

**Summer Training at
Abbott Health Care Pvt. Ltd.
(April 20 -June 15, 2012)**

**To Study the Disease Profile of Dental Hypersensitivity and Explore the
Future Opportunity for Abbott**

**By
Rajnish Gupta**

**Under the Guidance of
Dr. Kapil Garg**

**Post Graduate Diploma in Pharmaceutical Management
2011-2013**



**Institute of Health Management Research,
Jaipur
2012**

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Certificate

This is to certify that Rajnish gupta has undergone summer training in Abbott Healthcare Pvt.Ltd Jaipur from 20April to 15th June, 2012

The candidate carried out all the studies related to summer training himself. His approach to the studies has been sincere, scientific, and analytical. This summer training in partial fulfillment of the course requirement is recommended for the award of Post Graduate Diploma in pharmaceutical Management.

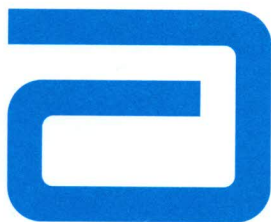
I wish his success in all future endeavors.

Dr .P. R.Sodani

(Dean Academics and student affairs)

Dr.Kapil Garg

(Associate Professor)



SUMMER TRAINING CERTIFICATE

This is to certify that **Mr. Rajnish Gupta**, pursuing **M.B.A.** from **Institute of Health Management Research** has successfully completed his Summer Training from **Abbott Healthcare Pvt. Ltd.**

His Summer Training project was focused on " To Study the disease profile of Dental Hypersensitivity and explore the future opportunity for any Pharma Co. " **under the guidance of Mr Kapil Garg.**

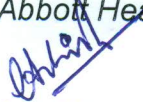
The period of his summer training was from **April 20th, 2012** to **June 10th, 2012.**

The work was a part of an on-going project and was confidential in nature and cannot be shared with the institute.

We wish **Mr. Rajnish** a success in all his future endeavours.

Warm Regards,

For Abbott Healthcare Pvt.Ltd , Mumbai


Ashish Bhargava
Zonal Business Manager
North

1. ACKNOWLEDGEMENT

I am extremely grateful to Abbott Health care pvt.ltd. for giving me the opportunity to carry out my summer internship in esteemed organization.

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I would like to thanks to my parents for their blessings and all the friends who supported and motivate.

Again I am thankful to all the peoples who supported me during the internship

Above all I thank GOD for their blessings upon me while working on the project

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3. Executive summary

Dentinal hypersensitivity, or cervical dentinal sensitivity, is a significant clinical problem, which can cause considerable concern for patients. This condition is frequently encountered by periodontists, dentists, hygienists and dental therapists. The management of this condition requires a good understanding of the complexity of the problem, as well as the variety of treatments available. This considers the aetiology, The research paper summarizes the reasons of dental hypersensitivity and treatment strategy followed by the dentists .intended to increase the awareness regarding available treatments, prevalence of disease, diagnosis procedures, marketing segment of drugs .this research tells disease profile of dental hypersensitivity and also tells the opportunities for abbott.

4. BRIEF PROFILE OF COMPANY

Abbott healthcare pvt. Ltd. is one of the largest privately held pharmaceutical companies in India. Abbott Laboratories (Abbott) are a global healthcare company. It undertakes the discovery, development, manufacture, and sale of a broad and diversified line of healthcare products along with pharmaceuticals, diagnostics, vascular and nutritional products. The company's diverse family of pharmaceutical, medical, and nutritional products includes a wide range of specialized medicines; medical diagnostic instruments and tests; minimally invasive surgical devices; a range of nutritional supplements for infants, children and adults; and products for veterinary care. Its research and development, manufacturing and administrative facilities are located in more than 100 countries worldwide. Abbott envisages building its position in the marketplace through new product launches, network expansion, internal development, in-licensing of technology and products, acquisitions and strategic alliances. The company markets its products through its own sales offices and distributors in over 130 countries globally.

Head quarter of Abbott healthcare pvt. Ltd. Is Bombay

Abbott healthcare Limited provides healthcare solutions through its four business units:

1. Primary Care, which markets products in the areas of Pain Management, Gastroenterology, with well-known brands like Brufen, Digene, Cremaffin.
2. Specialty Care – Metabolic & Urology provides solutions in the areas of Thyroid, Obesity, Diabetes and Benign Prostratic Hyperplasia.
3. Specialty Care - Neuroscience has a varied portfolio, with specialty products in the Neurology and Psychiatric segments.
4. Hospital Care, offers products in the field of anaesthesiology and neonatology namely Forane, Sevorane and Survanta.

The company has over 1000 employees and a state-of-the-art formulation plant at Verna in Goa. The manufacturing locations are designed to produce quality, high volume formulations using cost efficient processes. The plant has well equipped laboratories and trained personnel to ensure international standards of quality at each step of the manufacturing process

5. Introduction:-

Dental hypersensitivity appears to be a common problem in these days. It consists of short, sharp pain that occurs when a stimulus reaches exposed dentin.

Dentinal hypersensitivity poses a major problem as many patients are unable to perform adequate oral hygiene in hypersensitive areas thus leading to further plaque accumulation and degradation in gingival or periodontal health .Dentinal hypersensitivity can be a challenging condition for patients to describe and dental professionals to accurately diagnose.

Patients may or may not report this painful and often chronic condition to their dentist or dental hygienist and when they do, they report experiencing short, sharp pain after a variety of stimuli. A definitive diagnosis of dentinal hypersensitivity can be challenging and practitioners must rule out other problems, such as caries, fractured or cracked teeth, defective restorations, occlusal trauma, or gingival conditions that could be the underlying cause of the dental pain a patient experiences.

Majority of patients do not deem it to be a severe oral health condition and may not seek treatment or even report this condition to their practitioner. Patients with exposed dentin – a sign that dentinal hypersensitivity may be present – may or may not experience sensitivity.

The response to stimuli varies from patient to patient. Factors such as Individual pain tolerance, emotional state, and environment can contribute to the variety of responses between and among patients. Main cause of dental hypersensitivity is abrasion. Most of the peoples are not aware that they follow the improper techniques.

6. Prevalence:-

Dentinal hypersensitivity is a common dental problem yet it is often under-reported by patients or Misdiagnosed The prevalence rate of dental hypersensitivity is 56% Prevalence rate of dental hypersensitivity is high in 30 to 50 ages

7. DENTAL HYPERSENSITIVITY

Dental hypersensitivity is defined as pain arising from exposed dentine typically in response to thermal, chemical, tactile or osmotic stimuli.

Dentine may become exposed via several means. For example, the enamel or cementum covering the dentine surface may be removed or denuded as a result of attrition, abrasion or erosion.

Alternatively, in some individuals the cementum and enamel which normally cover the dentine do not meet and result in dentine exposure as a result of a developmental anomaly.

In general, it appears that dentinal hypersensitivity is rarely a result of just one of the above factors, but rather a combination of more than one factor. Regardless of the aetiology of dentine exposure, one feature appears to be in common and that is open dentinal tubules which provide a direct link between the external environment and the internal pulp of the tooth. If the tubules are not exposed it seems unlikely that hypersensitivity will be found.

In areas of sensitive dentine the apertures of the dentine tubules are patent and this results in more stimuli having closer contact with the dental pulp. once sensitivity has become established the pulp may become irreversibly sensitive.

Treatment is therefore aimed at not only restoring the original impermeability of the tubules by occluding them, but also controlling the neural elements within the pulp to dampen the external stimulatory effects.

Main causes of dental hypersensitivity: - Hypersensitivity is usually caused by loss of enamel covering due to-

Attrition: - The physiologic wearing away of a tooth as a result of tooth to tooth contact as in mastication. the main cause of attrition is parafunctional habits.



Abrasion: Is the pathologic wearing away of tooth substance through some abnormal mechanical process like improper brushing technique



Erosion: Erosion is the loss of tooth substance by a chemical process that does not involve known bacterial action.



Gingival recession:-

Gingival recession is more common as we age and has multiple aetiologies that can cause cementum and/or dentin to become exposed. The main cause of gingival recession is Periodontal disease. Poor oral hygiene, Iatrogenic loss during restorative procedures, Acute or chronic trauma.



Diagnosis:-

One of the difficulties facing the dental practitioner when confronted with a patient complaining of tooth pain is that there are a number of clinical conditions that may elicit the same clinical symptoms as Dental Hypersensitivity and they have to be eliminated before a correct diagnosis of Dental Hypersensitivity is made.

The reason for tubules to be exposed or open should be assessed during a visual examination of the teeth as well as a detailed dietary history.

Useful diagnostic tools are the air/water syringe (thermal), dental explorer (touch), percussion testing, bite stress tests, and other thermal tests such as an ice cube and assessment of occlusion. A comprehensive dental examination will ultimately rule out other underlying conditions for which sensitivity is a symptom such as cracked tooth, fractured restoration, chipped teeth, dental caries, gingival inflammation, post restorative sensitivity, marginal leakage, and

Pulpitis. Excessive intake of dietary acids such as citrus juices and fruits, carbonated drinks, wines, and ciders have been identified as potential risk factors for dental hypersensitivity. The dietary history provided by the patient will assist in identifying the risk factors the patient may have for tooth sensitivity. Erosion is one of the most common causes of irreversible enamel loss.¹⁵ In addition; other risk factors will be ferreted out during an examination such as toothbrush abrasion (Figure 3), chemical erosion (Figure 4), thin enamel, gingival recession, exposed dentin, and eating disorders. The patient will be able to assist in diagnosis by identifying the pain inciting stimuli, i.e., thermal, tactile, etc., as well as describing the pain. The response to stimuli

Varies from patient to patient. Factors such as individual pain tolerance, emotional state, and environment can contribute to the variety of

The most common cited reason for exposed dentinal tubules is gingival recession (predisposing factor). Chronic exposure to bacterial plaque, toothbrush abrasion, gingival laceration from oral habits such as toothpick use, excessive flossing, crown preparation, inadequate attached gingiva, inadequate labial plate of the alveolar bone and gingival loss secondary to disease or surgery are some but not all causes of gingival recession. Gingival recession is the reduction of the height of the marginal gingiva to a location apical to the

CEJ. Recessed areas may become sensitive due to the loss of cementum, ultimately exposing dentin. Probing depths, recessed areas, and sensitivity reported by the patient must be accurately recorded and monitored to provide a reference for the patient's disease activity over time.

Treatment options:-

1. Desensitizing the nerve:-
 - a. Potassium nitrate
2. Cover the dentinal nitrate:-
 - a. Periodontal surgery/ grafting
 - b. Composite/glass ionomer restoration
 - c. Crown placement
 - d. Plug (sclerose) the dentinal tubules
 1. Ions/salts
 - a. Stannous fluoride
 - b. Sodium fluoride/stannous fluoride combination
 - c. Ferrous oxide
 - d. Potassium oxalate
 - e. Strontium chloride
 2. Precipitates – proteins/amino acids
 - a. Glutaraldehyde
 3. Resins
 - a. Dentin sealers
 - b. Methyl methacrylate
3. Remineralising Technique:-
 1. SoothRx
 2. MI Paste

Treatment procedures:-

Home techniques:-

Main objective of home technique is occluding the dentinal tubules or making coagulates inside the tubules. Patients are often prescribed over-the-counter desensitizing agents. These “at home” desensitizing agents include toothpastes, mouthwashes and chewing gums. Majority of the toothpastes contain potassium salts (potassium nitrate, potassium chloride or potassium citrate), sodium fluoride, strontium chloride, dibasic sodium citrate, formaldehyde, sodium mono fluorophosphates and stannous fluoride. Potassium salts act by diffusion along the dentinal tubules and decreasing the excitability of the intradental nerve fibers by blocking the axonic action. Various clinical studies have shown the efficacy of potassium salts in controlling the Dental Hypersensitivity. It has been shown that toothpastes containing 5% potassium nitrate and 0.454% stannous significantly reduced the Dental Hypersensitivity. Also, toothpastes containing potassium nitrate and fluorides have been shown to reduce post-bleaching sensitivity. The desensitizing toothpastes should be used with the help of a toothbrush with soft bristles. Patients should be advised to use minimal amount of water to prevent the dilution of the active agent. Along with the desensitizing toothpastes, mouthwashes and chewing gums containing potassium nitrate, sodium fluoride or potassium citrate are also recommended. The results of “at-home” desensitizing therapy should be reviewed after every 3–4 weeks. If there is no relief in Dental Hypersensitivity, “professionally applied” therapy should be initiated.

Remineralization:-

There are such two types of therapies SoothRx (Omnii Pharmaceuticals) and MI Paste (GC America). These products are delivered via different methods, but their results are based on dentin remineralisation.

SoothRx utilizes calcium sodium phosphosilicate as its active ingredient and is distributed from the dental office. Such type of tooth paste like vantej (Dr. Reddy) has the calcium sodium phosphosilicate as their active ingredients. MI Paste utilizes Recaldent and is also distributed from the office. A set of custom trays are fabricated, and a variety of treatments can be used with this system. In addition to treating sensitivity, this product has been recommended for use in treating xerostomia, increased caries activity, and enamel and dentin demineralization. Both products work via the route of increasing calcium, phosphate, and fluoride uptake and remineralisation.

Professionally applied technique :-

office applied technique should provide an immediate relief from the symptoms of Dental Hypersensitivity. The in-office desensitizing agents can be classified as the materials which undergo a setting reaction (glass ionomer cement, composites) and which do not undergo a setting reaction (varnishes, oxalates). Oxalates can reduce dentinal permeability and occlude dentinal tubules. Thirty percent potassium oxalate had shown a 98% reduction in dentinal permeability

Fluorides

Traditionally, fluorides have been used as a caries preventive material which can help in Remineralisation of enamel/dentin. Also, various clinical trials have shown that application of Fluoride solution can decrease the Dental Hypersensitivity. Fluorides decrease the dentinal Permeability by precipitation of calcium fluoride crystals inside the dentinal tubules. These Crystals are partially insoluble in saliva. Various fluoride formulations are used to treat Dental Hypersensitivity. These include sodium fluoride, stannous fluoride, sodium Mono Fluorophosphate, fluorosilicates and fluoride combined with iontophoresis. Sodium fluoride has been used in dentifrices or may be professional applied in a concentration of 2%. The precipitates formed by sodium fluoride can be mechanically removed by the action of Saliva or mechanical action. Therefore, an addition of acid formulation is recommended. The Acidulated sodium fluoride can form precipitates deep inside the tubules. Also, A clinical Study has shown that 0.4% stannous fluoride along with 0.717% of fluoride can provide an Immediate affect after a 5 minute professional application. Stannous fluoride acts in a similar Fashion as that of sodium fluoride, i.e., formation of calcium fluoride precipitates inside Tubules. Also, stannous fluoride itself can form insoluble precipitates over the exposed Dentine. Fluorosilicates act by formation of precipitates of calcium phosphates from saliva. Ammonium hex fluorosilicate has been used as a desensitizing agent. It can present a continuous effect of dentinal tubule occlusion via precipitation of a mixture of calcium fluoride and fluoridated apatite. If the precipitate is predominantly composed of fluoridated apatite, it can form stable crystals deposited deep inside the dentinal tubules. These crystals are resistant to removal from the action of saliva, brushing or action of dietary substances.

Oxalates

Oxalates can reduce dentinal permeability and occlude dentinal tubules. Thirty percent potassium oxalate had shown a 98% reduction in dentinal permeability. Also, topical application of 3% potassium oxalate reduced Dental Hypersensitivity after periodontal therapy. The oxalate reacts with the calcium ions of dentine and forms calcium oxalate crystals inside the dentinal tubules as well as on the dentinal surface. This results in a better sealing as compared with an intact smear layer. It has been shown that the effect of oxalates on Dental Hypersensitivity diminishes over a period of time. This can be attributed to the removal of the calcium oxalate crystals by brushing or dietary acids. The condition can be improved by acid etching of the dentinal surface, thus increasing the penetration of calcium oxalate crystals deep into the dentinal tubules. Many vegetables like rhubarb, spinach and mint contain oxalates. It has been shown that phytocomplexes obtained from these natural products can reduce the dentinal permeability. This can also be followed by covering the

exposed surface with a dental adhesive. Potassium oxalate can lead to gastric irritation. Therefore, it should not be used with a tray with prolonged placement.

Varnishes are commonly used useful in-office measures to treat Dental Hypersensitivity. Copal varnish can be applied to cover the exposed dentinal surface. But its effect is for short term and is not recommended for long term management of Dental Hypersensitivity. To improve its efficacy, removal of smear layer is advocated. Also, the varnishes can act as a vehicle for fluoride. The fluoride varnishes can be acidulated to increase the penetration of ions.

Adhesive materials:-

Resin-based dental adhesive systems can provide a more durable and long lasting dentine desensitizing effect. The adhesive resins can seal the dentinal tubules effectively by forming a hybrid layer. Various clinical studies have demonstrated the effectiveness of adhesives in management of Dental Hypersensitivity. Traditionally, resin composites or dentin bonding agents are used as desensitizing agents. The conventional dentin bonding agents (DBA) removes the smear layer, etches the dentinal surface and forms deep dentinal resin tags inside the dentinal tubules. The combined dentin–resin layer (consisting of penetrating resinous tags) has been termed as hybrid layer. It effectively seals the dentinal tubules and prevents Dental Hypersensitivity. Newer bonding agents modify the smear layer and incorporate it in into the hybrid layer. Recently, some dentin bonding agents have been introduced in the market with the sole purpose of treating Dental Hypersensitivity. Gluma Desensitizer (Heraeus Kulzer, Hanau, Germany) contains hydroxyethyl methacrylate (HEMA), benzalkonium chloride, glutaraldehyde and fluoride. Glutaraldehyde causes coagulation of the proteins inside the dentinal tubules. It reacts with the serum albumin in the dentinal fluid, causing its precipitation. HEMA forms deep resinous tags and occludes the dentinal tubules. Gluma has shown promising results in the clinical trials.

Laser:-

Laser is an acronym for light amplification by stimulated emission of radiations. It has been shown in various studies that lasers can be used in the effective management of dental hypersensitivity. The mechanism of action of lasers in treating dental hypersensitivity is not very clear. Some authors have shown that Nd–YAG laser application occluded the dentinal tubules. Ga AlA laser is thought to act by affecting the neural transmission in the dentinal tubules. It has also been proposed that lasers coagulate the proteins inside the dentinal tubules and block the movement of fluid.

8. Management strategy:-

- Take a detailed clinical and dietary history.
- Differentially diagnose the condition from other dental pain conditions.
- Identify and manage etiological and predisposing factors.
- In case of mild-to-moderate sensitivity, advice at-home desensitizing therapy.
- If there is no relief or in case of severe sensitivity, initiate in-office treatment.
- In extreme cases, if patient does not respond to the therapy and there are individual teeth exhibiting the symptoms, then endodontic therapy can be initiated.

9. Problem statement:-

The project has been undertaken to understand The disease profile of dental hypersensitivity and to identify the prevalence in different regions.

10. Research objectives:-

- To study the treatment procedures of dental hypersensitivity
- To identify the prevalence rate of dental hypersensitivity in different regions.

11. Methodology:-

Research design:-

Research design is a total plan or strategy of a proposed research-

Descriptive study was conducted to achieve the objectives.

Collection of data:-

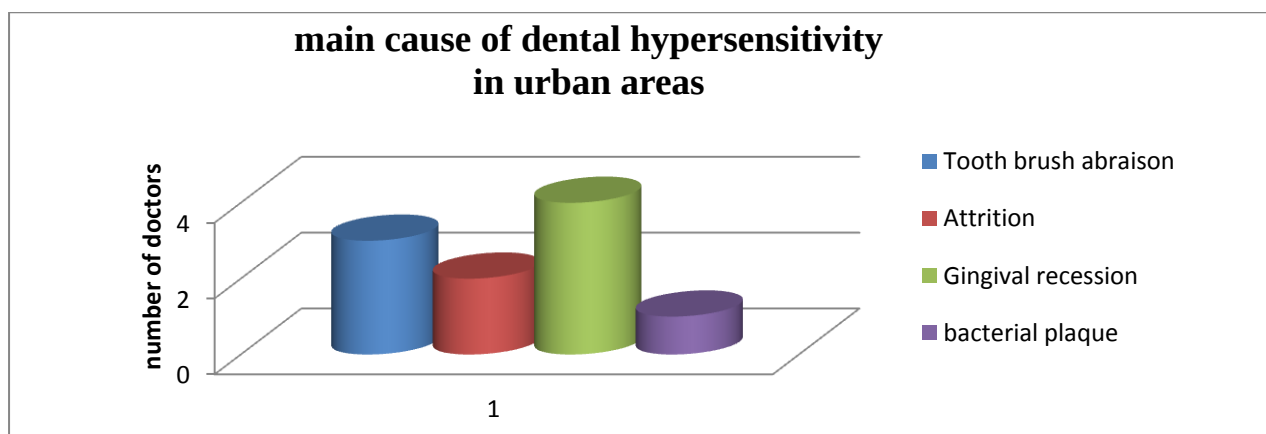
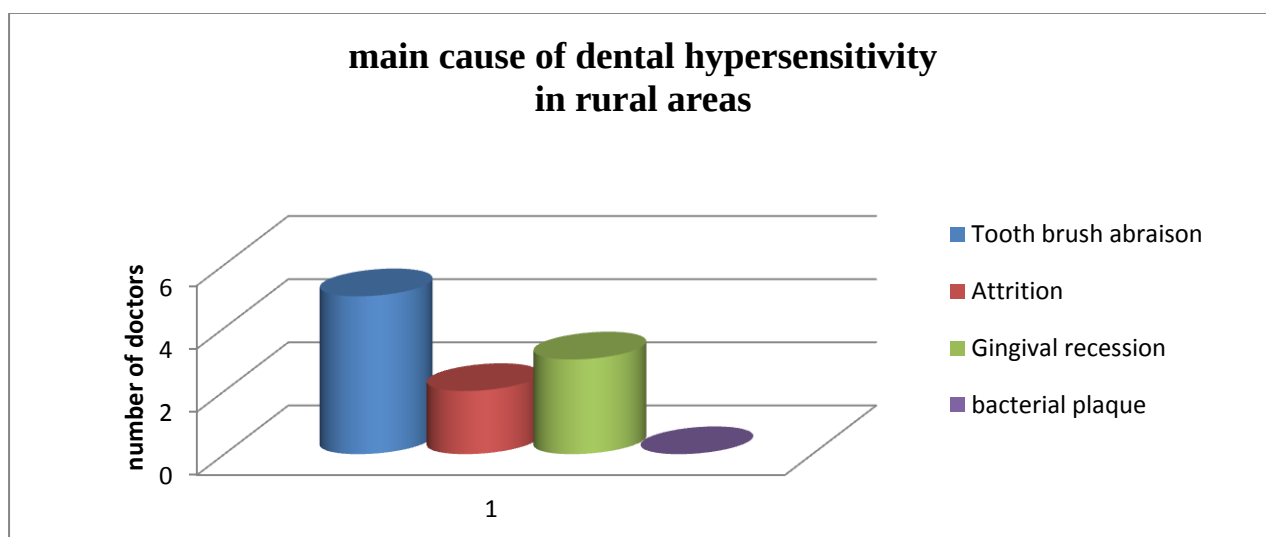
- **Data collection method:-** survey method followed to collect the data
- **Sample size:-** 25 dentist
- **Target population:-** To identify the prevalence rate of dental hypersensitivity in different regions 10 dentist from rural areas 10 from urban areas and 5 dentist from semi urban areas have selected.
- **Sampling method:-** convenience judgemental method was used to collect the data
- **Sampling extent:-** shri mahavir ji hindaun city, gangapur sity, jaipur
- **Contact method:-** A face to face interview were conducted with the dentists
- **Tool for data collection:-** A semi structured Questionnaire was designed considering the various factors identified, so that the data collected would be in compliance with the information needed.(Copy Enclosed)

. The data was recorded, analysed and interpreted within the scope of the given objectives.

12. ANALYSIS

Table -1

Main cause of dental hypersensitivity	Toothbrush abrasion	attrition	Gingival recession	Bacterial plaque
Response from rural areas	5	2	3	0
Response from urban areas	3	2	4	1



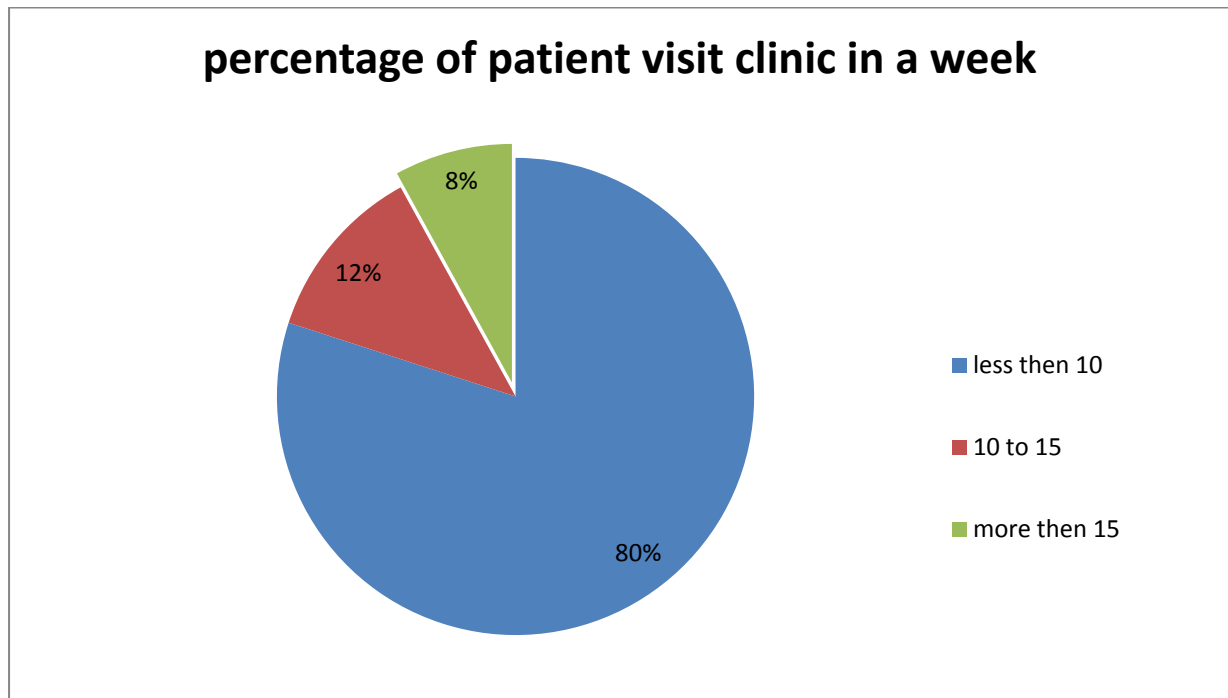
Interpretation:-

Main cause of dental hypersensitivity is tooth brush abrasion (improper brushing technique) in rural areas. It shows that most of the people in rural areas follow improper technique of brushing while in urban areas main cause of hypersensitivity is gingival recession. it shows that hypersensitivity problem in urban areas due to age related problem and their wrong dietary habits .Peoples in urban areas are more aware regarding to hypersensitivity as compared to rural areas

Table-2

Number of patients visit the clinic every week	less then 10	10 to 15	More then 15
Response	20	3	2

Chart-2



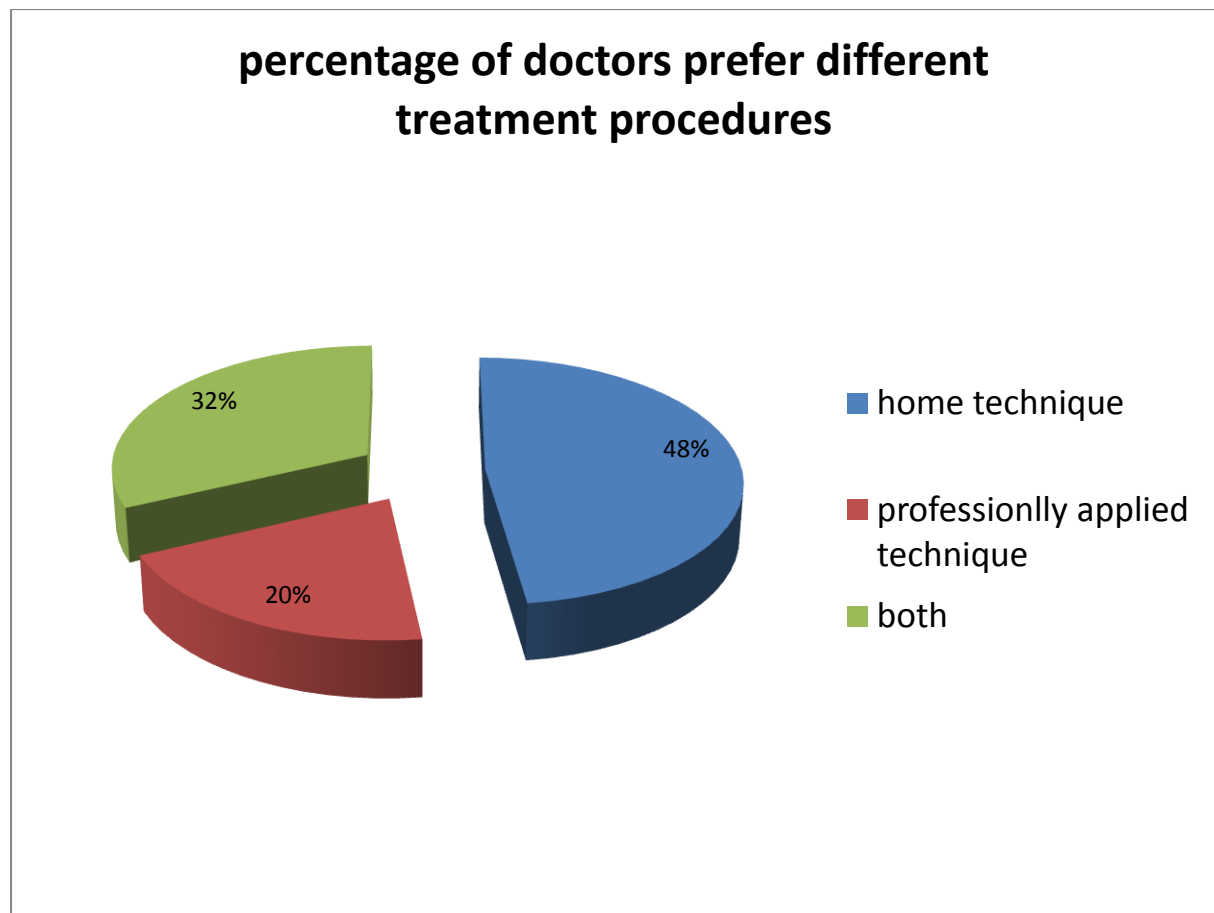
Interpretation:-

80% dentist told less than 10 patient visits the clinic every week .while the patient of dental hypersensitivity is more it shows that the patients are less aware about their disease and lack of requirement to the treatment of the disease only 50% of the patients go the clinic for the diagnosis of dental hypersensitivity

Table:- 3

Most preferred procedure to treatment of dental hypersensitivity response	Home technique	Professionally applied technique	Both
	12	5	8

Chart:- 3



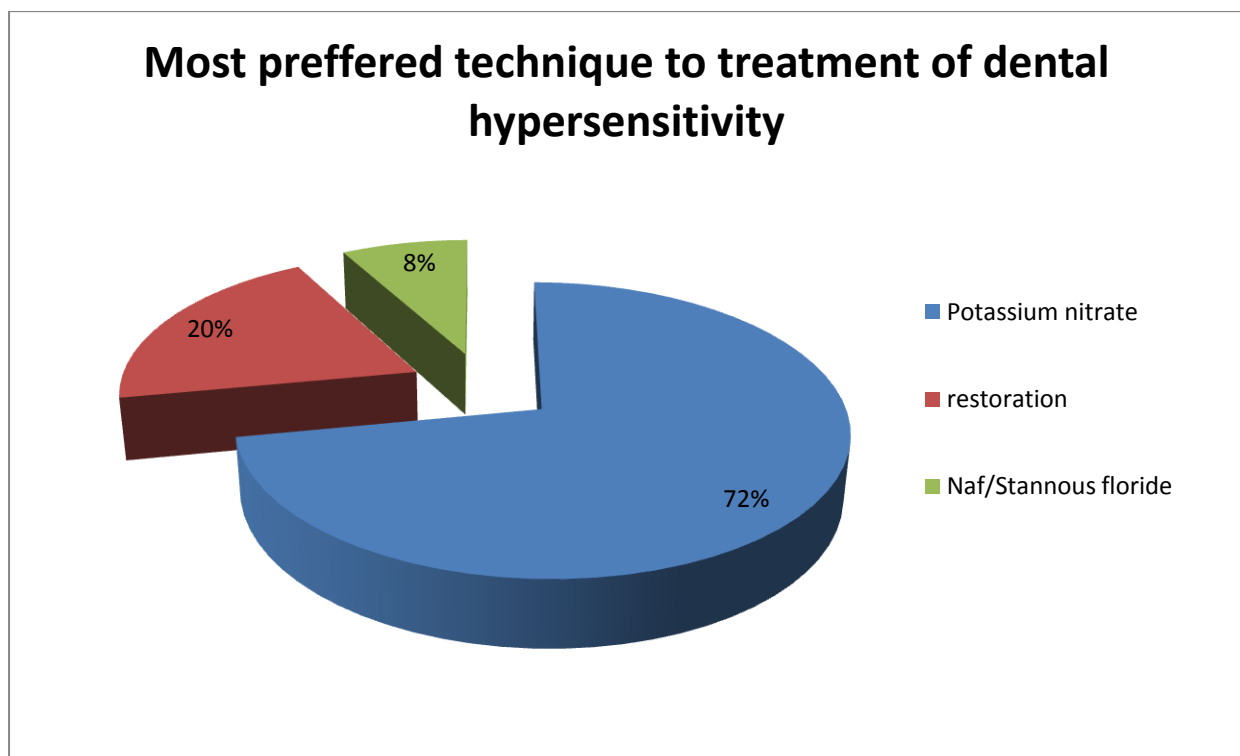
Interpretation:-

Most of the doctors prefer home technique like tooth paste and mouth washes for treatment of dental hypersensitivity. Doctors told that the treatment strategy is totally dependent on condition of patient if patient is in more severe condition they follow both home technique and professionally applied technique

Table:- 4

Most preferred technique to treatment of dental hypersensitivity response	Potassium nitrate	restoration	Naf/Stannous floride
	18	5	2

Chart :-4



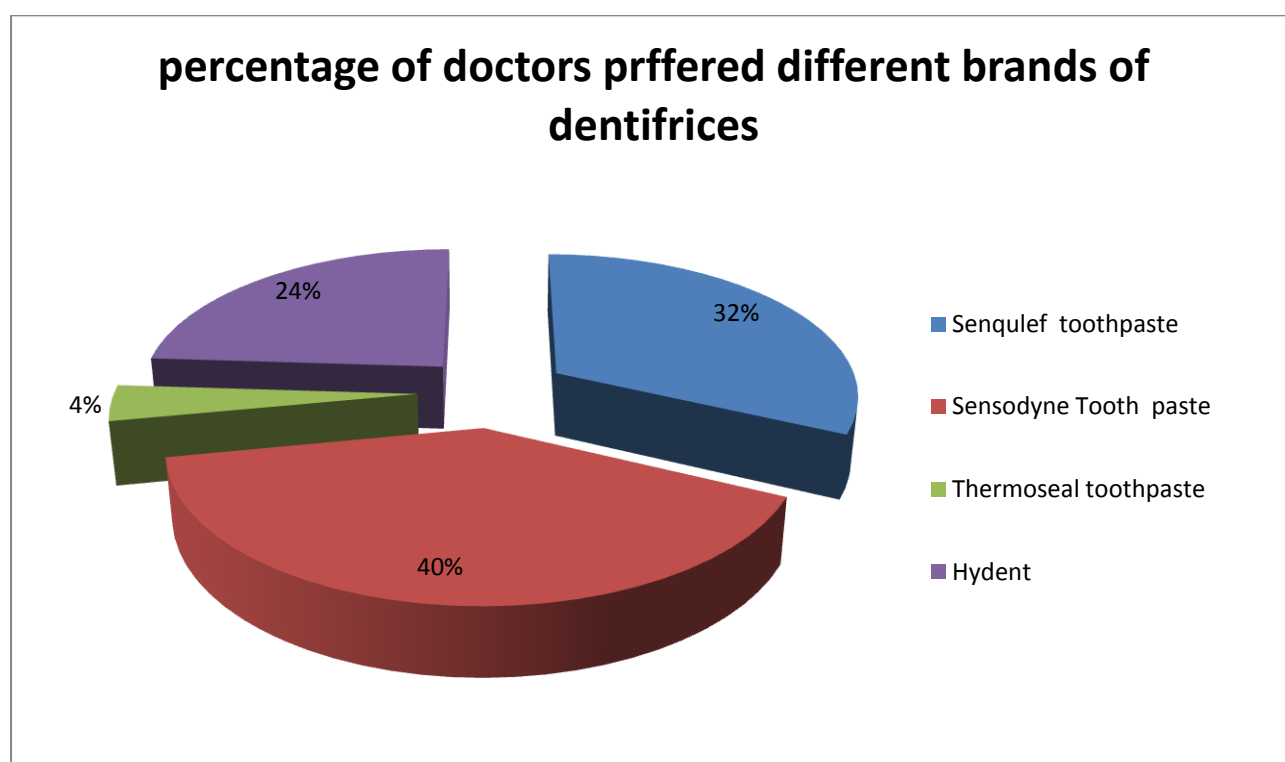
Interpretation:-

Most preferred technique of the treatment of dental hypersensitivity is potassium nitrate. Potassium nitrate has an effect on neural transmission, interrupting the signal which would result in the sensation of pain. It reduces the sensitivity.

Table:-5

Number of doctors preferred different brand of dentifrices	Senqulef toothpaste	Sensodyne Tooth paste	Thermoseal toothpaste	Hydent
response	8	10	1	6

Chart-5



Interpretation:-

Most prescribed brand of dentifrices is sensodyne tooth paste. About 40% of doctors prescribed it for dental hypersensitivity main component of sensodynne is Potassium Nitrate Sodium Fluoride sensodyne decrease the sensitivity of pain.

13. Conclusions

Dentinal hypersensitivity can be a challenging condition for dental practitioners to diagnose and treat effectively. With the advancement in dental products, options for providing relief from pain and sensitivity are great and vary according to the severity of the condition. It is clear that some products appear to be more effective than others. The patient should be responsible for the decision making process since some of their daily habits may be contributing to the problem and if not changed the condition will persist. Most of the peoples who follow improper technique of brushing have the dental hyper sensitivity problem patients may not need to experience the pain associated with hypersensitivity and if they have this condition, receive treatment that can provide relief from pain.

14. Recommendation to Abbott health care

1. Prevalence rate of hypersensitivity is very high so Abbott should invest to find out the proper treatment of hypersensitivity.
2. Abbott should have to invest on development of some OTC products so that patients can buy the products on their initial condition of hypersensitivity.
3. There are very few Programmes is going on to aware the peoples regarding hypersensitivity so Abbott should start such programmes to make the awareness and advertise their new developed OTC products.
4. Diagnosis of hyper sensitivity is too difficult because similarity of disease pattern of teeth and lack of instruments for diagnosis the hypersensitivity .Abbott should develop diagnostic instruments so that proper treatment can be made.

15. Annexure:-

QUESTIONNAIRE ON DENTAL HYPERSENSITIVITY

NAME OF DOCTOR_____

Address of doctor with Phone No and Email ID

Email_____ Phone No./Mobile No._____

Please answer the following questions if you choose the other option specify it-

1. What is the main cause of dental hypersensitivity?

- (A) Toothbrush abrasion
- (B) Recession
- (C) Attrition
- (D) other

2. How much patients of dental hypersensitivity come to your clinic in a week?

- (A) Less than 10
- (B) 10 - 15
- (C) More than 15

3. What do you prescribe for hypersensitivity?

- (A) Home technique
- (B) Professionally applied technique (restoration tropical fluoride application)
- (C) Both (paste)

4. What are the treatment strategies you follow?

- (A) Potassium nitrate (DESENSITIZING AGENTS)
- (B) Restoration (decade tooth)
- (C) Naf/Stannous fluoride
- (D) Other

5. Most proffered brand of dentifrices is?

- (A) Sensodyne Tooth paste
- (B) senqulef toothpaste
- (C) thermoseal toothpaste
- (D) Hydent

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