Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 11, pp.41315-41318, November, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

PREVALENCE OF VITAMIN D DEFICIENCY AMONGAN ELDERLY PEOPLE

[1]AlirezaKhalaj, [2,]*Ali Eslamifar, [3]Mohammad Hosein Gheini, [4]Mansour Abachi, [5]Ebrahim Azizi, [6]MonirSalati, [7]Mehrad Eslamifar, [8]Saeid Mahmoudi, [9]Hassan Ehteram, [10]Maryamossadat Moin Azad Tehrani and [11]Bahareh Soltani Ahmadi

[1]Department of Surgery, Shahed University, Tehran, Islamic Republic of Iran
[2]Department of Clinical Research, Pasteur Institute of Iran, Tehran, Iran
[3]Department of Anatomy and Pathology, Medical faculty, Shahed University, Iran
[4, 6, 8]Genomics Department of Ana Gen Biotech., Co Ltd.
[5]Genomics Department of Ana Gen Biotech, Pasteur Institute of Iran, Tehran, Iran
[7]Kazan University of Medical Sciences, Kazan, Russia & Genomics Department of Ana Gen Biotech., Co Ltd
[9]Department of pathology, School of medicine, Kashan University of Medical Sciences, Kashan, Iran
[10]Shahidbeheshti University of Tehran, Loghman Hakim Hospital

ARTICLE INFO

Article History:
Received 14th August, 2016
Received in revised form
22nd September, 2016
Accepted 12th October, 2016
Published online 30th November, 2016

Key words:

Vitamin D,
Elderly,
Prevalence.

ABSTRACT

Background: Vitamin D deficiency is common at all ages, and although vitamin D deficiency has been documented as a frequent problem in studies of young adults, elderly persons, and children in other countries, there are limited data on the prevalence of assess the status of serum vitamin D pathway with serum vitamin D level in elderly people in Iran.
Design: We measured the serum 25-hydroxyvitamin D levels in 3156 subjects aged 60 to 90 years old men and women in ShafaghlabLaboratory of Iran. Results were collected and the data were analyzed with SPSS, chi square tests and linear regression.
Results: 89% of the all had 25-OH-vitamin D deficiency (defined as a level below 20 ng/mL), and 67% had a severe deficiency (below 10 ng/mL). Only 4% had levels in the target range (30–60 ng/mL); none had a level above100 ng/mL.
Conclusion: Our findings revealed higher prevalence of osteoporosis in elderly people especially in women compared to other studies in Iran, and also showed high prevalence rate of vitamin D deficiency. Persons of very advanced age need a better supply of vitamin D not only to keep their bones healthy, but also to lessen the risk of falls and fractures.

Citation: AlirezaKhalaj, Ali Eslamifar, Mohammad Hosein Gheini *et al.*, 2016. "Prevalence of Vitamin D Deficiency amongan Elderly people", *International Journal of Current Research*, 8, (11), 41315-41318.

INTRODUCTION

An inadequate serum vitamin D status is commonly seen in elderly people as the result of various risk factors interacting in this population.For example, in a British study from 2005 a lower vitamin D level was measured in persons aged over 65 years than in the general public. Patients cared for in care facilities had lower values than those who lived at home (Hirani *et al.,* 2005). Vitamin D deficiency is associated with muscle weakness (Schott and Wills, 1976) and is common in elderly people (Gloth *et al.,* 1995). Older people are prone to develop vitamin D deficiency because of various risk factors: decreased dietary intake, diminished sunlight exposure, reduced skin thickness, impaired intestinal absorption, and impaired hydroxylation in the liver and kidneys (Omdahl *et al.,* 1982). Numerous studies have reported that low 25(OH) Dlevels are associated with osteoporosis and fractures inthe elderly (Ross *et al.,* 2011). Of 824 elderly people aged > 70 y from 11 European countries, 36% of men and 47% of women had wintertime serum 25-hydroxyvitamin D3 [25(OH)D3] concentrations < 30 nmol/L (van der Wielen *et al.,* 1995). Vitamin D status in African ancestry individuals has been primarily assessed in healthy younger individuals, pregnant and lactating women, healthy children and those with rickets, and clinical studies of tuberculosis and pneumonia patients (Prentice *et al.,* 2009). Information about the vitamin D status of older adult Canadians of diverse ancestry is limited. Available studieshave focused on European populations (van der Wielen *et al.,* 1995) or older adults of European ancestry (Linnebur *et al.,* 2007), and to lesserextent African ancestry residing in North America. Detailed descriptions of ancestry

Corresponding author: Ali Eslamifar,
Department of Clinical Research, Pasteur Institute of Iran, Tehran, Iran.

are often not reportedin vitamin D studies, including national surveys in Canada (Langlois *et al.,* 2010) and older persons of diverse ethnicities havebeen found not to be included in meaningful numbers in studies exploring vitamin D status (McKenna, 1992). Another small study examining the effect of calcitriol on erythropoiesis in 33 patients with chronic uremia suggested that calcitriol promoted increased erythroid colony formation (Aucella *et al.,* 2003). However, these 2 small, preliminary studies are inconclusive and leave open the question of whether vitamin D has an effect on erythropoiesis. Therefore, we undertook to study the relationship between vitamin D status and particular subtypes of anemia commonly seen in elderly subjects. Results of studies in Iran among different age-groups indicate a high prevalence of vitamin D deficiency (Azizi *et al.,* 2000; Salek *et al.,* 2008). Studies in Isfahan have shown a high prevalence of the problem among high school children, pregnant women, and newborns (Moussavi *et al.,* 2004). Results of a study in Tehran showed that the prevalence of vitamin D deficiency was also higher among the general population (Moussavi *et al.,* 2004).In order to examine the vitamin D supply of elderly patients in Iran, the vitamin D levels of men and women, were tested on admission. Vitamin D supply is becoming more and more important as a result of demographic changes and the resulting increase in the proportion of elderly people in the population.

MATERIAL AND METHODS

Between July 2004 and March 2016, the serum 25-OHvitaminD levels of a total of 3156 patients consecutivelyadmitted to the was carried out among men and women aged between 60 and 90, who had resided in the Shafagh laboratory of Iran. 72% of patients were women, 28% men, and the mean and median age was 82 years. No data were gathered on any vitamin D supplements taken before admission. Such data would have been very prone to errors, due to the common problem with medication histories relating to the vitamin D supplements that are freely available from pharmacies, drug stores, supermarkets, and online stores, and would therefore have provided very little information. Vitamin D level was determined in serum by Enzyme Linked Immune Sorbent Technique (ELISA) using OH vitamin D ELISA kit; Catalog No.EIA-4696 (DRG International, Inc.), CA, U.S.A. the status of 25OH vitamin D was evaluated as follows: According to Endocrine Society Clinical Practice Guidelines, vitamin D deficiency was defined as a 25 (OH) D < 20 ngl/L (50 nmol/l), and insufficiency as a 25 (OH) D between 21and 29 ng/l (52.5and72.5nmol/L), and 25 (OH) D level ≥ 30 ng/l (75 nmol/l) as the optimal level (Aucella *et al.,* 2003). Participated in this study toward the end of summer and winter. Serum was separated and kept at –80°C. Then 25-OHvitamin D were measured in Shafgagh laboratory. Mild, moderate and severe vitamin D deficiencies were defined as 25-OHD values of 20-35ng/ml, 10-20 ng/ml, and <10 ng/ml respectively. There is also another classification for vitamin D deficiency in the literature. In this classification, the combination of moderate and severe vitamin D deficiencies are considered vitamin D deficiency (25-OHD <20 ng/mL) and mild vitamin D deficiency (25-OHD 20-30 ng/mL) as vitamin D insufficiency (Holick, 2004). We used the first classification. However, the second classification was used after stating its usage.

RESULTS

The mean 25-OH-vitamin D level for all 3156 patientswas 10.2 ng/mL (range 1 to 77 ng/mL; median 8 ng/mL). There was no difference between the mean forwomen and for men. The median for women was 8 ng/mL, and for men 7 ng/mL. In the few patients under60 years of age (n = 38), the mean was 13.84 ng/mL, and the corresponding value for those aged over 90 (n = 208) was 8.63 ng/mL. The largest groups were thoseconsisting of patients aged between 71 and 80 years (n= 1002), the mean for which was 10.48 ng/mL, and ofpatients aged between 81 and 90 years (n = 1762), themean for which was 10.36 ng/mL (Table). Overall, 89% of patients were deficient in 25-OHvitaminD, with values below 20 ng/mL, and 96% ofthe measured values were below a limit of 30 ng/mL.Severe 25-OH-vitamin D deficiency below 10 ng/mLwas identified in 67% of patients. Only 4% of allmeasured values lay in the target region of 30 to 60 ng/mL, three values (<1%) were between 60 and 100 ng/mL, and no individual measurements were in the toxicregion of above 100 ng/mL. The highest measuredvalue was 77 ng/mL.In contrast to the variations seen between thebrighter and the darker halves of the year in youngerpeople (Hintzpeter *et al.,* 2008), in our geriatric patients vitamin D levelswere almost unaffected by the time of year. The maximummean level over six months was 10.71 ng/mL inthe brighter six months of 2010, and the minimummean level was 9.29 ng/mL in the darker six months of2010/2011 (Table).

Table 1. Distribution of 25-OH-vitamin D levels

Overall data on 25-OH-vitamin D levels, July 2004 to March 2016						
	n	Mean, ng/mL	Standard deviation	Median, ng/mL	Maximum ng/mL	Minimum ng/mL
Total	3156 (100%)	10.2	8.66	8	77	1
Women	2262 (72%)	10.2	8.74	7	77	1
Men	894 (28%)	10.2	8.45	8	64	2
Distribution of 25-OH-vitamin D levels by age, July 2004 to March 2016						
Age <60 years	38 (1.2%)	13.84				
Age 61–70 years	146 (4.6%)	8.96				
Age 71–80 years	1002 (31.7%)	10.48				
Age 81–90 years	1762(55.8%)	10.36				
Seasonal data on 25-OH-vitamin D levels, July 2004 to March 2016						
Summer ’09 (July to October)	140	10.9	7.23	8	33	1
Winter ’09/’10 (November to April)	1034	10.3	8.89	7	53	2
Summer ’10 (May to October)	1196	10.7	8.95	8	64	2
Winter ’10/’11 (November to March)	786	9.29	8.06	7	77	2

DISCUSSION

Here, we report the vitamin D status in a sample of community dwelling, active older adults (age > 60 years)of diverse ancestry living in theIran.Previous studies have shown that African Americans typically have lower levels of serum 25(OH)D than Caucasian Americans.9–13 The mean levels of total 25(OH)D among Afro-Caribbean men in our study (35 ng/mL) were considerably higher than the levels among older African American men in the Third National Health and Nutrition Examination Survey (NHANES III) (17 ng/mL) and among older African American men in the Study of Osteoporotic Fractures in Men (MrOS) (18.5 ng/mL) (Orwoll *et al.,* 2009). Epidemiologic data on vitamin D in African countries has been limited and mainlyderived from populations at high risk for deficiency, such as undernourished children, women, and tuberculosis and pneumonia patients (Prentice *et al.,* 2009), However, vitamin D deficiency is merely one condition that affects muscle function in elderly people (Grimby, 1995; Brooks *et al.,* 1994), which is illustrated by the fact that even in healthy, vitamin D–replete, elderly people, muscle strength declined with age (Boonen *et al.,* 1998), which was not prevented by vitamin D supplementation (Grady *et al.,* 1991; Johnson *et al.,* 1980). Moreover, severe comorbidity (and subsequent immobility) may cause muscle weakness and functional impairment, which cannot be improved by treating a coexisting vitamin D deficiency (Corless *et al.,* 1985). However, vitamin D deficiency is merely one condition that affects muscle function in elderly people (Grimby, 1995), which is illustrated by the fact that even in healthy, vitamin D–replete, elderly people, muscle strength declined with age (Boonen *et al.,* 1998), which was not prevented by vitamin D supplementation (Grady *et al.,* 1991). Moreover, severe comorbidity (and subsequent immobility) may cause muscle weakness and functional impairment, which cannot be improved by treating a coexisting vitamin D deficiency (Boonen *et al.,* 1998). As a rule, elderly people spend less time in the sun, and older skin has significantly less capacity to synthesize vitamin D from sunlight than the skin of younger people (Trémezaygues *et al.,* 2010). The study showed significant vitamin D deficiency; 89% of patients had 25-OH-vitamin D levels below20 ng/mL.In view of how common vitamin D deficiency is in the elderly, the question arises of whether or not thishas any clinical significance. The effects of vitamin D on bones and muscles are indisputable, and problems such as muscle weakness and pain in the musculo - skeletal system, which are often seen as age-related, may also be partly caused by the frequent vitamin D deficiency in old age. Whether there is a difference in the effects of an initial load dose following measurement of vitamin D levels and administration of vitamin D, for example, at the dose of 800 IU/day currently recommended by the IOM, on bone health, for example, or on the rate of falls and fracture rates, should be further clarified by future studies.

Conclusion

Vitamin D deficiency is very common among Iranians elderly population. Adequate vitamin D levels are required foreffective bone metabolism, and there is also a largeamount of evidence that a good vitamin D supply inelderly patients can also reduce the frequency of fallsand fractures. An adequate vitamin D supply is thereforevery desirable for the elderly population. As it iscurrently almost impossible to obtain sufficient vitaminD intake from food alone in Iran, vitamin Dsupplements should be used to boost vitamin D supply, particularly for the elderly, in addition to the naturalsource of vitamin D, which is moderate sun exposure.

Acknowledgments

This work was mainly supported by Department of Microbiology of Shfagh lab in Tehran**.**

REFERENCES

Aucella F, Scalzulli RP, Gatta G, *et al*. Calcitriol increases burst-forming unit-erythroid proliferation in chronic renal failure.Asynergistic effect with r-HuEpo. *Nephron ClinPract.,* 2003; 95(4):c121-c127.

Azizi F, Rais-Zadeh F, Mir Said Ghazi A. Vitamin D deficiency in a group of Tehran Population. *Res Med*., 2000; 4:291-303.

Boonen S, Lysens R, Verbeke G, *et al*. Relationship between ageassociatedendocrine deficiencies and muscle function in elderlywomen: a cross-sectional study. *Age Ageing.,* 1998; 27:449–54.

Boonen S, Lysens R, Verbeke G, *et al*. Relationship between ageassociatedendocrine deficiencies and muscle function in elderlywomen: A cross-sectional study. *Age Ageing,* 1998; 27:449–54.

Brooks SV, Faulkner JA. Skeletal muscle weakness in old age: underlying mechanisms. *Med Sci Sports Exerc.,* 1994; 26:432–9.

Corless D, Dawson E, Fraser F, *et al*. Do vitamin D supplementsimprove the physical capabilities of elderly hospital patients? *AgeAgeing,* 1985; 14:76–84.

Gloth FM III, Gundberg CM, Hollis BW, Haddad JG, Tobin JD. Vitamin D deficiency in homebound elderly persons. *JAMA* 1995; 274:1683–6.

Grady D, Halloran B, Cummings S, *et al*. 1,25-Dihydroxyvitamin D3 and muscle strength in the elderly: a randomized controlled trial. *J Clin Endocrinol Metab.,* 1991; 73:1111–7.

Grady D, Halloran B, Cummings S, *et al*. 1,25-Dihydroxyvitamin D3and muscle strength in the elderly: a randomized controlled trial. *J Clin Endocrinol Metab*., 1991; 73:1111–7.

Grimby G. Muscle performance and structure in the elderly as studiedcross-sectionally and longitudinally. *J Gerontol,* 1995; 50A:17–22.

Grimby G. Muscle performance and structure in the elderly as studied cross-sectionally and longitudinally. *J Gerontol.,* 1995; 50A:17–22.

Hashemipour S, Larijani B, Adibi H, Javadi E, Sedaghat M, Pajouhi M *et al*. Vitamin D deficiency and causative factors in population of Tehran. *BMC Public Health,* 2004;4:38

Hintzpeter B, Mensink GB, Thierfelder W, *et al*.: Vitamin D status and health correlates among German adults. *Eur J Clin Nutr.,* 2008; 62: 1079–90.

Hirani V, Primatesta P: Vitamin D concentrations among people aged 65 years and over living in private households and institutions in England: population survey. *Age Ageing* 2005; 34: 485–91.

Holick M.F. 2004 Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers, and cardiovasculardisease. *Am J Clin Nutr.,* 80:1678S–1688S.

Johnson KR, Jobber J, Stonawski BJ. Prophylactic vitamin D in theelderly. *Age Ageing,* 1980; 9:121–7.

Langlois K, Greene-Finestone L, Little J, Hidiroglou N, Whiting S. Vitamin D status of Canadians as measured in the 2007–2009 Canadian Health Measures Survey. *Statistics Canada Health Reports*, 2010, 21:47–55.

Linnebur SA, Vondracek SF, VandeGriend JF, Ruscin JM, McDermott MT: Prevalence of vitamin D insufficiency in elderly ambulatory outpatients in Denver, Colorado. *Am J Ger Pharm.,* 2007, 5:1–8.

McKenna MJ: Differences in vitamin D status between countries in young adults and the elderly. *Am J Med*., 1992, 93:69–77.

Moussavi M, Heidarpour R, Aminorroaya A, Pournaghshband Z, Amini M. Prevalence of vitamin D deficiency in Isfahan high school students in 2004. *Horm Res.,* 2005; 64:144-8.

Moussavi M, Heidarpour R, Aminorroaya A, Pournaghshband Z, Amini M. Prevalence of vitamin D deficiency in Isfahan high school students in 2004. *Horm Res*., 2005; 64:144-8.

Omdahl JL, Garry PJ, Hunsaker LA, Hunt WC, Goodwin JS. Nutritional status in a healthy elderly population: vitamin D. *Am J Clin Nutr*., 1982; 36:1225–33.

Orwoll E, Nielson CM, Marshall LM, *et al*. Vitamin D deficiency in older men. *J Clin Endocrinol Metab*., 2009; 94(4):1214–1222.

Prentice A, Schoenmakers I, Jones K, Jarjou L, Goldberg G. Vitamin D deficiency and its health consequences in Africa. *Clinical Reviews in Bone and Mineral Metabolism,* 2009; 7(1): 94–106.

Prentice A, Schoenmakers I, Jones K, Jarjou L, Goldberg G. Vitamin D deficiency and its health consequences in Africa. *Clinical Reviews in Bone and Mineral Metabolism*, 2009; 7(1): 94–106.

Ross AC, Taylor CL, Yaktine AL, Del Valle HB: Dietary Reference Intakes for Calcium and Vitamin D, Institute of Medicine of the National Academies. Washington: The National Academies Press; 2011.

Salek M, Hashemipour M, Aminorroaya A, Gheiratmand A, Kelishadi R, Ardestani PM *et al*. Vitamin D deficiency among pregnant women and their newborns in Isfahan, Iran. *Exp Clin Endocrinol Diabet,* 2008;116:352-6.

Schott GD, Wills MR. Muscle weakness in osteomalacia. Lancet 1976;1:626–9.

Trémezaygues L, Reichrath J: ZurBedeutung des Vitamin Stoffwechsels in der humanen Haut. *Hautarzt,* 2010; 61: 478–86.

Van der Veilen RPJ, Lowik MRH, van den Berg H, de Groot LCPGM, Haller J, Moreiras O, van Staveren WA: Serum vitamin D concentrations among elderly people in Europe. *Lancet*, 1995, 346:207–210.

Van der Wielen RPJ, Löwik MRH, van der Berg H, *et al*. Serum vitamin D concentrations among elderly people in Europe. *Lancet* 1995; 346:201–10.

****