

Prescribing Trends Affordability and Compliance to Osteoporosis Pharmacotherapy in Private and Public Sector Hospitals of Lahore

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Abstract- Objective: The aim of the study was to compare the current prescribing pattern, affordability and compliance rate to osteoporosis pharmacotherapy in Public and Private sector hospitals of Lahore.

Materials and Methods: An observational cross-sectional study was conducted on 204 pre and postmenopausal women's. Subjects were selected randomly from three each public and private sector hospitals of Lahore. Pre-designed questionnaire was filled by the osteoporotic patients. The questionnaire comprised of patient's demographics, family history, socio-economic status and medications regimen. Data was evaluated in percentage and displayed in graphical form.

Results: Bisphosphonates were considered as the first line agent in treating patients with osteoporosis. 98.03% & 95.09% patients were prescribed with bisphosphonates while all the patients were prescribed with calcium, vitamin D supplements and pain killers to combat the disease in public & private sector hospitals. Compliance rate was found to be 79.4% in public sector and 94.1% in private sector. Osteoporosis therapy was unaffordable to 55.8% patients in public and 28.4% patients in private sector hospitals.

Conclusion: The study concludes that osteoporosis is more prevalent in postmenopausal women's. Bisphosphonates are prescribed as the first line agent for slowing the progression of disease. Cost of treatment in public sector makes the therapy unaffordable to the patients. Compliance rate is found to be satisfactory in both hospitals.

Index Terms- Bisphosphonates, compliance, Osteoporosis, postmenopausal, premenopausal.

I. INTRODUCTION

Bones are the integral support system of the body, so their health and preservation is of prime importance. Osteoporosis has become a major public bone health problem worldwide with an estimated prevalence of over 200 million. 9.9 million People in Pakistan have osteoporosis of which 7.2 million are women. Occurrence of osteoporosis in Pakistan is expected to rise in the coming years with an estimated prevalence of 11.3 million in 2020 and 12.9 million in 2050. [1]

Osteoporosis is a disease having low bone mass and micro-architectural degeneration of bone tissue, leading to bone fragility and increase risk of fractures of the hip, spine and wrist. Spine, wrist and hip are the most commonly affected sites in osteoporosis. WHO defines osteoporosis as (BMD) T-score <

2.5. The disease is broadly classified into two main types: primary osteoporosis, the cause may be the age-related bone loss (sometimes called senile osteoporosis) or may be unknown (called idiopathic osteoporosis), while in secondary osteoporosis, the loss of bone mass is caused by certain lifestyle factors, diseases or medications. [2]

Risk factors in osteoporosis that are out of control include older age, female gender, small, thin bones body shape, Caucasian and Asian women, family history. Lifestyle factors that increases the risk of developing disease are low calcium and vitamin D intake, anorexia nervosa, lack of exercise, alcohol intake, cigarette smoking. [3] Regular weight-bearing (e.g., walking and stair climbing) and muscle-strengthening (e.g. weight training) exercise can improve agility, strength, posture, and balance which will ultimately reduce the subsequent fracture risk.

Diagnostic tools to identify patient with osteoporosis include dual-energy X-ray absorptiometry (DXA), Quantitative computed tomography (QCT) and Biochemical markers of bone turnover. The Fracture Risk Assessment Tool (FRAX) is a diagnostic tool used to evaluate the 10-year probability of bone fracture risk. [4]

Osteoporosis treatment is extensively classified into non pharmacological and pharmacological treatment. Non pharmacological approach includes fall prevention; formal home safety evaluations and physical therapy. Pharmacological treatment includes bisphosphonates; Oral bisphosphonates inhibit osteoclastic activity and are also called antiresorptive agents. The intravenous bisphosphonates currently approved by the FDA for the treatment of postmenopausal osteoporosis are zoledronic acid, ibandronate. Raloxifene, a selective estrogen receptor modulator, is approved for the treatment of postmenopausal osteoporosis. Teriparatide is a recombinant human parathyroid hormone that has bone anabolic activity. [5]

The purpose of the current study was to determine the current prescribing trends for osteoporosis therapy to observe and study the affordability of osteoporosis and to determine compliance rate to that therapy in Public and Private Hospitals of Lahore.

II. MATERIALS AND METHODS

An observational cross-sectional study was conducted from June to July, 2017 to observe the prescribing pattern and to study the affordability and compliance rate to osteoporosis pharmacotherapy. A convenient random sampling of 204 patients

was done in which 102 was from each public and private sector hospitals.

Data collection form was designed covering the following aspects including patient demographics, family history, dietary habits, counseling, prescribing trends, medication usage, discontinuation of therapy, exercise pattern, socio-economic status, cost of treatment and compliance to bisphosphonates therapy.

Study was performed by filling data collection form, analyzing prescriptions and face to face interview with patients. Data was analyzed and displayed in the form of graphs.

III. RESULTS

The data was collected from 204 osteoporotic patients. Socio-economic status in public sector was 23.52% patients fall in the monthly income range of less than 10,000 while only 7.84% of patients fall in this category in private sector. 68.62% public patients fall in Rs 11,000-30,000 while 19.60% had an income of Rs 31,000-60,000(Table 1).

The pharmacotherapy prescribed for postmenopausal and premenopausal osteoporotic patients included bisphosphonates as the fine line agents along with calcium and vitamin-D analogues (Table 2). Pain killers were also prescribed to subside the pain associated with bone fragility (Table 3).

Medications were prescribed by brand names. Figure 1 shows the comparison of bisphosphonates prescribed in public and private sector hospitals. Alendronate Na was prescribed to 24.4% patients in private hospitals while combination of alendronate Na and cholecalciferol was prescribed to 16.6% in public hospitals (Fig 1).

Pain killers mostly prescribed in public hospitals were a combination of paracetamol and orphenadrine citrate to 51.9% patients whereas diclofenac Na was prescribed to 22.5% in private sector hospitals (Table 1).

Common calcium analogue prescribed to public and private patients was combination of calcium carbonate plus cholecalciferol in 78.4% and 85.2% respectively (Fig 2).

Vitamin-D supplementation prescribed included cholecalciferol to 68.6% patients in public and 41.1% patients in private hospitals(Fig 3).

Percentage of patients who can and cannot afford osteoporosis pharmacotherapy in public and private hospitals 55.8% patients in public and 28.4% patients in private (Fig 4). Average cost of medications prescribed per day was Rs: 47 in public hospitals and Rs: 45 in private hospitals. Higher average cost in public hospital is due to the prescribing of expensive brands and polypharmacy (Table 4).

83.8% patients were compliant to bisphosphonates therapy in public and 98% patients in private hospitals(Fig 5).

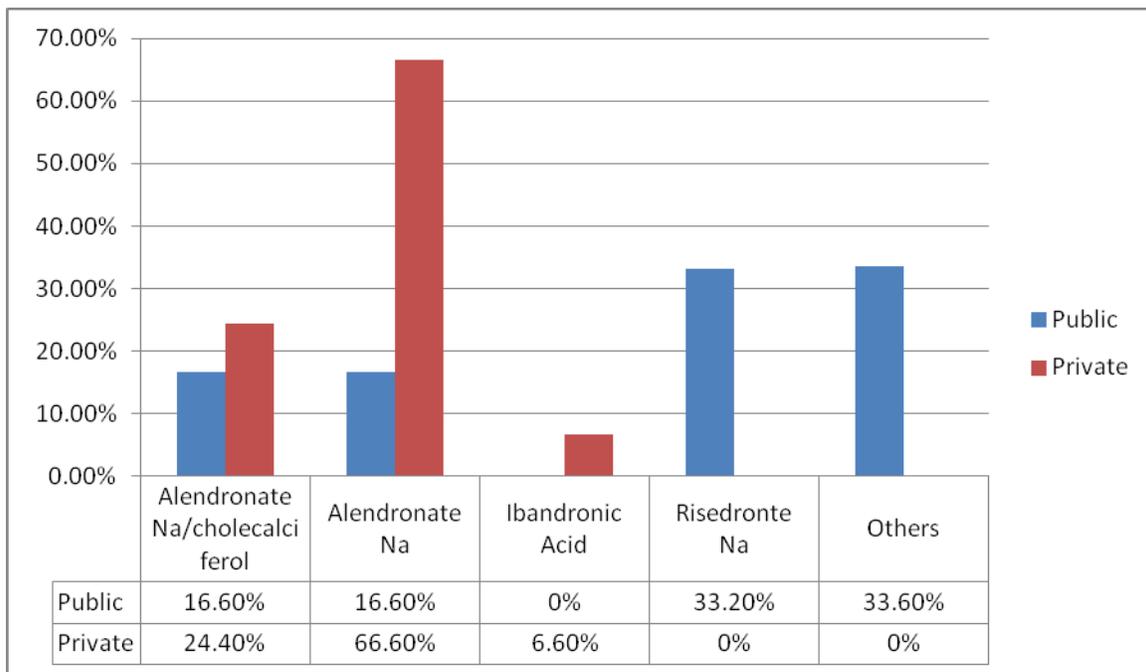


Figure 1: Types of Bisphosphonates prescribed

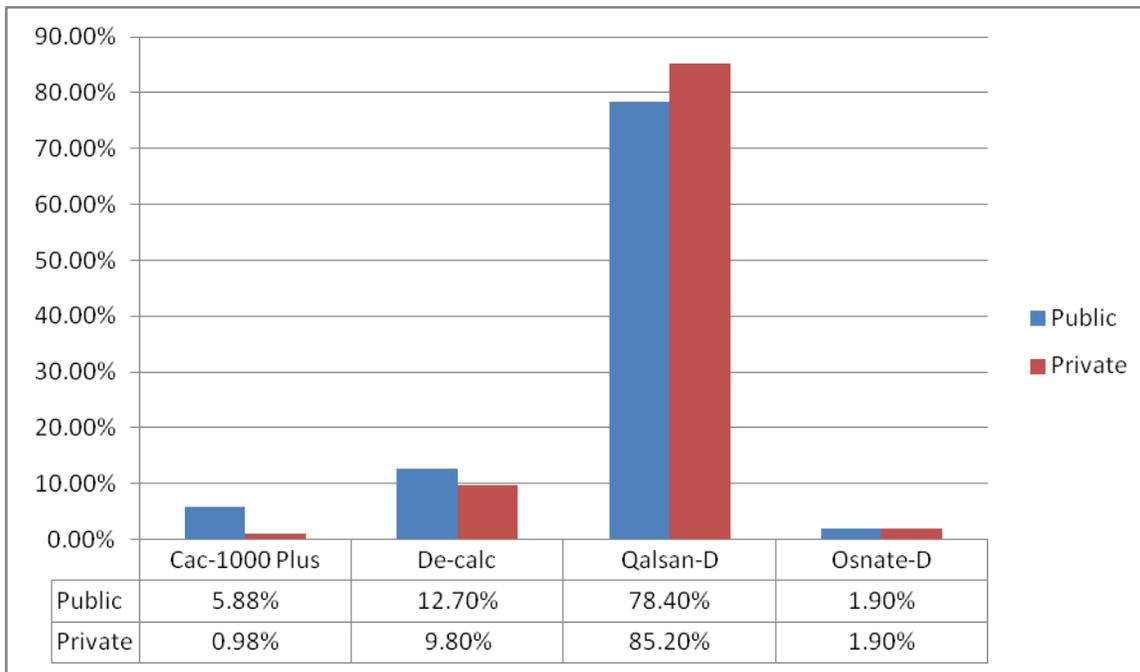


Figure 2: Calcium analogues prescribed

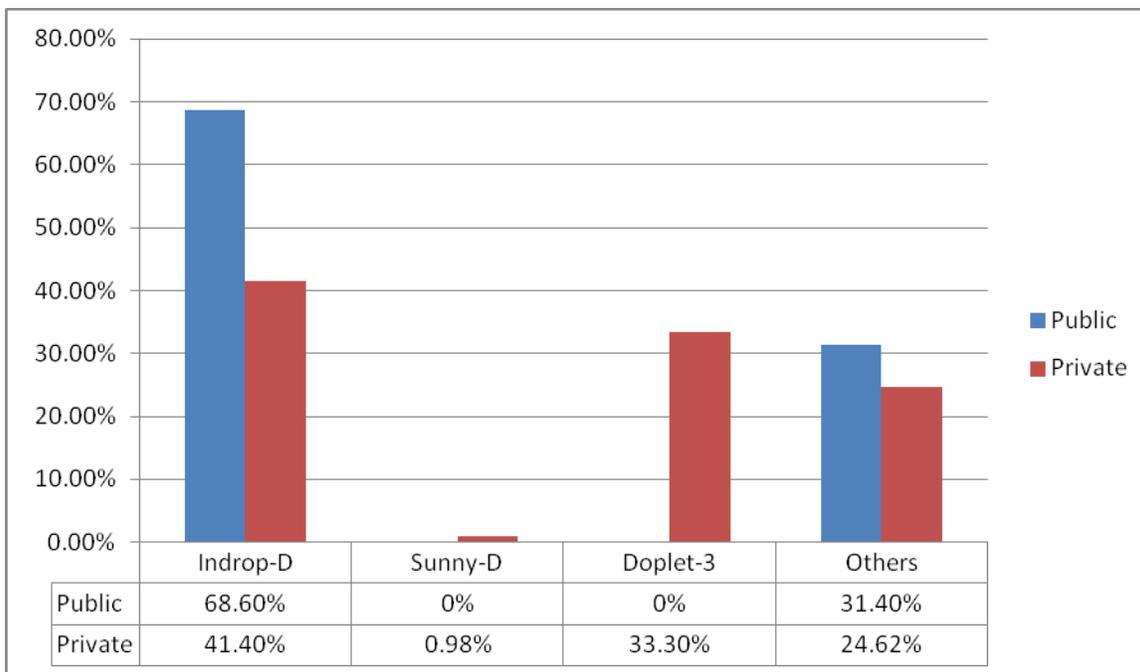


Figure 3: Vitamin-D supplement prescribed

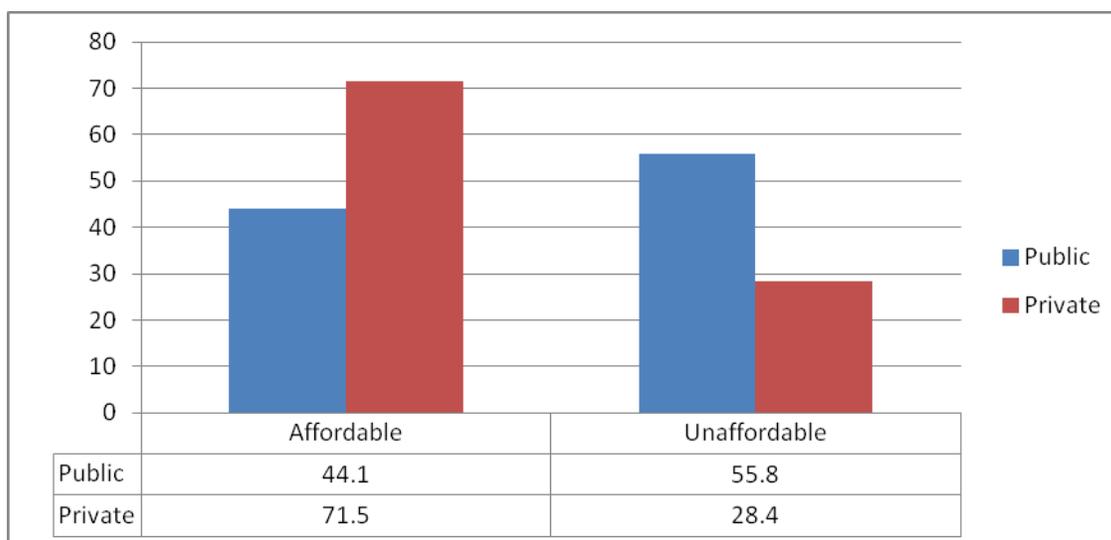


Figure 4: Affordability to osteoporosis therapy

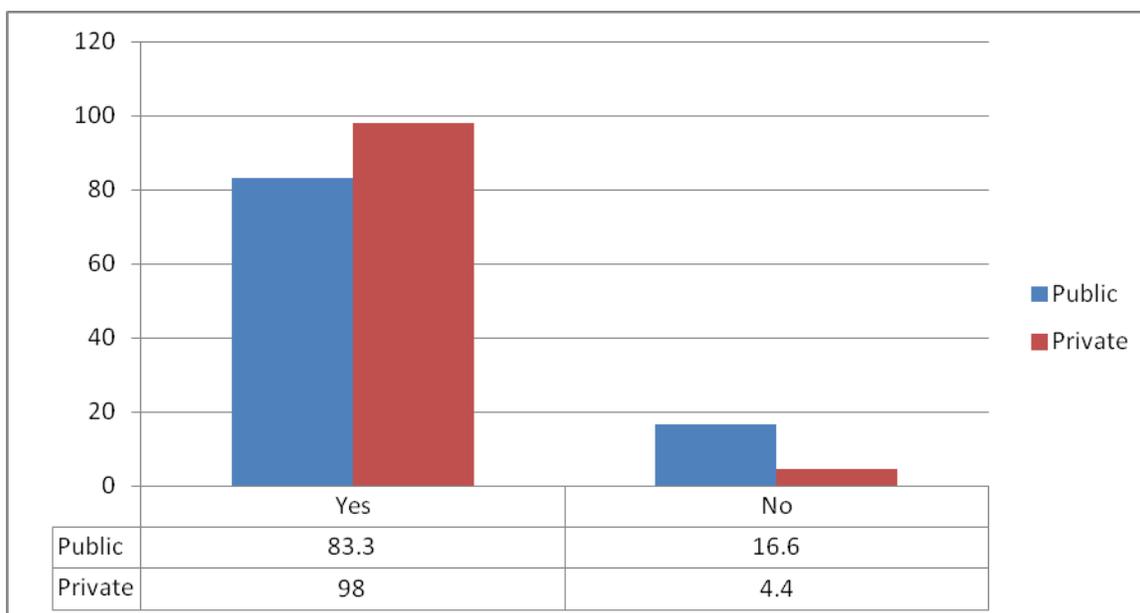


Figure 5: Compliance to osteoporosis pharmacotherapy

Table 1: Monthly Income

Monthly Income	F	Public	F	Private
Less than 10,000	24	23.52%	8	7.84%
Rs. 11,000 - Rs. 30,000	70	68.62%	20	19.60%
Rs. 31,000 - 60,0000	8	7.84%	31	40.19%
Rs. 61,000 - Rs. 100,000	0	0%	27	26.47%
More than 100,000	0	0%	16	16.32%

Table 2: Medications prescribed to osteoporosis patients

Medications	F	Public	F	Private
Bisphosphonates	100	98.03%	93	95.09%
Calcium Analogue	102	100%	102	100%
Vitamin D Analogue	102	100%	102	100%
Pain killers	102	100%	102	100%

Table 3: Pain killers prescribed

Pain killer	F	Public	F	Private
Paracetamol/orphenadrine citrate	53	51.9%	41	40.19%
Diclofenac Na	29	28.4%	43	42.1%
Meloxicam	2	1.96%	1	0.98%
Celecoxib	15	14.7%	17	16.6%
Paracetamol	3	2.94%	0	0%

Table 4: Average Cost of Prescribed Medicines per Day

Cost Per Day	Public	Private
Rs	47 Pkr	45 Pkr

IV. DISCUSSION

An observational study of osteoporosis patients was conducted to study the current prescribing pattern for osteoporosis therapy, affordability and compliance rate to the therapy in Public and Private sector hospitals of Lahore. 204 patients were studied in Public Sector Hospitals and Private Sector Hospitals during the 2 months duration.

Osteoporosis is one of the significant problems faced by women of the older age resulting in a decreased bone mass and is linked with high risk of fracture.^[6] In this study patients were asked about family history and it was found that hypertension and diabetes had high rates both in public and private sector hospitals; few patients had a family history of asthma and high cholesterol. Socioeconomic status in patients visiting public sector hospitals was low. 60.7% patients had a monthly income of Rs10, 000-30,000 in public hospitals while in private 32.6% fall in this range. 40.9% patients had an income of Rs 60,000-100,000. 64.7% and 88.2% women’s did exercise in public and private hospitals. Pattern of exercise that was followed was either walking/jogging or as instructed by their respective orthopedic doctors while in a previous study it was shown that Regular weight-bearing (eg, walking and stair climbing) and muscle-strengthening (e.g. weight training) exercise can improve agility, strength, posture, and balance, that will result in decreasing the risk of falls and eventually fractures.^[6]

In this study it was observed that combination of Alendronate Na plus cholecalciferol and Alendronate Na alone was prescribed at a dose of 70mg once weekly while Risedronate Na 150mg monthly both are in with FDA guidelines . However in another study it was found that risedronate and alendronate have only assessed adverse events or surrogate efficacy outcomes (bone resorption and bone density), so there is no clear rationale for choosing one agent over the other.^[7]

Intravenous Ibandronate Na 3 mg was prescribed 3 monthly for the treatment of osteoporosis. A previous study done under the title of Current and Emerging Pharmacologic Therapies for the Management of Postmenopausal Osteoporosis has shown that Intravenous bisphosphonates, including ibandronate have been approved more recently as a treatment for postmenopausal osteoporosis and a significant improvements in BMD.^[8]

In this study it was observed that calcium supplement was prescribed to pre & postmenopausal women’s with daily intake of 1250mg/125IU. Qalsan-D calcium supplement was prescribed at high rates with regard to other brands. A previous study showed that the treatment effect is greatest with calcium doses of greater than 1200 mg.^[7]

Whereas vitamin-D supplement was prescribed once monthly or fortnightly alone or in combination with calcium. Indrp-D(cholecalciferol) was most common prescribed brand of vitamin D.A previous study showed that of the two forms of vitamin D, ergocalciferol (vitamin D2) and cholecalciferol (vitamin D3),appears to be more strong in increasing the level of circulating vitaminD and is the preferred form of supplementation. The more effective is observed with doses of vitamin D of greater than 800 UI.^[9]

Pain management include nonsteroidal anti-inflammatory drugs (NSAIDs), topical pain relieving agents, nerve blocks, or nerve ablation (nerve removal). In this research, either one pain killer or two were prescribed twice daily. Paracetamol/orphenadrine citrate (Nuberol forte) 650/50mg & Diclofenac Na 50mg(Dicloran) were prescribed commonly.

Our study revealed that 76.4% of patients in public and 89.2% in the private sector had experience side-effects with the therapy. Stomach upset and abdominal pain were the most common problems with the ratio of 43.2% and 38.2% in public sector while 38.7% and 25.2% in private sector. However, patients also reported constipation, dizziness, nausea and fatigue. In previous study it emerged that esophageal irritation occurred as a result of oral administration of bisphosphonates.^[10]

We found that all the patients were counseled about the medicines in both sectors while 79.4% patients in public sector and 94.1% in private sector were following the instructions. The study revealed that 96% patients were counseled about bisphosphonates in public sector whereas 100% were counseled in private sector. In our study, 83.3% patients were following the instructions of bisphosphonates in public sector while 98% were following in private sector, in previous study conducted in large populations, overall adherence for all osteoporosis therapies was low, ranging from approximately 40–70%.^[11]

The current study showed that 34.3% patients in public and 13.7% patients in private sector had discontinued their therapy. 21.2% patients restart their therapy after 1-3 weeks, 69.6% after 1-6months and 9% after 1 year in public sector while 15.8% patients restart after 1-3 weeks, 63% after 1-3 months and 21%

after 1 year in private sector while in a previous study it was concluded that treatment with Alendronate is characterized by an important “tail effect”. Thus, after five years of optimal adherence, a treatment discontinuation might be planned in low-moderate risk patients, but the treatment holiday should rarely exceed 1–2 years with Alendronate.^[12]

We concluded that 36.3% patients in public sector and 63.7% in private sector visited their doctor/pharmacist every 3-6 months.

Average cost of prescribed medicines per day of patient in public sector was found to be Rs.47 and Rs.45 in private sector while the direct cost of osteoporotic fractures is 5-10 billion annually in USA^[15]. Discussion with the patients revealed that 84.2% & 72.4% patients in public & private hospitals respectively quit therapy because of affordability issue. While 15.7% & 27.5% restarted therapy when pain becomes intolerable. 44.1% patients in public and 71.5% in private sector said they can afford their therapy while 55.8% patients in public and 28.4% in private said they cannot afford their therapy.

Current study also drafted out some important points which states that expanding osteoporosis awareness to the rural areas will help to spread awareness of the disease, Government should be the flag bearer in developing programmes for osteoporosis that are similar to the existing Family Planning and the Extended Program of Immunization (EPI) programmes. Poor diagnosis leads to the complications of disease therefore, DEXA (gold standard for osteoporosis diagnosis) should be made available to all public and private hospitals. Pharmacists should be employed in orthopedic departments of very hospital to reduce the burden of osteoporosis by improving the identification of high risk patients.

V. CONCLUSION

Antiresorptive agents particularly bisphosphonates along with calcium and vitamin-D supplements are used to treat premenopausal & postmenopausal osteoporotic women in both the sectors. Socioeconomic status of patients visiting public hospitals showed that pharmacotherapy treatment is not affordable for them, which led to the discontinuation of therapy. Comparison of the compliance rate showed that private sector hospital patients were compliant to therapy but in public sector compliance is more related to the affordability and economic status. Effective treatment techniques have allowed many to beat the condition, at least in terms of being able to lead a normal life. Expanding osteoporosis awareness to the rural communities will help to spread awareness and an early diagnosis of the disease to the more remote areas of Pakistan.

ACKNOWLEDGMENT

It is my radiant sentiment to place on record my best regards, deepest sense of gratitude to the executive directors & orthopedic surgeons of all six hospitals that I covered during the

entire research project, for their careful and precious guidance which was extremely valuable for my study.

REFERENCES

- [1] Daniyal Nagi, Zeeshan Butt, Ali Amar, Fariha Farooq. Frequency of osteoporosis in an ambulatory setting in lahore using quantitative calcaneal ultrasound. *Journal of pakistan medical association*. 2013; 63:965-68.
- [2] Donald J Frisco. what you need to know about osteoporosis. *spine health*. 2006: 02.
- [3] [Czerwinski E, Badurski JE, Marciniowska-Suchowierska E, Osielec J. Current understanding of osteoporosis according to the position of the World Health Organization \(WHO\) and International Osteoporosis Foundation. *Ortop Tropatol Rehabil*. 2007; 9:337-56.](#)
- [4] Shazia khokhar, Jahan Ara Hasan, Sarah Qazi. Osteoporosis and its risk factors among postmenopausal women. *Pakistan journal of medical research*. 2014; 53(2): 42.
- [5] Riggs BL, Melton LJJ. The worldwide problem of osteoporosis: Insights afforded by epidemiology. *Bone*. 1995;17:505S–511S.
- [6] [Gass ML, Heights M, Manson JE](#). The 2012 hormone therapy position statement of: The North American Menopause Society. *Menopause*: 2012; 19(3): 257-71.
- [7] [Mohammad Hassan Murad, Matthew T. Drake](#). Comparative Effectiveness of Drug Treatments to Prevent Fragility Fractures. *The Journal of clinical Endocrinology and metabolism*. 2012; 1871-1880.
- [8] Collen A Mchorney, [John T. Schousboe, Thomas W. Weiss](#). The impact of osteoporosis medication beliefs and side-effect experiences on non-adherence to oral bisphosphonates. *Journal of current medical Research and opinion*. 2007; 23: 3137-3152.
- [9] [Amy H. Warriner, Jeffrey R. Curtis](#). Adherence to Osteoporosis Treatments Room for Improvement. *Curr Opin Rheumatol*. 2009; 21(4): 356–362.
- [10] [Nelson B. Watts Dima L. Diab](#): Long-Term Use of Bisphosphonates in Osteoporosis. *The Journal of Clinical Endocrinology & Metabolism*. 2010; 95(4): 1555–1565.
- [11] E. Michael lewiecki: current and emerging pharmacologic therapies for the management of postmenopausal osteoporosis. *Journal of women's health*. 2003;10: 1615-1626.
- [12] [Silvano Adami, Luca Idolazzi, Elena Fracassi, Davide Gatti, Maurizio Rossini](#): Osteoporosis Treatment: When to Discontinue and When to Restart. *Bone Research*. 2013; 1: 323–335.

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