

Knowledge Attitude and Practices about Management of Vitamin D Deficiency among Doctors in Pakistan

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Abstract

Background: Hypovitaminosis D is a common health issue in Pakistan because of its high prevalence. The awareness and practices of doctors treating vitamin D deficiency needs to be highlighted, as it will help in managing this public issue.

Objectives: To assess knowledge, attitude and practices for diagnosing and treating hypovitaminosis D among practicing doctors in Pakistan.

Subjects and Methods: Clinicians from different cities of the Pakistan were participated for a cross-sectional descriptive questionnaire based study about their approach in treating vitamin D deficiency. Results were analyzed using SPSS version 20. Descriptive statistics were calculated.

Results: One hundred eighty eight (188) practicing doctors from 21 different cities of Pakistan participated in the study. Majority (85.6%, n=161) prescribed vitamin D levels in patients of hypovitaminosis D. It is empirically treated by 101 (53.7%). Most clinicians (84%, n=158) prescribe Cholecalciferol, 19 (10.1%) Alfacalcidol and 11 (5.9%) prescribe Calcitriol as a vitamin D supplement, while 155 (82.4%) prescribe a maintenance dose. The prescription form preferred by doctors is tablets by 49 (26.1%), capsule by 29 (15.4%), oral injections by 68 (36.2%) and intra-muscular by 42 (22.3%). As a follow up tool, 84 (42.6%) clinicians order serum 25 (OH) D and serum calcium levels, 102 (54.3%) assess patients by improvement in clinical symptoms and 3 (1.9%) use both strategies for assessment. Nutritional advice was also given by most doctors.

Conclusion: There is no uniform approach for diagnosing and treating hypovitaminosis D among practicing doctors in Pakistan. A great variability and gap is seen in prescription options, dosing frequency and duration. This highlights the importance of need for a national guideline regarding prophylaxis, diagnosis and treatment of vitamin D deficiency.

Key words: Vitamin D, dosing regimen, hypovitaminosis D.

Introduction

Hypovitaminosis D, not merely a disease of elderly or post-menopausal, it almost equally affects every age group.^{1,2} Over one million people

in the world are affected by insufficient or reduced levels of vitamin D. Once it was thought that vitamin D deficiency was a rarity in South Asia.³ However, now the affected population in South Asian countries contributes the most.⁴ Studies from different countries showed an evidence of high prevalence of vitamin D deficiency in Asian population.⁵

Improving the vitamin D status must be the priority of health care provider because of skeletal and non-skeletal role as a vitamin and a hormone.⁶ It has anti-proliferative, pro-differentiation and immunosuppressive effects.⁷ Pakistani population is also very deficient in vitamin D. It is reported that up to 91.50% of some population were found to have hypovitaminosis D in Karachi.⁸ Some other reports also show vitamin D deficiency from various regions of Pakistan. Studies from India report 80–85%

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AJ conceptualized the project. MH, MSK, MR & TT did the data collection. MH & MSK also did the literature search and statistical analysis. Drafting, revision, writing of manuscript was done by SHW & MH.

prevalence of vitamin D deficiency in local population.⁹

Because of high prevalence of vitamin D deficiency among Pakistani population, it is important for treating doctors to understand vitamin D physiology and recognize, treat and prevent vitamin D deficiency.¹⁰ In order to improve our public health issues like vitamin D deficiency, there is strong need to highlight the awareness and practices of our doctors, as improving of their knowledge will lead to positive public health outcome. Our health system lacks a general guideline on population strategies for hypovitaminosis D, and also there is lack of uniformity and clarity even in international guidelines.¹ Thus, a study employed to assess knowledge, attitude and practices of physicians for managing vitamin D in our local setup making health care providers to think on the importance of laying down National Practical guidelines for vitamin D deficiency management.

Subjects and Methods

A self-made questionnaire was employed for a nation-wide cross-sectional descriptive survey to assess the management of vitamin D deficiency by clinicians. Convenient sampling technique was used. Different practicing doctors including general practitioners, consultant physicians, orthopedic surgeons, gynecologists, endocrinologist, surgeons, medical officers, pediatricians, pulmonologist, nephrologists and rheumatologist were contacted and informed consent was taken for inclusion in the study. Federal Medical and Dental college, as being the federal institute gives opportunity to all the provincial students from all over the Pakistan on quota basis. Students were asked to get the questionnaires filled from their native practicing doctors. Questionnaires were handed over directly to the practitioners to be filled and returned after a day or two. Questionnaires were filled by the respondents with their signature at the end as an implied consent. At the end of the data collection, questionnaires were checked for completeness. Anonymous data was analyzed using IBM SPSS (version 20). Descriptive statistical tests were conducted. Ethical approval for the study was provided by Hospital Ethics Committee of Pakistan Institute of Medical Sciences (PIMS), Islamabad.

Results

A total of 389 doctors were approached and amongst them, only 188 practicing doctors from 21 different cities of Pakistan responded and

participated in the study, with response rate of 48.23%.

Table-1 classifies respondents according to their specialties. Clinicians were from 21 major cities of Pakistan as shown in Table-2.

Table 1: Specialties of respondents.

Specialty	Frequency	%	Cumulative %
General Physician	97	51.6	51.6
Consultant Physician	22	11.7	63.3
Ortho specialist	11	5.9	69.1
Gynecologist	29	15.4	84.6
Endocrinologist	1	0.5	85.1
Surgeon	5	2.7	87.8
Medical Officer	9	4.8	92.6
Pediatrician	11	5.9	98.4
Pulmonologist	1	0.5	98.9
Nephrologist	1	0.5	99.5
Rheumatologist	1	0.5	100.0
Total	188	100.0	

Table 2: Geographical representation of respondents.

Cities	Frequency	%	Cumulative %
Islamabad	64	34.0	34.0
Karachi	43	22.9	56.9
Lahore	12	6.4	63.3
Faisalabad	4	2.1	65.4
Rawalpindi	18	9.6	75.0
Multan	1	0.5	75.5
Peshawar	13	6.9	82.4
Quetta	2	1.1	83.5
Zhob	1	0.5	84.0
Hyderabad	6	3.2	87.2
Mardan	2	1.1	88.3
Gujranwala	2	1.1	89.4
Jhelum	3	1.6	91.0
Matli	4	2.1	93.1
Murree	2	1.1	94.1
Layyah	1	0.5	94.7
Nowshehra	4	2.1	96.8
Gujarat	2	1.1	97.9
Haripur	2	1.1	98.9
Wah cantt	1	0.5	99.5
Hangu	1	0.5	100.0
Total	188	100.0	

Doctors serving in government public hospitals were 136 (72.3%) and those in private hospitals were 45 (23.9%) and 81 (43.1%) out of 188 have their own private set-ups as well.

Normal range of vitamin D was considered as 10-30 ng/dl by 32 (17%), 20-50ng/dl by 66 (35.1%), 30-100 ng/dl by 60 (31.9%) and 40-100 ng/dl by 30 (16%) of the doctors.

A total of 18 clinicians (9.6%) order investigation for vitamin D levels in every patient and 161 (85.6%) order vitamin D levels in patients showing signs and symptoms. However, 9 (4.8%) do not order vitamin D levels.

Vitamin D deficiency is empirically treated by 101 (53.7%) i.e. on the basis of clinical features only like, musculoskeletal aches, frequent fractures, bony tenderness etc, while rest of the respondents do not treat it empirically.

Cholecalciferol is prescribed by 158 (84%), Alfacalcidol by 19 (10.1%) and Calcitriol by 11 (5.9%) clinicians as a vitamin D supplement.

Safety, patient preference and pharmaco-economics are some of the principles governing the route of choice for drug administration.

Figure shows the dosage options and frequency preferred by clinicians.

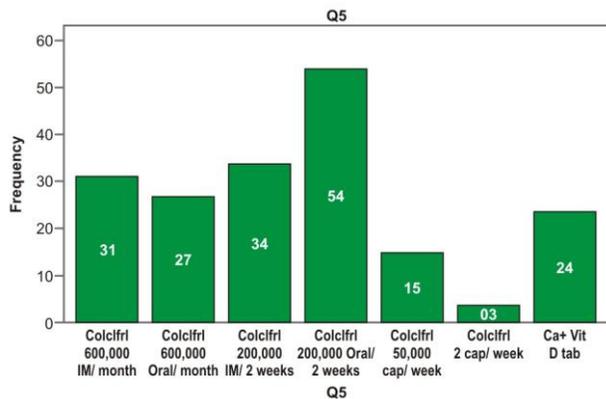


Figure: Dosage form and dosing frequency.

The duration of treatment practiced by 25 (13.3%) clinicians is one month, two months by 33 (17.6%), three months by 66 (35.1%) and six months by 64 (34%) clinicians.

Maintenance dose is prescribed by 155 (82.4%) clinicians, while 33 (17.6%) do not prescribe a maintenance dose of vitamin D supplements.

The duration of maintenance dose prescribed by 96 (51.1%) respondents is six months, 32 (17%) prescribe maintenance dose for one year, 24 (12.8%) for indefinite duration and about 36 (19.1%) don't prescribe maintenance dose of vitamin D.

The route preferred by doctors for maintenance dose is oral injections by 68 (36.2%), tablets by 49 (26.1%), capsule by 29 (15.4%), and intra-muscular by 42 (22.3%).

Monitoring of dose is done via blood tests by 80 (42.6%) clinicians, however, 102 (54.3%) monitor the dose by improvements in clinical symptoms and 6 (3.2%) use both strategies for assessment.

Discussion

Vitamin D deficiency is fairly prevalent in Pakistani population,¹¹ but unfortunately neither is

properly investigated in patients at risk nor treated as per recommendations of recognized guidelines.¹¹⁻¹³ Present study observed that 32 (17%) respondents considered normal range of vitamin D as 10-30 ng/dl and 66 (35.1%) of them as 20-50 ng/dl. In contrast, a study conducted in Europe, declared <20 ng/dl as deficient, 20-30 ng/dl as suboptimal and 30-50 ng/dl as adequate level of circulating metabolite of vitamin D.⁶ Khan QJ et al also reported levels less than 20 ng/dl as indicative of vitamin D deficiency.¹⁰ Older classifications declared levels less than 12 ng/dl as deficiency because symptoms were uncommon when levels were higher than this.¹⁴ Knowledge of our practitioners about normal level of vitamin D varies widely. Around 60% consider levels 20 to 100 ng/dl as normal that reflected the lack of awareness of recent international accepted vitamin D levels.^{15,16}

Studies conducted at different settings have considered different cut off points for defining vitamin D deficiency, however, all available evidence suggest individuals should maintain a serum vitamin D levels of >20ng/dl to prevent rickets and osteoporosis.¹⁷

Literature review of most local studies suggest serum 25(OH) D levels <20ng/dl as deficient, 20-30ng/dl as insufficient and > 30ng/dl as normal levels in Pakistani population.¹¹

Because the clinical presentation is insidious or nonspecific, vitamin D deficiency often goes unrecognized and untreated.¹⁸ Hence more than half of the clinicians in our study treat it empirically, while rests follow some treatment guidelines.¹⁹

Major source of vitamin D is unprotected sun exposure.¹⁷

Even in the most sunniest areas of the world like Middle East, 30-50% of the children and adults proved to have <20ng/ml of serum vitamin D levels. About 73% of their women and 80% of the infants are vitamin D deficient. Probably due to avoidance of sun exposure, the dietary habits, dark skin, lack of fortified food usage.²⁰

South Asians share a huge burden of Hypovitaminosis D. Where, 80% of the apparently healthy population is deficient having <20ng/ml of serum vitamin D levels.²¹

Being close to equator and having relatively greater amount of melanin excessive sun exposure is associated with increased risk for melanoma and other skin concerns. Therefore, in our case too, supplementation is highly recommended.¹⁷

In our study, 84% clinicians prescribe Cholecalciferol that is consistent with the treatment recommendation of other studies.¹³

Although optimal levels of vitamin D can be achieved equally with daily weekly or monthly dosing frequencies but infrequent dosing is more preferred for convenience point of view.^{22,23} Likewise, our respondents prescribe daily (12.8%), weekly (9.6%), bimonthly (46.8%) and monthly (30.9%) being infrequent dosing the more preferred approach of our clinicians.

Canadian guidelines recommend oral intake of 50,000 IU of vitamin D2 or D3 weekly for eight weeks or 600 IU daily for two months followed by a maintenance dose of 1500-2000 IU/day.¹⁷

Keeping 600 IU as a must minimum prescribed dose of vitamin D3,^{17,24} given either on daily, weekly or monthly basis, daily dosing being more effective in raising serum 25 (OH) D levels²⁵ and weekly dosing being more preferred route of most of the patients,^{22,23} taken in either oral or injectable form, however, more compliance is seen with oral route form.²⁶ Depending upon the clinician's preference and patient's compliance any option can be considered.

In vitamin D deficiency, oral vitamin D3 is the drug of choice. After one month of starting vitamin D or following a loading dose regimen, serum calcium levels are recommended. However, routine testing is not recommended.²⁷

The effects of prescribing vitamin D2 and D3 are comparable, however, some studies have reported that vitamin D3 is more potent and have very less toxic effects as compared to vitamin D2.^{28,29}

Our 42.6% respondents monitor dose through serum calcium and vitamin D levels. International guidelines recommend monitoring of vitamin D doses via blood levels of calcium and vitamin D.³⁰

The cost-effective strategy of many clinical experts is to prefer vitamin D supplementation without routine testing on the basis of symptoms.³¹

To conclude, a uniform approach for diagnosing and treating hypovitaminosis D is not found among practicing doctors. A great variability is seen in prescription options and dosing frequency and dosing duration. There is lack of clarity regarding doses for cure of vitamin D deficiency. Especially, the normal range of vitamin D for Pakistani population is still a subject of debate and yet to be defined in our national guidelines. This highlights the importance of need of a national guideline for prophylaxis, diagnosis and treatment of hypovitaminosis D among Pakistani population. However, on the basis of local literature review we can safely consider serum 25 (OH) D levels of < 20ng/dl as deficient, 20-30ng/dl as insufficient and > 30ng/dl as normal range.

The dosage form and dosing frequency can be opted according to the clinician's preference and patient's compliance, however, minimum prescribed dose of vitamin D is 600 IU/day.

For further studies, data stratification with respect to different specialization is suggested that could help health department to lay down National guide lines.

Conflict of interest: None declared.

References

1. Al-Amri F, Ashry Gad A, Al-Habib D, Ibrahim AK. Knowledge, Attitude and Practice Regarding Vitamin D Among Primary Health Care Physicians in Riyadh City, Saudi Arabia, 2015. *World J Food Sci Technol* 2017; 1(2): 47-55.
2. Verrusio W, Andreozzi P, Summa ML, Marigliano V, Gueli N, Cacciafesta M. Hypovitaminosis D: Which oral supplement therapy? *J Nutr Health Aging* 2014; 18(4): 449-50.
3. Hodgkin P, Kay OM, Hine PM, Lumb QA, Stanbury SW. Vitamin D deficiency in Asian at home and in Britain. *Lancet* 1973; 2: 167-72.
4. Kiani IG, Shah F, Mansur SS. Frequency of severe vitamin-D deficiency in patients presenting to a tertiary care hospital in Islamabad. *J Pak Med Assoc* 2014; 46: 16-8.
5. Mahmood K, Akhtar ST, Talib A, Haider I. Vitamin-D status in a Population of Healthy Adults in Pakistan. *Pak J Med Sci* 2009; 25(4): 545-50.
6. Piudowski P, Karczarewicz E, Bayer M, Carter G, Chlebna-Sokół D, Czech-Kowalska J, et al. Practical guidelines for the supplementation of vitamin D and the treatment of deficits in Central Europe-recommended vitamin D intakes in the general population and groups at risk of vitamin D deficiency. *Endokrynologia Polska*. 2013; 64(4): 319-27.
7. Baig A, Anjum P, Khani MK, Islam N, Rahman A. Pattern of serum Vitamin D in OPD patients. *Pak J Surg* 2007; 23: 145-49.
8. Roomi MA, Farooq A, Ullah E, Lone KP. Hypovitaminosis D and its association with lifestyle factors. *Pak J Med Sci* 2015; 31(5):1236-40.
9. Arya V, Bhambri R, Godbole MM, Mithal A. Vitamin D status and its relationship with bone mineral density in healthy Asian Indians. *Osteoporos Int* 2004; 15(1): 56-61.
10. Khan QJ, Fabian CJ. How I Treat Vitamin D Deficiency. *J Oncol Pract* 2010; 6(2): 97-101.
11. Sheikh A, Saeed Z, Jafri SAD, Yazdani I, Hussain SA. Vitamin D Levels in Asymptomatic Adults-A Population Survey in Karachi, Pakistan. *Burdmann EA, ed. PLoS ONE*. 2012; 7(3): e33452.
12. Khushdil A, Ullah S, Ali S, Khan I, Awan T. Hypovitaminosis D in healthy students of a medical college. *Khyber Med Univ J* 2015; 7(4): 162-4.
13. Javed R, Ghafoor F. A Review of Vitamin D in Pakistani Population. *Pak J Med Res* 2016; 55(2): 55-9.

14. Yetley EA. Assessing the vitamin D status of the US population. *Am J Clin Nutr* 2008; 88(2): 558S-64S.
15. Holick MF, Binkley NC, Bischoff-Ferrari HA, Gordon CM, Hanley DA, Heaney RP, et al. Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline. *The Journal of Clinical Endocrinology & Metabolism* 2011; 96(7): 1911-30.
16. Adami S, Romagnoli E, Carnevale V, Scillitani A, Giusti A, Rossini M, et al. Guidelines on prevention and treatment of vitamin D deficiency. *Reumatismo*. 2011; 63(3): 129-47.
17. Holick MF, Binkley NC, Bischoff-Ferrari HA, Gordon CM, Hanley DA, Heaney RP, et al. Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab* 2011; 96(7):1911-30.
18. Bordelon P, Ghetu MV, Langan RC. Recognition and management of vitamin D deficiency. *Am Fam Physician*. 2009; 80(8): 841-6.
19. Frandsen TB, Pareek M, Hansen JP, Nielsen CT. Vitamin D supplementation for treatment of seasonal affective symptoms in healthcare professionals: a double-blind randomised placebo-controlled trial. *BMC Res Notes*. 2014; 7(1): 528.
20. Naeem Z, AlMohaimeed A, Sharaf FK, Ismail H, Shaukat F, Inam SB. Vitamin D status among population of Qassim region, Saudi Arabia. *Int J Health Sci (Qassim)*. 2011; 5(2): 116-24.
21. Masood SH, Iqbal MP. Prevalence of vitamin D deficiency in South Asia. *Pak J Med Sci* 2008; 24(6): 891-7.
22. Pekkarinen T, Välimäki V, Aarum S, Turpeinen U, Hämäläinen E, Löyttyniemi E, et al. The same annual dose of 292000 IU of vitamin D 3 (cholecalciferol) on either daily or four monthly basis for elderly women: 1-year comparative study of the effects on serum 25(OH) D 3 concentrations and renal function. *Clin Endocrinol* 2010; 72(4): 455-61.
23. Ish-Shalom S, Segal E, Salganik T, Raz B, Bromberg IL, Vieth R. Comparison of daily, weekly, and monthly vitamin D3 in ethanol dosing protocols for two months in elderly hip fracture patients. *J Clin Endocrinol Metabol* 2008; 93(9): 3430-5.
24. Sheikh A, Saeed Z, Jafri SA, Yazdani I, Hussain SA. Vitamin D levels in asymptomatic adults-a population survey in Karachi, Pakistan. *PLoS one* 2012; 7(3): e33452.
25. Chel V, Wijnhoven HA, Smit JH, Ooms M, Lips PT. Efficacy of different doses and time intervals of oral vitamin D supplementation with or without calcium in elderly nursing home residents. *Osteoporos Int* 2008; 19(5): 663-71.
26. Billoo AG, Murtaza G, Memon MA, Khaskheli SA, Iqbal K, Rao MH. Comparison of oral versus injectable vitamin-D for the treatment of nutritional vitamin-D deficiency rickets. *J Coll Phys Surg Pak* 2009; 19(7): 428-31.
27. Aspray TJ, Bowring C, Fraser W, Gittoes N, Javaid MK, Macdonald H, et al. National osteoporosis society vitamin D guideline summary. *Age Ageing*. 2014; 43(5): 592-5.
28. Gupta A. Vitamin D deficiency in India: prevalence, causalities and interventions. *Nutrients* 2014; 6(2): 729-75.
29. Tripkovic L, Lambert H, Hart K, Smith CP, Bucca G, Penson S, et al. Comparison of vitamin D2 and vitamin D3 supplementation in raising serum 25-hydroxyvitamin D status: a systematic review and meta-analysis. *Am J Clin Nutr* 2012; 95(6): 1357-64.
30. Kennel KA, Drake MT, Hurley DL. Vitamin D Deficiency in Adults: When to Test and How to Treat. *Mayo Clinic Proceedings* 2010; 85(8): 752-8.
31. Kopes-Kerr C. Should family physicians screen for vitamin D deficiency? No Screening is unnecessary and routine supplementation makes more sense. *Am Fam Physician* 2013; 87(8): 541B-541C.