

**Summer Training at
Cadila Pharmaceuticals Limited,
Ahmedabad**

**Assessment of Calcium Supplements and Teriparatide usage in
Osteoporosis among Orthopaedic Physicians**

**By
Harishankar Sahu**

**Under the guidance of
Dr. Nirmal Kumar Gurbani**

**MBA Pharmaceutical Management
2015-2017**



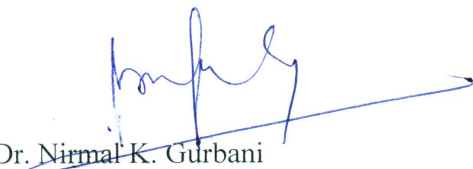
**The IIHMR University, Jaipur
2016**

CERTIFICATE

This is to certify that Harishankar Sahu has undergone Summer Training in Cadila Pharmaceuticals Limited, Ahmedabad from 1st April to 2nd June 2016.

The Candidate himself completed the project assigned to him during summer training. His approach to the project was sincere and proactive. This summer training is partial fulfillment of the course requirement recommended for the award of MBA in Pharmaceutical Management.

We wish success in all his future endeavors.



Dr. Nirmal K. Gurbani
(Professor)

The IIHMR University, Jaipur



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To Whom So Ever It May Concern

This is to certify that **Mr. Harishankar Sahu** student of The IIHMR University, Jaipur successfully completed 8 weeks Summer Internship under the guidance of Mr. Kaushik Dasgupta.

During the period of training from **01st April 2016 to 02nd June 2016** **Harishankar Sahu**, was found to be sincere, dedicated and committed.

We wish him the very best in all his future endeavors.

For Cadila Pharmaceuticals Ltd

A blue ink signature of Johnson Mathew, consisting of a stylized 'J' and 'M' followed by a horizontal line.

Johnson Mathew
GM HR - Branded

Acknowledgement

It gives me immense pleasure to acknowledge My Mentor Mr. Kaushik Das Gupta (General Manager Marketing), at Cadila pharmaceuticals, Ahmedabad, for their guidance throughout my Internship, it is the constant encouragement that has enriched my growth as an intern.

I place on record, my sincere gratitude to Mr. Lokesh Kumar Sir, Cadila Pharmaceuticals for being so supportive.

I would also like to express my deep sense of gratitude to my University mentor Dr. Nirmal K. Gurbani, Professor, at Institute of Health Management Research, Jaipur. I am greatly indebted to them for providing their valuable guidance at all stages of the study, his advice, constructive suggestions, positive and supportive attitude and continuous encouragement, without which it would have not been possible to complete the project.

I owe a debt of gratitude to all teachers for grooming me and my classmates for the inspiration needed to work with dedication and motivation throughout as an Intern at Cadila pharmaceuticals Limited, Ahmedabad.

I hope that I can build upon the experience and knowledge that I have gained and make a valuable contribution towards the industry in coming future.

Harishankar Sahu

CONTENTS

1	<i>Aknowledgement</i>	5	<i>Abbriviation</i>
6	<i>Executive Summary</i>	7	<i>Company Profile</i>
9	<i>Osteoporosis</i>	13	<i>Objectives</i>
14	<i>Research Methodology</i>	15	<i>Findings & Interpretation</i>
25	<i>Limitation of Study</i>	26	<i>Conclusion</i>
27	<i>Suggestion</i>	28	<i>Reference</i>

ABBREVIATIONS:

OTC	: Over the counter.
FDA	: Food and drug administration.
WHO	: World health organization.
GMP	: Good Manufacturing Practices.
ISBMR	: Indian Society for Bone and Mineral.
IOF	: International Osteoporosis Foundation.
QUS	: Quantitative ultrasound measurement of the calcaneus.
DXR	: Digital X-ray radiogrammetry.
OPG	: Osteoprotegerin.
PTH	: Parathyroid Hormone.
IL	: Interleukin.
TNF	: Tumor necrosis factor.
IGF	: Insulin like growth factor.
TGF	: Transforming growth factor.
IFN	: Interferon.
BMD	: Bone mineral density.
IU	: International Unit.
NETA	: Norethindrone Acetate.
RRR	: Relative risk reduction.

Executive Summary

Osteoporosis is an important public health problem leading to an increased risk of developing spontaneous and traumatic fractures. In India osteoporotic fractures occur more commonly in both sexes, and may occur at a younger age than in the western countries.

Osteoporosis is characterized by low bone mass with micro architectural deterioration of bone tissue leading to enhance bone fragility, thus increasing the susceptibility to fracture. This would be associated with enormous costs and considerable consumption of health resources. Pharmacological therapies that effectively reduce the number of fractures by improving bone mass are now available widely in markets.

At present most drugs available in the markets decrease bone loss by inhibiting bone resorption. Current treatment alternatives include bisphosphonates, calcitonin, teriparatide but sufficient calcium and vitamin D are a prerequisite. To further improve pharmacological interventions and therapeutical choices in this field, improvement of knowledge is very necessary.

The project assigned was “Market Research of Calcium Supplements and Teriparatide”

With objectives:

- ⇒ Assessment of Calcium supplements and Teriparatide usage in osteoporosis among orthopedic surgeons in Chhattisgarh.
- ⇒ To identify the choice of drug for Osteoporosis by Orthopedic Surgeons.
- ⇒ To identify Criteria by which orthopedic Surgeons prescribed drugs for Osteoporosis.

The project was carried out in 3 stages:

First stage was to carry out secondary research on Osteoporosis and preparation of questionnaire followed by second stage which involved meeting the orthopedic surgeons and conducting the survey. The final stage was to move ahead with data analysis and conclusion. Stage 2 was carried out by meeting with Orthopedic Surgeon of Chhattisgarh.

Company Profile

Cadila Pharmaceuticals Ltd. is one of the largest privately held pharmaceutical companies in India, headquartered at Ahmedabad, in the state of Gujarat.

Vision

"Vision is to be a leading pharmaceutical company in India and to become a significant global player by providing high quality, affordable and innovative solutions in medicine and treatment."

Mission

"We will discover, develop and successfully market pharmaceutical products to prevent, diagnose, alleviate and cure diseases. We shall provide total customer satisfaction and achieve leadership in chosen markets, products and services across the globe, through excellence in technology, based on world-class research and development. We are responsible to the society. We shall be good corporate citizens and will be driven by high ethical standards in our practices."

Over the last six decades, the company has been developing and manufacturing pharmaceutical products in India and selling and distributing these in over eighty five other countries around the world. Focused strongly on innovation and research, the company is present in more than 45 therapeutic areas spread across 12 specialties, including:

- Cardiovascular,
- Gastrointestinal,
- Analgesics,
- Hematinic,
- Anti-infective and antibiotics,
- Respiratory agents,
- Analgesics,
- Anti-diabetics and immunological.

At, Cadila pharmaceuticals, research and development is at the core of all its initiatives, be it biotechnology, API'S, Formulations, Plant tissue culture of Phytochemistry. More than 300 scientists in its various research and development steps reinforce the competitiveness of research in the therapeutic areas which have high unmet medical needs.

Company Profile

Global Presence

Cadila Pharmaceuticals has a multicultural, multilingual and multinational workforce of more than seven thousand employees including over two hundred people outside India in Africa, CIS, Japan and USA.

Cadila Pharmaceuticals is also partnering for growth with leading international companies worldwide in the areas of vaccine development, biological therapeutics and diagnostics, stem cell banking and hospital management. The company has also strategic alliances for preventing in-patient infections and development of novel treatment for specific and acute infections, for developing Antibiotic Resistant Breakers and innovative treatment in inflammation and pain management. The company makes active pharmaceutical ingredients at three sites in India:

Plants

From nine pharmaceutical production operations in India as well as a Zydus Cadila develops and manufactures a large range of pharmaceuticals as well as diagnostics, herbal products, skin care products and other OTC products.

The company makes active pharmaceutical ingredients at three sites in India:

Ankleshwar plants:

Zydus Cadila's plant complex at Ankleshwar in Bharuch District of Gujarat has been producing drug material since 1972. There are around 12 plants in the complex, which is ISO 9002 and ISO 14001 certified approved by the U.S. Food and Drug Administration (FDA). Total plant capacity at Ankleshwar is around 180 million tonnes.

Vadodara plant:

Zydus Cadila's plant at Dhabhasa, in Vadodara District's Padra taluka in Gujarat, was commissioned in 1997 by a company called Banyan Chemicals, and acquired by Zydus Cadila in 2002. The plant has a 90 million tonne capacity. It is approved by the U.S. FDA and is also approved to World Health Organization (WHO) good manufacturing practice (GMP) standards.

Patalganga plant:

Zydus Cadila acquired an API plant at Patalganga in Maharashtra state, 70 km from Mumbai, about 859 km from Nagpur, in the 2001 German Remedies deal. This plant operates to WHO GMP standards.^[1]



Osteoporosis

This chapter presents the background of the study, the main concepts in relation to Osteoporosis, treatment and the conceptual framework of the study.

Osteoporosis is a multi-factorial progressive skeletal disorder characterized by reduced bone mass and deterioration of bone micro architecture, predisposing it to increased fracture risk. The capacity of bone to resist mechanical forces and fractures depends not only on the quantity of bone tissue but also on its quality.

Osteoporosis is called a “silent disease” because it progresses without symptoms until a fracture occurs. Because of larger skeletons and no period of rapid hormonal change osteoporosis progresses more slowly in men than in women. The fractures caused by osteoporosis have a great impact on public health, as they are often associated to increased morbidity, mortality and high economic cost. Thus, in the last two decades pharmacological and non-pharmacological treatment (usually based on physical exercise) options have been largely developed to reduce the risk of fractures in osteoporotic patients^[2].

Osteoporosis in India:

The population of India is expected to increase to 1,367 million by 2020 and 1,613 million by 2050; of which 9.8% (134 million) and 19.6% (315 million), respectively, will be adults over 60 years. These staggering numbers give some idea of the population at risk for osteoporosis in India in the years to come.

Osteoporosis is becoming a serious problem for the public economy and health, because of the increase in elderly population in the near future. Conservative estimates in a study suggest that 20% of women and about 10-15% of men are osteoporotic in India. Another highly conservative estimate by a group of experts suggested that 26 million Indians suffer from osteoporosis, and this number is expected to reach 37 million by 2020.

Who is at risk of osteoporosis?

All men and women have some risk of developing 'thinning' of the bones (osteoporosis) as they become older, particularly over the age of 60. As mentioned above, women are more at risk than men. The following situations may also lead to excessive bone loss and so increase your risk of developing osteoporosis. If you:

- Are a woman and you had your menopause before the age of 45.
- Have already had a bone fracture after a minor fall or bump.
- Have a strong family history of osteoporosis.
- Have a body mass index (BMI) of 19 or less .
- Are a woman and your periods stop for six months to a year or more before the time of your menopause. This can happen for various reasons. For example, over-exercising or over-dieting.
- Have taken, or are taking, a steroid medicine (such as prednisolone) for three months or more. A side-effect of steroids is to cause bone loss..
- Are a smoker.
- Have an alcohol intake of more than four units per day.
- Lack calcium and/or vitamin D (due to a poor diet and/or little exposure to sunlight).
- Are not very mobile.
- Have, or had, certain medical conditions. Some conditions add to the risk of osteoporosis. For example: An overactive thyroid, Coeliac disease, Cushing's syndrome, Crohn's disease, Chronic kidney disease, Rheumatoid arthritis, Chronic liver disease, Type 1 diabetes and Any condition that causes poor mobility .

Diagnosis & Treatment of Osteoporosis

Diagnosis

Before any symptoms develop:

The ideal situation is that 'thinning' of the bones should be prevented in the first place. If this is not possible, the next best thing is for diagnosis and treatment of osteoporosis as necessary before any symptoms or fracture occur. A risk calculator is available to determine your risk of developing osteoporosis, depending on the number of risk factors that you have.

There are two commonly used risk calculators. One is called FRAX®, and the other is called QFracture. If you are found to be at increased risk, or your risk is uncertain, you may be referred for a DEXA scan. DEXA stands for dual-energy X-ray absorptiometry. It is a scan that uses special X-ray machines to check your bone

After symptoms develop:

Osteoporosis is often first diagnosed when you break a bone after a minor bump or fall. Even after the first fracture has occurred, treatment can help to reduce your risk of further fractures. If you are thought to have sustained a fragility fracture, you will usually be referred for a DEXA scan to look for signs of osteoporosis.

In older group of women, treatment for osteoporosis may be started without having a DEXA scan first. This is because osteoporosis is so common in this age group.

Other tests:

A newer test to look for osteoporosis is called digital X-ray radiogrammetry (DXR). It is easier to perform than a DEXA scan because it requires less technical equipment. It may sometimes be used as a screening test for osteoporosis. Ultrasound scans are also sometimes used as a screening test. They usually assess the bone at your heel. Again, they are not as sensitive as DEXA and not used very often.

Treatment:

Various medicines are available that can help to prevent and treat bone loss. Options used to treat 'thinning' of the bones include the following.

A. Calcium and vitamin D:

As a combination therapy, calcium and vitamin D is the accepted baseline treatment for osteoporosis. In a three year clinical study, supplementation with calcium and vitamin D3 reduced the risk of hip fractures and other non-vertebral fractures among elderly women and also a significant benefit was seen after 18 months. For elderly patients treatment with Vitamin D may have additional benefits, because vitamin D therapy increases muscle strength and thus may reduce the possibility of fractures^[5].

B. Bisphosphonates:

Bisphosphonates are a group of medicines that include alendronate, risedronate and etidronate. They are the most commonly used medicines to treat osteoporosis. They work on the bone-making cells. They can help to restore some lost bone and help to prevent further bone loss. Research studies have shown that the risk of bone fracture may be reduced by taking one of these medicines if you have osteoporosis. They may also help to reduce the chance of a second fracture if you have already had a fragility fracture. Alendronate is the medicine that is usually used first. Risedronate or etidronate may be considered in certain people who are not able to tolerate alendronate or in whom alendronate is not suitable.

A rare side-effect from bisphosphonates is a condition called osteonecrosis of the jaw. This condition can result in severe damage to the jaw bone.

Diagnosis & Treatment of Osteoporosis (Con.)

C. Calcitonin:

Another antiresorptive agent approved for treatment of osteoporosis is calcitonin. Calcitonin acts like the endogenous form of the hormone on the calcitonin receptor on osteoclasts to decrease their activity. Out of all recombinant or synthetic calcitonins that have been used for medical purposes, the salmon calcitonin preparation is the most widely used.^[7] As a desirable additional effect, calcitonin has been noted to reduce the pain of clinical vertebral fractures.^[8]

D. Estrogen replacement therapy:

Treatment of osteoporotic women with estrogen replacement therapy to prevent fracture has been controversial. The Women's Health Initiative trial on estrogen replacement therapy was the first large-scale, randomized, controlled study of healthy women aged 50-79 years.

The results of this study showed that there was 34% risk reduction for hip and vertebral fractures and also by the end of the study, the incidence of osteoporotic fractures was reduced by 24%. Estrogen therapy has long-term side-effects including vascular events and breast cancer

E. Parathyroid hormone peptide medicines:

These medicines are sometimes suggested for people who have already had a fragility fracture.

There are two of these medicines available: teriparatide (brand name Forsteo®) and parathyroid hormone (brand name Preotact®). They are given by an injection under the skin every day for two years. Studies have shown that they can reduce the risk of some osteoporotic fractures. But, they only tend to be used if other options cannot be tolerated or taken. Alternatively, they may be used if someone has been taking another treatment for one year and they have another fragility fracture and their bone density is getting worse.

Lifestyle: Medication will not restore all lost bone. Also, medication may not be suggested for all people with 'thinning' of the bones (osteoporosis). So, there are a number of lifestyle measures that are also important in treating osteoporosis. They include:

- Weight-bearing exercise.
- Muscle strengthening exercises.
- Not smoking.
- Keeping any alcohol drinking to within the levels as described earlier.^[10]

Following this, where appropriate, some people are offered suggestions such as a muscle strengthening and balance programme, or recommendations on how to reduce potential hazards in their home.



Objectives

- ⇒ **Assessment of Calcium supplements and Teriparatide usage in osteoporosis among orthopedic surgeons in Chhattisgarh.**
- ⇒ **To identify the choice of drug by orthopedic surgeons in the treatment of osteoporosis.**
- ⇒ **To identify Criteria by which orthopedic Surgeons prescribed drugs for Osteoporosis.**

Significance of the study

The study helps to determine the current scenario of Calcium supplements and Teriparatide in Treatment of Osteoporosis and overall market potential of the Calcium supplements and Teriparatide. The study helps to determine current prescribing trend of doctors for osteoporosis. It gives idea of current market coverage of competitor brands.

It can help a pharmaceutical company to understand the need of the customer (Surgeons) prior launching any new molecule. It can help a pharmaceutical company to make strategies and make a foothold through creative marketing so as to acquire a good market share for their product.

Research Methodology



In this chapter, details on how the research was conducted have been presented. This includes: research design, Target population, sampling size, sampling technique, research instruments, data collection methods, data analysis and presentation.

Research Study design: Descriptive study design was used in this study. Descriptive research design was considered best for it is a scientific method, which involves observing, describing recording, analyzing and reporting conditions that exists without alterations.

Target Population: Orthopedic surgeons.

Sample size: During the study 120 questionnaires were distributed and only 111 respondents handed back their filled questionnaires representing 92.5% response.

Study area: Districts of Chhattisgarh (Raipur, Durg, Bhilai, Rajnandgaon, Bilaspur and Jagadalpur).

Time Period: April 2016-May 2016.

Sampling technique: The researcher used Non-Probability (Convenience) sampling to get the sample size .

Instruments: The research main instruments for data collections were mixed ended questionnaires, semistructured interviews and secondary data collection

Data collection methods:

The research involved data collection from primary and secondary sources. The primary data was collected through questionnaires (Mixed ended) and semi structured interviews.

Personal interviews gave an in depth into the information; and eliminated misinterpretation. Questionnaires had the advantage that the respondent had adequate time to respond to questions and free from bias because the respondents were guided and interviewer did not influence answers. The secondary data were obtained from hospital records, published material, journals and internet sources.

Data analysis and presentation:

The data collected was analyzed by both qualitative and quantitative methods. Quantitative techniques such as percentages and frequencies were used. Tables, graphs and charts were used to present findings where applicable.



Data Analysis, Finding and Interpretation:

This chapter presents the report of data analysis, interpretation and summary of findings. As indicated in research methodology, the study utilized descriptive statistics.

As such, frequency tables were generated to highlight the percentage scores and cumulative percentages for variables of interests. For pictorial presentation, bar graphs and charts were drawn to enable users to conceptualize the results. From the sample size that was selected, the returned questionnaires whose response were used in further processing of the data to come up with the research findings included :

Number of patients examine by Orthopedic surgeons daily:

Number of Patients	Responses	% Responses
less than 5	24	21.81 %
5 – 10	65	59.09 %
10 – 20	22	20 %
20 - 30	0	0
more than 30	0	0

Table 1: Total no of osteoporosis patients examine daily by Orthopedic surgeons .

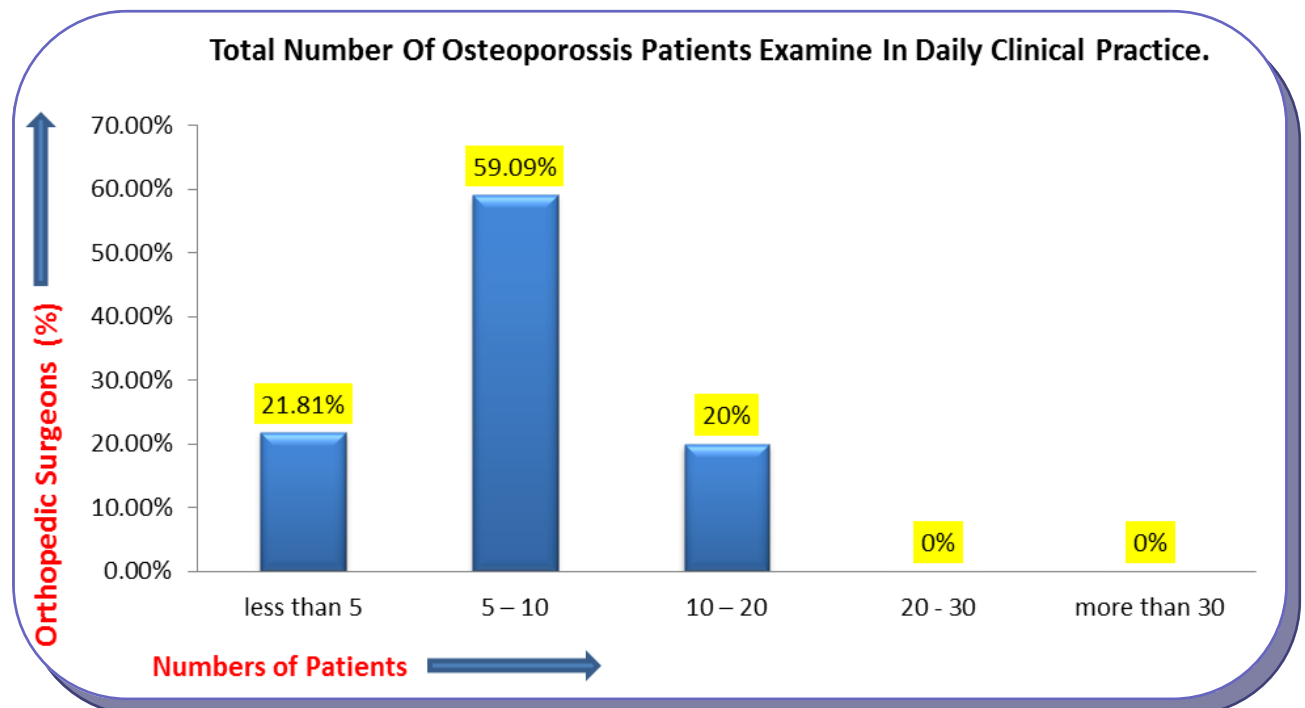


Figure 1: Percentage Of Patients Examine In Daily Clinical Practice

Inference: It was found that data taken from most of doctors have strong prescribing base with 5-10 patients / day.

Gender mostly analyzed by Orthopedic Surgeons:

Gender	Response	% Response
Female	72	65.45 %
Male	39	35.45 %

Table 2: Gender Mostly Analyzed By Orthopedic Surgeons.



Figure 2: Gender mostly examine by Orthopedic Surgeons.

When the question asked by researcher from orthopedic surgeons during interview about to whom (Gender) they mostly examine resulting, among them 35% of orthopedic surgeons mostly examine to male daily and 65% of surgeons respond as they mostly examine female patient daily.

Inference:

- From above surgeons responds it was found that mostly female were suffering from osteoporosis as compare to male and the ratio was almost 2:1.
- Female are most prone to suffer Osteoporosis, reason being Hormaonal changes, Less BMD as compare to males.

Age group mostly analyzed by Orthopedic Surgeons:

Age Group	Responses	% Response
Child	3	2.72 %
Adult	36	32.72 %
Old	72	64.54 %

Table 3: Age Group mostly analyzed by Orthopedic Surgeons.

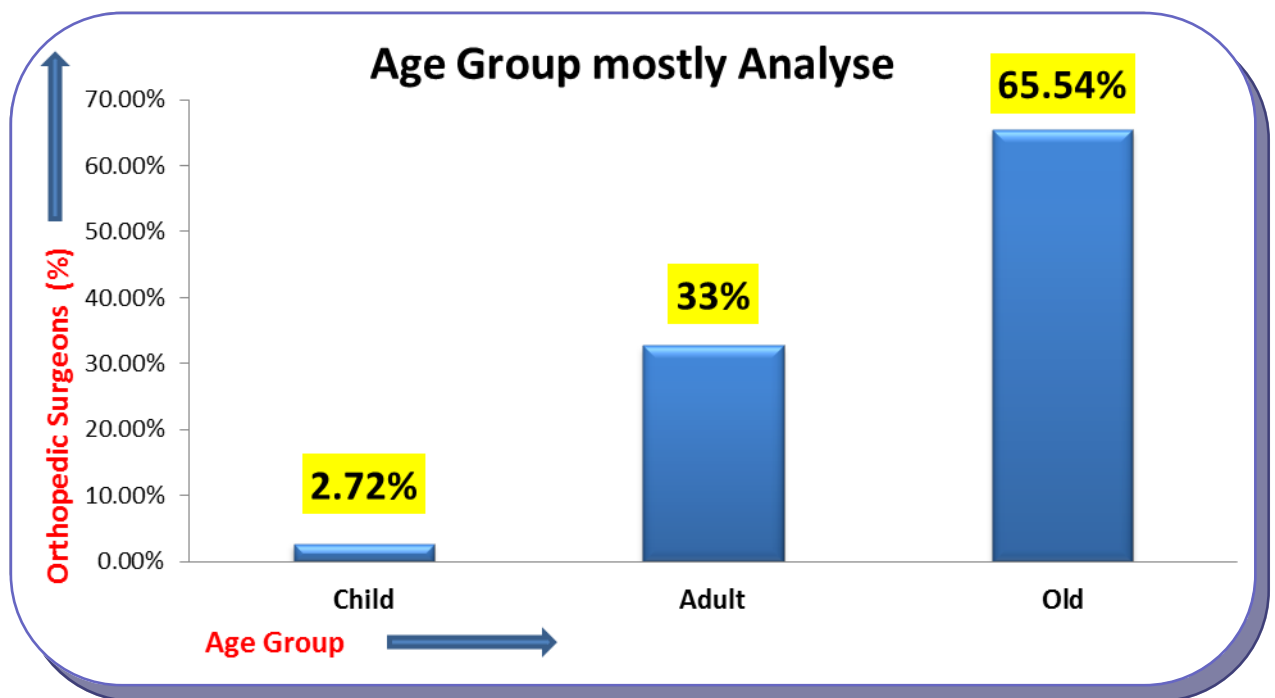


Figure 3: Age Group mostly analyzed by Orthopedic Surgeons.

When the question asked by researcher from orthopedic surgeons during interview about to which age group they mostly examine resulting, among them 2.72 % of orthopedic surgeons mostly examine to Child patient, 32.72 % of surgeons mostly examine adult patient and 65.54 % of surgeons respond as they mostly examine old patient daily.

Inference: Among three group age it was found that mostly old people prone to suffer from osteoporosis as compare to adult and child was negligible.

Symptoms observed in patients suffering from osteoporosis:

Symptoms	Responds	Responds (%)
Loss of Height,	20	18.18181818
Body Pain,	37	33.63636364
Improper movement,	76	69.09090909
Joint Pain,	80	72.72727273
Inflammation,	23	20.90909091
Fracture	100	90.90909091
Stooped Posture.	66	60
Spine fractures	33	30
Weakness	30	27.27272727
Hip fractures	15	13.63636364
Stiffness	40	36.36363636
Dislocation	26	23.63636364
Muscle cramps	73	66.36363636
Reduced movements	55	50
Vertebral Fractures	12	10.90909091
Fragility	40	36.36363636

Table 4: Symptoms observed in patients suffering from osteoporosis.

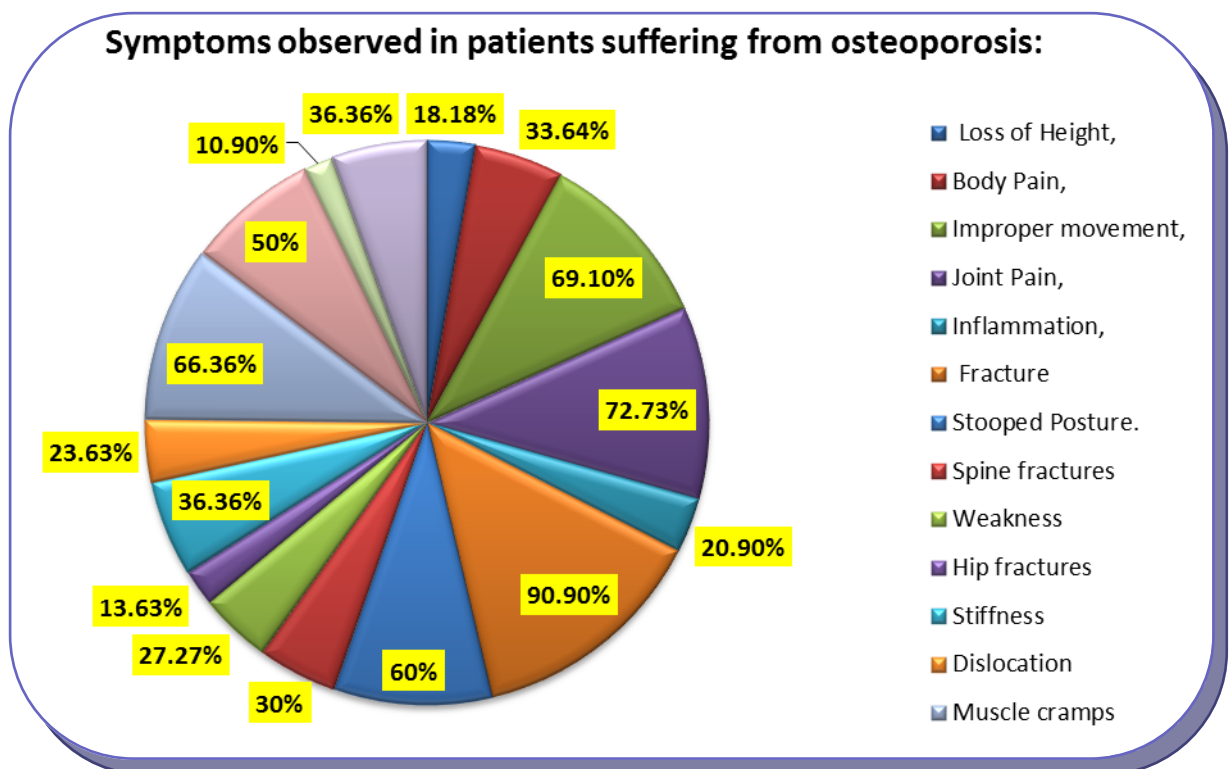


Figure 4: Symptoms observed in patients suffering from osteoporosis.

Inference: Orthopedic surgeons indicate some kind of symptoms among them Body pain ,Joint pain and Fracture are main common symptoms in osteoporosis.

First line treatment of Osteoporosis:

Drugs	Responses	% Response
Vitamin D	0	0 %
Calcium Supplement	17	13.63 %
Vitamin D + Ca Supplements	77	70 %
Teriparatide	19	17.27 %

Table 5: First line treatment of Osteoporosis

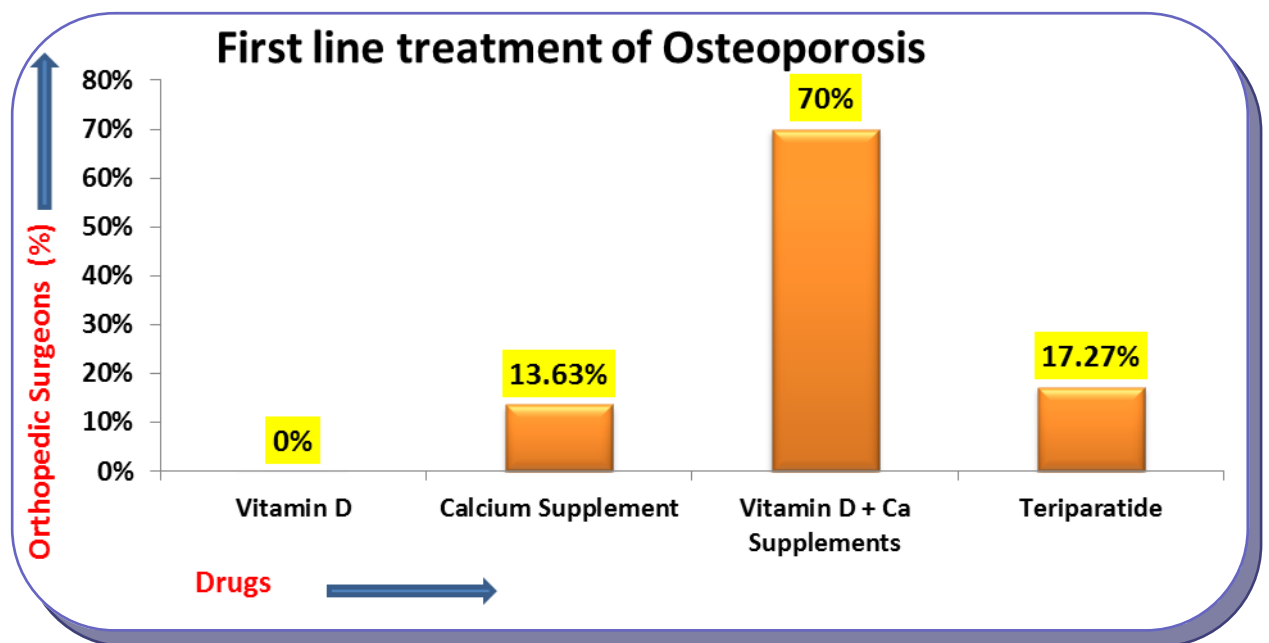


Figure 5: First line treatment of Osteoporosis

Through closed ended Questionnaire when researcher asked about first line treatment of Osteoporosis among all respondents 13.63 % of orthopedic surgeons indicate calcium supplements, 70 % of surgeons indicate vitamin D3 and Calcium Supplement combination, 17.27% of surgeons indicate teriparatide drug for the treatment of Osteoporosis and among them none of orthopedic surgeons preferred single Vitamin D for treatment of Osteoporosis.

Inference: It was found that most of surgeons preferred Vitamin D and Calcium supplement combination as first line treatment of Osteoporosis. Teriparatide preferred less a compare to calcium+Vit D combination because of its competitive price of treatment whereas Cal.+ Vit D combination preferred more because of supportive treatment and it fits with pocket of osteoporosis patients.

Brand preference for treatment of Osteoporosis:

Drugs	Response	% Responses
Shelcal 500	66	60 %
Alpha D3	27	24.54 %
Ostocalcium	39	35.45 %
Cipcal 500	33	30 %
Calcimax Fort	53	48.18 %
Forteo	22	20 %
Ezorb D3	36	32.72 %
Supracal	47	42.72 %
Calaid Capsule	17	15.45 %
Macalvit	11	10 %

Table 6: Brand preference for treatment of Osteoporosis.

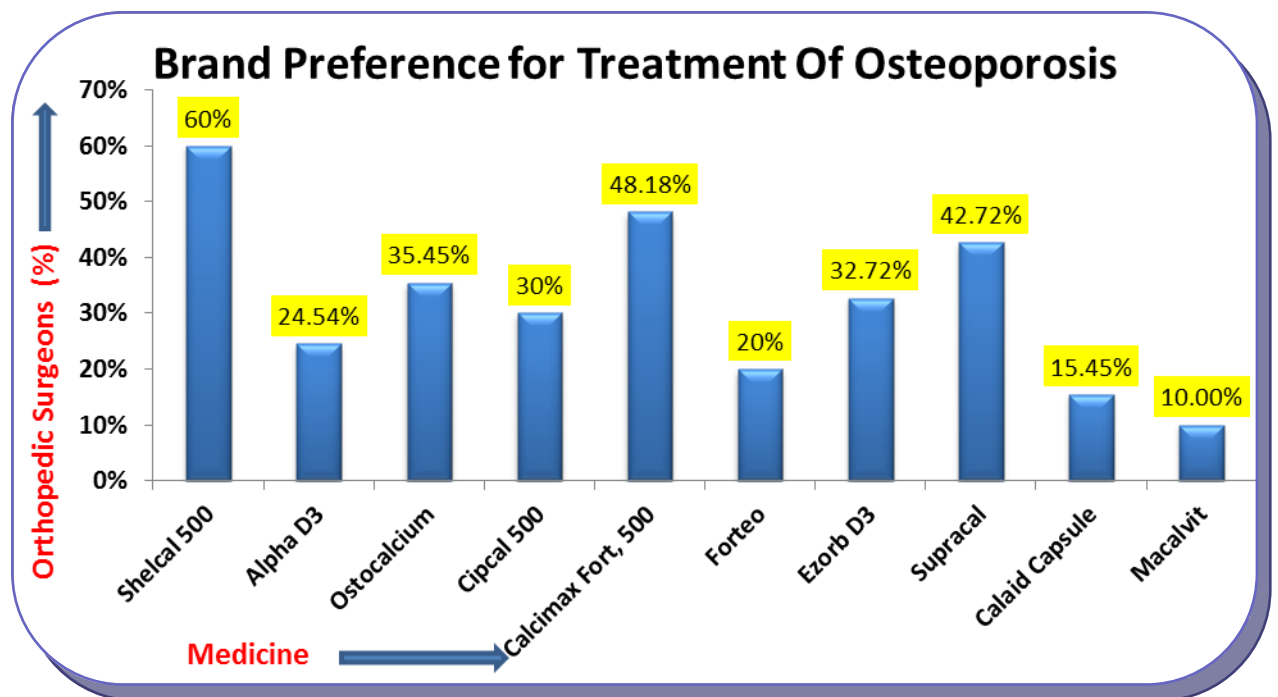


Figure 6: Brand preference for treatment of Osteoporosis.

After taking responds about brand preference researcher scale up the top 10 most preferred brands which are: Shelcal 500, Alpha D3, Ostocalcium, Cipcal500, Forteo, Ezorb D3, Supracal, Calaid Capsulw and Macalvit.

Inference:

- Among all 10 brands Shelcal is mostly preferred by the ortopedic surgeons followed by Calcimax fort and Supracal having Second and third position Respectively.
- It was found that there are tough competetion between Ostocalcium and Ezorb D3.
- Among All brands Forteo was a single which mostly preferred by Surgeons in Therapeutic segment of Osteoporosis.

Duration of prescribing drug for treatment of Osteoporosis:

Duration	Responses	% Responses
15 Days	7	6.36 %
1 Month	15	13.63 %
3 Month	17	15.45 %
More than 3 month	72	65.45 %

Table 7: Duration of prescribing drug for treatment of Osteoporosis.

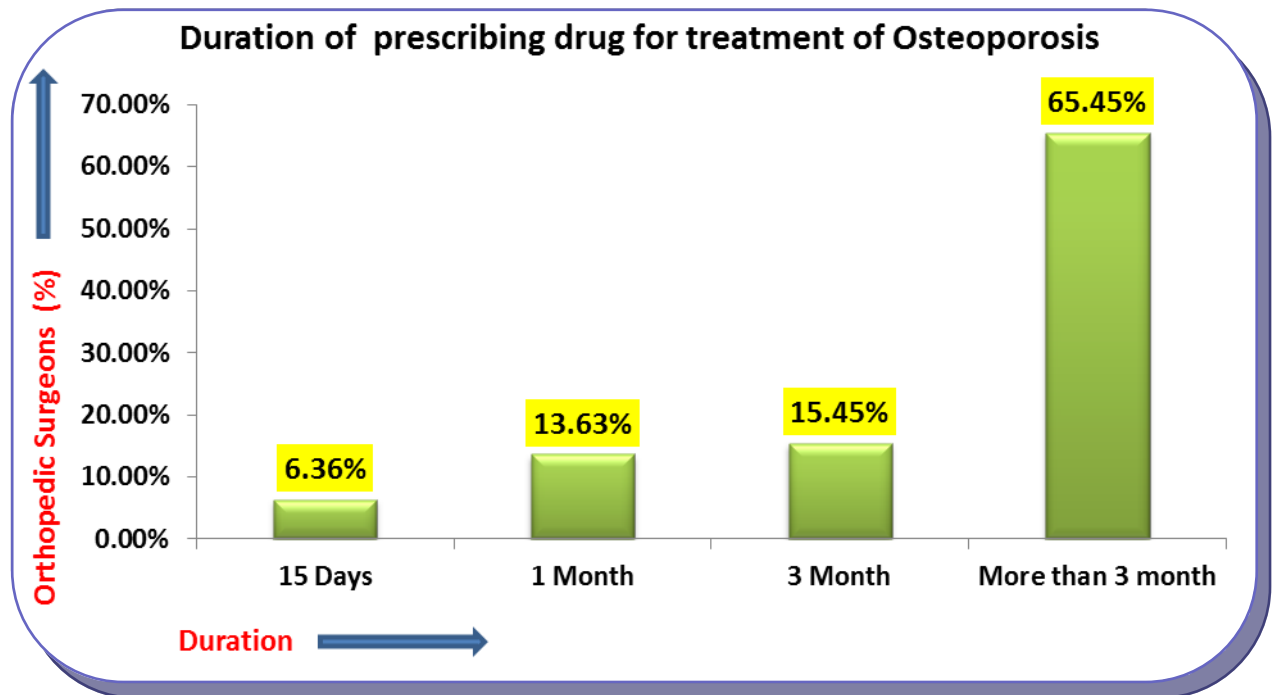


Figure 7: Duration of prescribing drug for treatment of Osteoporosis.

Among all respondents 6.36% of surgeons prescribed the drug for 15 days, 13.63% surgeons prescribed for 1 month, 15.45% of surgeons prescribed and 65.45% orthopedic surgeons prescribed more than 3 month medicine for treatment of Osteoporosis.

Inference: It was found that mostly orthopedic Surgeons prescribed medicine for more than 3 month for the treatment of Osteoporosis because of the bone healing process is quite slow it takes time to recover.

Preference Criteria for Prescribing Osteoporosis Drug:

Parameters	Responses (Rank 1)	Responses (%)
Competitive Price	63	57.27 %
Patient Compliance	32	29.09 %
Safety Profile	16	14.54 %
Brand	0	0%

Table 8: Preference Criteria for Prescribing Osteoporosis Drug.

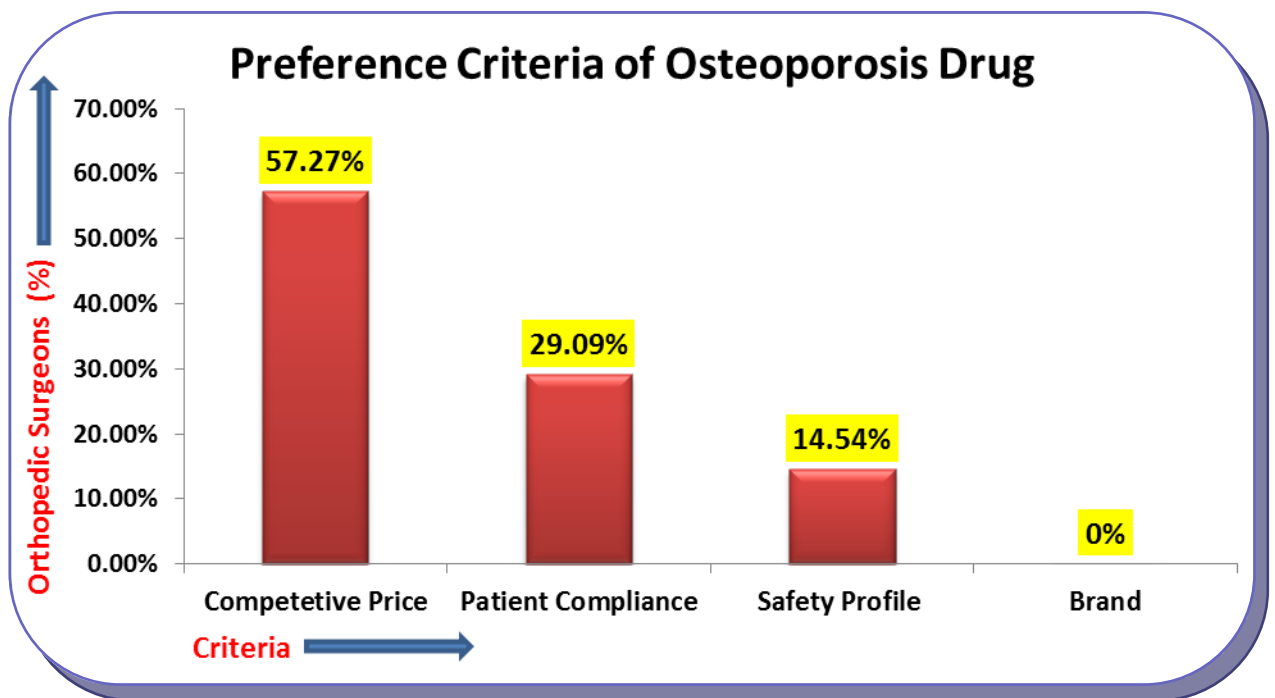


Figure 8: Preference Criteria for Prescribing Osteoporosis Drug.

Among all respondents 57.27%, 29.09% and 14.54% of orthopedic surgeons gave first rank to Competitive price, Patient compliance and Safety profile Respectively as their preference criteria for prescribing the osteoporosis drug.

Inference: Most of the Orthopedic surgeons gave first preference criteria to competitive price for prescribing osteoporosis drug.

Among all Orthopedic surgeons none of them gave first preference to brand for prescribing osteoporosis drug.

Criteria for Prescribing Vitamin D and Calcium Supplements:

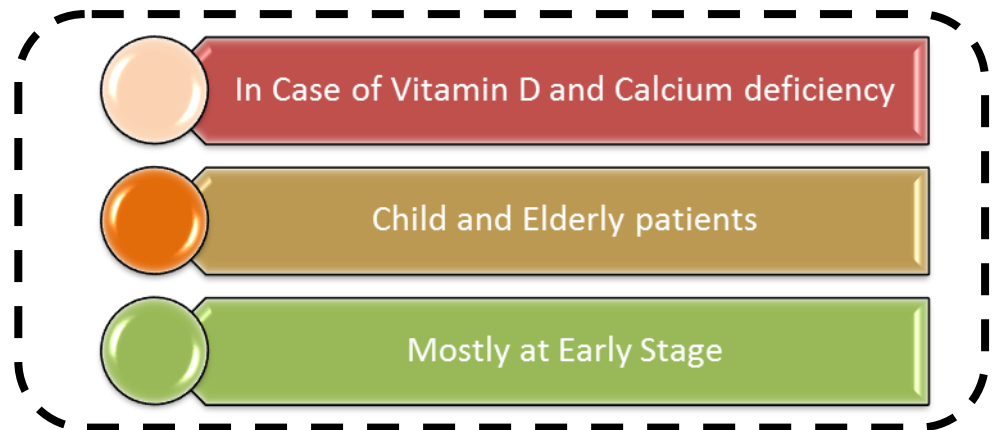


Figure 9: Criteria for Prescribing Vitamin D and Calcium Supplements.

Criteria for Prescribing Teriparatide:

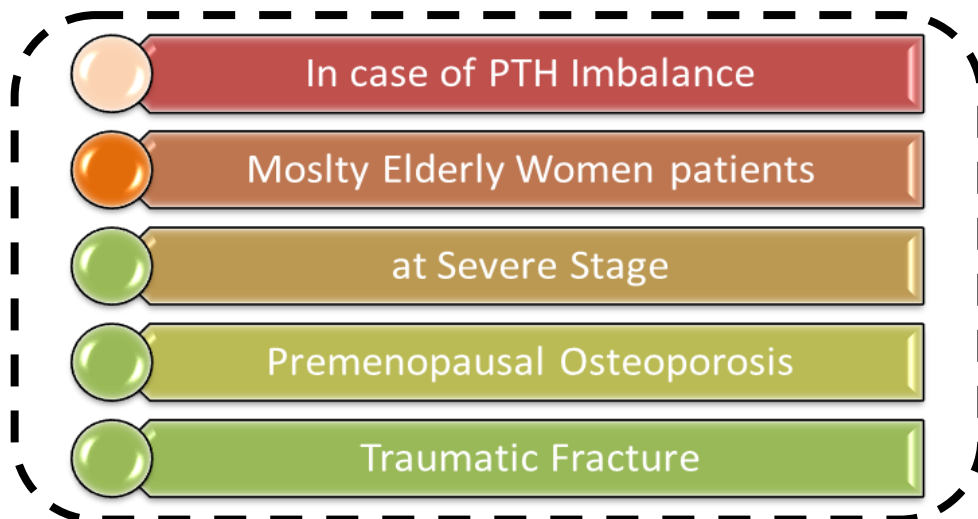


Figure 10: Criteria for Prescribing Teriparatide.



Other Findings

Surgeons also preferred some another brands like:

- Omical forte
- Ostopolybium
- calaid

Doctor's have also suggested the following:

- Low dose combinations
- Sustained release combinations
- Company should focus on treating rote cause rather than symptom
- Dosing frequency should be minimal.

Limitations of the study:

- Due to personal attitudes, individual values and organizational policies, practitioners' in the medical profession keep most of their undertaking secret.
- The researcher received minimal cooperation from some respondents. The Unavailability of target respondents due to their busy schedules was a major challenge. Therefore, accessibility of records was limited hence limiting the availability of more information that would have permit elaborate research.
- Resource constrains also posed a great limitation with constrained finances and very busy schedules therefore the researcher having limited time to carry out the research.



Conclusion

Osteoporosis, though one of the most common diseases with patient frequency 5 to 10 patient daily, mostly affecting both elderly men and women, is also one of the most neglected diseases. Lack of overt symptoms in the initial stages of the disease and unavailability of economical diagnostic tools to aid in early diagnosis, on a common treatment regime, makes the situation grim.

As more anti-osteoporosis molecules become widely available in India, it is imperative for surgeons to select appropriate therapy for their patients.

In the present study, Orthopedic Surgeons mostly prescribe calcium and vitamin D supplementation like SHELICAL, CALCIMAX and SUPRACAL in Chhattisgarh along with Calcium Supplements some of them Orthopedic Surgeons also prescribe Teriparatide like FORTEO. Orthopedic surgeons preferred economical condition and safety compliances of patient to prescribing the osteoporosis drug. Teriparatide prescribed very less because of its costly medication,

Treatment of Osteoporosis with Teriparatide is costly but more effective in cases of severe osteoporoses. Some doctors said that it shows better results. For the use of Teriparatide the factors like cost of treatment might have long term implications in the treatment of osteoporosis and thus need to be addressed.



Suggestions

- Mostly females are affected with osteoporosis, so early diagnosis (frequent checking of bone density) and proper maintenance of diet is better than long term treatments with potent drugs.
- Proper care should be taken in post menopausal women's and old people, as themselves are most susceptible to osteoporosis.
- Shelcal is the leading brand (Region:Chhattisgarh) so company should focus on best promotional activities to acquire the good market share.
- Calcium and vitamin D is mostly used in combinations. So instead of releasing single molecules, afford should be made on combinations along with good promotional strategies.
- Teriparatide is used for effective treatment in the late phases of osteoporosis. Rather than the high cost, low cost of teriparatide will acquire a good market share.
- Calcium is used for long term treatment, so give more preference to safety profile and should be cost effective.
- There is need for a study to increase the data collection area and population size to get accurate date and result about market scenario of osteoporosis and their drug for treatment.



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