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COMMONLY PRESCRIBED ANALGESICS IN THE CHILDREN TREATED UNDER GENERAL ANESTHESIA -A RETROSPECTIVE COHORT STUDY

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Abstract

Introduction: General anaesthesia in children is commonly used in the department of pedodontics in dentistry which was used in doing all procedures in children with anxiousbehaviour, special children, medically compromised or uncooperative children. Managing the Post operative pain is challenging thing in this stage.

Aim: The ultimate aim of this study was to analyse the commonly used analgesics used in the children treated under general anesthesia.

Materials and Methods: The research was carried out in Chennai, India at Saveetha Dental College between September 2020 to February 2021. The data was collected with the help of DIAS software. Total sample collected was 100 and data was analyzed using SPSS statistical software. The chi-square test was done in this study to analyze the data. Results were collected which were tabulated and bar graphs were made accordingly.

Results: 100 Participants (Children) with mean age of 3.22+ 3.110 year age group were included for analysis. It was found that 73.39% of the children were prescribed paracetamol. It was seen that there was no significant association between type of analgesic prescribed and age group (p= 0.167).

Conclusion: Paracetamol was found to be the most commonly prescribed drug compared to other analgesics in children under general anesthesia.

Keywords: paracetamol, general anesthesia, special children

Introduction

General anesthesia in children is most commonly used widely in the department of pediatric dentistry which is used in doing all procedures in children with anxious behavior, special children, medically compromised or uncooperative children (1). Some of the benefits of GA is that it does not need child's cooperation and hence have greater quality and durability. It is also convenient for the parents, patients and the dentist (2). However, any anesthetic agent is hazardous and poses a risk (3). Management of pain is an important aspect of dentistry and more important in pediatric dentistry (4). Treatment of pain after day case pediatric surgery that is both safe and effective remains a challenge. In children, the acceptability of the mode of administration is as important as the analgesia produced, and oral formulations with a pleasant taste are favored over injections or suppositories. (5). Acute pain heightens the sensory nociception in the head and oral cavity. Hence, timing of IV paracetamol administartion is very significant. A pre-emptive analgesic approach in dental treatment has been documented to show a better effect on the intensity of pain (6). It was observed that Ibuprofen and ibuprofen/paracetamol combinations were more effective than normal or high-dose paracetamol at reducing children's pain and distress following extraction of teeth under GA (7).

Administration of paracetamol or ibuprofen to the children prior to the dental procedures like extraction of tooth appeared to reduce the likelihood that an analgesic would be needed, compared to the administration of a placebo (8). Diclofenac potassium was considered as a more effective analgesic than paracetamol or ibuprofen for postoperative analgesia in both adults and children who are having teeth extracted and deep cavities prepared under general anesthesia (9). Diclofenac sodium is a more potent analgesic when it is compared to acetaminophen, which is especially used for most traumatic procedures or some pain provoking procedures. Perioperative analgesics are recommended as an essential treatment adjunct for child dental rehabilitation under general anaesthesia(10). Not only under general anesthesia, Use of tramadol drops in young children undergoing dental extractions which results in rapid absorption whose bioavailability is same as oral administration of tramadol capsules (11). The non-steroidal anti-inflammatory (NSAIDS) drug named diclofenac has been recorded as an effective drug in relieving the post operative pain in children and extraction in adults.

Sleepiness, agitaion are commonly seen in children undergoing dental rehabilitation under general anesthesia and they need analgesics for management of pain and discomfort (12). Prilocaine infiltration analgesia reduces the early postoperative distress after dental extractions in children under general anesthesia.Studies are under process to analyse the effects and benefits of prilocaine infiltration (13). Analgesics are administered to the patient to reduce the postoperative discomfort after dental rehabilitation during the recovery stage (14). Preoperative use of medicines such as paracetamol and ibuprofen can possibly provide some pre-emptive analgesic effect in paediatric patients which receive adequate analgesia during mandibular primary tooth extraction (15).

With numerous studies and varying results the aim of the present study was to find out the commonly prescribed analgesics in children undergoing dental treatment under general anesthesia. Our team has extensive knowledge and research experience that has translate into high quality publications(16–28)(29–35)

Materials and Methods

The study was done in a private dental college and hospitals, Chennai India. Ethical approval was obtained from the institutional review board prior to the start of study.

The patient records were reviewed and the data of patients between September 2020 to February 2021was analyzed. Data was collected from a Total sample of 100 children who were treated under General anesthesia for oral rehabilitation. Data was collected with parameters like age, gender and used analgesics. The source of data was collected using DIAS software in Saveetha Dental College and Hospitals, Chennai. Collected data were analysed using SPSS statistics software and done using chi-square tests. P value was set as 0.05 as the level of significance.

Results :

100 children treated under general anesthesia were included in the present study. Demographic details of the participants are tabulated in table 1. Paracetamol was found to be the most commonly prescribed analgesics in children undergoing dental treatment under general anesthesia.(Figure 1) No significant difference in type of analgesic prescribed was noticed with increase in age. (Figure 2)

TABLE 1 : Demographic details of the participants

Age	3.22 ±3.110
Gender	Males - 55% Females - 45%

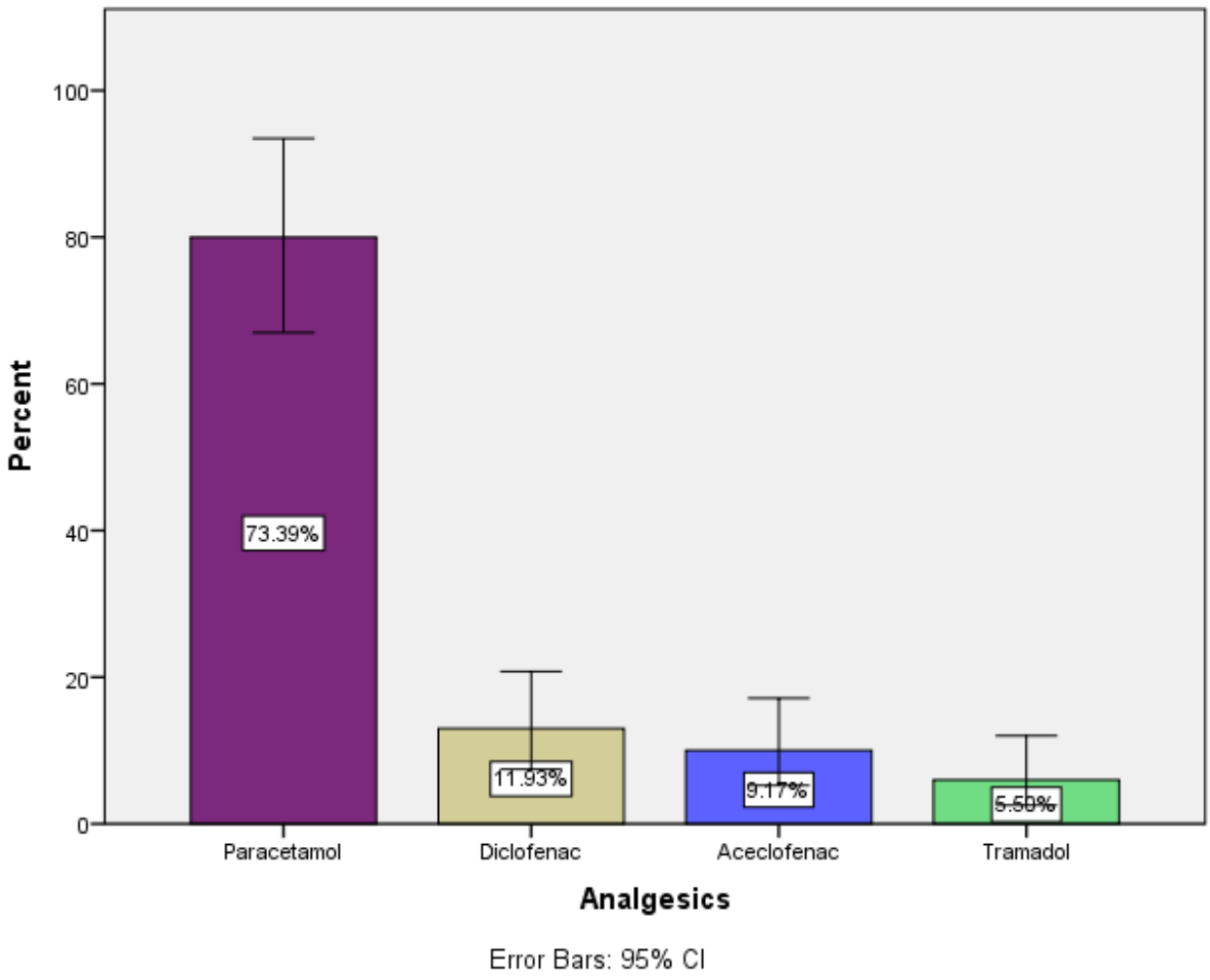

FIGURE 1

Bar graph shows the distribution of analgesics that are commonly prescribed for children under general anesthesia. Drugs that are used are Paracetamol(73.39%), Diclofenac(11.93%), Aceclofenac(9.17%) and Tramadol(5.50%). X axis represents the distribution of analgesics and Y axis represents the percentage.

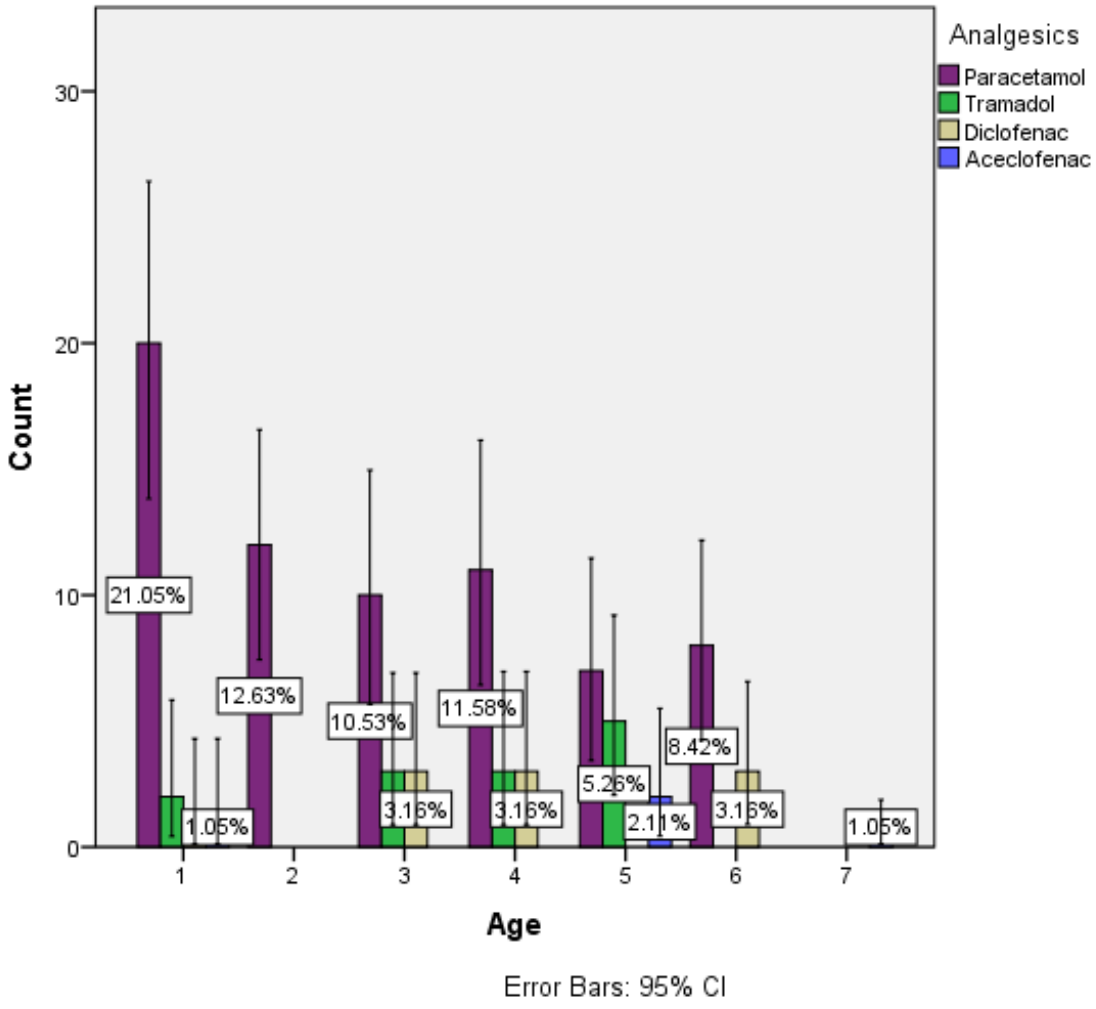

FIGURE 2 :

Bar graph shows the correlation between age and the commonly prescribed analgesics used in children under general anesthesia. X axis represents the age of the children and Y axis represents the commonly used analgesics. It has been concluded that paracetamol (Violet) has been most commonly used among the age group of 1 (21.05%), 2 (12.63%), 3 (10.53%), 4 (11.58%), 5 (5.25%), and 6 (8.42%) years than other analgesics likeAceclofenac (Blue), Diclofenac (Yellow) and Tramadol (Green). P value was calculated as 0.167 which is not significant.

Discussion

Postoperative pain is most commonly considered as a new experience for the young children. The complexity of verbalizing and interpreting pain may be convoluted further by unfamiliar postoperative sensations from general anesthesia, disorientation and surgical site discomfort(36). The postoperative dental pain has been the highest after root canal treatment, performed crowns and extractions. Use of certain analgesics like paracetamol, Ibuprofen, Aceclofenac, Diclofenac etc. can have the effect of relieving post operative pain in the children who are treated under general anesthesia. Previous study stated that most of the treated children under general anaesthesia have been reported of mild to moderate postoperative pain after discharge from the hospital. Inadequate administration of analgesics by the parents has been recorded and can be a reason for increased discomfort during the post operative period (37).

In the present study it was concluded that Paracetamol was the most commonly prescribed analgesics in children who underwent dental treatment under general anesthesia. Surprisingly Ibuprofen which is another commonly prescribed analgesic in children was not seen in the present study. 11.93% and 9.17% of the children were given Diclofenac and Aceclofenac. However use of aceclofenac and diclofenac in children has not been studied in the literature. Studies have also shown that in order to manage pain, certain medications like Paracetamol and ibuprofen has been given for short-term mild pain relief (38).

Paracetamol is a commonly and very oftentimes used analgesic in children and it does not induce discomfort like nausea and vomiting. It has a good reputation of safety with recommended dosage forms. Previous study concluded that Paracetamol acts as satisfactory and safer analgesics in children and is provided with plasma concentration to reduce pain and fever (39). The interventional pharmacological approach in children consists of the use of NSAIDS and other

analgesics via intravenous bolus administration rectal and other route of administration. Use of certain analgesics in larger and more appropriate doses can increase the risk of some adverse effects like nausea and vomiting. Certain adverse effects of overdose of analgesics include inhibition of platelet function, decreased renal blood flow, inhibition of bone growth and healing, gastritis with pain and bleeding, and increased incidence of cardiovascular events (40).
This study limits the data containing the child population visiting only one institution. Further research including a wide range of population can see the betterment and varied results on the usage of other analgesics.

Conclusion

Paracetamol was found to be the most commonly prescribed drug compared to other analgesics in children under general anesthesia.

Reference

1. O'Donnell A, Henderson M, Fearne J, O'Donnell D. Management of postoperative pain in children following extractions of primary teeth under general anaesthesia: a comparison of paracetamol, Voltarol and no analgesia. Int J Paediatr Dent [Internet]. 2007 Mar;17(2):110–5. Available from: http://doi.wiley.com/10.1111/j.1365-263X.2006.00800.x
2. Ramazani N. Different Aspects of General Anesthesia in Pediatric Dentistry: A Review. Iran J Pediatr [Internet]. 2016 Apr;26(2):e2613. Available from: http://dx.doi.org/10.5812/ijp.2613
3. Lee HH, Milgrom P, Starks H, Burke W. Trends in death associated with pediatric dental sedation and general anesthesia. Paediatr Anaesth [Internet]. 2013 Aug;23(8):741–6. Available from: http://dx.doi.org/10.1111/pan.12210
4. Gazal G, Mackie IC. A comparison of paracetamol, ibuprofen or their combination for pain relief following extractions in children under general anaesthesia: a randomized controlled trial. Int J Paediatr Dent [Internet]. 2007 May;17(3):169–77. Available from: http://dx.doi.org/10.1111/j.1365-263X.2006.00806.x
5. Roelofse JA, Payne KA. Oral tramadol: analgesic efficacy in children following multiple dental extractions. Eur J Anaesthesiol [Internet]. 1999 Jul;16(7):441–7. Available from: http://dx.doi.org/10.1046/j.1365-2346.1999.00505.x
6. Kharouba J, Hawash N, Peretz B, Blumer S, Srour Y, Nassar M, et al. Effect of intravenous paracetamol as pre-emptive compared to preventive analgesia in a pediatric dental setting: a prospective randomized study. Int J Paediatr Dent [Internet]. 2018 Jan;28(1):83–91. Available from: http://doi.wiley.com/10.1111/ipd.12311
7. Goddard JM, Pickup SE. Postoperative pain in children. Anaesthesia [Internet]. 1996 Jun;51(6):588–90. Available from: https://onlinelibrary.wiley.com/doi/10.1111/j.1365-2044.1996.tb12573.x
8. Kharouba J, Ratson T, Somri M, Blumer S. Preemptive Analgesia by Paracetamol, Ibuprofen or Placebo in Pediatric Dental Care: A Randomized Controlled Study. J Clin Pediatr Dent [Internet]. 2019;43(1):51–5. Available from: http://dx.doi.org/10.17796/1053-4625-43.1.10
9. Gazal G, Al-Samadani KH. Comparison of paracetamol, ibuprofen, and diclofenac potassium for pain relief following dental extractions and deep cavity preparations. Saudi Med J [Internet]. 2017 Mar;38(3):284–91. Available from: http://dx.doi.org/10.15537/smj.2017.3.16023
10. El Batawi HY. Effect of intraoperative analgesia on children's pain perception during recovery after painful dental procedures performed under general anaesthesia. Eur Arch Paediatr Dent [Internet]. 2015 Feb;16(1):35–41. Available from: http://dx.doi.org/10.1007/s40368-014-0143-y
11. Payne KA, Roelofse JA, Shipton EA. Pharmacokinetics of oral tramadol drops for postoperative pain relief in children aged 4 to 7 years--a pilot study. Anesth Prog [Internet]. 2002 Winter;49(4):109–12. Available from: https://www.ncbi.nlm.nih.gov/pubmed/12779111
12. Needleman HL, Harpavat S, Wu S, Allred EN, Berde C. Postoperative pain and other sequelae of dental rehabilitations performed on children under general anesthesia. Pediatr Dent [Internet]. 2008 Mar;30(2):111–21. Available from: https://www.ncbi.nlm.nih.gov/pubmed/18481575
13. Noble DW, Raab GM, MacLean D, MacLachlan D. Prilocaine Infiltration as Postoperative Analgesia for Children Having Dental Extractions Under General Anesthesia. Reg Anesth [Internet]. 1994 Mar 1 [cited 2021 May 11];19(2):126–31. Available from: https://rapm.bmj.com/content/19/2/126.abstract
14. Carter L, Wilson S, Tumer EG. Descriptive study of perioperative analgesic medications associated with general anesthesia for dental rehabilitation of children. Pediatr Dent [Internet]. 2010 Mar;32(2):141–5. Available from: https://www.ncbi.nlm.nih.gov/pubmed/20483018
15. Baygin O, Tuzuner T, Isik B, Kusgoz A, Tanriver M. Comparison of pre-emptive ibuprofen, paracetamol, and placebo administration in reducing post-operative pain in primary tooth extraction. Int J Paediatr Dent [Internet]. 2011 Jul;21(4):306–13. Available from: http://doi.wiley.com/10.1111/j.1365-263X.2011.01124.x
16. Subramanyam D, Gurunathan D, Gaayathri R, Vishnu Priya V. Comparative evaluation of salivary malondialdehyde levels as a marker of lipid peroxidation in early childhood caries. Eur J Dent [Internet]. 2018 Jan;12(1):67–70. Available from: http://dx.doi.org/10.4103/ejd.ejd_266_17

17. Ramadurai N, Gurunathan D, Samuel AV, Subramanian E, Rodrigues SJL. Effectiveness of 2% Articaine as an anesthetic agent in children: randomized controlled trial. Clin Oral Investig [Internet]. 2019 Sep;23(9):3543–50. Available from: http://dx.doi.org/10.1007/s00784-018-2775-5
18. Ramakrishnan M, Dhanalakshmi R, Subramanian EMG. Survival rate of different fixed posterior space maintainers used in Paediatric Dentistry – A systematic review [Internet]. Vol. 31, The Saudi Dental Journal. 2019. p. 165–72. Available from: http://dx.doi.org/10.1016/j.sdentj.2019.02.037
19. Jeevanandan G, Thomas E. Volumetric analysis of hand, reciprocating and rotary instrumentation techniques in primary molars using spiral computed tomography: An in vitro comparative study. Eur J Dent [Internet]. 2018 Jan;12(1):21–6. Available from: http://dx.doi.org/10.4103/ejd.ejd_247_17
20. Princeton B, Santhakumar P, Prathap L. Awareness on Preventive Measures taken by Health Care Professionals Attending COVID-19 Patients among Dental Students. Eur J Dent [Internet]. 2020 Dec;14(S 01):S105–9. Available from: http://dx.doi.org/10.1055/s-0040-1721296
21. Saravanakumar K, Park S, Mariadoss AVA, Sathiyaseelan A, Veeraraghavan VP, Kim S, et al. Chemical composition, antioxidant, and anti-diabetic activities of ethyl acetate fraction of Stachys riederi var. japonica (Miq.) in streptozotocin-induced type 2 diabetic mice. Food Chem Toxicol [Internet]. 2021 Jun 26;155:112374. Available from: http://dx.doi.org/10.1016/j.fct.2021.112374
22. Wei W, Li R, Liu Q, Devanathadesikan Seshadri V, Veeraraghavan VP, Surapaneni KM, et al. Amelioration of oxidative stress, inflammation and tumor promotion by Tin oxide-Sodium alginate-Polyethylene glycol-Allyl isothiocyanate nanocomposites on the 1,2-Dimethylhydrazine induced colon carcinogenesis in rats. Arabian Journal of Chemistry [Internet]. 2021 Aug 1;14(8):103238. Available from: https://www.sciencedirect.com/science/article/pii/S1878535221002537
23. Gothandam K, Ganesan VS, Ayyasamy T, Ramalingam S. Antioxidant potential of theaflavin ameliorates the activities of key enzymes of glucose metabolism in high fat diet and streptozotocin - induced diabetic rats. Redox Rep [Internet]. 2019 Dec;24(1):41–50. Available from: http://dx.doi.org/10.1080/13510002.2019.1624085
24. Su P, Veeraraghavan VP, Krishna Mohan S, Lu W. A ginger derivative, zingerone-a phenolic compound-induces ROS-mediated apoptosis in colon cancer cells (HCT-116). J Biochem Mol Toxicol [Internet]. 2019 Dec;33(12):e22403. Available from: http://dx.doi.org/10.1002/jbt.22403
25. Mathew MG, Samuel SR, Soni AJ, Roopa KB. Evaluation of adhesion of Streptococcus mutans, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial [Internet]. Vol. 24, Clinical Oral Investigations. 2020. p. 3275–80. Available from: http://dx.doi.org/10.1007/s00784-020-03204-9
26. Sekar D, Johnson J, Biruntha M, Lakhmanan G, Gurunathan D, Ross K. Biological and Clinical Relevance of microRNAs in Mitochondrial Diseases/Dysfunctions. DNA Cell Biol [Internet]. 2020 Aug;39(8):1379–84. Available from: http://dx.doi.org/10.1089/dna.2019.5013
27. Velusamy R, Sakthinathan G, Vignesh R, Kumarasamy A, Sathishkumar D, Nithya Priya K, et al. Tribological and thermal characterization of electron beam physical vapor deposited single layer thin film for TBC application. Surf Topogr: Metrol Prop [Internet]. 2021 Jun 24 [cited 2021 Aug 10];9(2):025043. Available from: https://iopscience.iop.org/article/10.1088/2051-672X/ac0c61/meta
28. Aldhuwayhi S, Mallineni SK, Sakhamuri S, Thakare AA, Mallineni S, Sajja R, et al. Covid-19 Knowledge and Perceptions Among Dental Specialists: A Cross-Sectional Online Questionnaire Survey. Risk Manag Healthc Policy [Internet]. 2021 Jul 7;14:2851–61. Available from: http://dx.doi.org/10.2147/RMHP.S306880
29. Sekar D, Nallaswamy D, Lakshmanan G. Decoding the functional role of long noncoding RNAs (lncRNAs) in hypertension progression. Hypertens Res [Internet]. 2020 Jul;43(7):724–5. Available from: http://dx.doi.org/10.1038/s41440-020-0430-4
30. Bai L, Li J, Panagal M, M B, Sekar D. Methylation dependent microRNA 1285-5p and sterol carrier proteins 2 in type 2 diabetes mellitus. Artif Cells Nanomed Biotechnol [Internet]. 2019 Dec;47(1):3417–22. Available from: http://dx.doi.org/10.1080/21691401.2019.1652625
31. Sekar D. Circular RNA: a new biomarker for different types of hypertension. Hypertens Res [Internet]. 2019 Nov;42(11):1824–5. Available from: http://dx.doi.org/10.1038/s41440-019-0302-y
32. Sekar D, Mani P, Biruntha M, Sivagurunathan P, Karthigeyan M. Dissecting the functional role of microRNA 21 in osteosarcoma. Cancer Gene Ther [Internet]. 2019 Jul;26(7-8):179–82. Available from: http://dx.doi.org/10.1038/s41417-019-0092-z
33. Duraisamy R, Krishnan CS, Ramasubramanian H, Sampathkumar J, Mariappan S, Navarasampatti Sivaprakasam A. Compatibility of Nonoriginal Abutments With Implants: Evaluation of Microgap at the Implant-Abutment Interface, With Original and Nonoriginal Abutments. Implant Dent [Internet]. 2019 Jun;28(3):289–95. Available from: http://dx.doi.org/10.1097/ID.0000000000000885
34. Parimelazhagan R, Umapathy D, Sivakamasundari IR, Sethupathy S, Ali D, Kunka Mohanram R, et al. Association between Tumor Prognosis Marker Visfatin and Proinflammatory Cytokines in Hypertensive Patients. Biomed Res Int [Internet]. 2021 Mar 16;2021:8568926. Available from: http://dx.doi.org/10.1155/2021/8568926

35. Syed MH, Gnanakkan A, Pitchiah S. Exploration of acute toxicity, analgesic, anti-inflammatory, and anti-pyretic activities of the black tunicate, Phallusia nigra (Savigny, 1816) using mice model. Environ Sci Pollut Res Int [Internet]. 2021 Feb;28(5):5809–21. Available from: http://dx.doi.org/10.1007/s11356-020-10938-2
36. Wong M, Copp PE, Haas DA. Postoperative Pain in Children After Dentistry Under General Anesthesia. Anesth Prog [Internet]. 2015 Winter;62(4):140–52. Available from: http://dx.doi.org/10.2344/14-27.1
37. Jensen B. Post-operative pain and pain management in children after dental extraction under general anaesthesia. Eur Arch Paediatr Dent [Internet]. 2012 Jun 1;13(3):119–25. Available from: https://doi.org/10.1007/BF03262857
38. Kankkunen P, Vehviläinen-Julkunen K, Pietilä A-M, Kokki H, Halonen P. Parents 'perceptions and use of analgesics at home after children's day surgery. Paediatr Anaesth [Internet]. 2003 Feb;13(2):132–40. Available from: http://dx.doi.org/10.1046/j.1460-9592.2003.00998.x
39. Anderson B, Kanagasundarum S, Woollard G. Analgesic efficacy of paracetamol in children using tonsillectomy as a pain model. Anaesth Intensive Care [Internet]. 1996 Dec;24(6):669–73. Available from: http://dx.doi.org/10.1177/0310057X9602400606
40. Tamblyn R, Berkson L, Dauphinee WD, Gayton D, Grad R, Huang A, et al. Unnecessary prescribing of NSAIDs and the management of NSAID-related gastropathy in medical practice. Ann Intern Med [Internet]. 1997 Sep 15;127(6):429–38. Available from: http://dx.doi.org/10.7326/0003-4819-127-6-199709150-00003