

Compliance with Calcium+Vitamin D Treatment Among the Elderly

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ABSTRACT

Objective: Among elderly patients, compliance with recommended therapy can present a significant problem in the treatment of many diseases. This study was designed to investigate the frequency and reasons for compliance difficulties related to calcium+vitamin D (Ca+vitD) treatment in elderly patients with low bone mineral densitometry values.

Methods: A total of 296 geriatric patients from between January 2013 and December 2015 who volunteered to participate were included in the study. A face-to-face interview was conducted with participants to record and assess their sociodemographic characteristics and treatment compliance.

Results: Only 41.2% of the participants regularly adhered to the Ca+vitD treatment prescribed by their physician. The results revealed that 39.08% of the patients indicated that they believed they consumed an adequate amount of calcium in their diet, 20.11% did not like the taste of the supplement, and 16.09% reported that they thought the treatment could damage the heart.

Conclusion: Motivation, side effects, and fear of possible side effects were important factors that determined compliance with the use of Ca+vitD. Contraindications for use in patients with a low bone mineral density should be examined, and thereafter, once prescribed, it is important to carefully explain the necessity for Ca+vitD treatment, possible side effects, and the risks of non-use. Compliance should be followed up with regular control visits.

INTRODUCTION

A lack of compliance with the treatments recommended by physicians is a problem that may occur during follow-up with elderly patients. Contributing factors may include the patient's age, educational status, psychosocial status, cognitive status, chronicity of the disease, and multidrug use.

Osteoporosis follow-up units have observed difficulty with adherence to treatment plans. Patients diagnosed with osteopenia or osteoporosis whose bone mineral density (BMD) values are below normal are generally prescribed a daily 1200 mg calcium and 800 IU vitamin D supplement.^[1] Low BMD and increased fracture risk are important causes of morbidity and mortality in the elderly. Calcium+vitamin D (Ca+vitD) supplementation, with or without other treatments, has been reported to contribute significantly to the prevention of fracture risk.^[2]

This study was conducted to examine the compliance of elderly patients with the recommended Ca+vitD treatment and reasons for noncompliance.

MATERIAL AND METHODS

Between January 2013 and December 2015, 296 patients who were over 65 years of age and without cognitive impairment were included in the study. Ethics committee approval was obtained for the study. Patients with a minimal score of >24 were included in the study. Patients with a contraindication for the use of calcium (hypercalcemia, hypercalciuria, nephrolithiasis), cases with hypothyroidism, hyperthyroidism, Paget's disease, chronic liver disease, renal failure (serum creatinine >1.4 mg/dL), any oncological disease, sarcoidosis, intestinal malabsorption, chronic alcohol use (>40 g/day) or a mini-mental test score ≤24 were not included in the study. Face-to-face interviews with the participants were conducted using a questionnaire designed to assess sociodemographic characteristics, adherence to the treatment plan, and any reasons for noncompliance. Participants were asked about age of menopause, general health status, knowledge of osteoporosis, regular follow-up, any treatment, treatment period, drugs used, history of any fall, location of any fracture, activity level, duration of Ca+vitD use, and reasons for non-usage. General health status was evalu-

ated based on the patient's global assessment as good, moderate, or poor. Study participants who stated that they had some knowledge of osteoporosis were asked about sources of information, such as physicians, friends and relatives (social environment), electronic mass media (radio/TV), print media, and the Internet. Daily exercise or walking habits were also assessed. Patients who did not routinely use the Ca+vitD prescribed were asked about the reasons for not adhering to the recommended treatment.

Statistical analysis

IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY, USA) was used for the statistical analysis. The Shapiro-Wilk test was applied to all variables to determine normal distribution. Normally distributed variables were expressed as mean±SD, and the mean was used to describe variables that did not conform to normal distribution. The Mann-Whitney U test was used to compare variables that did not have a normal distribution, and an independent paired sample t-test was used for comparisons between groups with normally distributed variables. A

chi-square test was used to compare more than 2 groups. Statistical significance was accepted as $p < 0.05$.

RESULTS

The sociodemographic characteristics and survey results of the participants are summarized in Table 1. Osteoporosis was present in 34.5% of female patients. When asked about their awareness of osteoporosis, 63.5% of the participants stated that they had no knowledge about the condition. Among those who were informed about osteoporosis, the cited sources of information were physicians (12.0%), friends/relatives (social environment) (14.1%), electronic media (radio/TV) (3.3%), print media (1.1%), Internet (2.2%), and a combination of all of these sources (30.4%).

When asked about their BMD measurements and regular follow-up in the osteoporosis polyclinic, 76.3% of the participants stated that they did not observe regular osteoporosis follow-up. Drug use data indicated that 6.2% of patients were taking alendronate, 8.4% risedronate, 9.6% ibandronate, 5.4% zoledronic acid, and 4.9% denosumab,

Table 1. Sociodemographic characteristics and results of the survey

Age (mean±SD) (years)	69.59±3.97	Osteoporosis (n=102)	34.5%
Gender		Knowledge of osteoporosis	
Female (n=262)	88.5%	No (n=108)	36.5%
Male (n=34)	11.5%	Yes (n=188)	63.5%
Height (cm) (mean±SD)		Sources of information	
Female	71.44±13.03	Physician (n=23)	12.0%
Male	77.23±12.02	Friends/relatives (n=27)	14.1%
Body weight (kg) (mean±SD)		Mass media (radio/TV) (n=6)	3.3%
Female	157.56±7.17	Print media (n=2)	1.1%
Male	169.29±5.73	Internet (n=4)	2.2%
Education level		Friends + mass media (n=30)	1.3%
Illiterate (n=24)	8.1%	Physician + friend + mass media (n=39)	20.7%
Literate (n=102)	34.5%	All of the above (n=57)	30.4%
Primary school (n=42)	14.2%	History of fall within the past 5 years	
Middle school (n=84)	28.4%	No (n=270)	91.2%
High school (n=42)	14.2%	Yes (n=26)	10.8%
University (n=2)	0.7%	History of fracture within the past 5 years	
Marital status		No (n=264)	89.2%
Married (n=94)	31.8%	Yes (n=32)	8.8%
Single (n=6)	2.0%	Region of the fracture	
Divorced (n=6)	2.0%	Vertebra (n=16)	50%
Widow/widower (n=186)	62.8%	Wrist (n=6)	18.75%
Separated (n=4)	1.4%	Hip (n=4)	12.5%
Age at menopause (mean±SD) (years)	46.83±6.35	Other (n=6)	18.75%
General health status		Regular adherence to Ca+vitD treatment	
Good (n=104)	35.1%	No (n=174)	58.8%
Fair (n=180)	60.8%	Yes (n=122)	41.2%
Poor (n=12)	4.1%	Use of appropriate dose of Ca+vitD treatment	
Bone mineral densitometry result		No (n=30)	24.6%
Osteopenia (n=194)	65.5%	Yes (n=92)	75.4%

SD: Standard deviation; Ca+vitD0 Calcium+vitamin D.

Table 2. Reasons for not adhering to prescribed calcium+vitamin D treatment

Side effects, n=56 (32.18%)	Inadequate motivation, n=80 (45.97%)	Fear of potential side effects, n=38 (21.83%)
Dislike the taste n=35 (20.11%)	Dietary intake thought to be adequate n=68 (39.08%)	Potential heart damage n=28 (16.09%)
Stomach problems n=11 (6.32%)	Concern about taking too many medications (more than 5 medications a day) n=10 (5.74%)	Potential kidney damage n=10 (5.74%)
Bowel problems n=10 (5.74%)	Forgetting to take the supplement n=2 (1.11%)	

and 41.2% were taking Ca+vitD either alone or in conjunction with another recommended treatment.

The mean length of time since the Ca+vitD treatment was recommended was 3.25+1.26 years.

In the study group, 10.8% of the participants had a history of a fall within the previous 5 years.

In all, 8.8 % of the participants had a history of fracture within the previous. The fracture site was in the vertebral region in 50%, the wrist in 18.75%, the hips in 12.5%, and in another area in 18.75%.

When asked about their activity level,42.6% of the participants stated that they were walking regularly as a form of

exercise, 19.6% did other regular exercise, and 16.9% did not exercise or walk regularly.

The study data indicated that 41.2% of the participants were regularly following the Ca+vitD treatment (Fig. 1). There was no significant difference in adherence to the treatment based on gender, level of education, BMD values, knowledge about fracture risk, or history of fracture. In addition, 24.6% of the regular Ca+vitD users stated that they had not been using the appropriate dosage and/or formulation.

When the justifications of those who did not observe the prescribed Ca+vitD treatment were questioned, the participants cited drug-related side effects they had experienced, insufficient motivation, and fear of possible side effects (Table 2). The results revealed that 39.08% of the patients indicated that they believed they consumed an adequate amount of calcium in their diet, 20.11% did not like the taste of the supplement, 16.09% reported that they thought the treatment could have a harmful effect on the heart and 5.74% expressed the same concern regarding kidney damage, gastric discomfort was cited by 6.32%, intestinal problems (flatulence, constipation, etc.) by 5.74%, multidrug use by 5.74%, and forgetting to take the medication was reported as a reason for not adhering to the Ca+vitD treatment by 1.11% (Fig. 2).

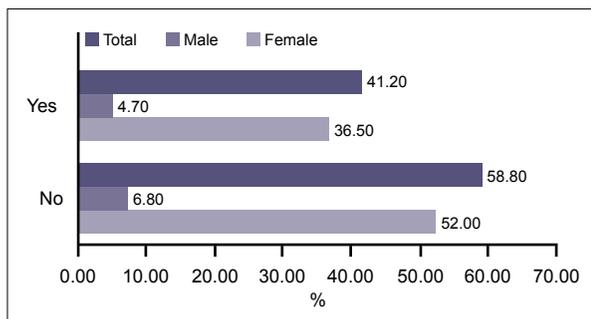


Figure 1. Regular use of calcium+vitamin D.

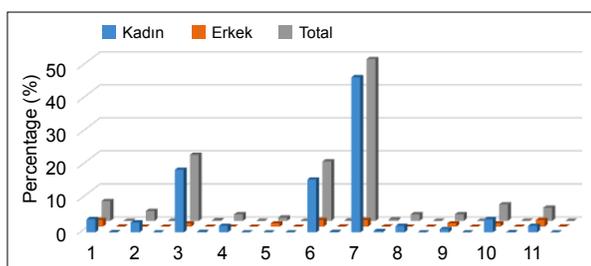


Figure 2. Distribution of the reasons for not adhering to calcium+vitamin D therapy. 1. It upsets my stomach; 2. I am suffering from bowel problems (flatulence, constipation); 3. I dislike the taste; 4. I think it could damage my kidneys; 5. I forget to take my drugs; 6. I think it could damage my heart; 7. I get enough calcium through my diet; 8. I have to take too many drugs; 9. It upsets my stomach + it may damage my heart; 10. I think it may damage my kidneys + I have to take too many drugs; 11. I am suffering from bowel problems + I don't like the taste.

DISCUSSION

Ca+vitD treatment is a recommended treatment in elderly patients with low BMD values (osteopenia and osteoporosis). Current treatment guidelines recommend the use of 800 IU of vitamin D and 1200 mg of calcium per day.^[1,2] The primary goal is to reduce or stop bone loss and the associated fracture risk.^[1-4] The mortality and morbidity rates associated with fracture increase with age. Ca+vitD supplementation has been shown to reduce the rate of all types of fracture in individuals over 50 years of age, and it was reported in a meta-analysis that included 64,000 individuals that the treatment led to a 2-fold decrease in the incidence of fracture.^[5] Therefore, appropriate Ca+vitD treatment is very important for elderly patients. Our study was conducted to investigate adherence and noncompliance with Ca+vitD treatment among geriatric patients.

Three basic categories of response were seen in our study results related to noncompliance: drug-related side effects, inadequate motivation, and fears regarding the treatment and/or side effects. Among the motivation-related factors were the belief that dietary intake was sufficient and concern about excessive drug use. Misperceptions regarding the importance of adhering to Ca+vitD therapy are important causes of noncompliance. The most common drug-related side effects are gastrointestinal discomfort and bowel problems. Dislike of the taste of the supplement was also commonly reported. Fears related to cardiotoxic or renotoxic effects of Ca+vitD therapy were also reported as reasons for non-adherence. Rossini et al.^[6] examined osteoporosis treatment without discriminating between age groups and the most common reasons for not maintaining the prescribed treatment were drug-related side effects, insufficient motivation to pursue the treatment, and fear related to the treatment or its side effects.^[6] The most important reason for not continuing Ca+vitD treatment in individuals with low BMD without consideration for age has been found to be a lack of motivation, similar to the results seen in geriatric individuals in our study.^[5-7]

Compliance with treatment often decreases with age due to forgetfulness, multi-morbidity, and multiple drug use. It has also been demonstrated in studies that patients sometimes use less than the recommended dose even if they use the drug regularly.^[6,7] In our study, 24.6% of the participants who used Ca+vitD did not use the appropriate dosage and/or formulation. In another study that did not evaluate geriatric patients, gastrointestinal problems (constipation, dyspepsia, etc.) were reported to be the most common side effects.^[8,9] Brunner et al. found that only 23% of the female patients adhered to Ca+vitD treatment in the first year of osteoporosis treatment.

Noncompliance with medication use is associated with many factors, including increasing age, low socioeconomic status, smoking, and poor health status. Meta-analyses have also reported that compliance is also associated with insufficient social support, depression, and hopelessness.^[5-10] In our study, no correlation was seen between regular use of Ca+vitD and age, perception of health state, level of activity, education, diagnosis of osteoporosis, osteoporosis treatment, or fracture history.

In our study, the participants stated that they had most often obtained information about osteoporosis from a physician, friends or relatives (social environment), electronic mass media (radio/TV), print media, and the Internet, with 30.4% reporting the use of all of these sources. Özişler et al.^[11] found that physicians (48.6%) and television (39.5%) were the most frequent sources of information for patients. In a study with a group of participants with a mean age of 46.6±12.6 years, physicians were second to visual and print media as the most frequently named sources of information.^[12] Inaccurate information sources can contribute to fears about treatment and side effects. One study of geriatric patients observed that while the degree

of awareness and knowledge about osteoporosis was high, it was noted that the primary source of information was visual and print media, while health professionals were the least referenced source.^[13,14]

In recent years, studies have shown that high levels of calcium intake can lead to cardiac side effects and mortality, but there is more evidence supporting the opposite assertion. Manson et al.^[15] is a good example with a long follow-up period. In a 7- year follow-up period, it was demonstrated that Ca+vitD supplementation did not affect the formation of calcified plaques in the coronary arteries of postmenopausal women. In this comprehensive review of nearly 300 original studies, articles, and literature reviews on the subject, it was concluded that Ca+vitD vitamin treatment did not affect cardiovascular health or mortality.^[16]

There is a lot of disinformation on the Internet, in the mass media, and the social environment about Ca+vitD vitamin treatment and potential side effects. In our study, 16.3 % of the participants reported not taking the recommended Ca+vitD because they thought it could be harmful to the heart. It is very important for health professionals to clearly convey complete and accurate information to the patient.

It has also been shown in population studies that compliance rates are lower among outpatients than when treatment is administered in the hospital.^[17] In our study, the rate of compliance was lower than that found in other studies. As our study was conducted in a hospital environment rather than as a population-based study, this may be considered a limitation. In addition, the small number of participants in the study and its single-center design prevented the evaluation of regional differences. The inability to evaluate patients in terms of psychiatric and socioeconomic aspects may be considered another limitation to our research. Multicenter studies with a larger number of participants are needed.

Nonetheless, it is clear that the necessity, importance, benefits, and proper usage of Ca+vitD treatment and the potential risk of fracture in the absence of the therapy should be explained to elderly patients in detail and regular follow-up visits should be scheduled to monitor compliance. In addition, it should be emphasized that patients should contact a health professional if they have any questions or problems regarding their Ca+vitD treatment.

Ethics Committee Approval

Approved by the local ethics committee.

Informed Consent

Retrospective study.

Peer-review

Internally peer-reviewed.

Authorship Contributions

Concept: A.S.; Design: A.S.; Data collection &/or processing: A.S.; Analysis and/or interpretation: A.S.; Literature search: A.S.; Writing: A.S.; Critical review: A.S.

Conflict of Interest

None declared.

REFERENCES

1. Qaseem A, Forciea MA, Mclean RM, Denberg TD; Clinical Guidelines Committee of the American College of Physicians. Treatment of low bone density or osteoporosis to prevent fractures in men and women: a clinical practice guideline update from the American College of Physicians. *Ann Intern Med* 2017;166:818–39.
2. Reginster JY, Rizzoli R, Kanis JA, Cooper C. Treatment of low bone density or osteoporosis to prevent fractures in men and women. *Ann Int Med* 2017;167:902–3.
3. Weaver CM, Alexander DD, Boushey CJ, Dawson-Hughes B, Lappe JM, LeBoff MS, et al. Calcium plus vitamin D supplementation and risk of fractures: an updated meta-analysis from the National Osteoporosis Foundation. *Osteoporos Int* 2016;27:367–76.
4. Rahme M, Sharara SL, Baddoura R, Habib RH, Halaby G, Arabi A, et al. Impact of calcium and two doses of vitamin D on bone metabolism in the elderly: a randomized controlled trial. *J Bone Miner Res* 2017;32:1486–95.
5. Tang BM, Eslick GD, Nowson C, Smith C, Bensoussan A. Use of calcium or calcium in combination with vitamin D supplementation to prevent fractures and bone loss in people aged 50 years and older: a meta-analysis. *Lancet* 2007;370:657–66.
6. Rossini M, Bianchi G, Di Munno O, Giannini S, Minisola S, Sinigaglia L, et al; Treatment of Osteoporosis in clinical Practice (TOP) Study Group. Determinants of adherence to osteoporosis treatment in clinical practice. *Osteoporos Int* 2006;17:914–21.
7. Calabria S, Cinconze E, Rossini M, Rossi E, Maggioni AP, Pedrini A, et al. Adherence to alendronic or risedronic acid treatment, combined or not to calcium and vitamin D, and related determinants in Italian patients with osteoporosis. *Patient Prefer Adherence* 2016;10:523–30.
8. den Uyl D, Geusens PP, van Berkum FN, Houben HH, Jebbink MC, Lems WF. Patient preference and acceptability of calcium plus vitamin D3 supplementation: a randomised, open, cross-over trial. *Clin Rheumatol* 2010;29:465–72.
9. Touskova T, Vytrisalova M, Palicka V, Hendrychova T, Fuksa L, Holcova R, et al. Drug holidays: the most frequent type of noncompliance with calcium plus vitamin D supplementation in persistent patients with osteoporosis. *Patient Prefer Adherence* 2015 9:1771–9.
10. Brunner R, Dunbar-Jacob J, LeBoff MS, Granek I, Bowen D, Snetseelaar LG, et al. Predictors of adherence in the women's health initiative calcium and vitamin D trial. *Behav Med* 2009;34:145–55.
11. Özişler Z, Ünsal Delialioğlu S, Özel S, Şahin Onat Ş, Yılmaz Şahin A, Dolmuş M. The Awareness of Elderly about Osteoporosis: What about Our Elderly? *Turkish Journal of Osteoporosis* 2015;21:69–72.
12. Aksu A, Zinnuroğlu M, Karaoğlu B, Akın S, Kursal YG, Atalay, F, et al. Osteoporosis, Education Status and Knowledge Level Research Results. *Turkish Journal of Osteoporosis* 2005;11:36–40.
13. Juby AG, Davis P. A prospective evaluation of the awareness, knowledge, risk factors and current treatment of osteoporosis in a cohort of elderly subjects. *Osteoporos Int* 2001;12:617–22.
14. Gaines JM, Narrett M, Parrish, JM. The effect of the addition of osteoporosis education to a bone health screening program for older adults. *Geriatr Nurs* 2010;31:348–60.
15. Manson JE, Allison MA, Carr JJ, Langer RD, Cochrane BB, Hendrix SL, et al; Women's Health Initiative and Women's Health Initiative-Coronary Artery Calcium Study Investigators. Calcium/vitamin D supplementation and coronary artery calcification in the Women's Health Initiative. *Menopause* 2010;17:683–91.
16. Watson J, Lee M, Garcia-Casal MN. Consequences of Inadequate Intakes of Vitamin A, Vitamin B12, Vitamin D, Calcium, Iron, and Folate in Older Persons. *Curr Geriatr Rep* 2018;7:103–13.
17. Lips P, Bouillon R, van Schoor NM, Vanderschueren D, Verschueren, S, Kuchuk N, et al. Reducing fracture risk with calcium and vitamin D. *Clin Endocrinol* 2010;73:277–85.

Yaşlılarda Kalsiyum+Vitamin D Tedavisine Uyum

Amaç: Yaşlılarda tedaviye uyum birçok hastalığın tedavisinde önemli bir sorundur. Kemik mineral dansitometrisi (KMD) değerleri düşük hastalara verilen kalsiyum+vitamin D (Ca+vitD) tedavisine devamlılık ile ilgili sorunlar yapılan takiplerde hekimlerin karşısına çıkmaktadır. Bu durumun ne sıklıkla ve ne sebeple olduğunu araştırma amaçlı bu çalışma planlandı.

Gereç ve Yöntem: Osteoporoz tanı ve takibi nedeniyle hastanemize Ocak 2013–Aralık 2015 tarihleri arasında kabul edilen hastalardan çalışmaya katılmaya gönüllü 296 yaşlı birey çalışmaya dahil edildi. Katılımcılar ile yüz yüze görüşerek, sosyo-demografik özellikleri ve tedaviye uyumu değerlendirmeyi amaçlayan anket formu dolduruldu.

Bulgular: Katılımcıların yalnızca %41.2'si hekim tarafından reçete edilen Ca+vitD tedavisini düzenli olarak almaktaydı. Tedaviyi almama nedenleri sırasıyla %39.08 ile yeterli kalsiyumu beslenme ile aldığını düşünme, %20.11 ile ilacın tadını beğenmeme ve %16.09 ile kalp sağlığına zararı olduğunu düşünme olarak belirtilmiştir.

Sonuç: Motivasyon, yan etkiler ve oluşabilecek yan etkilere dair korkular yaşlı hastaların Ca+vitD kullanımında uyumu belirleyen önemli etmenlerdir. KMD değerleri düşük olan yaşlı hastalara kontrendike bir durum olup olmadığı detaylı sorgulandıktan sonra reçete edilen Ca+vitD tedavisinin gerekliliği, kullanım şekli, olabilecek yan etkileri ve kullanmama durumunda ortaya çıkan riskler özenle anlatılıp, düzenli kontrollerle uyumu takip etmek gerekmektedir.

Anahtar Sözcükler: Kalsiyum+vitamin D; uyum; yaşlılık.