



## REVIEW ARTICLE

### A REVIEW ON UDDANAM KIDNEY DISEASE IN ANDHRA PRADESH

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#### ABSTRACT

The Uddanam region that lies in north-coastal Andhra consists of the mandals of Kaviti, Sompeta, Kanchili, Itchapuram, Palasa and Vajrapukotturu, accounting for more than 100 villages in total. As of 2015, It was estimated that more than 4500 people had died in the last ten years, and around 34,000 people were suffering from kidney diseases in this area alone. Mainly uddanam people are effected with chronic kidney failure. It was reported that each family in the area had at least one person suffering from a kidney ailment. The cases had first mysteriously surfaced in the early 90s. Symptoms included hypertension and diabetes, followed by a long asymptomatic period, and later diagnosed with excess proteins in the urine, decreased red blood cell count and high levels of uric acid in the blood.

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#### INTRODUCTION

Kidney disease, also known as nephropathy or renal disease, is damage to or disease of a kidney. Nephritis is inflammatory kidney disease.

##### Causes

Causes of kidney disease include deposition of the IgA antibodies in the glomerulus, administration of analgesics, xanthine oxidase deficiency, toxicity of chemotherapy agents, and long-term exposure to lead or its salts. Chronic conditions that can produce nephropathy include systemic lupus erythematosus, diabetes mellitus and high blood pressure (hypertension), which lead to diabetic nephropathy and hypertensive nephropathy, respectively. Kidney disease is broadly classified into acute kidney injury and chronic kidney disease.

##### Symptoms

Initially, kidney failure may be not produce any symptoms (asymptomatic). As kidney function decreases, the symptoms are related to the inability to regulate water and electrolyte balances, clear waste products from the body, and promote red blood cell production.

If unrecognized or untreated, the following symptoms of kidney failure may develop into life-threatening circumstances.

- Lethargy
- Weakness
- Shortness of breath
- Generalized swelling (edema)
- Generalized weakness due to anemia
- Loss of appetite
- Lethargy
- Fatigue
- Congestive heart failure
- Metabolic acidosis
- High blood potassium (hyperkalemia)
- Fatal heart rhythm disturbances (arrhythmias) including ventricular tachycardia and ventricular fibrillation
- Rising urea levels in the blood (uremia) may lead to brain encephalopathy, pericarditis (inflammation of the heart lining), or low calcium blood levels (hypocalcemia).

##### Diagnosis

- **Blood tests.** Kidney function tests look for the level of waste products, such as creatinine and urea, in your blood.
- **Urine tests.** Analyzing a sample of urine may reveal abnormalities that point to chronic kidney failure and help identify the cause of chronic kidney disease.

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- **Imaging tests.** Doctor may use ultrasound to assess the kidneys' structure and size. Other imaging tests may be used in some cases.
- **Removing a sample of kidney tissue for testing.** Doctor may recommend a kidney biopsy to remove a sample of kidney tissue. Kidney biopsy is often done with local anesthesia using a long, thin needle that's inserted through skin and into kidney. The biopsy sample is sent to a lab for testing to help determine what's causing the kidney problem.

### What is Uddanam Nephropathy?

The Uddanam region that lies in north-coastal Andhra consists of the mandals of Kaviti, Sompeta, Kanchili, Itchapuram, Palasa and Vajrapukotturu, accounting for more than 100 villages in total. As of 2015, It was estimated that more than 4500 people had died in the last ten years, and around 34,000 people were suffering from kidney diseases in this area alone. Mainly uddanam people are effected with chronic kidney failure. It was reported that each family in the area had at least one person suffering from a kidney ailment. The cases had first mysteriously surfaced in the early 90s. Symptoms included hypertension and diabetes, followed by a long asymptomatic period, and later diagnosed with excess proteins in the urine, decreased red blood cell count and high levels of uric acid in the blood. The phenomenon was discussed and termed *Uddanam Nephropathy* at the 2013 International Congress of Nephrology held in Hong Kong.

### Why does it occur?

Though it has been close to twenty years since the first cases were reported, the cause of *Uddanam Nephropathy* is yet to be scientifically established. The disease is known to disproportionately affect farmers and agricultural workers. Coconut and cashew are the main crops grown in the area. "Although the association of specific occupations with endemic nephropathy has highlighted the issue of environmental toxins and heat stress, the exact cause of *Uddanam Nephropathy* is still an enigma," writes Anirban Ganguli of Georgetown University in the May 2016 issue of the American Journal of Kidney Disease:

In 2011, a group of researchers studied the drinking water sources of these villages and found that "the presence of phenols and mercury in drinking water was found to be very high...Phenols and mercury, being very toxic in their characteristic nature, are bio-accumulative. Hence these waters are found not suitable for potable purposes." But this finding too could not conclusively term water to be the sole culprit for such a high prevalence. In 2016, The Indian Council of Medical Research (ICMR) along with researchers of Harvard University, Andhra Medical College, Bhabha Atomic Research Centre (BARC) and NTR University of Health Sciences among others looked into the matter. Researchers initially pinpointed "excessive levels of silica in water" as the cause after a preliminary round of examination. The ICMR research however could not be pursued further due to a fund crunch. Uddanam is a lush green region with rich coconut and cashew plantations in Srikakulam district. Andhra Pradesh state, India. An unknown number of people living in this area have a chronic kidney disease of unknown etiology, a disease that mostly affects farmers and agricultural workers. This condition was discussed and named Uddanam nephropathy at

the 2013 International Congress of Nephrology held in Hong Kong, China. An increased prevalence of chronic kidney disease has been observed in several geographical areas across the world over the past two decades.

**These endemic nephropathies include:** mesoamerican nephropathy in the central American countries; Balkan endemic nephropathy in the Balkan states; aristolochic acid nephropathy in Belgium, China and other countries that use herbal medicines; Sri Lanka nephropathy in Sri Lanka; and Uddanam endemic nephropathy in India. As the etiology of these nephropathies is not clear, the term chronic kidney disease of unknown etiology has been used for these nephropathies since the early 2000s.

Although chronic kidney disease has been recognized as a public health problem, Uddanam endemic nephropathy, compared to the other nephropathies of unknown etiology, is the least understood and the least publicized. Unpublished cross-sectional estimates from Uddanam suggest that the prevalence of chronic kidney disease of unknown etiology is between 40% and 60% (Raviraju, Dr, NTR University of health sciences, personal communication, August 2017). This range is nearly three times higher than the national prevalence of 17.2%. As of 2015, it was estimated that more than 4500 people had died from chronic kidney disease in the last ten years and around 34000 people had kidney diseases in Uddanam.

Many scientific communities are exploring the causes of chronic kidney disease of unknown etiology in Uddanam region. Various institutes and organizations such as the Indian Council of Medical Research along with Harvard University, King George Hospital, Andhra University, Dr NTR University of Health Sciences and others are looking into the possible causes of the disease. These institutes have sampled patients' blood and urine, tested soil, water and food, and surveyed and mapped the population of the affected region. Several hypotheses, such as high levels of silica in water, prolonged dehydration, heat stress nephropathy, nonsteroidal anti-inflammatory drug use, gene mutations, high pesticide use, heavy metals in water and others have been suggested as possible causes. However, until now none of these can explain why the disease is so rampant in Uddanam (Raviraju, Dr, NTR University of health sciences, personal communication, August 2017). Uddanam nephropathy is a public health issue in India and sharing expertise across disciplines and countries is needed to accelerate knowledge dissemination, guide the research agenda and help establish its causes. However, it is challenging for India to engage in sustained research, given constrained resource, research capabilities and national policy initiatives.

### What is the cause of the mysterious kidney disease in the Uddanam area of the Srikakulam District in Ap?

In 2016, The Indian Council of Medical Research (ICMR) along with researchers of Harvard University, Andhra Medical College, Bhabha Atomic Research Centre (BARC) and NTR University of Health Sciences among others looked into the matter. After a preliminary round of examination, researchers pointed that excessive levels of silica in water as the cause. A two member Harvard team strongly suspects genetic predisposition and a strong genetic founder effect playing a role in the Uddanam nephropathy. Their hypothesis is based on women who moved away from the region after marriage

developing chronic kidney disease of unknown aetiology (CKDu). They cited the recent study carried out by the Centre for Cellular and Molecular Biology (CCMB), which revealed the vulnerability of the people of Andhra Pradesh to genetic diseases. They underscored the importance of establishing a world-class kidney research institution in Uddanam and setting up a bio-bank to collect and store samples from the patients. Speaking at a symposium on Uddanam nephropathy, Dr Joseph Bonventre, chief of renal division, Brigham Women's Hospital, Harvard Medical School, and past president of the American Society of Nephrology, said; "The CCMB study revealed a high IBD (Identity-by-descent) score of AP, which shows they carry certain gene mutations responsible for diseases. I heard that people who migrated from North India to kidney disease endemic regions have not been developing CKDu. But people who are moving to other areas from Uddanam are developing CKDu. This points out at possible genetic predisposition."

Dr. Bonventre added that marriages among sub-population can easily lead to genetic diseases. However, a lot of research needs to be done to establish this link in Uddanam. "The world has changed so drastically and personalised medicine has gained prominence. The Uddanam patients may need total genome sequencing to identify the root cause," he added.

#### What has to be done?

- Screening the disease in early stages is what could help patients to take precautions.
- Primary and community health centers should be equipped with ultrasound machines. Blood and urine tests should be carried out regularly to examine patients.
- Sufficient funds to be released for those organisations and institutes who are unable to continue the research..
- Proper medical assistance and support in all aspects should be given to the affected people.
- Mineral water plants should be opened at every place. The govt promised NTR Sujala scheme (which aims to supply clean drinking water to all the people of AP) is not at all implemented in these areas.

This isn't just a health issue, but a human rights issue as clean drinking water is a fundamental right.

#### Problems being faced by the people in this region

- **Poor governance:** Most of the govt employees are not interested to work and live in this area because of this *Uddanam Nephropathy*.
- Most of the govt schools in this region don't have sufficient teaching staff and minimum primary facilities like mineral drinking water.
- Most effected people are farmers and agricultural workers, works on daily bais and their annual income is below 30,000 INR. This region doesn't have any rivers, so they depends only on rain water for all the agricultural purposes. The Socio-economic status of the people in this area is very low.
- Outsiders are not at all interested to marry the young people of this uddanam region.
- The only city which has somewhat international medical standards is Visakhapatnam which is around

250 km. They should travel to this city for better medical treatments.

- Most people are unable to afford the treatment expenses which is order of thousands or lakhs. They can bear only the travel expenses to Visakhapatnam. (You can imagine how much low is their economic status).

The government can spend 1,00,000 crores INR on building a capital city of the state and already spent 2,000 crores INR each on Krishna and Godavari pushkaralu but sad part is less concern to spent any money in a region where people are dying.

#### **"Uddanam Nephropathy is developing disease by negligence of the government and officials. WHAT IS THIS UDDANAM DISEASE?"**

This is a form of Chronic Kidney Disease (CKD). The cause is unknown till date. The symptoms of this disease include:

- High Blood Pressure
- Urea, which is to be eliminated out by urine gets deposited in the Kidney.
- Potassium accumulation in blood
- Red blood cells count decreased leading to Anemia.
- Fluid balance (total amount of intake and output of water in body is distributed

Even certain toxic chemicals like silicon, silica and other elements could become the cause of such kidney stone and renal failure. Research proves that elements like silica are known to cause renal failure when tested on animals. It could be the regional water that could contain such toxic elements that has made the people here to suffer from such kidney ailments. The water here should not be utilized for drinking purposes or should be completely eliminated from such toxic elements before consumption. Kidney effect is widely spread in uddanam. It's been more than two decades and the Uddanam kidney disease remains a mystery. The cause of 'Uddanam Nephropathy' as it is called is still unknown. Actor and Jana Sena party chief Pawan Kalyan is himself a champion and fighter for the cause. He was the one to receive the team of scientists from Harvard who have come to Srikakulam. This is a return visit and their research continues for a solution. They shall collect sample, conduct tests and submit their finding.

#### Epidemiology in Uddanam

- As of 2016, 3200 have lost their lives to the mystery disease.
- One in each family in Srikakulam is prey to the disease, as per numbers.
- Higher chances of disease attacking the age group of 30-40 years.
- More males prone to the disease than females.
- The most affected are cashew nut, rice and coconut farmers in the region.

#### Homeopathy can take chronic kidney disease in uddanam?

**Visakhapatnam:** Even as the mysterious prevalence of the chronic kidney disease (CKD) in Uddanam of Srikakulam district has kept the medicine and research fraternity biting their nails, a doctor from Vizag has claimed that the renal ailments, in an initial stage, respond well to the homoeopathy medicines.

Kongara Ramesh, a private homoeopathy practitioner, has said that his team is conducting a study on the chronic kidney disease victims in Uddanam after collecting samples from the region. "After reviewing several cases from Uddanam, we came to know that in the stage-I, the CKD patients are responding well to homeopathy treatment. The patients who are in the early stages are responding well to drugs such as Merk-car, Lycopodium, Calidabo and etc in various combinations," Ramesh told the media at the Homeo Hospital in Pandurangapuram on Tuesday. Ramesh and his 6-member team, all homeopathy practitioners, will organise a medical camp for CKD victims in Uddanam from Wednesday. "We will provide medicines to the patients and conduct an analysis on the CKD prevalence," he said. Citing the recent studies conducted by the research scholars of Biological Sciences Department of Andhra University, Ramesh said that the prevalence of bacteria E Coli in Uddanam was one of the trigger for the spread of CKD. "There are around 30 factors responsible for spread of CKD in Uddanam. We will try Homeopathic medicine as they have been yielding good results for E Coli cases," he said, adding that Navayuga Engineering Private Limited, a company is sponsoring the medial camp.

### Conclusion

- Screening the disease in early stages is what could help patients to take precautions.
- Primary and community health centers should be equipped with ultrasound machines.
- Blood and urine tests should be carried out regularly to examine patients .
- Sufficient funds to be released for those organisations and institutes who are unable to continue the research.
- Proper medical assistance and support in all aspects should be given to the affected people.

- Mineral water plants should be opened at every place . The govt promised NTR Sujala scheme (which aims to supply clean drinking water to all the people of AP) is not at all implemented in these areas.

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