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Research Article

STUDY OF DRUG USED IN TREATMENT OF TOOTHACHE IN VARIOUS HOSPITALS AND PRIVATE CLINICS OF BILASPUR REGION OF CHHATTISGARH (INDIA)

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ABSTRACT

Toothaches usually refer to pain around the teeth or jaws as primarily as a result of dental condition. This study has been done to analyze the drugs prescribed for treatment for toothaches in the region of Chhattisgarh. 623 Prescriptions containing the drugs for toothache were collected from 5 clinics and 2 hospital of Bilaspur region of Chhattisgarh (India). It was found that Analgesics were the most commonly used drug, followed by antiulcer, antimicrobial, Proteolytic enzymes mouthwashes and Vitamins. This was also found that the antibiotics and vitamins were irrationally used in treatment of toothache.

Keywords: Toothaches, analgesics, anti ulcer, anti microbial.

INTRODUCTION

Dental diseases were one of the commonest ailments known to mankind. Almost everyone suffers some kind of dental disease at some point or the other. Toothache" usually refers to pain around the teeth or jaws primarily as a result of a dental condition. In most instances, toothaches are caused by tooth problems, such as a dental cavity, a cracked tooth, an exposed tooth root, or gum disease. However, disorders of the jaw joint (temporo-mandibular joint) can also cause pain that is referred to as "toothache." The severity of a toothache can range from chronic and mild to sharp and excruciating. The pain may be aggravated by chewing or by cold or heat. Sometimes, a toothache may be caused by a problem not originating from a tooth or the jaw. [1,2] Pain around the teeth and the jaws can be symptoms of diseases of the heart (such as angina or heart attack, ears (such as inner or external ear infections), and sinuses (air passages of the cheekbones). [2] For example, the pain of angina (inadequate supply of oxygenated blood to the heart muscle because of narrowing of the arteries to the heart) is usually located in the chest or the arm.

However, in some patients with angina, a toothache or jaw pain is the only symptom of their heart problem. Infections and diseases of the ears and sinuses can also cause pain around the teeth and jaws. [2]

Therefore, evaluations by both dentists and doctors are sometimes necessary to diagnose medical illnesses causing "toothache."

Causes of toothaches

Common dental causes of toothaches include dental cavities, dental abscess, gum disease, irritation of the tooth root, cracked tooth syndrome, Temporomandibular joint (TMJ) disorders, impaction, and eruption.

Dental cavities & dental abscess

The most common cause of a toothache is a dental cavity. [3]. [Figure1].

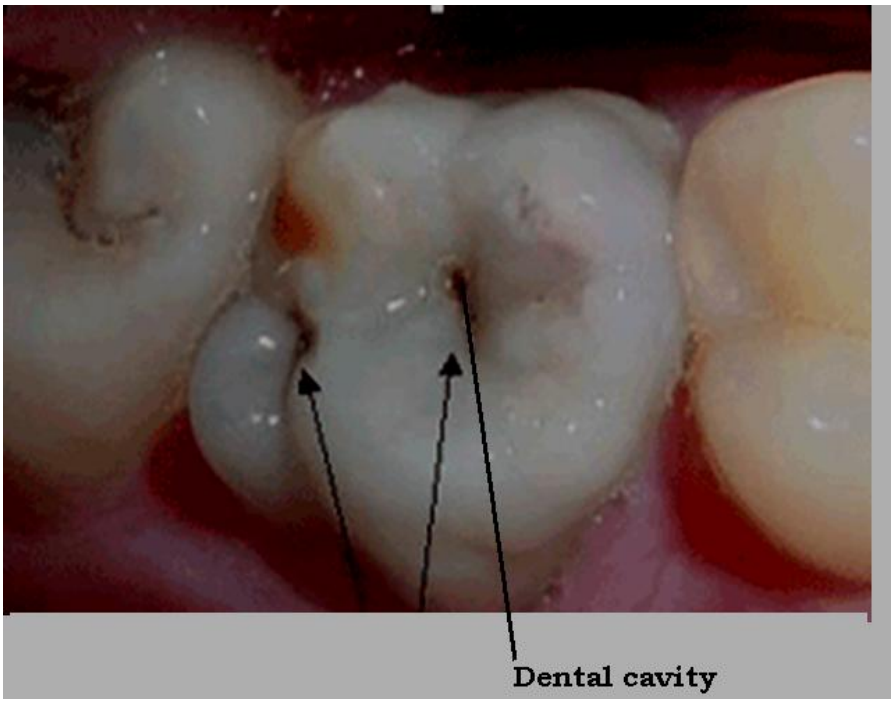


Figure1: Dental cavity

It is a disease where bacterial processes damage hard tooth structure (enamel, dentin, and cementum). [3] These tissues progressively break down, producing dental caries (cavities, holes in the teeth). Two groups of bacteria are responsible for initiating caries: Streptococcus mutans and Lactobacillus. If left untreated, the disease can lead to pain, tooth loss, infection, and, in severe cases, death[4].

Tooth decay is caused by specific types of acid-producing bacteria that cause damage in the presence of fermentable carbohydrates such as sucrose, fructose, and glucose.[5,6,7,8,9]

The mineral content of teeth is sensitive to increases in acidity from the production of lactic acid. Specifically, a tooth (which is primarily mineral in content) is in a constant state of back-and-forth demineralization and remineralization between the tooth and surrounding saliva.

When the pH at the surface of the tooth drops below 5.5, demineralization proceeds faster than remineralization (meaning that there is a net loss of mineral structure on the tooth's surface).

The second most common cause of toothache is gum disease (periodontal disease). Gum disease refers to inflammation of the soft tissue (gingiva) and abnormal loss of bone that surrounds and holds the teeth in place. Gum disease is caused by toxins secreted by certain bacteria in "plaque" that accumulate over time along and under the gum line. This plaque is a mixture of food, saliva, and bacteria.

Gingivitis ("inflammation of the gum tissue") is a term used to describe non-destructive periodontal disease.[10] [Figure 2]

Figure 2: Figure showing Gingivitis

The most common form of gingivitis is in response to bacterial biofilms (also called plaque) adherent to tooth surfaces, termed plaque-induced gingivitis, and is the most common form of periodontal disease. In the absence of treatment, gingivitis may progress to periodontitis, which is a destructive form of periodontal disease.[11]

The etiology, or cause, of plaque-induced gingivitis is bacterial plaque, which acts to initiate the body's host response. This, in turn, can lead to destruction of the gingival tissues, which may progress to destruction of the periodontal attachment apparatus.[12] The plaque accumulates in the small gaps between teeth, in the gingival grooves and in areas known as plaque traps: locations that serve to accumulate and maintain plaque. Examples of plaque traps include bulky and overhanging restorative margins, claps of removable partial dentures and calculus (tartar) that forms on teeth. Although these accumulations may be tiny, the bacteria in them produce chemicals, such as degrative enzymes, and toxins, such as lipopolysaccharide (LPS, otherwise known as endotoxin) or lipoteichoic acid (LTA), that promote an inflammatory response in the gum tissue. This inflammation can cause an enlargement of the gingiva and subsequent pseudopocket formation.

Tooth root sensitivities

Toothache can also be caused by exposed tooth roots. Typically, the roots are the lower two-thirds of the teeth that are normally buried in bone. The bacterial toxins dissolve the bone around the roots and cause the gum and the bone to recede, exposing the roots. The condition of exposed roots is called "recession." The exposed roots can become extremely sensitive to cold, hot, and sour foods because they are no longer protected by healthy gum and bone.

Many of us say we have "sensitive teeth."[Figure 3] We usually mean that we feel twinges of pain or discomfort in our teeth in certain situations. These may include:

- Drinking or eating cold things
- Drinking or eating hot things
- Eating sweets
- Touching the teeth with other teeth or the tongue

There are two types of tooth sensitivity:

a) Dentinal sensitivity occurs when the dentin (middle layer) of a tooth is exposed. Normally, the dentin is covered by enamel above the gumline and by cementum below the gumline. Dentin is made up of tiny openings called tubules. Inside each tubule lies a nerve branch that comes from the tooth's pulp (the nerve center of the tooth). When the dentin is exposed, cold or hot temperature or pressure can affect these nerve branches. This causes sensitivity.

Dentinal sensitivity occurs when the outer protective layers of enamel or cementum are removed, exposing the dentin. It can affect one or more teeth. Some causes of dentin exposure include:

- Brushing your teeth too hard. This wears away the enamel layer.

- Poor oral hygiene. This may allow tartar to build up at the gum line.
- Long-term tooth wear
- Untreated cavities
- An old filling with a crack or leak
- Receding gums that expose the tooth's roots. Receding gums often are caused by periodontal diseases or by brushing too hard.
- Gum surgery that exposes a tooth's roots
- Tooth whitening in people who have tooth roots that already are exposed
- Frequently eating acidic foods or drinking acidic beverages

b) Pulpal sensitivity is a reaction of the tooth's pulp. The pulp is a mass of blood vessels and nerves in the center of each tooth. Pulpal sensitivity tends to affect only a single tooth. Causes include:

- Decay or infection
- A recent filling
- Excessive pressure from clenching or grinding
- A cracked or broken tooth

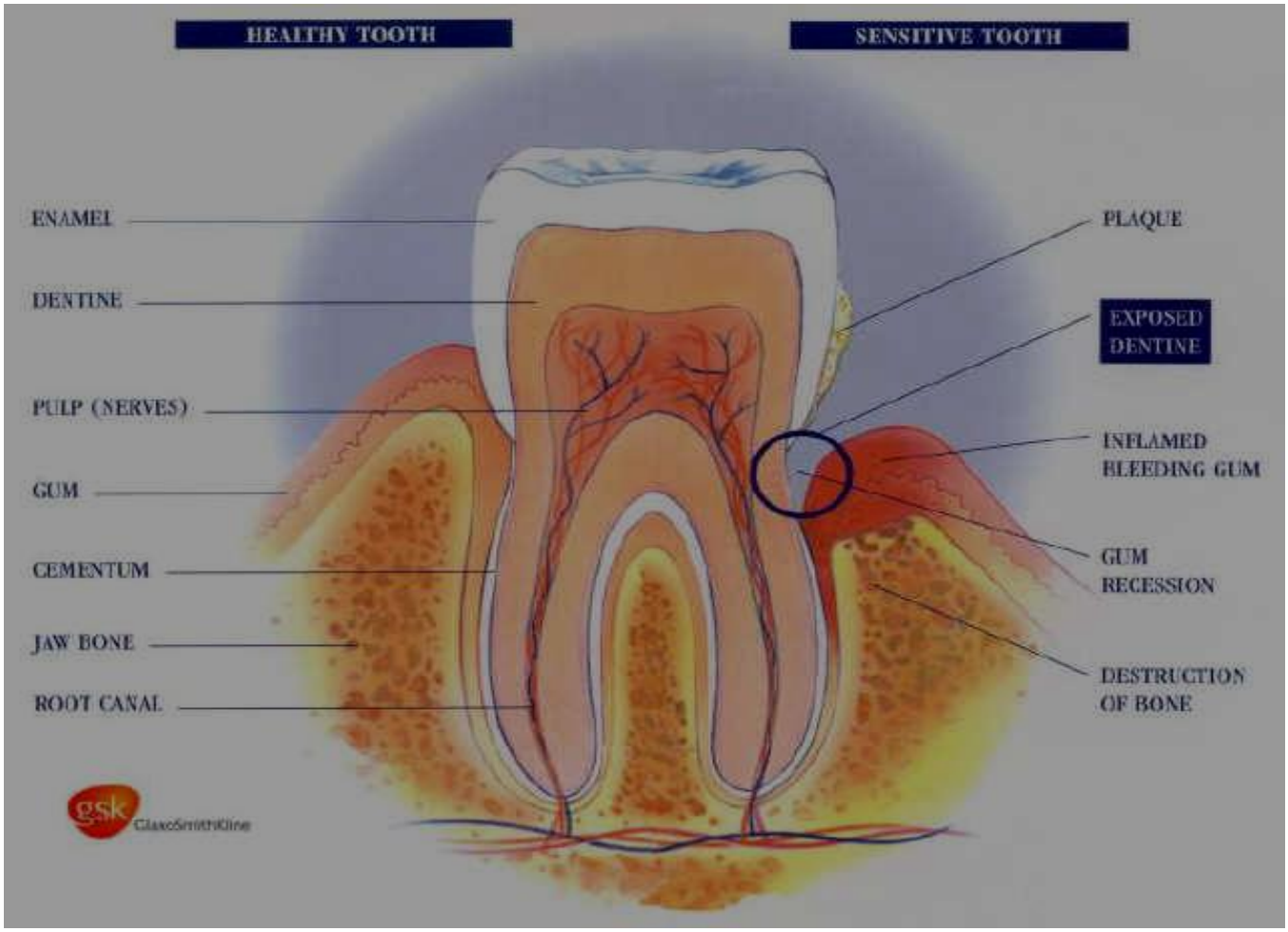


Figure 3: comparison between a normal and senstive tooth

Cracked tooth syndrome

"Cracked tooth syndrome" refers to a toothache caused by a broken tooth (tooth fracture) without associated cavity or advanced gum disease. Biting on the area of tooth fracture can cause severe sharp pains. [12]

Cracked tooth syndrome is most common in lower back teeth (molars). That's because these teeth absorb most of the forces of chewing. These fractures are usually due to chewing or biting hard objects such as hard candies, pencils, nuts, etc.

Teeth with large fillings may be more likely to crack. Teeth that have undergone root canal treatment are weaker than other teeth and also may be more likely to crack. People with one cracked tooth are more likely to have others, either at the same time or in the future.[13,14,15]

According to one study in Seoul, for 1 year, each tooth that were identified as a cracked tooth was recorded and analyzed in terms of the classification of cavity and restorative material, the nature of opposing tooth, the location in the arch, the age and gender, and the clinical signs and symptoms, and treatment result were recoreded . Cracked teeth were observed most frequently in the teeth with no restorations (60.4%) and with class I restorations (29.2%). The most prevalent age was in those over 40 years of age (33.2% in their 40s, 26.6% in their 50s) and the prevalence was similar in men (53.9%) and women (46.1%). Cracked teeth were found most frequently in the maxillary molars (33.8% in first molar, 23.4% in second molar) than in the mandibular molars (20.1% in first molar, 16.2% in second molar). 96.1% of the cracked teeth responded to the bite test, and 83.1% of the cracked teeth were observed in the mesiodistal direction. The prevalence of cracked tooth was highest in the intact teeth with no restoration, in maxillary molars, and in those over 40 years of age.[14]

According to one other study in study to determine the age of patients suffering from "Cracked tooth syndrome" in Nigeria CTS was seen most often in the 41 to 50 years age band (36.4%), in molars (63.6%), and in the maxillary arch (53.5%). Also, it was more frequent in men (55.8%). About 82% of CTS occurred in amalgam-

restored teeth. All cases had a positive response to the bite test and a normal response to the electric pulp test. Only 10% gave a positive history of masticatory accident as against none with history of bruxism habits. It was concluded that patients with unexplained pain in a vital, amalgam-restored tooth (especially in maxillary molars), with or without a history of a masticatory accident, may have a cracked or fractured tooth.

Temporomandibular joint (TMJ) disorders

Disorders of the temporomandibular joint(s) can cause pain which usually occurs in or around the ears or lower jaw. The TMJ hinges the lower jaw (mandible) to the skull and is responsible for the ability to chew or talk. TMJ disorders can be caused by different types of problems such as injury (such as a blow to the face), arthritis, or jaw muscle fatigue from habitually clenching or grinding teeth. Habitual clenching or grinding of teeth, a condition called "bruxism," can cause pain in the joints, jaw muscles, and the teeth involved. Bruxism is often due to life "stress," family history of bruxism, and poor bite alignment. Sometimes, muscles around the TMJ used for chewing can go into spasm, causing head and neck pain and difficulty opening the mouth normally. These muscle spasms are aggravated by chewing or by stress, which cause the patients to clench their teeth and further tighten these muscles. Temporary TMJ pain can also result from recent dental work or by the trauma of extracting impacted wisdom teeth.

Impaction & eruption

Dental pain can come from teeth that are erupting (tooth growing out or "cutting") or are impacted (tooth has failed to emerge into its proper position and remains under gum and/or bone). When a molar (the large teeth at the back of the jaw) tooth erupts, the surrounding gum can become inflamed and swollen. Impacted teeth cause pain when they put pressure onto other teeth or bone and are inflamed and/or infected.

Treatment for the above mentioned reason of the toothaches

Treatment of a small and shallow cavity usually involves a dental filling. Treatment of a larger cavity involves an onlay or crown. Treatment for a cavity that has penetrated and injured the pulp or for an infected tooth is either a root canal procedure or extraction of the affected tooth. The root canal procedure involves removing the dying pulp tissue (thus avoiding or removing tooth infection) and replacing it with an inert filling material. The procedure is used in an attempt to save the dying tooth from extraction. Once a root canal procedure is done, the tooth is more prone to fracture and will oftentimes require a crown to protect it.

Treatment of gum disease always involves oral hygiene and removal of bacterial plaque and tartar (hardened plaque). Moderate to advanced gum disease usually requires a thorough cleaning of the teeth and teeth roots called "scaling and root planning" and "subgingival curettage." Scaling and root planning is the removal of plaque and tartar from exposed teeth roots while subgingival curettage refers to the removal of the surface of the inflamed layer of gum tissue. Both of these procedures are usually performed under local anesthesia and may be accompanied by the use of oral antibiotics to overcome gum infection or abscess. Follow-up treatment, if necessary, may include various types of gum operations. In advanced gum disease with significant bone destruction and loosening of teeth, teeth splinting or teeth extractions may be necessary.

Tooth root sensitivities**:-** Early stages of root exposure can be treated with topical fluoride gels applied by the dentist or with special toothpastes (such as Sensodyne or Denquel) which contain fluorides and other minerals. These minerals are absorbed by the surface layer of the roots to make the roots stronger and less sensitive to the oral environment. Dentists may also apply "bonding agents" to the exposed roots to seal the sensitive areas. If the root exposure causes injury and death of the inner living pulp tissue of the tooth, then a root canal procedure or tooth extraction may be necessary.

Cracked tooth syndrome:- Treatment usually involves protecting the tooth with a full-coverage crown made of gold and/or porcelain. However, if placing a crown does not relieve pain symptoms, a root canal procedure may be necessary.

Treatment of Temporomandibular joint pain usually involves oral anti-inflammatory over-the counter (OTC) drugs like ibuprofen (Motrin or Advil) or naproxen (Aleve). Other measures include warm moist compresses to relax the joint areas, stress reduction, and/or eating soft foods that do not require much chewing. If bruxism is diagnosed by a dentist, a bite appliance (night guard) may be recommended that is worn during the night to protect the teeth. However, this bite appliance is used mainly to protect the teeth and may not help with joint pain. For more serious cases of joint pain, a referral to a TMJ specialist may be necessary to determine further treatment.

Impaction & eruption

Treatment for impacted teeth is usually pain medication, antibiotics (for infections), and surgical removal. This most commonly occurs with impacted molar (wisdom) teeth.

MATERIALS AND METHODS

The subjects were enrolled in the study according to the inclusion and exclusion criteria.

Enrollment of the Subjects takes place on the sites selected for the study. The subjects were educated about the study by the investigator, the subject were informed what was the objective of the study, what was importance of such type of study, why they were asked to participate in the study, how to participate in the study, what were the information subject had to give to the investigator, the subjects confidentiality clause, what were the benefits they were going to be get from the study and after explaining all the parameters mentioned above the informed consent was asked from the subjects and subjects giving the informed consent were enrolled in the study. During enrollment of subjects any types of pressure on the subjects to participate in the study were no given. The subject has given the freedom to give or to not give the consent for the study. Each of the steps mentioned above like enrollment of subjects, informed consent procedure, and subjects confidentially study was in accordance with standard guidelines used in clinical study like GCP, Schedule Y of Drugs and Cosmetics Act, Principle of Helenski. [21, 22, 23]. Subjects were selected on the basis of the inclusion and exclusion criteria. The inclusion and exclusion criteria of the study were as follows:-

Inclusion criteria

a)Subjects coming to the Dental OPD for toothache

b) Subjects giving the consent for the Study

c) Subjects ready to share the information in the prescription.

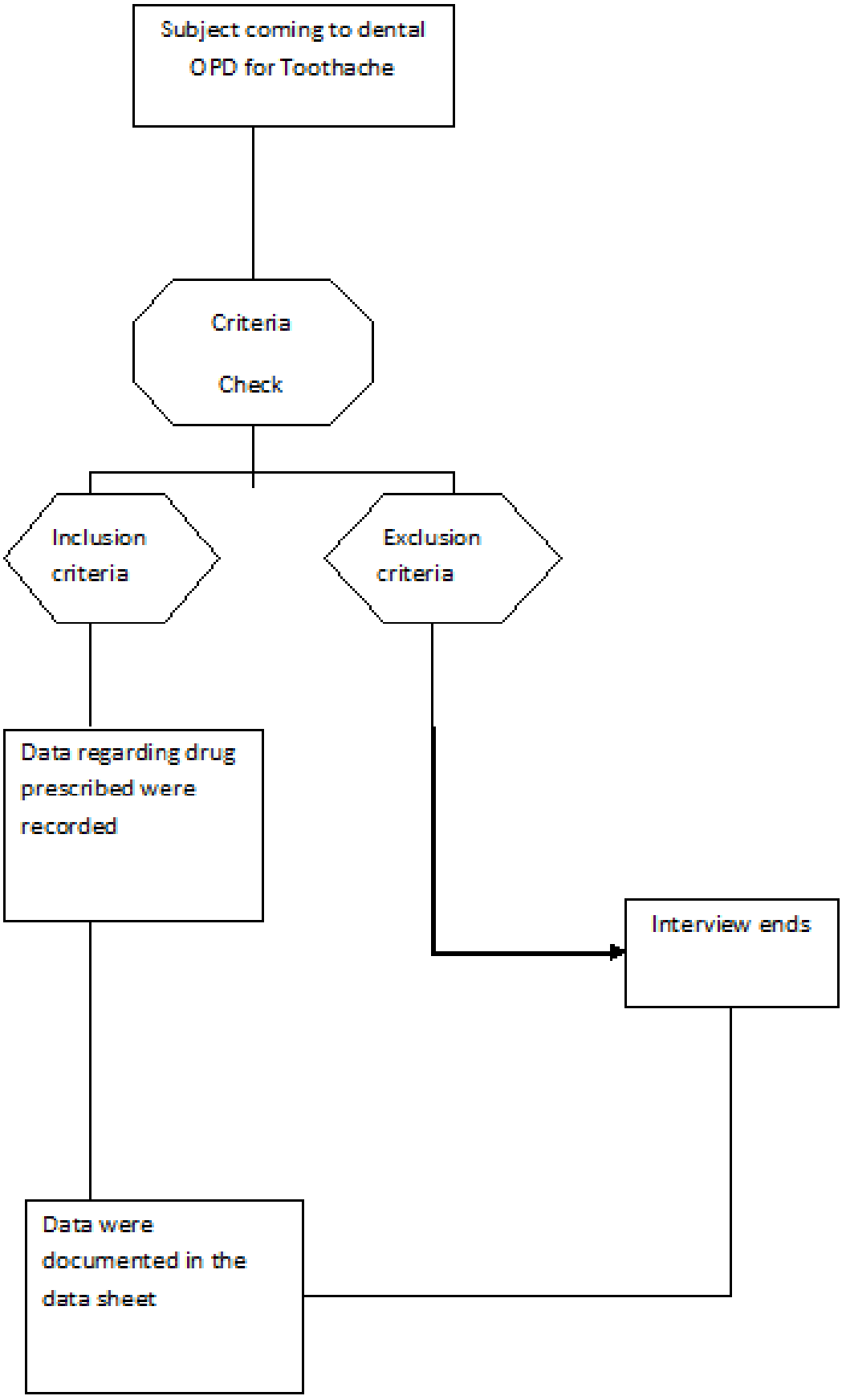
d) Adult subjects having age equal to or over 18 was included in the Study

Exclusion criteria

a) Subjects not giving the consent for the Study

b) Subjects having age less than 18 Years

The methodology used for this study can be explained by following flowchart


Subject coming to dental OPD for Toothache
Criteria Check
Inclusion criteria
Exclusion criteria
Data regarding drug prescribed were recorded
Interview ends
Data were documented in the data sheet

RESULTS

Analgesics were commonly used drugs for Toothaches (94%) followed by anti ulcer drugs (92%) antimicrobials and antibiotics (76.6%). Proteolytic enzymes (13.56%). Mouth washes(2.65%), Vitamins(38.53%) were commonly used.[Figure 4]

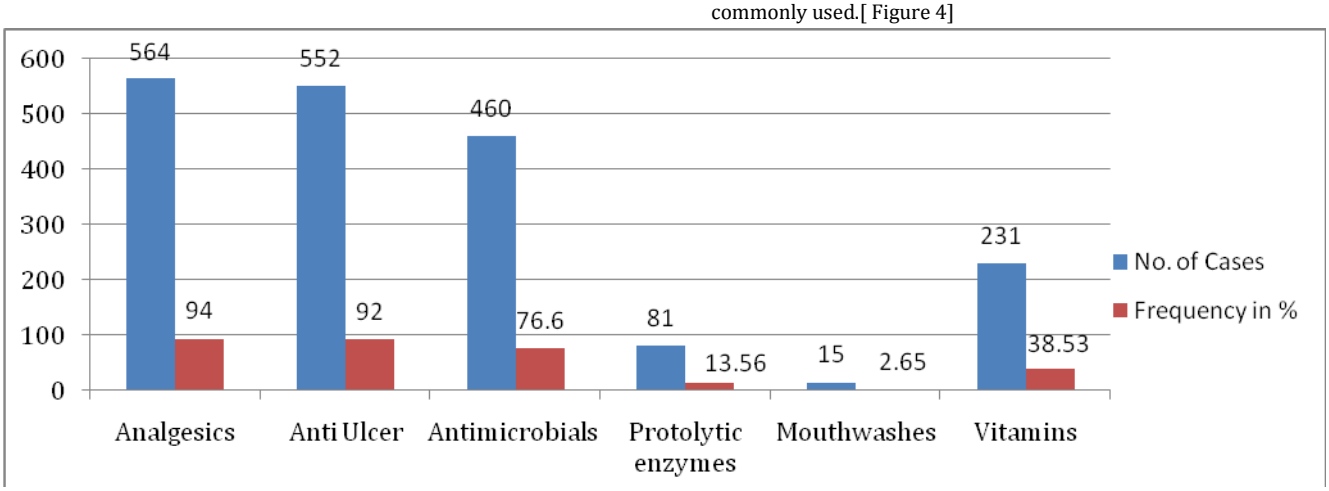


Figure 4: Drugs commonly used for toothaches

Diclofenac (24.6%) is the most commonly used analgesics followed by Paracetamol + Aceclofenac combination(18.27%) Ibuprofen (13.13%) , Ketorolac (22.51%), Nimesullide+ Paracetamol (21.45%) respectively. [Figure 5]

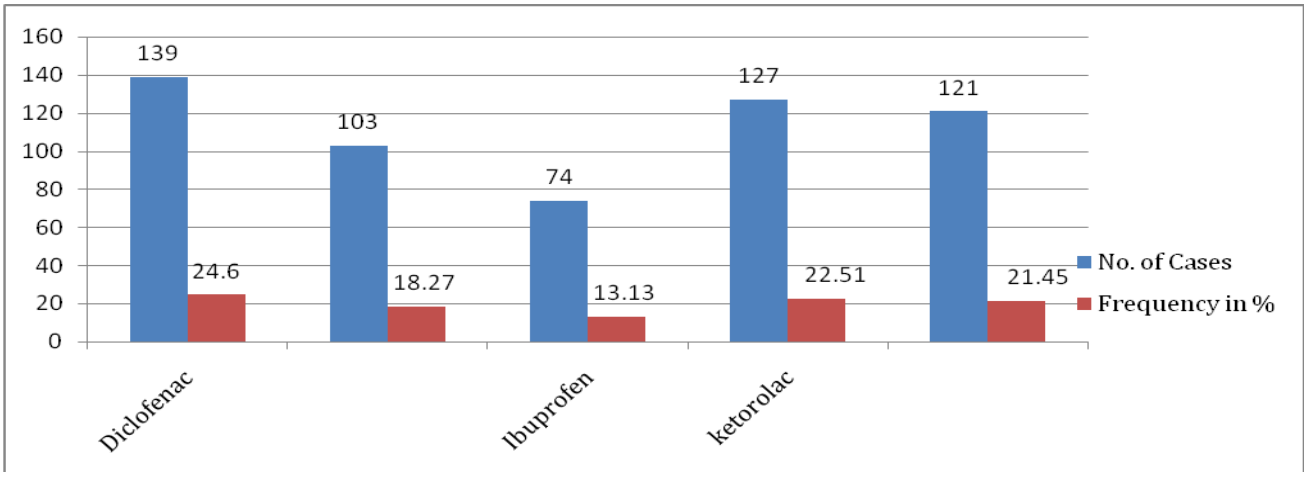


Figure 5: Analgesics commonly used for toothaches

PPI(Proton Pump Inhibitors) and Anti spasmodic combination like Pantaprazole + Domperidone(66.48 %) is the most commonly used drug followed by PPI (Proton Pump Inhibitors) like Omeprazole, Pantaprazole (22.28%) and H2 blockers like Ranitidine, Famotidine (13.37%). [Figure 6]

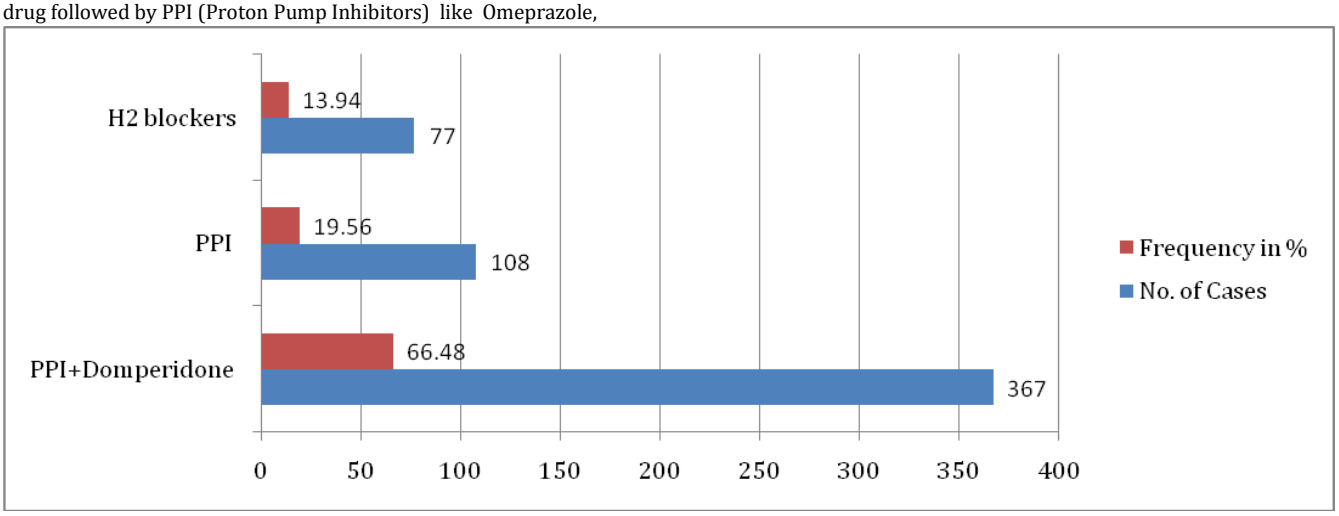


Figure 6: Anti Ulcer commonly used for toothaches

Amoxicillin (49.78%) is the most commonly used antibiotics followed by Metronidazole (24.13%) , Ofoloxacin + Ornidazole (23.9%) and Cephalosporin's(23.04%) [Figure 7]

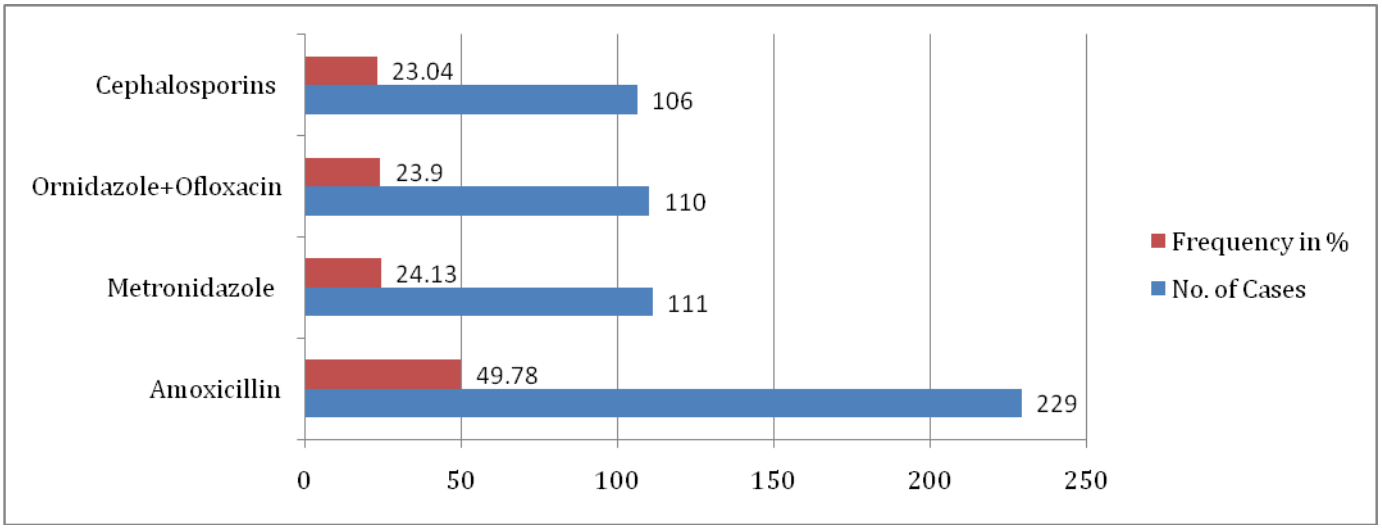


Figure 7: Antibiotics commonly used for toothaches

Mouthwashes generally contains Chlorhexidine as major constituents followed by Betadine Mouthwashes .

DISCUSSION

In the drug utilization study for toothache , we found that the Prescription contains Analgesics, Anti ulcers , Antibiotics and Anti microbial Proteolytic enzymes, Mouth washes and Multi vitamins. It is found that anti ulcers drugs were used to counteract the side effects of Analgesics. Almost 76.6% of antimicrobials and antibiotics show that these drugs were irrationally used. Almost all prescription contains Multi vitamins which are irrationally used [16-17].

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