. Cross verification was done by using photographic records of patients, who underwent extraction procedures.Variables such as age,gender,tooth number, analgesic prescribed were recorded and tabulated.Internal validity checking was done by a non- probability inclusion method for the selected sample. External validity checking was not indicated for this study.

### Statistical analysis

Data was analyzed using SPSS software (IBM SPSS Statistics, Version 24.0, Armonk, NY: IBM Corp). Descriptive statistics were used for the data summarization and presentation.Chi-square test was **done to evaluate the association of variables.p value<0.05 was considered to be statistically significant.**

## RESULTS & DISCUSSION

A total of 7888 patients were involved in this study. Out of which 45.7% were female patients and 54.3% were male patients (Figure 1). Out of these 7888 patients, 17.5% of the population fall in the age group 0-20 years, about 70.3% of the population falls in the age category 21-60 years and a minority of 12.2% of the population falls in the age group of 61 years and above (Figure 2). Most preferred analgesic was Paracetamol prescribed to Around 45.8% of the population were prescribed with Paracetamol, Aceclofenac was preferred by 20.9% of the population, about 3.2% of them preferred opting for Diclofenac and the remaining 0.03% of patients preferred Tramadolol as the suitable analgesic drug for pain control post extraction of teeth. The combination drug consisting of Paracetamol and Aceclofenac was preferred by 26.6% of the population and 0.9% of the patients were prescribed with Paracetamol and Diclofenac combination of analgesic drugs. (Figure 3) Paracetamol (female-1640, male-1973 = 45.8%) was considered to be the most preferred analgesic followed by Paracetamol+Aceclofenac combination (female-947, male-1154 = 26.6%) and Aceclofenac (female-758, male-891 =20.9%) for dental pain relief.(Pearson chi value = 7896.561, P value = 0.000)(Figure 4) Paracetamol ( 896 people of 0-20 years, 2356 people of 21-60 years and 388 people belong to 60 years and above). Aceclofenac, (157 people of 0-20 year, 1234 people of group 21-60 years and 259 people of 60 years and above.) Paracetamol+Aceclofenac 166 people of 0-20 years, 1662 people of 21-60 years and 273 people of more than 60 years of age (Pearson chi value = 8466.606, P value = 0.000)(Figure 5).

Dental pain, an unpleasant sensory and emotional experience, that is associated with actual or potential tissue damage is the commonest complaint of every patient reporting to a dental clinic with severe or moderate tooth ache.(Marimuthu et al., 2018; Thenarasu, Gurunathan and Santhosh Kumar, 2018) Being a musculoskeletal pain, opioid and non opioid analgesics are considered as suitable drugs for providing pain relief in either preoperative and post operative dental pain.(Acs et al., 1986; Maldonado, 2017) Extraction is an invasive/ non invasive procedure for removal of teeth, depending upon the site, teeth condition and other factors.(Christabel et al., 2016) Precautionary tests such as blood sugar levels, hypertension, etc are taken for individual patients prior extraction to avoid complications.(Sweta, Abhinav and Ramesh, 2019; Nalliah et al., 2020) Extraction is employed to remove teeth which have extensive decay, periapical infections, loss of vitality and difficulty to restore to their original state.(Raffaelli et al., 2016; Hersh et al., 2020) Extractions are indicative in conditions like periodontal diseases, dental trauma and impacted teeth which are commonly accompanied by pericoronitis.(Derry, Wiffen and Moore, 2011)(Jain et al., 1986; Joshi, Parara and Macfarlane, 2004). The analgesics prescribed in our analysis are Paracetamol, Aceclofenac, Diclofenac, Kerorolac, Tramadolol, Aceclofenac + Paracemol combination analgesic and Paracetamol + Diclofenac drug of combination.(Moore et al., 1998; Rangaswamy, Sheshappa and Srikanthan, 2016)

A total of 7888 patients were involved in this study. Out of which 45.7% (3604) were female patients and 54.3% (4282) were male patients. In this study, male predilection is observed.(Simone et al., 2013) Out of these 7888 patients, 17.5% (1377) of the population fall in the age group 0-20 years, about 70.3% (5547) of the population falls in the age category 21-60 years and a minority of 12.2% (963) of the population falls in the age group of 61 years and above. This variation in age group shows that the majority of the population are middle aged between 21-60 years old. This is due to age factors, oral hygiene conditions and prone to dental caries in accordance to previous literature as indicated.(Gottschalk and Smith, 2001; Kaklamanos, Makrygiannakis and Athanasiou, 2020) Out of the 7888 patients taken for this study, around 45.8% (3613) of the population were preferred Paracetamol, 26.6% (2101) of the population preferred Paracetamol+Aceclofenac drug combination, 20.9% (1650) of the population preferred pain control under Aceclofenac, 3.2% ( 250) patients preferred Diclofenac, 0.9% (71) of the people preferred Paracetamol+Diclofenac drug analgesic and 0.7% (53) preferred Ketorolac for pain control. Remaining patients 1.9% (146) were not prescribed any analgesic drug for pain management of post operative dental extraction. This may be due to a failure to report the analgesic prescribed in the case sheet. Our study has shown that the majority of the population preferred Paracetamol, followed by Paracetamol+Aceclofenac combination and Aceclofenac, for pain control as cited by previous article.(Hyllested et al., 2002; Au et al., 2015) When comparing gender distribution with the analgesics preferred, both male and female patients opted on preferring Paracetamol, followed by Paracetamol+Aceclofenac combination as the second most preferred analgesic. Hanzawa et al. in their study have reported that analgesics such as Paracetamol, Aceclofenac, etc are effective drugs for handling postoperative dental pain that occurs after extraction of teeth in middle aged patients. (Hanzawa et al., 2018). Paracetamol was the most preferred analgesic 896 people of 0-20 years, 2356 people of 21-60 years and 388 people belonging to 60 years and above. Aceclofenac, being the 2d most preferred analgesic by 157 people of 0-20 year, 1234 people of group 21-60 years and 259 people of 60 years and above. Followed by a combination drug of Paracetamol+Aceclofenac preferred by 166 people of 0-20 years, 1662 people of 21-60 years and 273 people of more than 60 years of age. Limitations of this study included the retrospective nature of the study, where complete data and patient follow up is not present,, geographical restrictions and being a single centre study. Future scope of this study would be to do more prospective studies comparing the commonly used drugs with newer analgesics with follow up.

## CONCLUSION

From this study we can conclude that middle aged patients in the age group 21-60 years, especially males, who underwent extraction were prescribed paracetamol for pain relief followed by Aceclofenac and Paracetamol combination.

## AUTHOR CONTRIBUTIONS

HariPriya Karthikeyan - Study design and conception, data collection, manuscript drafting  
Abhinav Rajendra Prabhu - Study design, Data collection and analysis, Manuscript editing  
Visalakshi Ramanathan - Study Design, Data collection, Manuscript review

**Conflict of interest:** None declared.

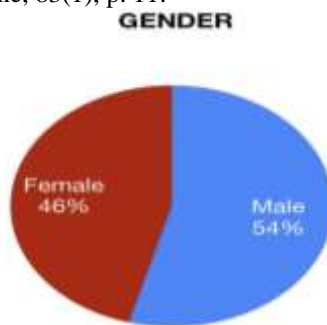
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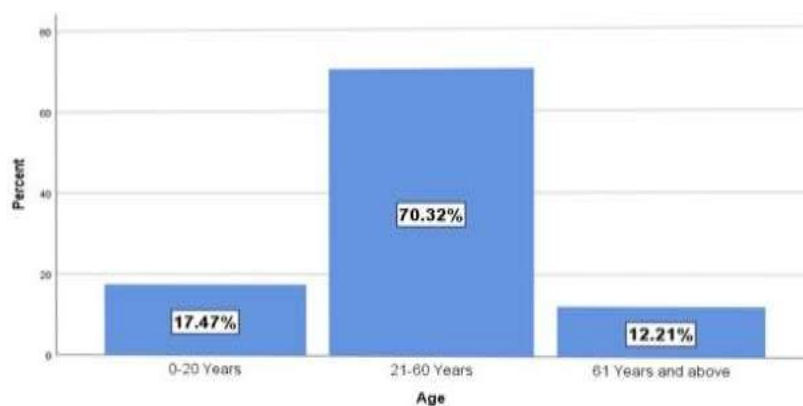
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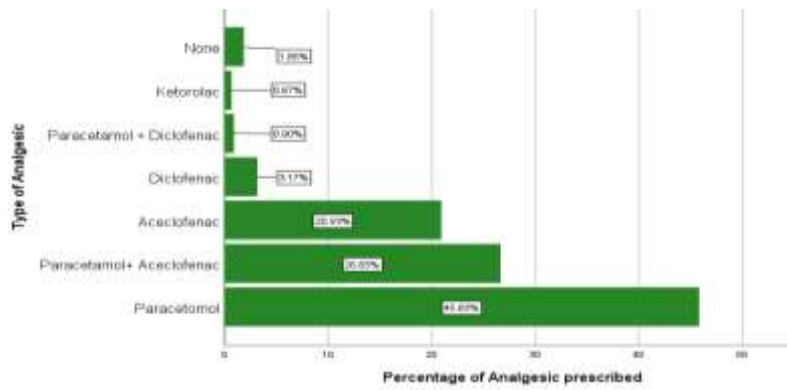
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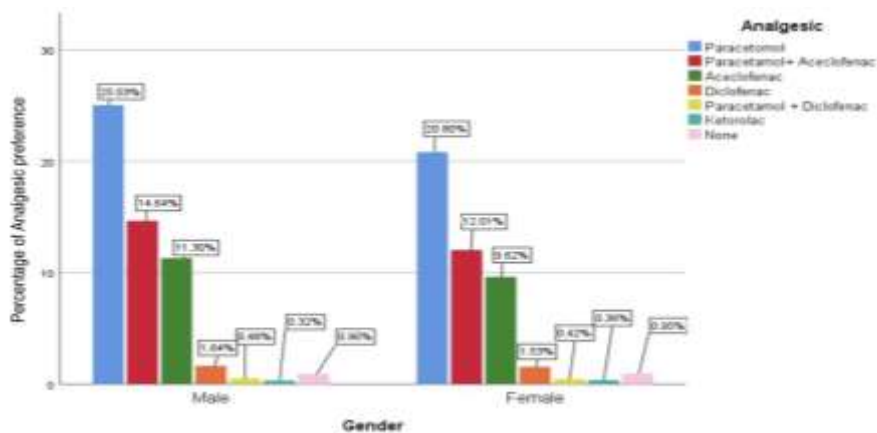
**Fig.1: Pie chart representing the frequency of gender distribution of the patients. 45.7% were female patients and 54.3% were male patients.**



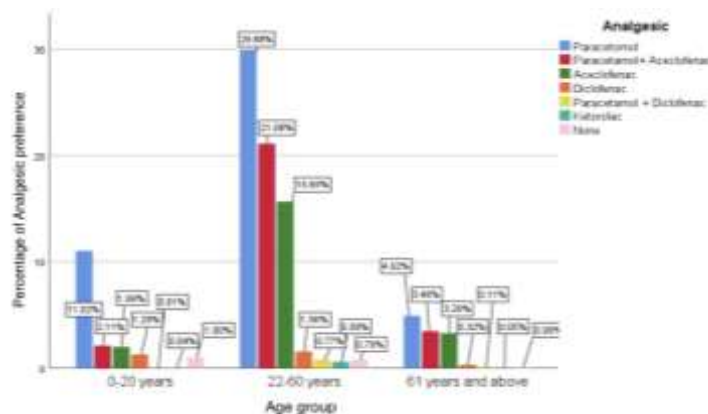
**Fig.2: Bar graph indicating the frequency of patients based on age group. X axis indicates the age group distribution whereas Y-axis shows the frequency of preference. 17.5% of the population fall in the age group 0-20 years, about 70.3% of the population falls in the age category 21-60 years and a minority of 12.2% of the population falls in the age group of 61 years and above.**



**Fig.3:** Bar graph representing the commonly prescribed analgesic to control postoperative dental pain. X axis denotes the percentage of drugs prescribed whereas Y axis shows the types of analgesic drugs prescribed. Paracetamol was the most commonly prescribed drug.



**Fig.4:** Bar graph representing the commonly prescribed analgesic among males and females to control postoperative dental pain. X axis indicates the distribution of gender and Y axis indicates the frequency of preferred analgesic. Paracetamol was the most preferred analgesic prescribed (female-1640, male-1973 = 45.8%) for dental pain relief. (Pearson's chi square value = 7896.561, p-value = 0.000) thus statistically significant.



**Fig.5:** Bar graph representing the association between commonly prescribed analgesics among the different age groups to control postoperative dental pain. X axis indicates the distribution of age group and Y axis indicates the frequency of the preferred analgesic. Paracetamol was the most preferred analgesic by 896 people of 0-20 years, 2356 people of 21-60 years and 388 people belonging to 60 years and above. (Pearson's chi square value = 8466.606, p-value = 0.000) thus statistically significant.