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Critical Analysis of Vitamin D3 Deficiency and Concept of Nourishment and Transformation of Bodily Tissues (Dhatus) in Ayurved

Padmanabhan Priya¹, Nangare Ninad², Muke Abhinandan^{3*}

¹Ph.D. Scholar, Department of Roga Nidan and Vikruti Vijnan, Bharati Vidyapeeth [Deemed to be University] College of Ayurved, Pune 411043.

²Associate Professor, Department of Dravyaguna, Bharati Vidyapeeth (Deemed to be University) College of Ayurved, Pune

^{3*}Professor, Medical Superintendent, Bharati Vidyapeeth, Bharati Hospital, Kohlapur.

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ABSTRACT:

Vitamin deficiency is the lack of essential vitamins in our body and turns out to be a matter of major concern when it continues for the long term causing various abnormal signs and symptoms. Vitamin D is a group of fat-soluble prohormones known as sunshine vitamin. The two major biologically inert precursors of vitamin D are vitamin D3 (cholecalciferol) and vitamin D2 (ergocalciferol). Vitamin D plays an important role in maintaining an adequate level of serum calcium and phosphorus. Vitamin D has a great effect on forming and maintaining strong bones. Vitamin D deficiency occurs when people do not have an appropriate dietary intake or exposure to UVB rays. Ayurveda emphasizes prevention and encourages health maintenance through close attention to balance in one's life, right thinking, diet, lifestyle, and the use of medicines. Knowledge of Ayurveda enables one to understand how to balance body, mind, and consciousness to lead a healthy life. In the present era food habits, life lifestyle of humans has changed a lot. Even there is a drastic change in environment and climate. Hence, newly formed diseases not explained in the Ayurveda Samhita are emerging. Here an attempt was made to understand the Vitamin D3 deficiency with the basic principles of Ayurveda. This study would help a further researcher in establishing the principles and treatment for this condition. Current medical science can discover only a few facts about the mechanism of vitamin D3 Deficiency but fails to understand its complete etiology. With the above facts in mind, can a scientifically designed, well-planned study gives some answers to this ever-increasing health hazard, this was the motto of working on this problem.

Keywords: Vitamin, Dhatu Poshana, Dhatu Parinama, Asthi Dhatu, Skin

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1. Introduction

Vitamin D is a fat-soluble compound that can be obtained from two sources primarily sunlight exposure and diet. The majority of the Vitamin D in the body is generated as a result of sun exposure on the skin. It imparts both endocrine and autocrine functions. The primary endocrine function of Vitamin D is to sustain calcium and phosphorus homeostasis, which is accomplished via modulating intestinal/kidney calcium absorption and bone resorption. Vitamin D insufficiency is a worldwide problem that affects people of all ages and health situations¹. The incidence of Vitamin D insufficiency is becoming well-documented as testing processes become more automated and standardized. Vitamin D insufficiency has been established as a risk factor for many serious diseases, including bone and muscle disorders, inflammatory disease, and some kinds of cancer². Vitamin D insufficiency has also been related to metabolic syndrome risk factors and the underlying causes of cardiovascular disease and diabetes, such as high blood pressure, high triglycerides, low HDL cholesterol, and high fasting blood sugar³. It has been observed that the cases of Vitamin D3 Deficiency are increasing daily in human society. This deficiency affects the healthy standard of living of humans both mentally and physically. Ayurved is a living science and this problem can be rectified with the help of the principles of Ayurved.

The objective of this comparative, cross-sectional observational study of 200 patients with Vitamin D3 Deficiency was undertaken to evaluate the impact of Vitamin D3 status on the health and vitality of Dhatus in Ayurvedic terms. To explore the correlation between Vitamin D3 levels and Ayurvedic indicators of tissue nourishment and transformation and to understand the etiopathogenesis of Vitamin D3 deficiency from an Ayurvedic perspective.

2. Methodology

Study Design: this observational clinical study utilizes a cross-section design to assess the etiopathogenesis of Vitamin D3 deficiency from an Ayurvedic perspective in the study population.

Participants: The study included patients of all age groups and sexes with Vitamin D3 deficiency from outpatient clinics of Bharati Ayurved Hospital, Dhankawadi, Pune, India.

Data Collection and Analysis: Patient data recorded in case record form (CRF) and pre-diagnosed Vitamin D3 deficiency patients were included in the study. Serum Vitamin D3 levels are measured using standardized assays. Assessment of patients was done through understanding Nidanapanchaka, based on Dosha Dhatu Kshaya Vriddhi, Prokapa lakshan, Sroto dusti karana, and lakshana⁴ and reviewing clinical features of Vitamin D3 deficiency. All lab investigations including serological investigation (25-hydroxy vitamin D test) of patients were studied.

The study was approved by the Institutional Ethical Committee of Bharati Vidyapeeth (deemed to be university) College of Ayurved, Pune, India. The written consent was obtained from each patient before data collection.

a) Inclusion Criteria

- 1) Patients having Serum Vitamin D3 levels less than 12.3 ng/ml.
- 2) Asymptomatic and symptomatic patients with low Vitamin D3 levels will be selected.
- 3) Patients will be selected irrespective of age and sex.

b) Exclusion Criteria

- 1) Patients of chronic disease with fatal signs
- 2) Patients with neoplastic and other systematic disorders with fatal sign

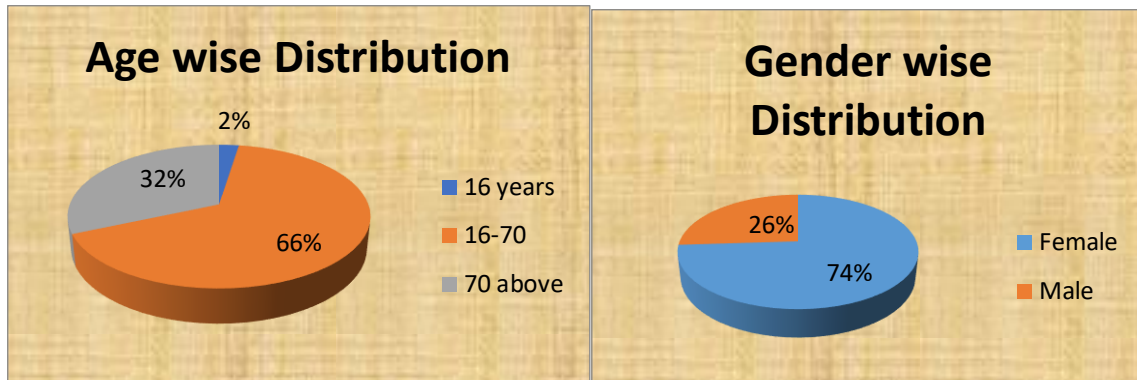
c) Assessment Criteria

The assessment was done with the help of clinical features of Vitamin D3 deficiency and serological investigation (25-hydroxy vitamin D test). And ayurvedic parameters i.e. Nidanapanchaka, Dosha, Dhatu Kshaya Vriddhi, Prokapa lakshan, Sroto dusti⁵ were assessed in Case proforma

3. Observations and Results

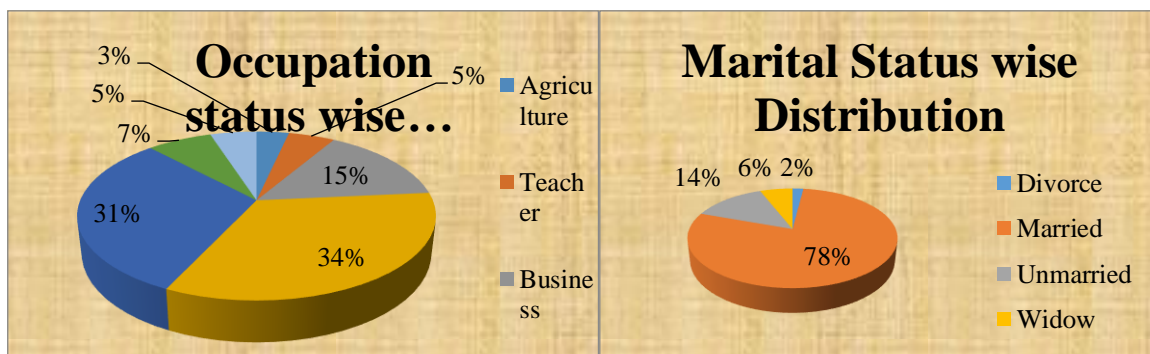
Age-wise distribution: Among 200 patients included in the study, 66% of patients belong to the 16-70 years age group.

Gender Wise Distribution: 74% were females and 26% were males.



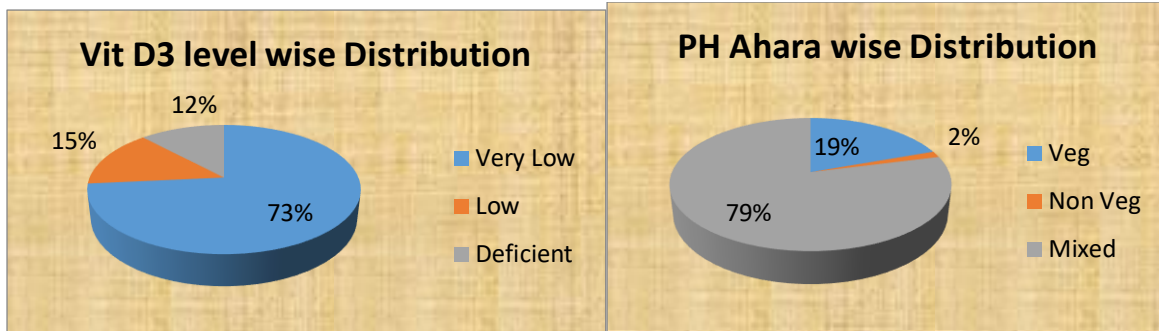
Occupation-wise distribution: A maximum no of Patients were Housewives in this study.

Marital Status-wise Distribution: In this study, 2% were divorced, 78% were married, 14% were Unmarried, and 6% were Widows.



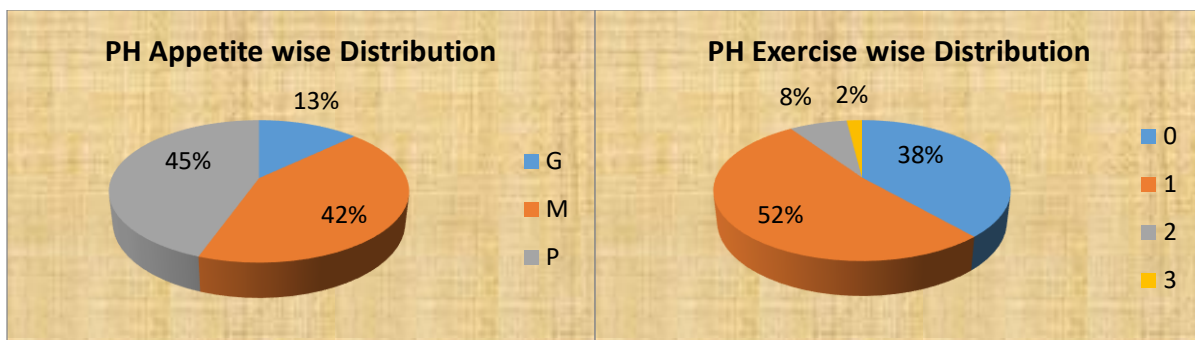
Vitamin D3 level-wise distribution: Among 200 patients' low vitamin D3 was found in 15% of pts, very low was found in 73% of pts, and deficiency was found in 12 % of patients. When the level ranging from 0.1ng/ml to 4.1ng/ml was considered very low, 4.2ng/ml to 8.2ng/ml was considered as low, and 8.3 to 12.02ng/ml was considered a deficient level of vitamin D3 value.

Ahara-wise distribution: 79% of pts preferred a mixed diet, 19% were vegetarians and 2% were non-vegetarians.



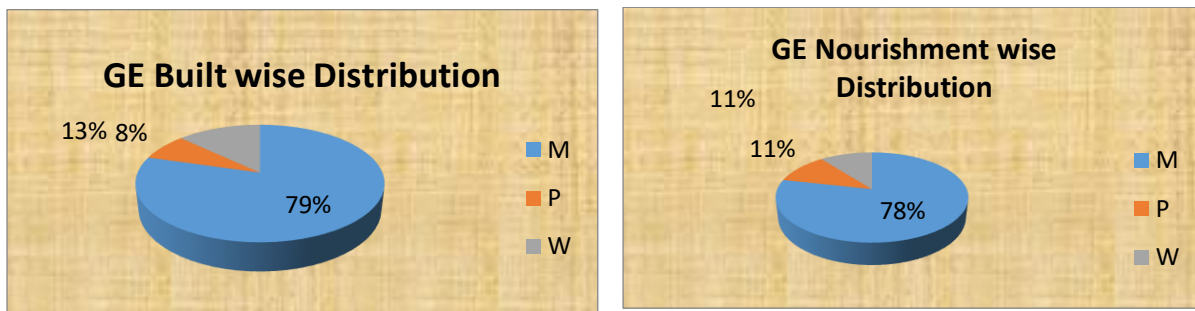
Appetite-wise distribution: In the present study, good appetite was found in 13% of patients, Moderate Appetite in 42%, and Poor Appetite in 45% of patients.

Exercise-wise distribution: In this study maximum no of pts i.e. 52% of pts were doing very minimum exercise in their daily life and was not regular.



Built-wise distribution: The majority of patients had moderate build.

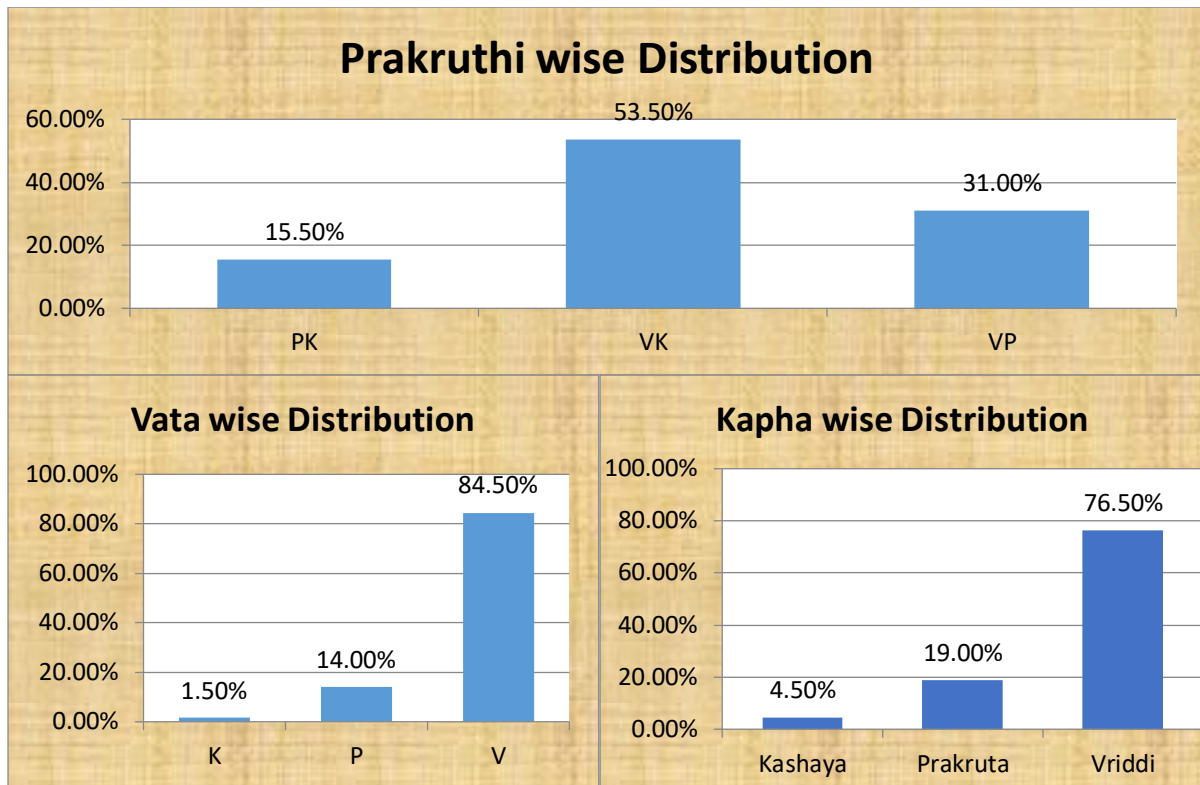
Nourishment-wise distribution: The majority of patients had moderate nourishment.



Prakruti-wise distribution: In this study, Vata kaphaj prakruti was found in a maximum no of patients.

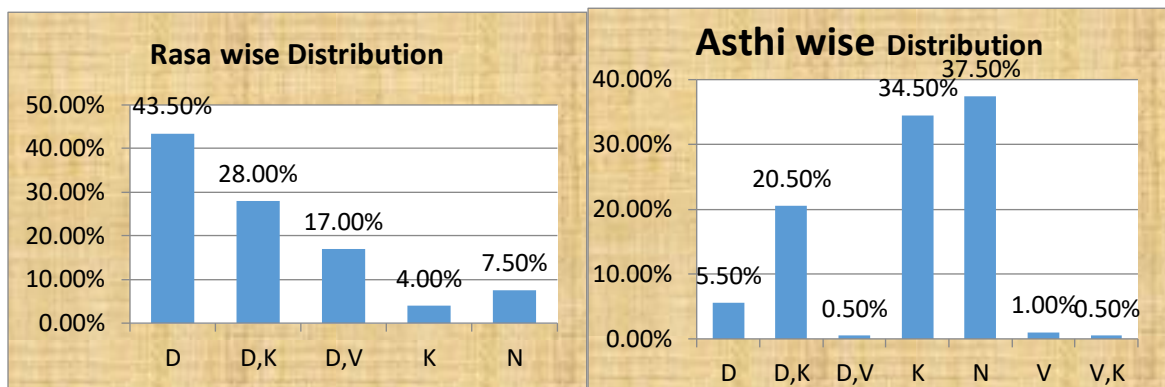
Vata-wise distribution: Among 200 patients we found Vata Kshaya in 1.50% of patients, Prakruta vata in 14%, and Vata vriddhi in 84.50%.

Kapha-wise distribution: Kapha Dosha Kshaya was found in 4.50%, and Kapha dosha Vriddi was found in 76.50% of patients.



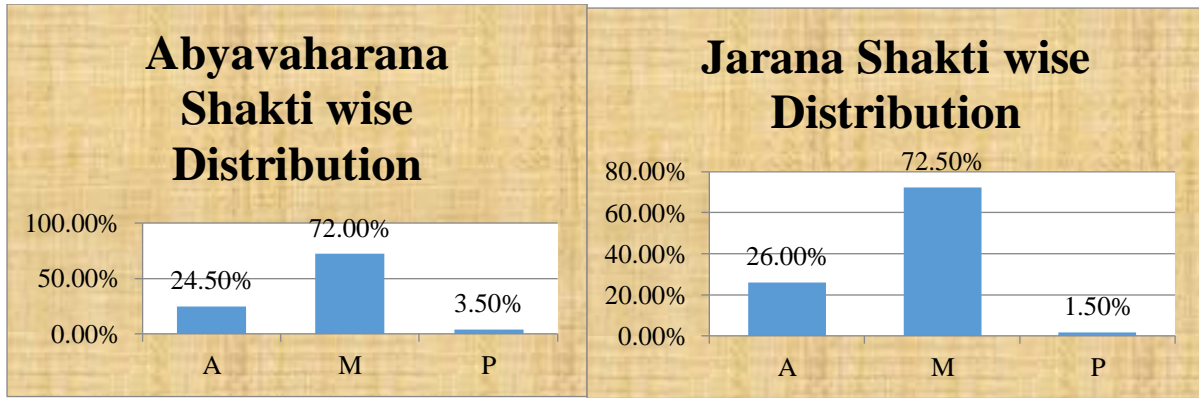
Rasa-wise distribution: In this study, Rasa Dhatu Dusti was found in a maximum no of patients.

Asthi-wise distribution: Among 200 patients Asthi Kashaya found in 55% of pts.

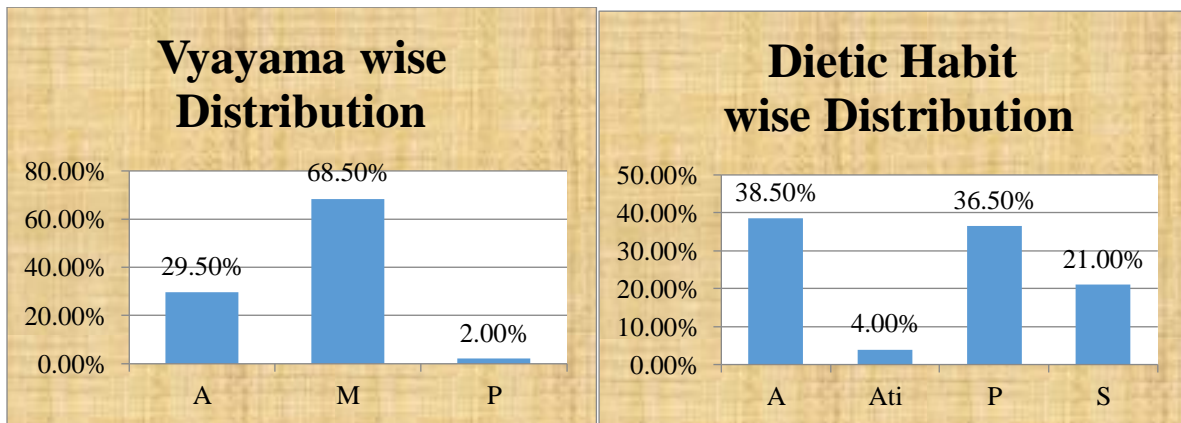


Abyavaharana Shakti-wise distribution: Madhyam Abyavaharana Shakti was found in the maximum number of patients.

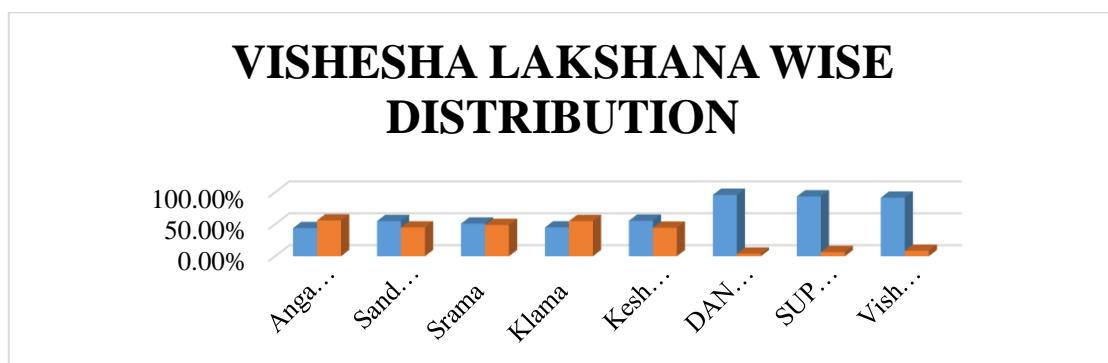
Jarana Shakti-wise distribution: Madhyam Jarana Shakti was found in the maximum number of patients.



Vyayama wise distribution: Madhyam Vyayama Shakti found in maximum no of patients.
Dietic habit wise distribution: Considering dietic habits Pramitashana was found in 36.50% of patients.



Vishesha Lakshana wise distribution: Among 200 patients, Angamarda lakshan was found in 112 pts, Sandhisputana in 90, Sarama in 98, Klama was in 110, Keshashdana was in 89, Dantashdana was in 8, Supatata were in 13 and Vishada were in 17.



4. Discussion

Age: Among 200 patients included in the study, patients aged 16-70 years were 66% and 70 above were 32%. This might be due to busy schedules and a modern lifestyle they may not be exposed to sunlight and may skip nutritional diet. So no proper dhatu poshana will be there and may be the reason for vitamin D3 deficiency.

Gender: In this study 74% were females. Females are mostly housewives and they spend most of their time in the kitchen preparing food for others and working for other members of a family; forget to spend time for maintaining their health by eating healthy food, exercising, exposure to sunlight, and rest. This may be the reason why females are more prone to Vitamin D3 deficiency.

Occupation: In the present study 33% were Housewives. While considering all these categories housewives are busy with their household work, teachers and students are now a day around the clock busy with academics retired people spend most time inside the home and old age may be a reason for Dhatu Kshaya. Professionals are in an era of busy lifestyles and fast food, night outs which causes Vishamagni. Improper Dhatu poshana and parinama can be considered a cause of Vitamin D3 deficiency.

Appetite: In the present study 42% of patients had moderate appetite. From this, it is clear that most of the patients had deranged appetites due to vishamagni or mandagni leading to improper saara kitta vibhajana of aahara.

Excercise: Majority of patients i.e., 52% of pts do very less exercise in their daily life. While doing the Vyayama Shakti Pareeksha it is found that 68.50% of patients had Madyama Vyayama Shakti and 29.50% of patients had Avara Vyayama Shakti. Vyayama helps to stimulate both jataragni and dhatvagni. It also maintain the balance between Tridosha. Here as the patients does very less exercise all the benefits of vyayama is not achieved.

Hobby: Majority of patients i.e. 29.50%, spend their time watching TV which makes the person sit ideal for long time and exposure to sunlight will be less. All these vitiate the Agni resulting in improper metabolism.

Ahara Matra: In present study 38.50% of patients had alpashana, 36.50% of patients has pramitashana 21% of patients had samashana and 4% had ati ashana. Intake of Amatravata ahara result in Saara Vidhamana¹² and is the cause of many vata vikaras. Here also Alpashana may be a reason for Asthi Dhatu kshaya.

Vegadharana: Majority of patients ie, 71.00% do vegadharana. Suppression of natural urges causes vitiation of vata dosha resulting in various disease from vata and ksheena dhatu. Continuous vegadharana causes vata prakopa resulting in vishamagni produces derangement in dhatu poshana and dhatu parinama.

Vishamashana: In the present study 74.50% of patients do Vishamashana. Vishamashana means taking food irregularly or taking food without following a particular time ie, Aprapta kala bukta and atita kala bhukta. Taking food before the digestion of previously consumed food is called Aprapta kala Bhukta and taking food long after the digestion of the previous meal is called Atita kala bhukta. Aprapta kala bhojana hampers agni and produces ama dosha. Atita kala bhojana due to suppression of hunger causes vata prakopa. Vitiating vata causes agnimandya and further leads to various diseases. In the present era due to a busy lifestyle, people do not get enough time to take food and maintain its quality and quantity. Thus vishamashana has become a very common trend these days. Ayurveda Samhita says that Vishamashana aggravates all tri dosha and also vitiates agni.

Prakruti: 53.50% of patients had Vata kapaha prakruti. An Inherent type of character of the human body is called Prakruti and it is considered as Swavabha which is the mental and

physical constituent that is formed by the Shukra Shonita Samyoga. It also means that the Dosha that is dominant at the time of formation of the zygote decides the Prakruti of the human. So this Prakruti gives the Shareera a particular character or Guna and there are more chances of having Vikruti of the same Dosha as of Prakruti if Prakopaka Ahara Vihara also has similar Gunas. Here vata kapha prakruti is more prone for vataja and kaphaja vikaras.

Vata Dosha: The majority of patients i.e., 84.50 % of patients had vata dosha prakopa. Due to vataprakopa ahara vihara vitiated vata does the depletion of Dhatus. Here the Asthi dhatu kshaya is manifested. Also due to vitiated vata there will be vishamagni in an individual which hinders the proper digestion of food and sara kitta vibhajana resulting in improper Dhatu poshana and parinam.

Kapha Dosha: Majority of patients ie, 76.50% of patients show kapha vridhi lakshana. Kapha prakopa results in agnimandya which is considered as the root cause of derangement in Dhatu Poshana and Parinama which is seen in vitamin D3 deficiency.

Rasa Dhatu: In this study, 92.50% of patients had Rasa dhatu dusti. This will be due to Agnimandya resulting in improper Sara kitta vibhajana. Srama is a major clinical presentation in patients with vitamin D3 deficiency.

Asthi Dhatu: The majority of patients i.e. 55.5% of patients had Asthi Dhatu kshaya lakshana and 7% of patients had Asthi Dhatu Dusti Lakshana. Here it is clear that patients with vitamin D3 deficiency show symptoms like Asthi toda, Angamarda, keshashadana, dandhashadana, srama, sandhishaidilya. Asthi Kshaya can be considered as 'Swapramana hani'¹³ and as 'Swaganakriyanasat'.

Abhyavahara Shakti and Jarana Shakti: In this study 72% of patients had madyama Abhyavaharana Shakti and 24.50% of patients had Avara Abhyavaharana Shakti. 72.50% of patients had Madyama Jarana Shakti and 26% patients had Avara Jarana Shakti. Ahara Shakti pareeksha is divided into two stages one is Abhyavaharana Shakti which means the measure of quantity of food one would comfortably consume and the second is the Jarana Shakti which measures one capacity to digest the consumed food. Here Madyama, Avara Abhyavaharana Shakti and Jarana Shakti in most patients indicate the decrease in digestive power in patients with vitamin D3 deficiency.

Vishesha lakshana

Angamarda is seen as Vishesha lakshana due to vitiation of Agni there occurs Rasa Dhatu dusti resulting in symptoms like angamarda which is a Rasapradoshaja Vikara. In Vitamin D3 deficiency patient present with muscle pain in muscles at multiple location.

Keshashadana: Kesha is the mala of Asthi dhatu. So due to Asthi kshaya there occurs the Kshaya of Kesha which is also considered as a Asthi Pradoshaja Vikara. Hair loss is a major problem faced by patients with vitamin D3 deficiency which puts patients in mental strain.

Sandhisputana: Most of the patients' complaints of Sandhisputana in Vitamin D3 deficiency which is seen as medokshaya lakshana where the snehana karma by the medo dhatu is affected this can be considered as the reduction in the serous fluid present in the joints for lubrication.

Klama and Srama: It is a condition of exhaustion experienced by the patient without exertion. Srama is a condition of feeling tired after doing some work. Both occur due to improper

preenana occur in patients because of Rasa Dhatu dusti. Srama is also seen in Asthi kshaya where the deha dharana is affected.

From the above study, the samprapti ghataka of Vitamin D3 deficiency is understood in the light of Ayurveda as

Samprapti Ghataka ⁶

- Dosha : Vata Kapha
- Dhatu: Rasa, Medas.Asthi, Majja.
- Srotas: Rasavaha, Medovaha, Asthivaha,Majjavaha
- Sroto dusti prakara:Sanga
- Agni: Jatharagni, Rasa, Meda, Asthi, Majja Dhatwagni.
- Aama: Jatharagnijanya Aama, Rasa, Meda .Asthi, Majja Dhatwagnijanya Aama
- Udbhava Sthana: Aamashaya
- Sanchara Sthana: Sarva sareera
- Vyakta Sthana: Sarva sareera
- Roga Marga: Bhahya and Madyama Roga Marga
- Vitamin D3 Deficiency is a Linga Sankara Vyadhi

5. Conclusion

Etiopathogenesis of Vitamin D3 deficiency observed was as follows in this study. Hetu Sevana by the patients leads to Kapha, Vata Dosha Prakopa. Then due to Jatharagni Bhutagni, Dhatuagnimandya Ahara Parinama is affected. From The Ekakala Dhatu Poshana Nyaya, the parthivamsha from Ahara Rasa does not undergo proper paka due to Bhutagni and Asthi Dhatu agni Mandya. Rasavaha, Medovaha, Asthivaha and Majjavaha Srotas Dusti was seen. Rasa, Meda, Asthi Majja Dhatu Dushti takes place. This Dhatu Agni should be understood as Vitamin D3. Thus we can conclude that improper Dhatu Poshana and Dhatu Parinama are responsible for Vitamin D3 deficiency.

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