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DEHA PRAKṚTI (BODY CONSTITUTION) IN THE PREVENTION AND MANAGEMENT OF CHRONIC KIDNEY DISEASE AND ASSESSMENT OF *DEHA PRAKṚTI* IN PATIENTS WITH CHRONIC KIDNEY DISEASE – WESTERN PROVINCE, SRI LANKA

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ABSTRACT

Introduction: With the current scenario, it is observed that a comprehensive approach to CKD is required to overcome the challenges rather than seeking individual solutions from various medical systems. According to Ayurveda, *Deha prakṛti* is a multifaceted concept with a wide variety of therapeutic applications that can be successfully employed for the integrated prevention and management of CKD. However, no scientifically proven evidence exists that the concept has been implemented clinically in CKD patients. **Aims and Objectives:** The study has been focused to discuss the concept of *Deha prakṛti* in the prevention and management of CKD and to assess the prevalence and distribution pattern of *Deha prakṛti* among patients with CKD in the Western province of Sri Lanka. **Materials and Methods:** This was a retrospective cross-sectional observational study that included 134 CKD patients selected based on Kidney Disease Outcomes Quality Initiative (KDOQI) criteria currently used in the Western medical sector. **Results and Discussion:** Although the prevalence of *Vāta* (33.6 percent), *Pitta* (35.1 percent), and *Kapha* (30.6 percent) *pradhāna prakṛti* types was shown to be nearly equivalent among CKD patients, *Pitta* and *Vāta pradhāna prakṛti* types are most largely associated with CKD. **Conclusion:** The concept of *Deha prakṛti* can be successfully applied for the prevention and management of CKD in the filed of early detection, prediction of disease susceptibility, clinical decisions meking regarding the disease etc,. As the disease advances, the proportion of CKD patients with *Pitta* and *Vāta pradhāna prakṛti* types steadily increases, with the majority of *Vāta pradhāna prakṛti* type patients representing the later stages, i.e., CKD stages 4 and 5, whereas the majority of patients with *Pitta pradhāna prakṛti* type representing CKD stages 2 and 3. The patients with *Kapha pradhāna prakṛti* types and *Sama Doṣaja prakṛti* type appeared to have stage 1 CKD.

Key words: CKD - stages, *Deha prakṛti* – types, Prevalence, Prevention, Management

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1. INTRODUCTION

CKD is defined as structural or functional abnormalities of kidneys, present for more than three months, with implications for health. The structural damage of the kidneys is determined by the presence of one or more markers of kidney damage such as albuminuria, urine sediment abnormalities, electrolyte and other abnormalities, detected by histology and structural abnormalities detected by imaging, etc., whereas decreased Glomerular Filtration Rate (GFR) that is lower than 60 ml/min/1.73 m^2 for three months or more determines the functional damage of the kidney[1]. CKD is graded from stages 1 to 5 based on the severity of each stage and the stage which requires dialysis or transplantation is known as End-Stage Renal Disease (ESRD)[2]. At present, CKD is a global health crisis associated with significant morbidity and mortality due to its influence on cardiovascular risk and End-Stage Kidney Disease (ESKD)[3]. The Global Burden Disease Study (2010) has revealed that CKD deaths have risen by 82.3% in the last two decades[4]. Findings from the Global Burden Disease Study in 2015 confirmed that kidney diseases are the 12th most common cause of death and it is approximately 1.1 million deaths worldwide[5].

As per the available data in population-based studies conducted in Sri Lanka, the prevalence of CKD is higher in the Northern districts than in the Central districts and the distribution ranges from 9.7% in Monaragala to 18.9% in Anuradhapura[6]. The Western province has the highest proportion of CKD patients (68.5%)[7] and the increase in CKD prevalence in Sri Lanka is mainly due to the rise in type 2 diabetes and hypertension[8-9].

Increasing incidence and prevalence rates have indicated that it is difficult for a single medical system to successfully meet the goals of preventing and managing CKD; thus, it is time to adapt to an integrated approach with innovative strategies to address the situation. Promoting prediction of disease susceptibility, early detection and taking precautions to prevent developing the disease as well as disease progression towards ESRD would be the most effective long-term strategies to combat CKD. The concept of *Deha prakṛti* mentioned in Ayurveda can be considered as one of the most suited approaches to the aforesaid long-term integrated strategies. However, though the concept has multidimentional aspects in predicting disease susceptibility, early detection, epidemiology, clinical decision-making and prognosis, the clinical importance of *Deha prakṛti* in the

prevention and management of CKD has not been previously discussed in the literature and no studies on the prevalence of *Deha prakṛti* among CKD patients in the Sri Lankan community have been found. Therefore, this study was conducted to discuss the relevance of *Deha prakṛti* concept in the prevention and management of CKD and prevalence of *Deha prakṛti* among CKD patients in the Western province, Sri Lanka.

Prakṛti is one of the concepts mentioned in Ayurveda under "*Dashavidha āthura pareekshā*" (ten-fold examination methods of a patient)[10], consisting of high clinical values with extensive theoretical knowledge. *Prakṛti* refers to *"Swabhāva"* [11]; the psychosomatic constitution of an individual which remains invariant throughout the lifespan[12]. Among the two types of *prakṛti* i.e, *Mānasika* (psychic constitution) and *Śāririka* or *Deha prakṛti* (body constitution), Ayurveda principally reflex to *Prakṛti* of a human as *Deha prakṛti*. *Deha prakṛti* is classified into 7 types (i.e 03 types of *Eka doṣaja,* 03 types of *Dvidoṣaja and* 01 type of *Tridoṣaja/ Sama Doṣaja prakṛti*) based on the dominance of any single or a combination of two or three *Doṣās* called *Vāta, Pitta* and *Kapha* at the time of conception[13].

2. Objectives

1. To discuss the concept of *Deha prakṛti* in the prevention and management of CKD.
2. To assess the prevalence and distribution of *Deha prakṛti* among patients with CKD in the Western province of Sri Lanka.

3. *Deha prakṛti* in the prevention and management of CKD

Prakṛti is one of the imperative concepts mentioned under "*Dašavidha āthura pareekshā*" (ten-fold examination methods) in authentic Ayurveda texts[10]. According to Ayurveda, "*Dašavidha āthura pareekshā*" is one of the patient examination techniques that must be performed without failure, as it gives essential information about the patient. This is referred to as *Rogi pareekshā* (examination of the patient) in Ayurveda which is one of the steps in the process of disease diagnosis and *Roga pareekshā* (disease examination) is the other[14]. A well-executed *Roga – Rogi pareekshā* reveals the paths to battling a disease successfully. However, there are two main categories of *Prakṛti*, *Deha prakṛti* (Body constitution) and *Mānasika prakṛti* (Psychic constitution) [15], Ayurveda principally reflex to *Prakṛti* of a human as *Deha prakṛti*. *Deha prakṛti* is also known as *Doṣaja prakṛti*, *Shāririka prakṛti* or body constitution[16]. *Prakriti* is an enumeration of body features, both internal and external[17] and it is the constitutional make-up of an individual. Each individual is unique and this uniqueness is called *Prakṛti*. *Prakṛti* of an

individual is determined according to *Doṣic* predominance (predominance of *Vāta*, *Pitta* and *Kapha doṣa*) at the time of conception. *Achārya Sušruta* has classified *Prakṛti* into seven categories based on the three doṣas; *Vāta*, *Pitta* and *Kapha* individually, two together, and the sum of all *doṣas*. Accordingly, there are 03 types of *Ekadoṣaja* (*Kewala Vāta*, *Kewala Pitta* and *Kewala Kapha*), 03 types of *Dvidoṣaja* (*Vāta Pitta*, *Pitta Kapha* and *Kapha Vāta*) and one type of *Tridoṣaja/ Sama Doṣaja prakṛti*[18]. Even though the classics explain three kinds of *Dvidoṣaja prakṛti*, there is a possibility of discovering six types of *Dvidoṣaja prakṛti* individuals during the practice [19].

Furthermore, CKD is not explicitly addressed in Ayurveda and no reviews of clinical application of *Deha prakṛti* to prevent and manage CKD are found in the existing literature. Therefore, it is important to emphasize the application of *Deha prakṛti* in the prevention and management of CKD as the concept can be applied diversely in the field of early detection, prediction of diseases susceptibility, planning and development of novel and targeted treatment regimes, including dietary – behavioral patterns and making clinical judgments, particularly with regard to disease prognosis.

It is observed that preventive and curative measures mentioned in Ayurveda are often associated with *Deha prakṛti* and are well-described in authentic Ayurveda texts as *Dinacharyā* (Daily routines), *Ṛtucharyā* (Seasonal routines), *Rāthricharyā* (Night routines), *Sadvṛtta* (Code of good conducts), and *Pathya Apathya āhara – pāna vihāra* (Healthy and unhealthy dietary habits), *Vyāyāma* (Excercise,) *Nidrā* (Sleep) etc. They provide valuable information on behavioral as well as dietary patterns that every individual who wishes to be healthy according to their *Deha prakṛti*[16, 20]. For instance, *Ṛtucharyā* described in Ayurveda, is a set of behaviors that should be followed by an individual who wants to be healthy in each *ṛtu* [21]. All individuals, specially those who associated with *Pittaja* types of *prakṛti* should be avoid food and beverages with *Aṃla* (sour), *Lavana* (salt) and *Katu* (pungent) in taste, physical excercises and exposure to sunlight due to the intense sunlight, high temperature of the environment, the depletion of *Kapha doṣa* and the accumulation of *Vāta doṣa* inside the body during the *Grīṣma ṛtu* (summer). Especially individuals with *Pittaja* type *prakṛti* should take more sweets, more liquids and their diet should be light (easy to digest). Moreover, *Madhya* (wine) should not be taken by that

type of individuals to maintain their healthy life without getting vitiation by *Pitta doṣa*[22].

Moreover, plenty of medications are mentioned in Ayurveda texts according to patients' type of *Deha prakṛti*. For example, according to Ayurveda, *Abhyanga cikitsā* (oil massage) would be beneficial not only for healthy individuals but also for those suffering from disorders related to the nervous system. But the type of oil chosen for the oil massage should be selected with great care, taking into account the patient's *Deha prakṛti* and the *doṣic* condition of the disease. In such a case, a patient with *Kaphaja prakṛti* can use an oil with the *Rukṣa* (ununctuous) property, whereas a patient with *Vātaja prakṛti* should use an oil with the *Snigdha* (unctuous) properties. To explain with another example, *Swedana* (sudation) and *Agni karma* (thermal cauterization) can be prescribed for the patients with *Kaphaja prakṛti* type, but *Pittaja prakṛti* types cannot.

Accordingly, patients with CKD require lifestyle adaptation and this adaptation should be based on *Deha prakṛti* of that particular patient. Healthy dietary and behavioral patterns are recommended as lifestyle adaptations in Ayurveda based on the type of *Deha prakṛti* of the patient. Therefore, preventive and curative measures can be effectively applied to prevent and manage CKD if *Deha prakṛti* of the patient is determined initially.

As said in Ayurveda, *Kaphaja* type *prakṛti* individuals are more prone to *kaphaj nanātmaj vikāra* (disorders in which *Kapha doṣa* predominates), whereas *Pitta* and *Vāta prakṛti* individuals are more prone to *Pittaja* and *Vātaja vikāra* respectively. According to Ayurveda, specific varieties of *Deha prakṛti* are exclusive to particular disorders. *Deha prakṛti* is the central pillar that affects the pattern of susceptibility of an individual to different diseases, prognosis, course and complications [23]. For example, a CKD patient with *Kaphaja prakṛti* type is more likely to develop *Prameha roga* since it is predominantly a disorder of *Kapha doṣa*, while those with *Pittaja prakṛti* type are more likely to create disorders related to *Rakta pitta* in which the *Pitta doṣa* gets prevalent[24]. This is mostly owing to the association between the predominant *doṣa* of the patient and the prevalent *doṣic* status of the disease. Physicians should be cautious when planning treatments for such CKD patients. For example, *Vātaja prakṛti* type CKD patients can be treated with *Santharpana cikitsā* (enriching/nourishing type of treatments) to some extent, while a CKD patient with *Kaphaja prakṛti* cannot be treated with the same as they are more prone to develop *Kaphaja vikāra* (diseases related to

Kaphaja disorders) such as *Prameha roga* and *Medo vṛddhi* etc. When considering the behavioral and dietary habits, the patients with *Kaphaja* types of *prakṛti* should avoid abandoned sitting, excessive sleep, excessive intake of curd, milk, new cereals and drinks, products of jaggery and all other *Kapha* promoting regimens to prevent developing *Kaphaja* disorders like *Prameha roga, Medo vṛddhi* etc [25-28].

As mentioned above, an assessment of *Deha prakṛti* among CKD patients will indicate which kinds of individuals are more likely to develop the disease. Therefore, it will be advantageous to identify the most vulnerable groups of individuals, especially those in high-risk zones for CKD and encourage them to take the necessary precautions, such as frequently engaging in screening programs and adopting dietary and behavioral patterns based on their *Deha prakṛti*. Furthermore, the susceptible individuals can be made aware of the signs and symptoms of the disease to be on alert. If the susceptible individual consists of a *Kaphaja* type of *prakṛti*, he or she can be advised to engage in an adequate amount of physical exercise for an average time period daily. However, the same recommendation cannot be made for a CKD susceptible individual with a *Pittaja* type of *prakṛti*, as he or she should engage in physical activities for a shorter period than the individual with *Kaphaja* type *prakṛti*. Due to the inherent hot quality of *Pitta*, the individuals with *Pitta prakriti* have a high metabolic rate, and a high metabolic rate leads to excessive perspiration and excretion [29]. Moreover, they are averse to heat [30]. Hence, extra exercises, night workouts and working near a hot environment etc., should be avoided by patients with *Pittaja* type of *prakṛti*.

If a CKD patient with *Vātaja prakṛti* type has a *Kaphaja* disorder such as *Athisthaulya* (obesity) or *Medo vṛddhi* (hypercholesterolemia) etc, he or she should be treated with *samšodhana cikitsā* (purification treatments) without aggravating the *Vāta doṣa*. The efforts to balance the vitiated *Kapha doṣa* may be the cause of the intensifying *Vāta doṣa*. For example, medications possessing *Laghu* (light), *Thīkṣna* (sharp) and *Rukṣa* (ununctuous) properties should be used to pacify *Kapha doṣa* in patients with *Kaphaja* diseases. However, these qualities can aggravate *Vāta doṣa* very easily. As a result, treatment regimens should be planned in a way that balances the *doṣās* predominant in *Deha prakṛti* and the *doṣa* predominant in the disorder. Clinicians can convincingly utilize medications containing *Uṣna* (hot in potency) properties even though

the property of *Uṣna* affects the pacification of both *Vāta* and *Kapha doṣās*.

The staging of CKD has been done by the National Kidney Disease Outcomes Quality Initiative (KDOQI) criteria according to the severity of the disease and depending on the GFR. Among the stages, stage 1 CKD has the lowest severity while stage 5 CKD has the highest severity. The stage, which requires dialysis or transplantation, is known as End-Stage Renal Disease (ESRD)[2]. Therefore, determining *Deha prakṛti* of the patients with stage 1 and 2 CKD would be very important to decide the treatment regimes and the wholesome dietary and behavioral patterns the patients should follow accordingly. Different therapeutic measures unique to each type of *Deha prakṛti* are described in Ayurveda texts. Therefore, it is unnecessary to apply the same *cikitsā* method (methods of treatment) to all CKD patients, as they will not all be effective for one form of treatment. For an instant, CKD patients with *Pittaja prakṛti* cannot be prescribed the medications which consist of the properties of *Uṣṇa* (food which are of hot potency like spicy food), *Tīkṣṇa* (sharp), *Rūkṣa* (dry/ ununctuous) and the food and drinks with *Aṃla* (sour), *Lavana* (salty) and *Katu* (pungent) tastes etc, as those properties of medicines, food and drinks are similar to the properties of *Pitta doṣa*[31]. They should follow food and beverages, which consist of the properties of *Guru* (hard to digest), *Snigdha* (unctuous), *Drava* (liquid) and *Śīta* (cold). Cow's ghee, green gram, vegetables like cabbage, cauliflower, pumpkin, ladies finger, snake guard, milk and milk products, taste-wise *Madhura* (sweet), *Tikta* (bitter) and *Kaṣāya* (astringent) food can be recommended for them. It is also recommended to avoid spicy - deep-fried – processed food and red meat for all types of *Deha prakṛti* patients but they are totally prohibited for CKD patients with *Pittaja type*. Daytime sleep is recommended for CKD patients with a *Vātaja prakṛti*, but not for those with a *Kaphaja prakṛti*. Additionally, CKD patients with *Vātaja* type can be advised to have regular oil massage, yoga, meditation and hot water bath.

There is no Ayurveda literature on preventive or curative measures according to CKD stages. However, it is reasonable to suggest that preventive measures such as *Dinacharyā* (Daily routins), *Ṛtucharyā* (seasonal regimens), *Pathya āhara – pāna viharana* (wholesome dietary and behavioral patterns) and so on should be strictly followed by patients at all stages, and medications should be administered according to the stage of the disease and the level of *Deha bala* of the patients in each stage. Ayurveda clinicians are

able to modify existing therapy procedures by changing the plant/ drug type in a decoction, powder, or paste as appropriate and apply novel treatment regimens according to the *Deha prakṛti* that will ultimately prevent them from acquiring ESRD. Additionally, new opportunities for novel drug development in the field will be established with the clinical application of *Deha prakṛti* concept. Moreover, planning and implementing treatments according to the type of *Deha prakṛti* of the patients with end-stage would ease their daily routines and increase the quality of life, which is frequently lowered in patients with CKD even at the early stages of the disease [32].

Today, it appears that the majority of CKD patients have been managed symptomatically. Consequently, that would not be an acceptable response, as symptomatic therapies can only alleviate the discomfort, not the underlying cause. However, the effectiveness of treating a patient symptomatically is questionable. Because providing them medications for each symptom may result in an unnecessary drug overload. Since there are no symptom-specific treatment regimens in Ayurveda, medications are administered based on the patient's *Deha prakṛti* and the *Doṣic* predominance of the disease. Therefore, there will be no unnecessary drug overkill for patients. For instance, if a clinician can design a treatment regimen to alleviate the "*Āma" c*ondition i.e. *Āma pāchana cikitsā* that has evolved within the body of that particular CKD patient, as opposed to merely planning therapies for *Agnimāndya* (lack of appetite), it will eradicate all the other symptoms caused by the *"Āma"* condition such as appetite loss, joint and muscle pain, constipation, nausea, vomiting etc.,. In this instance, the patient will not experience a drug overload, as he or she may not require separate medications for each symptom.

In addition, the type of *Deha prakṛti* of a patient possesses provides insight into his or her *Deha bala* (natural strength of the body). Since all drug dosages are based on the patient's *Deha bala*, physicians can specify the exact drug dosage based on the patients' *Deha prakṛti*. According to Ayurveda, *Vātaja*, *Pittaja* and *Kaphaja prakṛti* patients should take the *Alpa* (minimum), *Madhya* (moderate), and *Pravara* (highest) doses of medicine, respectively [33]. A CKD patient with the *Vātaja* kind of *prakṛti* will not be able to tolerate high doses and drugs that have high potency. In contrast, minimal drug dosages and low potency drugs would not be beneficial for *Kaphaja* patients as they have the highest strength in the body. As mentioned in

Ayurveda, the individuals with *Vātaja* kind of *prakṛti* would have the lowest strength of the body, whereas the individuals with *Kaphaja* kind of *prakṛti* types consist of maximum strength among the basic three types of *Prakṛti* [34-35]. For instance, a *Kaphaja prakṛti* CKD patient with constipation may generally be treated with *Tīkṣṇa virechana karma*. However the same cannot be said for a *Vātaja prakṛti* patient. They should be treated with *Mṛdu virechana karma* (mild purgatives) because they possess the least amount of physical strength. Regarding *Dwandwaja prakṛti* types, Ayurveda asserts that *Dwandwaja prakṛti* types are *nindya* (prohibited) [36]. It is somewhat challenging to manage a patient with *Dwandwaja prakṛti* in practice, as clinicians must consider two *doṣās* rather than one predominant *doṣa*. To treat a patient with *Dwandwaja prakṛti*, however, clinicians should apply *Viruddha upakrama*[37]. It is stated that *Sama Doṣaja prakṛti* types are the best among the others, but it is difficult to develop treatment regimens because three *doṣās* should be considered simultaneously.

It is very important to maintain the status of *Agni* (digestive fire in the body) of a patient with CKD. Most often, loss of appetite is the main complaint made by those patients. As the level of *Agni* in each patient varies based on the kind of *Prakṛti* [38], it is essential to understand the type of *Deha prakṛti* while prescribing drugs and recommending dietary and behavioral patterns to correct the state of *Agni*. For instance, in a disease like CKD, the reduction in the level of *Agni* of a CKD *Kaphaja* type patient is greater than the reduction in the level of *Agni* of a CKD *Pittaja type* patient. Therefore, the drugs which consist *Tīkṣṇa* (sharp), *Uṣṇa* (hot) properties can also be similarly indigestible for *Kaphaja* type of CKD patients as they have lower levels of *Agni*.

Furthermore, the application of the concept, *Deha prakṛti* can be economically effective for the patients as they use only the required drugs as needed. The patients do not have to take so many medications for various complications as the treatment will be specific and more focused because the treatment regimes are based on their type of *Deha prakṛti*. Also, this will reduce the number of visits to the hospitals. Patients might have a higher quality of life due to the fact that they do not need to be troubled because they are receiving appropriately identified treatment.

The clinical importance of applying *Deha prakṛti* to make a judgment on CKD prognosis is the final point. According to Ayurveda, a disease is easily curable if the patient's body has different *Doṣās*, *Dūṣyās* (tissues), *Deša* (regions), *Kāla* (season), and *Prakṛti* (body constitution) etc. [39]. Therefore, a *Kaphaja*

disease arising during *Varshā ṛtu* (rainy season), in a person of *Vāta prakṛti* (constitution) and in *Jāngala deša* (desert-like regions), all being of a different nature, are easily curable. Further, Ayurveda describes that if the vitiated or *vikṛti doṣās* (abnormal) of the disease are different from the type of *prakṛti* of the patient, the disease can be considered as a *Sādhya roga* or it can be cured easily. Similarly, if the vitiated *doṣās* are the same as the *doṣās* dominant in the patient's *Deha prakṛti*, the disease becomes *Kṛchya sādhya* (difficult to cure)[40]. In other words, if the disease is vitiated mostly by *Pitta doṣa*, managing a CKD patient with *Pitta pradhāna* (dominant) *prakṛti* is complicated. Therefore, the disease will be *Kṛchcha sādhya* for that patient. If a CKD patient with *Kapha pradhāna prakṛti* has *Vāta doṣa*, clinicians can simply treat him or her by planning and administering appropriate medications, which include *Viruddha guna* medications (drugs that consist of opposite properties).

However, it is an undeniable fact that Ayurvedic literature is scattered with preventative and therapeutic measures related to *Deha prakṛti* . Even its clinical application may be limited due to the widespread dispersion of pertinent information. Also, the scattered information has not been well reconciled. Therefore, the above discussion has been done to gather the information and convert it into a relevant manner.

As discussed, if the concept of *Deha prakṛti* can be practically applied to the prevention and management of CKD, it will be of enormous benefit to both patients and professionals in the field, and most probably, it might become easier to conquer the disease, not entirely, but at least to run off from the current burden.

4. Materials and Methods

4.1) Ethical Clearance:

Ethical clearance for the study was obtained from the Ethics Review Committee, Institute of Indigenous Medicine, University of Colombo and Ethics Review Committee, University of Kelaniya.

4.2) Source of data:

CKD patients who visited Nephrology clinics functioning under the Professorial Unit - National Hospital, Sri Lanka and the Renal clinic conducted by Bandaranaike Memorial Ayurveda Research Institute, Nawinna, Sri Lanka.

4.3) Sample type - Purposive simple random sampling

4.4) Sample size: 134 diagnosed CKD participants were selected from the clinics mentioned in 4.2.

4.5) Study type: A retrospective cross-sectional observational study

4.6) Study period: 05 months from July to December 2021

4.7) Inclusion Criteria

This study was carried out on patients who were diagnosed with CKD. The disease diagnosis was based on the Kidney Disease Outcomes Quality Initiative (KDOQI) criteria published by National Kidney Foundation, which is currently utilized in Western medicine. Both male and female patients between the ages of 18 to 80 years were included in the study.

4.8) Exclusion Criteria

The CKD patients below 18 and above 80 years, patients with HIV infection, malignant disorders, psychiatric diseases, dementia etc., patients who had immunotherapy within the last 6 months and chemotherapy within the last 2 years, female CKD patients having pregnancy and breastfeeding, patients who refused to give informed consent, patients with Acute Kidney Injury (AKI) were excluded from the study.

4.9) Assessment of *Deha prakṛti* in patients with CKD

Deha prakṛti assessment of each subject was performed by AyuSoft software developed by the Centre for Development of Advanced Computing (C-DAC), Pune, Department of Information Technology, Ministry of Communications and Information Technology (MCIT), India. The assessment of *Prakṛti* assessment was performed using weightage configuration in AyuSoft.

4.10) Grouping of the selected subjects

The cases were grouped into 10 groups according to their type of *Deha prakṛti* as follows.

Kewala Vāta prakṛti patients (V), *Kewala Pitta prakṛti* patients (P), *Kewala Kapha prakṛti* patients (K), *Vāta Pitta prakṛti* patients (VP), *Pitta Kapha prakṛti* patients (PK), *Kapha Vāta prakṛti* patients (KV), *Pitta Vāta prakṛti* patients (PV), *Kapha Pitta prakṛti* patients (KP), *Vāta Pitta prakṛti* patients (VP), *Sama Doṣaja prakṛti* patients (SD).

5. Results

The study comprised 134 patients with CKD from the Western province of Sri Lanka. The following results were observed regarding the prevalence and distribution pattern of *Deha prakṛti* among the selected patients with CKD.

5.1) Clinical profiles of CKD patients according to the stages of the disease

The study had 42 (31.3%) cases with CKD stage 1, 29 (21.6%) cases with CKD stage 2,

10 (7.5%) cases with CKD stage 3, 23 (17.2 %) cases with CKD stage 4 and 30 (22.4%) cases with CKD stage 5.

5.1.1) Profile of stage 1 CKD patients

Among the 42 cases of CKD stage 1, 28 cases (66.7 %) were males and 14 (33.3%) were female. The mean age of CKD stage 1 cases was 59, with a standard deviation of 11.3.

5.1.2) Profile of stage 2 CKD patients

Among the 29 cases of CKD stage 2, 22 cases (75.9 %) were males and 07 (24.1%) were females. The mean age of CKD stage 2 cases was 60, with a standard deviation of 11.5.

5.1.3) Profile of stage 3 CKD patients

Among the 10 cases of CKD stage 3, 05 cases (50 %) were males and 05 (50 %) were females. The mean age of CKD stage 3 cases was 60 (59.5), with a standard deviation of 14.5.

5.1.4) Profile of stage 4 CKD patients

Among the 23 cases of CKD stage 4, 15 cases (65.2%) were males and 08 (34.8%) were females. The mean age of CKD stage 4 cases was 61 (60.9), with a standard deviation of 13.7.

5.1.5) Profile of stage 5 CKD patients

Among the 30 cases of CKD stage 5, 19 cases (63.3 %) were males and 11 (36.7%) were females. The mean age of CKD stage 5 cases was 60 with a standard deviation of 13.3.

5.2) Clinical profiles of CKD patients according to the type of *Deha prakṛti* – Assessed data

5.2.1) Patients with *Kewala Vāta* (V) *prakṛti*

Among the 03 cases of *Kewala Vāta prakṛti* , 02 (66.7%) cases were males and 01 (33.3%) case was female. The mean age of *Kewala Vāta prakṛti* patients was 60 (59.6), with a standard deviation of 4.9.

100% of cases with *Kewala Vāta prakṛti* had CKD Stage 3.

5.2.2) Patients with *Kewala Pitta* (P) *prakṛti*

Among the 03 cases of *Kewala Pitta prakṛti*, 02 cases (66.7 %) were males and one case (33.3%) was female. The mean age of *Kewala Pitta prakṛti* patients was 61 (61.3), with a standard deviation of 12.5. 100% of cases with *Kewala Pitta prakṛti* belonged to CKD stage 5.

5.2.3) Patients with *Kewala Kapha* (K) *prakṛti*

Among the 12 cases of *Kewala Kapha prakṛti*, 07 cases (58.3%) were males and 05 (41.7%) were females. The mean age of *Kewala Kapha prakṛti* patients was 59 (59.1) with a standard deviation of 10.6. 100% of cases with *Kewala Kapha prakṛti* patients had CKD stage 1.

5.2.4) Patients with *Vāta Pitta* (VP) *prakṛti*

Among the 14 cases of *Vāta Pitta prakṛti*, 09 (64.3%) cases were males and 05 (35.7%) cases were females. The mean age of *Vāta Pitta prakṛti* patients was 61(61.4), with a standard deviation of 15.4.

02 cases (14.2 %) belonged to CKD stage 3, 06 cases (42.9 %) belonged to CKD stage 4 and 06

cases (42.9 %) belonged to CKD stage 5.

5.2.5) Patients with *Pitta Kapha* (PK) *prakṛti*

Among the 30 cases of *Pitta Kapha prakṛti*, 21(70%) cases were males and 09 (30 %) cases were females. The mean age of *Pitta Kapha prakṛti* patients was 61 (61.2), with a standard deviation of 13.3. 21(70 %) cases were in CKD stage 2, 07 (23.3 %) cases were in CKD stage 4 and 02 (6.7%) cases were in CKD stage 5.

5.2.6) Patients with *Kapha Vāta* (KV) *prakṛti*

Among the 17 cases of *Kapha Vāta prakṛti* patients, 11(64.7%) cases were males and 06 (35.3 %) cases were females. The mean age of *Kapha Vāta prakṛti* patients was 58 (57.6), with a standard deviation of 13.4. 100% of cases with *Kapha Vāta* (KV) *prakṛti* belonged to CKD stage 1.

5.2.7) Patients with *Pitta Vāta* (PV) *prakṛti*

Among the 14 cases of *Pitta Vāta prakṛti*, 08 (57.1%) cases were males and 06 (42.9 %) cases were females. The mean age of *Pitta Vāta prakṛti* patients was 61, with a standard deviation of 12.9.

05 (35.7%) cases had CKD stage 3, 04 (28.6 %) cases had CKD stage 4 and 05 (35.7%) cases belonged to CKD stage 5.

5.2.8) Patients with *Kapha Pitta* (KP) *prakṛti*

Among the 12 cases of *Kapha Pitta prakṛti*, 09 (75 %) cases were males and 03 (25 %) cases were females. The mean age of *Kapha Pitta prakṛti* patients was 61 (61.3), with a standard deviation of 9.3. 100% of cases with *Kapha Pitta prakṛti* had CKD stage 1.

5.2.9) Patients with *Vāta Kapha* (VK) *prakṛti*

Among the 28 cases of *Vāta Kapha prakṛti*, 19 (67.9%) cases were males and 09 (32.1 %) cases were females. The mean age of *Vāta Kapha prakṛti* patients was 59 (58.6), with a standard deviation of 12.2. 8 (28.6%) cases belonged to CKD stage 2, 06 (21.4 %) cases belonged to CKD stage 4 and 14 (50%) cases belonged to CKD stage 5.

5.2.10) Patients with *Sama Doshaja* (SD) *prakṛti*

There was only 01 male CKD patient at the age of 65 years with *Sama Doshaja* (SD) *prakṛti* belonging to CKD stage 1.

Figure 1 depicts the distribution of CKD patients with age.

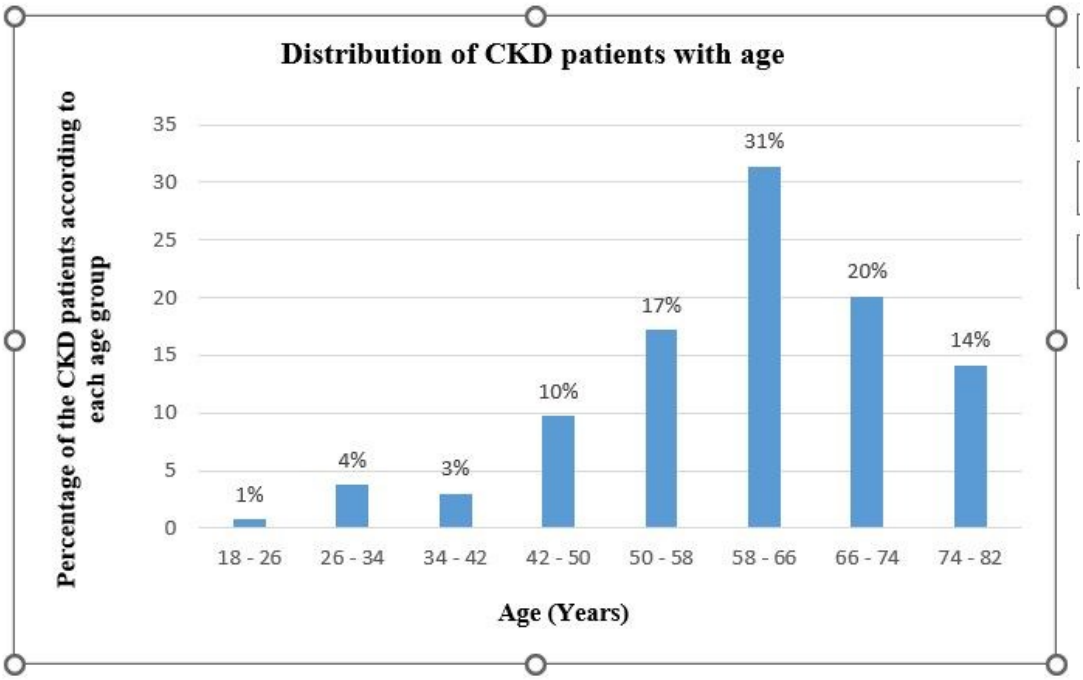

Figure1: Distribution of CKD patients with age

As depicted in Figure 1, 1% of the CKD patients were in the age group of 18 years or above and less than 26 years. 4% of the CKD patients were in the group of 26 years or above and less than 34 years. 3% of the patients were in the group of 34 years or above and less than 42 years. 10% were in the group of 42 years or above and less than 50 years. 17% were in the group of 50 years or above and less than 58 years.31% of the CKD patients were in the group of 58 years or above and less than 66 years. 20% of the patients were in the group of 66 years or above and less than 74 years. 14% of the CKD patients were in the group of 74 years or above and less than 82 years. Accordingly, the majority of CKD patients in the Western province were in the age group of 58 years or above and less than 66 years. That is 31 %.

Figure 2 depicts the distribution of CKD patients according to gender.

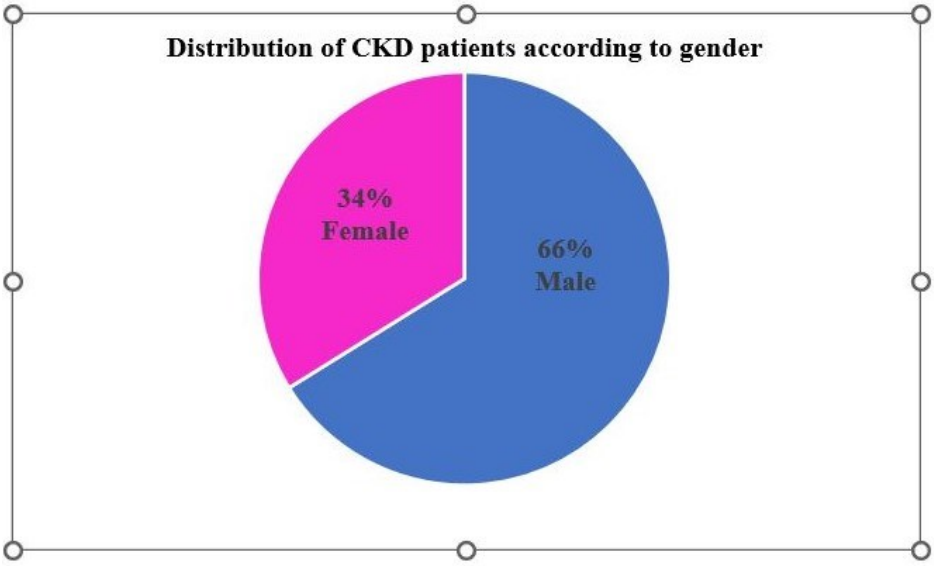

Figure 2: Distribution of CKD patients according to gender

As depicted in Figure 2, the study consisted of 89 (66 %) males and 45 (34%) females. Accordingly, the majority of CKD patients (66%) in the Western province of Sri Lanka were males. The ratio of males to females was 1.98, with a mean age of 60 (60.3) years among males and 60 (59.6) years among females. The age distribution of males was 23 to 80 years and females between 33 to 80 years.

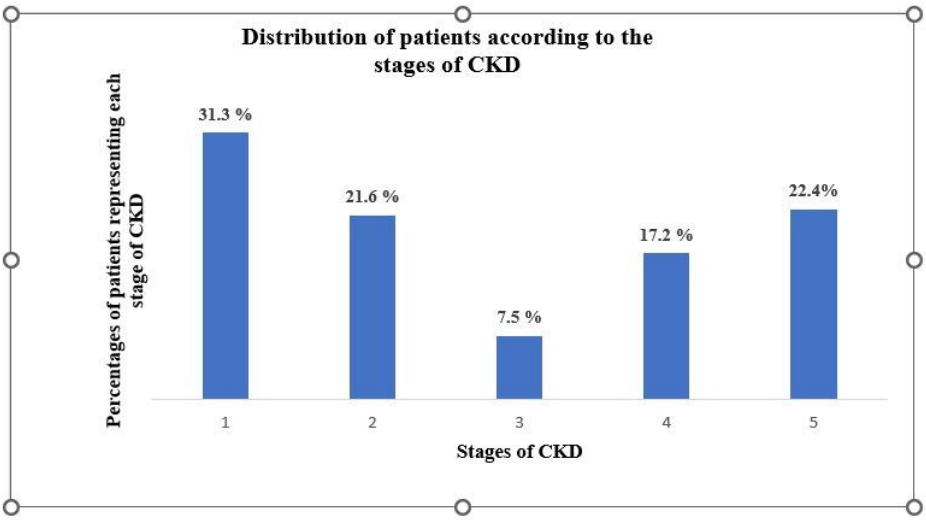

Figure 3: Distribution of patients according to the stages of CKD

As depicted in Figure 3, 31.3% of patients had CKD stage 1, whereas 21.6% and 7.5% had CKD stage 2 and 3, respectively. Moreover, 17.2% of patients were in CKD stage 4, and 22.4% of patients were in CKD stage 5. Accordingly, the highest percentage (31.3%) of patients had

CKD stage 1 and the lowest percentage (7.5%) had CKD stage 3.

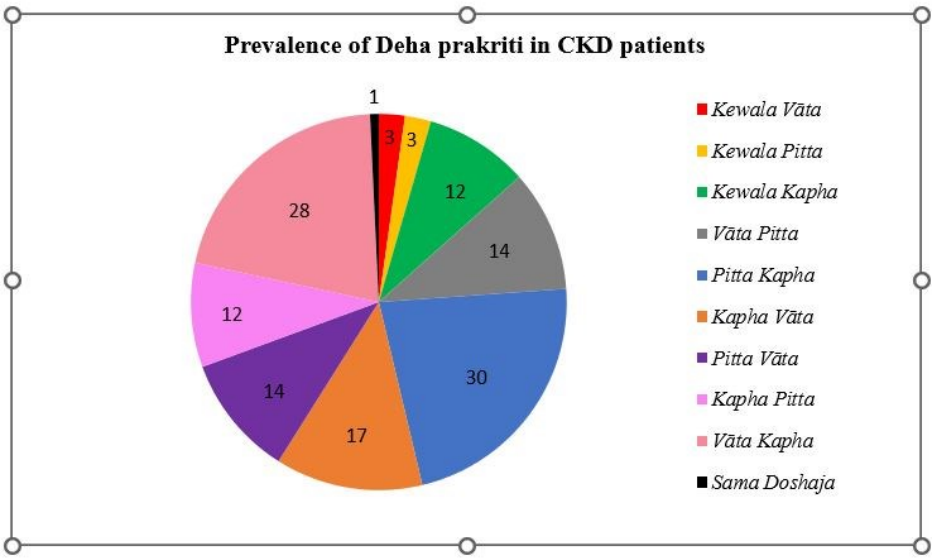

Figure 4: Prevalence of *Deha prakṛti* in CKD patients

As illustrated in Figure 4, the patients with *Kewala Vāta* (V) and *Kewala Pitta* (P) *prakṛti* types were identical in numbers. There were 03 (2.2%) *Kewala Vāta* (V) patients and 03 (2.2%) *Kewala Pitta* (P) *prakṛti* types patients. Patients with *Vāta Pitta* (VP) *prakṛti* and *Pitta Vāta* (PV) *prakṛti* were also identical in numbers. There were 14 (10.4%) *Pitta Vāta* (PV) patients and 14 (10.4%) *Vāta Pitta* (VP) patients. Furthermore, it can be observed that there were 12 (9%) patients in each group of *Kewala Kapha* (K) and *Kapha Pitta* (KP) *prakṛti* types. Also, there were 17 (12.7 %) CKD patients with *Kapha Vāta* (KV) *prakṛti* and only 01 (0.7%) patient with *Sama Doshaja* (SD) *prakṛti*.

Figure 5 summarizes Figure 4 and describes the prevalence of *Deha prakṛti* in CKD patients based on the predominance of 03 major *doṣās*. i.e *Vāta*, *Pitta* and *Kapha*

Accordingly, the patients were further categorized into 04 types of *Deha prakṛti* as *Vāta pradhāna* (dominant), *Pitta pradhāna* (dominant), *Kapha pradhāna* (dominant) and *Sama Doṣaja prakṛti*.

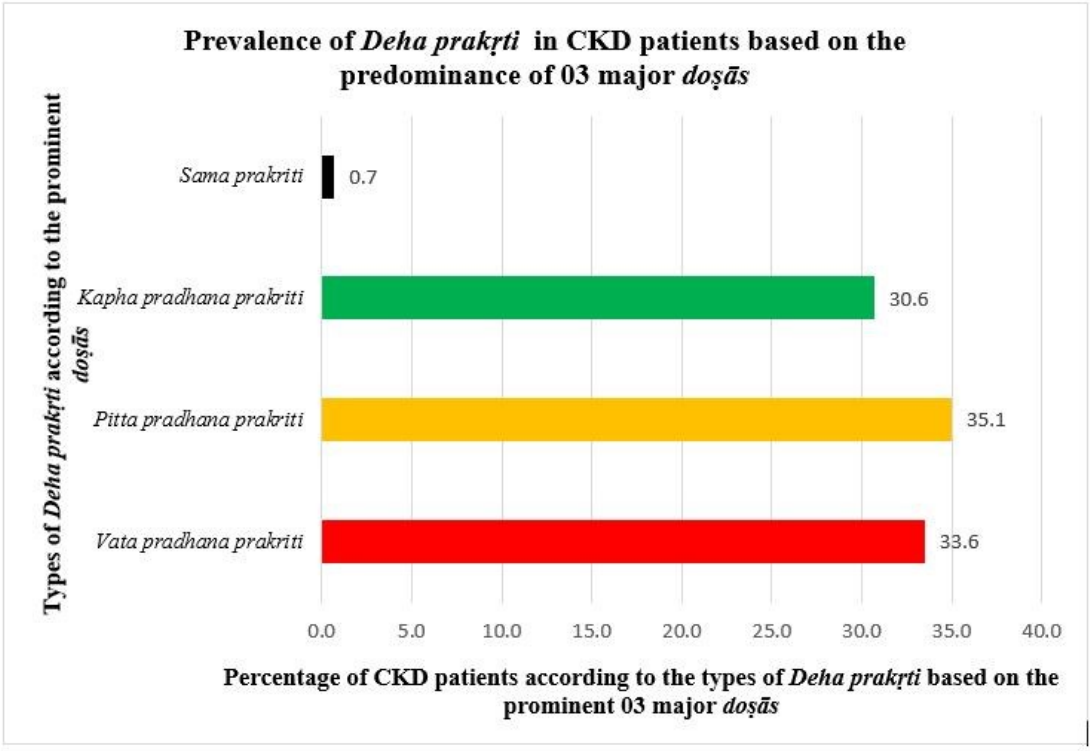

Figure 5: Prevalence of *Deha prakṛti* in CKD patients based on the prominent 03 *major doṣās*

As depicted in Figure 5, there were 47 (35.1 %) *Kapha pradhāna prakṛti* patients and 01(0.7 %) *Pitta pradhāna prakṛti* patients, 45 (33.6 %) *Sama Doṣaja prakṛti* patients. *Vāta pradhāna prakṛti* patients, 41 (30.6 %)

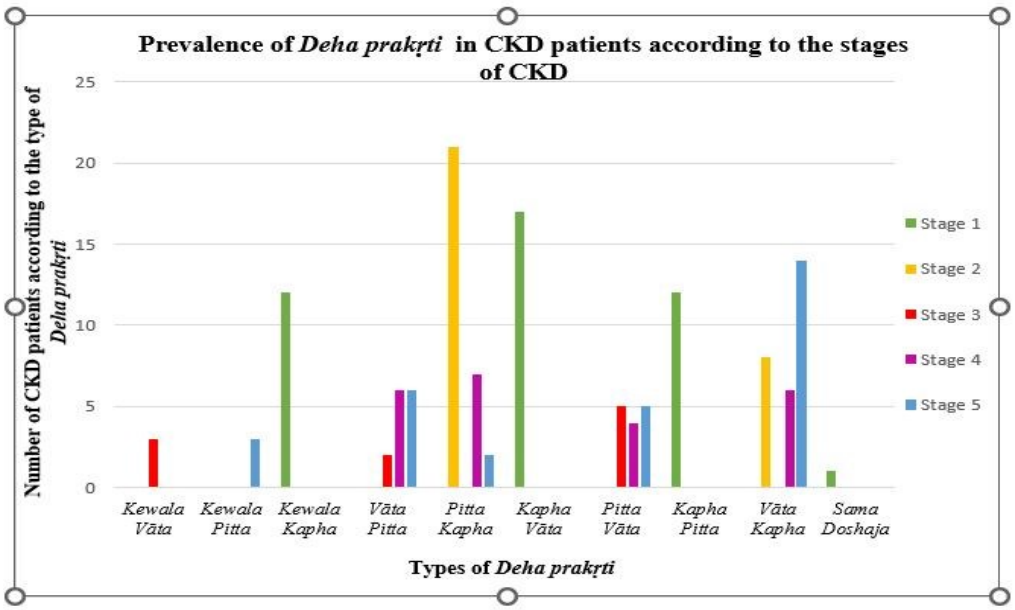

Figure 6: Prevalence of *Deha prakṛti* in CKD patients according to stages of CKD

As depicted in Figure 6, 100 % of CKD patients with *Kewala Vāta prakṛti* were exclusively represented by CKD stage 3. CKD stage 5 represented 100% of patients with *Kewala Pitta prakṛti*. Furthermore, 100% of patients with *Kewala Kapha prakṛti* fully represented CKD stage 1. Not only the patients with *Kewala Kapha prakṛti*, but also all patients with *Kapha Vāta* and *Kapha prakṛti* types were represented in stage 1 of CKD and it was 100% for each type. Accordingly, it can be stated that 100 % of CKD patients with *Kapha pradhāna prakṛti* types have always represented stage 1 of CKD. Patients with *Kewala Pitta prakṛti* were only present in stage 5 of CKD, whereas those with other *Pitta pradhāna prakṛti* types dispersed among the stages 2, 3, 4, and 5 of CKD apart from stage 1. The only CKD patient with *Sama Doṣaja prakṛti* with equal proportions of *doṣas* belonged to stage 1 of CKD.

Figure 7 depicts the prevalence of *Deha prakṛti* in CKD patients based on the predominance of 03 major *doṣās* i.e. *Vāta*, *Pitta* and *Kapha,* according to the stages of CKD.

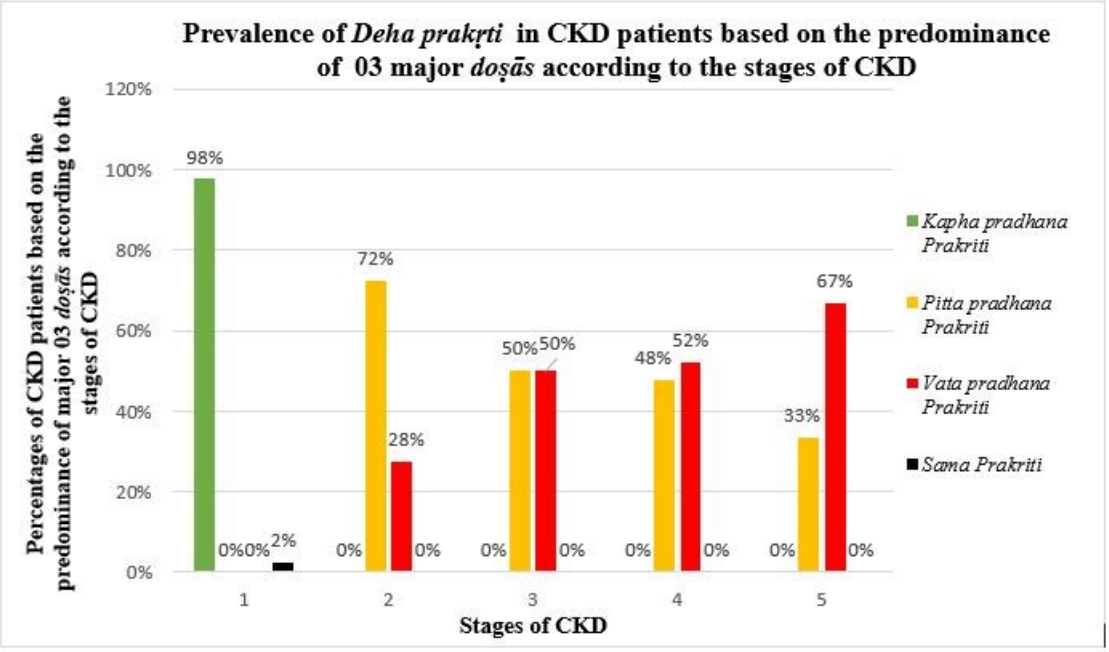

Figure 7: Prevalence of *Deha prakṛti* in CKD patients based on the predominance of 03 major *doṣās* according to stages of CKD.

As represented in Figure 7, the CKD patients with *Kapha pradhāna prakṛti* types were confined only to stage 1 of CKD. That was 98 % and the patients with the *Sama (Doṣaja) prakṛti* type represented the remaining 2 % of CKD stage 1. Patients with *Kapha pradhāna*

prakṛti types and *Sama Doṣaja prakṛti* types have not been identified in CKD stages 2,3,4 and 5 and there was no specified stage 1 CKD patients with *Pitta* or *Vāta pradhāna prakṛti* types. The percentage of CKD patients with *Pitta* and *Vāta pradhāna prakṛti* types gradually increases compared to *Kapha pradhāna prakṛti* types and *Sama Doṣaja prakṛti* types when the disease progresses. The highest percentage (72 %) of patients with *Pitta pradhāna* types was reported in stage 2 of CKD patients.

6. DISCUSSION

According to Figure 1, the most significant percentage of patients were in the age groups of 50 – 58, 58 - 66, 66 -74 and 74 - 80. It was 83%. This indicates that a considerable proportion of CKD patients in the Western province are 50 years and above.

As the prevalence of CKD risk factors such as diabetes mellitus, hypertension, obesity, atherosclerosis, etc., increases in the elderly population [41,42,43,44], it is obvious that the elderly will develop CKD inevitably. In addition, multiple research studies have demonstrated that the prevalence of CKD in the elderly population is substantial [45,46] and it is estimated that after the age of 30 years, GFR progressively declines at an average rate of 8mL/ min/1.73 m2 /decade [47]. Accordingly, this study also reveals that the CKD prevalence is higher in the elderly compared to the younger generation in the Western province of Sri Lanka.

According to Figure 2, the majority of CKD patients (66 %) in the Western Province - Sri Lanka, were males. Recent research studies have shown that males have a higher incidence rate of CKD and ESRD than females [48,49] as the kidney functions of males degrade more rapidly. This is likely owing to the unhealthy lifestyles of men and also, it is believed that higher testosterone levels in men cause kidney injury, while higher oestrogen levels protect women from developing kidney damage [50].

CKD is difficult to detect in its early stages. It is silent and undetected until the advanced stages, as most of the symptoms appear in later stages [51]. However, according to the study findings in Figure 3, 52.9% of patients were identified at the early stages of the disease (i.e., stage 1 and stage 2) compared with 39.6 % of patients in stages 4 and 5. Therefore, CKD patients in early stages may have the advantage of detecting the disease in early stages and taking precautions according to the *Deha prakṛti* .

As illustrated in Figure 4, the patients with the *Prakṛti* types of *Pitta Kapha* (PK) and *Vāta Kapha* (VK) were the most prevalent among the selected CKD patients. There were 30

(22.4%) patients with *Pitta Kapha* (PK) and 28 (20.9%) patients with *Vāta Kapha* (VK) *prakṛti* types. The peculiarity here is that the *Kapha doṣa* is associated as *anubandha doṣa* (associated doṣa) with the two most prevalent varieties of *Deha prakṛti*. Therefore, it is obvious that all three *doṣās* i.e *Vāta*, *Pitta* and *Kapha* are frequently connected with the most prevalent *Prakṛti* types (*Pitta Kapha* and *Vāta Kapha*) in CKD patients – Western province, Sri Lanka.

According to Figure 5, among the basic types of *Prakṛti*, it is evident that almost the same percentages of CKD patients have associated with *Pitta*, *Vāta* and *Kapha pradhāna prakṛti* types, i.e., 35.1%, 33.6% and 30.6% respectively when compared to *Sama Doṣaja prakṛti* types.

Further, the CKD patients with *Sama Doṣaja prakṛti* type were very less in number, i.e., only 01 (0.7%) patient was reported with *Sama Doṣaja prakṛti* type.

As described in *Caraka Saṃhithā*, individuals with *Sama Doṣaja prakṛti* type are free of diseases, while the individuals with the predominance of *Vāta*, *Pitta* and *Kapha doṣa* are always unhealthy[52]. The same concept was emphasized by *Achārya Kāšyapa in Kašyapa Saṃhithā* [53]. According to *Kašyapa Saṃhithā*, people with same *prakṛti* are perpetually healthy, whereas people with *Vātika*, etc., are perpetually unhealthy [54]. As shown in Figure 5, there was only one patient with *Sama Doṣaja* type of prakṛti. Therefore, it is reasonable to conclude that the *Sama Doṣaja prakṛti* types are less prone to develop CKD than the *Vāta*, *Pitta* and *Kapha pradhāna prakṛti* types.

Considering the results shown in Figure 6, *Pitta doṣa* is primarily responsible for metabolism, thermos - regulation, energy homeostasis, pigmentation, vision, and host surveillance [54,55]. In addition, it is also believed that inflammatory diseases are associated with the vitiation of *Pitta doṣa*[55]. Low-grade chronic inflammation is a common characteristic observed in patients with CKD [56] and it is confirmed that inflammation contributes to the progression and outcome of CKD [57]. Therefore, it is reasonable to conclude that people with *Pitta pradhāna prakṛti* types are highly associated with CKD-related inflammatory conditions. As illustrated in Figure 6, individuals with *Kewala Pitta prakṛti* might have a higher grade of inflammation because they all were at the end stage of CKD. In addition, none of the patients with Pitta-associated prakṛti types were observed in stage 1 CKD, which is most likely due to reduced or absent inflammation in Stage 1 CKD.

Moreover, it can be observed that the patients with *Pitta pradhāna prakṛti* types such as *Kewala Pitta*, *Pitta Vāta*, *Pitta Kapha* and those who had *Pitta doṣa* as *anubandha* (associate) doṣa in their *Prakṛti* types such as *Vāta Pitta* and *Kapha Pitta*, were distributed among the CKD stages of 2,3, 4 and 5 except for the *Kapha Pitta* type. Further, the patients with *Vāta doṣa* as *pradhāna* (dominant) *doṣa* or *anubandha doṣa* in their *Prakṛti* type were also dispersed across the CKD stages of 2,3,4, and 5, except for the *Kapha Vāta* type. This is typically attributable to the association of *Kapha doṣa* into *Kapha Vāta* and *Kapha Pitta* types as *pradhāna doṣa* and its property of reducing the strength of the disease and disease susceptibility.

Additionally, the most prevalent *Prakṛti* types of *Pitta Kapha* and *Vāta Kapha* were scattered among the CKD stages 2, 4, and 5. Furthermore, the patients with *Vāta Pitta* and *Pitta Vāta prakṛti* have dispersed among the CKD stages 3, 4 and 5. However, patients with *Pitta Vāta prakṛti* type have evenly distributed in the CKD stages 3, 4 and 5.

The only CKD patient with *Sama Doṣaja prakṛti* (the patients with equal proportions of doṣas) belonged to stage 1 of CKD. This situation is nearly matched with the fact mentioned in *Caraka Saṃhithā*, that the individuals with *Sama Doṣaja prakṛti* are always disease free [41].

As represented in Figure 7, the CKD patients with *Kapha pradhāna prakṛti* types were confined only to stage 1 of CKD. That was 98 % and the patients with the *Sama Doṣaja prakṛti* type represented the remaining 2 % of CKD stage 1. Patients with *Kapha pradhāna prakṛti* types and *Sama Doṣaja prakṛti* types have not been identified in CKD stages 2,3,4 and 5 and there were no identified stage 1 CKD patients with *Pitta* or *Vāta pradhāna prakṛti* types.

Among the three types of *Vāta*, *Pitta* and *Kapha pradhāna prakṛti*, the persons with the predominance of *Kapha* are mentioned as strong in Ayurveda texts [34] whereas the persons with *Pitta* are stated as moderate in strength [58] and persons with the predominance of *Vāta* are mostly stated as low degree of strength [35]. Accordingly, persons with *Kaphaja prakṛti* may be less susceptible to diseases as they possess the maximum level of body strength. *Pittaja prakṛti* persons have a moderate susceptibility to diseases, while *Vātaja prakṛti* individuals have a high susceptibility to diseases. As demonstrated in Figure 7, it can be assumed that the individuals with *Kapaja* types of *prakṛti* are all in the earliest stage of the disease i.e, stage 1, because they have optimum strength compared to the individuals

with *Pitta* and *Vāta pradhāna prakṛti*. In addition, the prevalence of patients with *Vāta pradhāna prakṛti* steadily increases as the condition progresses. It could be possible since the individuals with *Vāta pradhāna prakṛti* have less strength and greater susceptibility to diseases. Therefore, it can be stated *Vātaja prakṛti* patients are subjected to developing the disease easily and their disease progression is more likely to extend to the end-stage. The patients with *Pitta pradhāna prakṛti* seemed to be dispersed among CKD stages 2,3,4 and 5. But the majority of patients with *Pitta pradhāna prakṛti* types are prevalent in the middle stages of CKD. That was 72%, 50%, and 48% in stages 2,3 and 4. That may be their moderate strength and moderate disease susceptibility.

The percentage of CKD patients with *Pitta* and *Vāta pradhāna prakṛti* types gradually increases when the disease progresses. The highest percentage (72 %) of patients with *Pitta pradhāna* types was reported in stage 2 of CKD patients. Further, the number of CKD patients with *Pitta pradhāna prakṛti* gradually decreases when the disease progress.

In order to determine *Deha prakṛti*, data must be collected from the patient throughout his or her healthy period, therefore, the patients had to be reminded of this periodically when being questioned. It was extremely difficult to recruit voluntarily participating patients for the study as they were reluctant to answer the questions due to a variety of discomforts they suffered. The spread of the third and fourth waves of COVID-19 in Sri Lanka was another practical challenge encountered throughout the study period.

7. CONCLUSION

The study discussed the importance of the concept *Deha prakṛti* in Ayurveda in the prevention and management of CKD. As discussed, *Deha prakṛti* determination could be successfully utilized to detect CKD in its early stages, predict disease susceptibility, decide and plan treatment regimens, educate patients on appropriate precautions, and make the right clinical judgments regarding disease prognosis.

According to the type of *Deha prakṛti* of patients with CKD in the Western province in Sri Lanka, males were predominated and the disease was more prevalent among people with age 50 years and above. Majority of CKD patients were found to be more associated with *Pitta Kapha* (PK) and *Vāta Kapha* (VK*) prakṛti* types. Furthermore, the results revealed that there were a relatively high number of patients in stages 1 and 2 of CKD compared to the patients with stages 4 and 5 of CKD.

Regardless of the stage of the disease, the distribution pattern of *Vāta* (33.6%), *Pitta* (35.1%), and *Kapha* (30.6%) *pradhāna prakṛti* types is basically equivalent among the patients with CKD compared to the percentage of patients with *Sama Doṣaja prakṛti* (0.7%). Patients with *Kapha pradhāna prakṛti* are dispersed only in stage 1 of CKD and patients with *Pitta* and *Vāta pradhāna prakṛti* types are dispersed throughout the remaining stages of CKD. The proportion of patients with *Vāta pradhāna prakṛti* are increased and the proportion of patients with *Pitta pradhāna prakṛti* is decreased with the disease progression.The patients with *Sama Doṣaja prakṛti* represented a minor percentage of the disease. Further, patients with *Vāta pradhāna prakṛti* are more likely to progress to stage 5 of CKD, whereas those with *Kapha pradhāna prakṛti* may remain in the early stages. This is related to the reduced body strength and increased susceptibility to disease shown by *Vātaja* types of patients. Therefore, *Vātaja* type *prakṛti* patients should be given special concern during disease management. As *Pitta pradhāna prakṛti* patients are more susceptible to get inflammation, especially those with *Kewala Pitta prakṛti* may develop severe inflammatory conditions due to stage 5 of CKD.

The study recommended that susceptible individuals be made aware of healthy dietary and behavioral habits based on their *Deha prakṛti* to prevent contracting the disease and that a specific treatment regimen be designed for CKD patients based on the type of *Deha prakṛti* to prevent disease progression to ESRD.

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