

## Development of a Yoga Module for Chronic Kidney Disease of Unknown Etiology: Different evaluation methods

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### Abstract

There are currently no targeted interventions for chronic kidney disease at Uddanam (CKDu), a condition whose cause is unknown but which mainly impacts male farmers in the Uddanam region of Andhra Pradesh, India, and which leads to a decline in kidney function even when traditional risk factors are not present. While yoga is effective in treating kidney disease symptoms, no CKDu-specific modules exist. This study aims to design and validate such a module along with an effective methodology. Using systematic development and validation processes, we present a well-received yoga module tailored to the specific needs of CKDu patients.

### Methods

A review of earlier studies and classical texts led to the development of a yoga module for CKDu patients. Forty experts ranked fifty practices in order of significance after evaluating them. The content validity ratio (CVR) was computed using Lawshe's formula and twelve experts ranked Content Validity Index (CVI) for effective evaluation of Yoga module. All experts agree that the final module is relatively easy to teach, learn, and practice.

### Results

The final yoga module had 30 practices and a content validity ratio (CVR) of  $\geq 0.29$ . Only 30 of the initial 50 practices showed significant content validity. On the other hand, on the same lines with lesser number of experts say 5 to 7, we calculated the CVI and found  $>0.90$  which is excellent compared to CVR. Hence we came to the conclusion that CVI method may be used for the yoga module development.

### Conclusion:

Although the yoga module for CKDu patients demonstrated strong content validity by combining traditional wisdom with scientific evidence, more research is needed to fully assess its feasibility and effectiveness.

### Keywords:

Chronic kidney disease, unknown etiology, content validity ratio, Content validity Index.

**Introduction:**

Since 1950, numerous definitions of content validity have developed, showcasing diverse methodologies in the realm of test validation [1]. Initially characterized content validity as the degree to which a test subject's responses reflect a thorough sample of their reactions to a real or hypothetical array of situations that collectively delineate the area of interest for the test interpreter. Cronbach (1971) subsequently characterized content validity as the degree to which items on a tool are accurately chosen from the designated content domain. Throughout the years, various definitions of content validity have emerged in the literature. Regardless of the phrasing, these definitions typically agree that content validity pertains to the extent to which the sampled items accurately represent the domain and operational definition of the construct [2].

Chronic kidney disease (CKD) is a significant health issue worldwide, affecting a considerable number of people. The prevalence of CKD globally is estimated to be around 13.4% (with a range of 11.7% to 15.1%) and between 4.02 to 7.083 million individuals require renal replacement therapy due to end-stage kidney disease (ESKD). CKD has a direct impact on global morbidity and mortality rates due to its association with cardiovascular risk and ESKD. The increase in CKD prevalence worldwide is mainly attributed to factors such as ageing, obesity, hypertension and diabetes mellitus. However, in certain regions, CKD is caused by other factors such as infections, exposure to environmental toxins, and the use of herbal medicines. The lack of access to renal replacement therapy in developing nations has resulted in a significant number of deaths. Furthermore, the rising number of patients with ESKD is estimated to cause a substantial financial burden, even for wealthy nations in the future. Therefore, the cost-effectiveness of preventive measures to mitigate the disease burden should be evaluated based on local economic development and available resources [3]. According to the US-based KDOQI, hypertension appears late in the, slowly progressing CKDu and is frequently asymptomatic until an advanced stage. In 2002 the KDOQI defined CKD as a condition characterized by abnormalities in kidney structure or function [4]. Many substances, including agrochemicals, heavy metals, fluoride, toxins, and high salinity, are linked to these issues [5]; however, new research indicates that these levels are below safety thresholds. Unidentified toxins or additive effects could be involved. The need for prevention stems from its unclear causes [6]. Access to clean water, healthcare, and education is a challenge in rural areas. A suggested yoga-based module provides these communities with an affordable way to encourage physical activity.

**Yoga**

Yoga, a traditional practice, integrates breathing exercises (pranayama), physical postures (asanas), meditation, and relaxation techniques to enhance overall well-being. Studies indicate that yoga has a significant effect on lowering heart rate [7], blood pressure [8], and basal metabolic rate by diminishing sympathetic nervous system activity and enhancing parasympathetic dominance [9,10]. The adjustment of the autonomic nervous system significantly influences health, especially in the control of non-communicable diseases like hypertension, diabetes, and cancer. Through the reduction of sympathetic arousal and the promotion of relaxation, yoga improves the body's capacity to handle stress and slow disease progression, establishing itself as a valuable therapeutic approach for enhancing long-term health outcomes.

**Yoga and Kidney Diseases**

The Yoga Prana Vidya (YPV) system, which focuses on energy body healing, has demonstrated significant improvements in kidney health and hypertension using structured techniques such as exercises, breathing, and meditation [11]. In patients with CKDu, studies show reduced pain, fatigue, and improved biochemical markers. Although it is widespread, the evidence available is inadequate to identify the

environmental risk factors linked to CKDu [12, 13, 14]. Yoga's holistic approach is beneficial for a variety of non-communicable diseases, including CKDu, but it should be used in conjunction with medical treatment.

### **CKDu studies**

Chronic kidney disease of unknown etiology (CKDu), particularly prevalent in Uddanam, Andhra Pradesh, India, poses a major public health challenge due to its high morbidity and mortality rates. CKDu predominantly affects agricultural workers in tropical regions, with significant cases emerging in Central America, Sri Lanka, and India. The absence of a clear causal factor complicates prevention and management strategies. Various hypotheses have been proposed, including chronic exposure to agrochemicals, heavy metals, hard water consumption, and repeated dehydration due to strenuous labor in hot climates. However, the epidemiological evidence supporting these theories remains inconclusive.

Studies in the Uddanam region indicate a disproportionately high prevalence of CKDu, with many affected individuals progressing to end-stage renal disease (ESRD) in the absence of adequate intervention. Pesticide exposure, chronic dehydration, and heat stress are considered potential risk factors, though robust longitudinal studies to firmly establish causation are lacking. Some researchers have pointed to potential environmental contaminants, including cadmium and silica, but more comprehensive investigations are required to confirm these associations [15, 16].

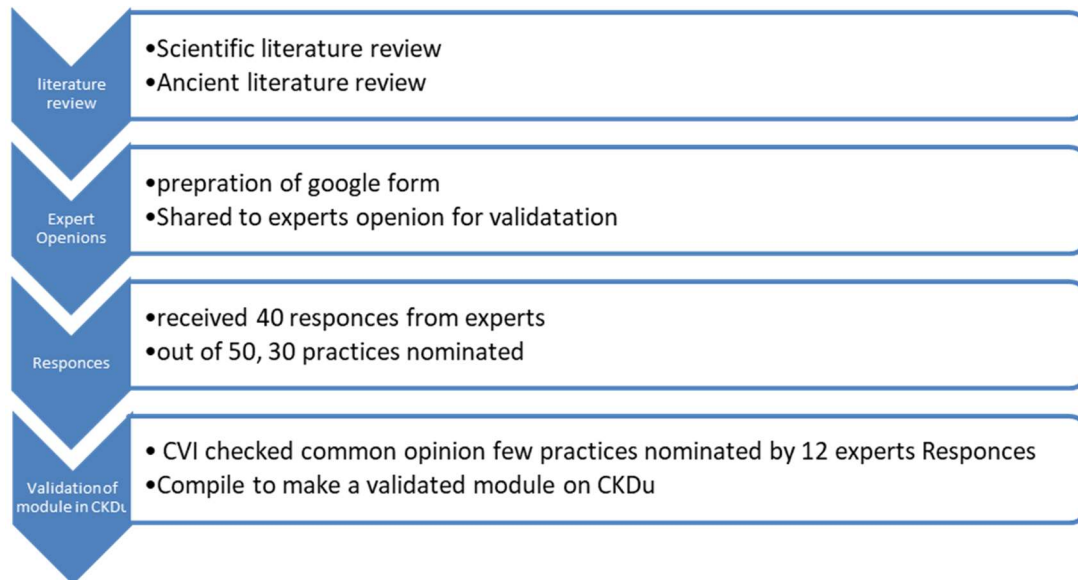
Further complicating CKDu research is the multifactorial nature of kidney damage, making it challenging to pinpoint specific etiological factors. In the absence of definitive preventive strategies, efforts to manage CKDu have focused on symptomatic treatment and community-level interventions. For instance, ensuring regular hydration and minimizing exposure to harmful environmental agents have been suggested as preliminary measures. Additionally, innovative therapeutic approaches, such as the integration of yoga and mindfulness-based interventions, have gained attention for their potential to alleviate the psychological and physiological stress associated with CKDu, although such approaches should complement rather than replace standard medical care.

### **Rationale for the Study**

The practice of yoga has shown considerable advantages in multiple areas of health, encompassing enhancements in physical, mental, and emotional wellness. Considering the intricate nature of chronic kidney disease of unknown etiology (CKDu) and the absence of conclusive alternatives to therapy, it is crucial to explore complementary therapies that could assist in minimizing its symptoms and improving the quality of life for patients. Creating a specialized yoga module designed for CKDu patients shows potential, yet it is crucial to ground this intervention in both traditional yogic knowledge and modern scientific understanding. Examining traditional yogic literature in conjunction with contemporary studies can contribute to the development of a secure and efficient yoga practice. The module's validation by health experts and yoga practitioners will further confirm its alignment with the specific needs of CKDu patients, providing an integrated strategy to dealing with this challenging condition.

### **Materials and Methods**

The Chronic Kidney Disease module was designed and validated as follows:



### Statistical analysis

The value of 0.29 was obtained using Lawshe’s formula to calculate the Content Validity Ratio (CVR) for the items [17]. The average CVR of all the items can be used as a measured of the overall content validity of the test.

Lawshe’s formula:  $CVR = (N_e - N/2) / (N/2)$ ,

The variables used in the formula are as follows:

$N_e$  = the total number of panelists who indicated that a specific practice is “essential”

$N$  = the total number of panelists who participated in the study or evaluation.

CVI

### CVI (Content Validity Index):

In content validity assessment, the percentage of content experts who consider an item relevant is measured using the Item-level Content Validity Index (I-CVI) [18]. It is computed by dividing the total number of experts by the number of experts who concur that an item is relevant (usually rated as 3 or 4 on a scale). Thus, the I-CVI formula is:

$$I-CVI = \text{Number of experts who agreed on item relevance} / \text{Total number of experts}$$

$$I-CVI = \text{Number of experts concurring on the applicability of the item} / \text{Total number of specialists}$$

$$I-CVI = \frac{\text{Total count of specialists}}{\text{experts concurred that the item was relevant}}$$

According to experts in the field, this index helps evaluate the relevance and appropriateness of individual items within a measurement or assessment tool. Showing the questionnaire to experts and asking them to rate each item as "not necessary," "useful but not essential," or "essential" is one way to check the content validity. The formula is as follows for every item: Given that  $N_e$  is the number of experts who voted 'essential' and  $N$  is the total number of recruited experts, the critical value ratio (CVR) can be calculated as  $(N_e - N/2) / (N/2)$ . From minus one to plus one, the CVR will swing. The next step in determining your item's validity is to use the Lawshe table to determine the minimum value of CVR that corresponds to your expert panel. The

content validity index also requires an extra Likert scale with four options: (A) relevance (from 1 to 4), (B) clarity (from 1 to 4), and (C) relevance (from 1 to 4). For each item, the relevance ITEM level CVI is determined by dividing the total number of experts recruited (N) by the number of experts voting (N = 3 or 4), which is represented by Nr. From zero to one, that's the range of the CVR. Similarly, for the sake of clarity, for each item, I-CVI (C) = NC/N. Calculating the total scale involves dividing the number of items with a CVI of 1 or deemed relevant by all judges (or the number of items with a score of 3 or 4) by the total number of items. This yields the scale content validity index S-CVI (R). If we want S-CVI (C) to be more clear, we should use the same method. At the item level, I-CVI (C) equals NC divided by N. To find the total scale, we divide the number of items with a CVI of 1 by the total number of items, then take the number of items that all judges deem relevant (scoring 3 or 4), and finally calculate the scale content validity index S-CVI (R).

**Table 1 Definition and characteristics of content validity**

	Definition and calculation	Characteristics	Limitations
1. Content validity-related estimates Content Validity Ratio (CVR)	2. CVR is a method for measuring agreement among experts regarding how essential a particular item is. $CVR = \frac{ne - N/2}{(N/2)}$ 3. $CVR = \frac{ne - N/2}{(N/2)}$ , Where CVR is the content validity ratio, ne is the number of panelists indicating an item "essential" and N is the total number of panel members.	1. Easy to compute 2. CVR value is computed for each item so it is useful in the discarded or retention of specific items. 3. Rating scale used for rating items: "essential", "useful but not essential", or "not necessary" 4. CVR values range from -1.0 to +1.0 5. CVR value is determined by Lawshe table. 6. Cut-off point value depends on the number of experts	1. Not easy to interpret as the calculations related to CVR critical were not reported in the literature.
2. CVI for each item (ICVI)	1. Item -CVI= Number of experts rating the item either 3 or 4/total number of experts 2. Ave-CVI= Sum of the I-CVIs (I-CVI1+I-CVI2+I-CVI3+ ... +I-CVI <sub>n</sub> )/total number of items 3. UA-CVI= Number of items that achieved rating 3	1. Simple and easy to compute. 2. Easily understood and interpreted. 3. It is computed for each item and assists in revising, deleting, or substituting items. 4. The method of calculating the item-CVI	1. Inflation of agreement due to chance

	<p>or 4 by all experts/total number of items.</p> <p>4. Ave-proportion of agreement across experts = Proportion of agreement of each expert/total number of experts. (I-CVI = content validity index of an item, Ave-CVI= Content validity index of the entire instrument, averaging calculation method, UA-CVI= Content validity index of the entire instrument, Universal agreement calculation method). (Adapted from Polit and Beck, 200641)</p>	<p>is similar between the two approaches.</p> <p>5. In both approaches, the minimum number of experts required is 3 experts.</p> <p>6. Lynn approach recommended 100% agreement required with fewer than six experts. Polit et al approach requires perfect agreement when there are three or four experts.</p> <p>7. Lynn approach: Cut-off point value depends on the number of experts and is determined by applying the standard error of the proportion. Polit et al approach: The Cut- off of the I-CVI is 0.78 or higher.</p>	
<p>(I-CVI = content validity index of an item, Ave-CVI= Content validity index of the entire instrument, averaging calculation method, UA-CVI= Content validity index of the entire instrument, Universal agreement calculation method, CVR Content Validity Ratio [18])</p>			

**Results**

**Table: 2 Proposed Practices for Chronic Kidney Disease**

Sl.No	Yoga practice items	Ne*	N*	(N/2)	(Ne-N/2)	CVR	Remarks
1.	Jogging	13	40	20	-7	-0.35	excluded
2.	Sukhasana twisting	31	40	20	11	0.55	included
3.	Waist twisting	35	40	20	15	0.75	included
4.	Hands in and out breathing	30	40	20	10	0.5	included

5.	Hands stretch breathing	32	40	20	12	0.6	included
6.	Ankle stretch breathing	31	40	20	11	0.55	included
7.	Tiger breathing	36	40	20	16	0.80	included
8.	Shashankasana breathing	33	40	20	13	0.65	included
9.	Tadasana Urdhva Hastasana	25	40	20	5	0.25	excluded
10.	Tadasana Urdhava Baddhasana	19	40	20	-1	-0.05	excluded
11.	Padahastasana	27	40	20	7	0.35	included
12.	Ardhakati chakrasana	36	40	20	16	0.8	included
13.	Ardha chakrasana	30	40	20	10	0.5	included
14.	Padmasana	21	40	20	1	0.05	excluded
15.	Vajrasana	24	40	20	4	0.2	excluded
16.	Ardha Ustrasana	34	40	20	14	0.7	included
17.	Shashankasana	32	40	20	12	0.6	included
18.	Yoga Mudrasana	29	40	20	9	0.45	included
19.	Paschimotanasana	32	40	20	12	0.6	included
20.	Uttana Mandukasana	22	40	20	2	0.1	excluded
21.	Gomukhasana	27	40	20	7	0.35	included
22.	Parshva sukhasana	30	40	20	10	0.5	included

23.	Simhasana	20	40	20	0	0	excluded
24.	Uttanasana	19	40	20	-1	-0.05	excluded
25.	Meru Vakrasana	35	40	20	15	0.75	included
26.	Vakrasana	34	40	20	14	0.7	included
27.	Ardha Matsendrasaa	30	40	20	10	0.5	included
28.	Bhujangasana	35	40	20	15	0.75	included
29.	Shalabhasana	24	40	20	4	0.2	excluded
30.	Purva Uttanasana	17	40	20	-3	0.15	excluded
31.	Vipareethakarni	28	40	20	8	0.4	included
32.	Ardha Halasana	26	40	20	6	0.3	included
33.	Matsyasana	22	40	20	2	0.1	excluded
34.	Chakrasana	11	40	20	-9	-0.45	included
35.	Pavanamukthasana	33	40	20	13	0.65	included
36.	Setubandasana	27	40	20	7	0.35	included
37.	Shavasana	38	40	20	18	0.90	included
38.	Ananthasana	21	40	20	1	0.05	excluded
39.	Jala Neti	15	40	20	-5	-0.25	excluded
40.	Sutra Neti	9	40	20	-11	-0.55	excluded
41.	Vaman Dhouti	10	40	20	-10	-0.5	excluded
42.	Kaphalabhathi	17	40	20	-3	-0.15	excluded
43.	Sectional Breathing	37	40	20	17	0.85	included

44.	Ujjayee Pranayam	24	40	20	4	0.2	excluded
45.	Nadisuddhi	37	40	20	17	0.85	included
46.	Bhramari	35	40	20	15	0.75	included
47.	Yoga Nidra	38	40	20	18	0.9	included
48.	Deep Relaxation Technique(DRT)	38	40	20	18	0.9	included
49.	Mind Sound Resonance Technique(MSRT)	31	40	20	11	0.55	included
50.	Om Meditation	32	40	20	12	0.6	included

Ne = the total number of panelists who indicated that a specific practice is “essential”, N = the total number of panelists who participated in the study or evaluation, Content Validity Ratio (CVR)= (Ne - N/2)/(N/2), Content Validity Index (CVI)

**Table: 3**

The definition and formula were derived from the Recommendations [ 19, 20,21,22]

ms	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	Numbering in Agreement	Item CV I	Universal Agreement
1	1	1	1	1	0	0	1	1	0	0	1	1	7	0.5833	0
2	0	1	0	0	1	0	0	0	0	0	0	1	2	0.1667	0
3	1	0	1	1	0	0	1	1	0	0	1	1	8	0.6667	0
4	1	1	1	1	0	1	1	1		1	1	0	9	0.75	0
5	1	1	1	1	0	1	1	1		0	1	1	8	0.6667	0
6	1	1	1	0	0	1	0	1	1	0	1	1	8	0.6667	0
7	1	0	0	0	1	1	1	1	1	1	1	0	9	0.75	0
8	1	1	0	0	0	0	1	1	0	1	1	1	7	0.5833	0
9	1	1	0	0	0	1	0	0	0	1	1	0	4	0.3333	0
10	1	1	1	1	0	0	1	1	1	1		0	8	0.6667	0
11	1	1	1	0	0	1	1	1	1	1	1	1	10	0.8333	0
12	1	1	1	0	0	0	1	1	1	1	1	0	8	0.6667	0
13	1	1	1	0	0	0	1	1	0	0	1	1	7	0.5833	0

14														0.8 333 33	0
	1	1	0	0	1	1	1	1	1	1	1	1	1	10	
15														0.6 666 67	0
	1	1	1	0	0	1	1	1	1	0	1	0	8		
16														0.5 833 33	0
	1	1	0	0	1	1	1	1	0	0	1	0	7		
17														0.7 5	0
	1	0	1	1	0	0	1	1	1	0	1	1	9		
18														0.7 5	0
	1		1	0	0	1	1	1	1	1	1	0	9		
19														0.5	0
	1	1	0	0	1	0	1	1	1		1	0	6		
20														0.3 333 33	0
	1	0	0	0	0	0	1		1	0	0	1	4		
21														0.7 5	0
	1	1	0	0	1	0	1	1	1	1	1	1	9		
22														0.6 666 67	0
	1	1	1		0	0	1	1	1	1	1	1	8		
23														0.7 5	0
	1	0	1		0	0	1	1	1	1	1	1	9		
24														0.6 666 67	0
	1	1	1	1		0	1	1	0	0	1	1	8		
25														0.3 333 33	0
	0	0	0	0	1	0	1	1	0	0	1	0	4		
26														0.6 666 67	0
	1	0	1	0	0	0	1	1	1	0	1	1	8		
27														0.4 166 67	0
	1	1	0	0	0	0	1	1	1	0	1	0	5		
28														0.4 166 67	0
	1	1	1		1	0	1	0	0	0	1	0	5		
29														0.9 166	0
	1	1	1	1	1	1	1	1		1	1	1	11		

														67		
30	1	1	1	1	1	1	1	1	1	1	1	1	1	12	1	1
31	1	1		0	1	1	1	1	1	1	1	0	9	0.75	0	
32	0	0	1	1	1	1	1	1	1	0	0	0	7	0.5833	0	
33	1	0	1	0	0	0	1	1	1	0	0	1	7	0.5833	0	
34	0	0	0	0	0	0	1	0	0	0	1	0	2	0.1666	0	
35	0	0	0	1	0	0	1	1	0	1	1	1	6	0.5	0	
36	1	0	0	0	0	0	0	0	0	1	1	0	3	0.25	0	
37	1	1	1	1	1	1	1	1	1	1	1	1	12	1	1	
38	1	1	1	1	1	1	1	1	1	1	1	1	11	0.9166	0	
39	1	1	1	1	0	1	1	1	1	1	1	1	11	0.9166	0	
40	1	1	1		1	0	1	1	1	1	1	0	9	0.75	0	
41	1	1	1		0	0	1	1	1	1	1	1	9	0.75	0	
42	1	1	1	1	1	1	1	1	1	1	1	1	12	1	1	
43	1	0	1	0	0	0	1	1	1	1	1		8	0.6666	0	
44	0	1	0	1	1	0	1	1	1	1	0	0	6	0.5	0	
45	1	1	0	0	1	0	1	1	1	1	0	1	7	0.5833	0	
46	1	1	0	0	0	0	1	1		1	1	1	7	0.5833	0	
47	0	0	0	0	1	0	1	0	0	0	1	0	4	0.3	0	

														333 33		
48	1	1	1	1	1	1	1	1	1	1	1	1	1	12	1	1
49	0	0	0	0	0	0	1	0	0	1	1	0	3	0.2 5	0	
50	1	0	1		1	0	1	1	1	0	1	0	8	0.6 666 67	0	
Proportion	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9			0	
Relevant	76 19	68 75	666 67	411 76	523 81	473 68	782 61	76 19	677 42	655 17	767 44	642 86	7.6			
Mean Expert Proportion(S-CVI/Aver) =0.63333															0.08	
The definition and formula were based on the recommendations [19, 20, 21, 22]																

**Table: 4 Critical Analysis of two Methods – CVR and CVI**

	Requisite Yoga Modules	Method 1	Method 2
			12 experts
		40 experts	<ul style="list-style-type: none"> <li><b>Relevance:</b> Experts rated items on a scale from 1 ('not relevant') to 4 ('highly relevant').</li> </ul>
Sl.No.	Asanas and Pranayamas	CVR	CVI
1.	Sukasana Twisting	31(0.55)	relevant
2.	Waist Twisting	35(0.75)	relevant
3.	Hands in and out breathing	30(0.5)	relevant
4.	Hands stretch breathing	32(0.6)	relevant
5.	Ankle stretch breathing	31(0.55)	relevant
6.	Tiger Breathing	36(0.8)	relevant
7.	Shashankasana Breathing	33(0.65)	relevant

8.	Padahatasana	27(0.35)	relevant
9.	Ardha kati chakrasana	36(0.8)	highly relevant
10.	Ardha Ustrasana	34(0.7)	relevant
11.	Shashankasana Breathing	32(0.6)	relevant
12.	Yoga Mudrasana	29(0.45)	relevant
13.	Gomukhasana	27(0.35)	relevant
14.	Parshvasukhasana	30(0.5)	relevant
15.	Meru Vakrasana	35(0.75)	relevant
16.	Vakrasana	34(0.7)	relevant
17.	Ardha Matsendrasana	30(0.5)	relevant
18.	Bhujangasana	35(0.75)	relevant
19.	Vipareethakarni	28(0.4)	relevant
20.	Ardha Halasana	26(0.3)	relevant
21.	Pavanamukthasana	33(0.65)	relevant
22.	Setubandasana	27(0.35)	relevant
23.	Shavasana	38(0.9)	highly relevant
24.	Sectional Breathing	37(0.85)	relevant
25.	Nadisuddhi	37(0.85)	relevant
26.	Bhramari	35(0.75)	relevant
27.	Yoga Nidra	38(0.9)	highly relevant
28.	Deep Relaxation Technique(DRT)	38(0.9)	highly relevant
29.	Mind Sound Resonance Technique(MSRT)	31(0.55)	relevant
30.	Om meditation	32(0.6)	relevant

**Table: 5 Yogic Practices and their Health Benefits**

Quality	Yogic practice
Twisting stimulates and tones your abdominal organs, including the kidneys and digestive organs.	Sukasana Twisting
Helps to detoxify the waste, lactic acid and acidity from the body. Strengthens muscles, tendons and ligaments.	Waist Twisting
It helps in dealing with many life style diseases such as diabetes, hyper tension,	Hands in and out breathing

back pain ,digestive issues and heart disease.	
stimulates the lymphatic system(De toxifies the body),lowers blood pressure.	Hands stretch breathing
Stretching may help a person alleviate lower back pain, research suggests that performing specific stretches may help relieve headaches and improve sleep disorders.	Ankle stretch breathing
Induces proper and great metabolism	Tiger Breathing
It helps to eliminate anger and has a cooling effect on the brain	Shashankasana Breathing
Eliminate stress, fatigue and anxiety by simply energizing the body	Padahatasana
Tones the muscles around the waist ,hips and abdomen.	Ardha kati chakrasana
Stimulates the internal organs of the stomach and boosts the functions of liver, pancreas, adrenal. Envigorates the entire nervous system which is good for stress and depression.	Ardha Ustrasana
Massages the abdominal muscles. Gives good relaxing stretch to the spine.	Shashankasana
Heals gastric condition, brings fresh blood to the brain.	Yoga Mudrasana
Relieves from chronic knee pain. Provides power to ankles, thighs, shoulders armpit, chest deltoid and triceps.	Gomukhasana
Relives from joint muscular pain	Parshvasukhasana
Ensures the proper flow of oxygen, blood and nutrients to the urinary region.	Meru Vakrasana
Stimulate the abdominal area by promoting the release of digestive juices.	Vakrasana
Heals back pain relieves from stress	Ardha Matsendrasana
Helps in better circulation of oxygen in blood vessels of the heart and various organs.	Bhujangasana
Heals hypertension and symptoms of depression	Vipareethakarni
Improves metabolism, beneficial for heart, blood and claustral problems.	Ardha Halasana
Relieves from chronic gas problems	Pavanamukthasana
Relief from high blood pressure	Setubandasana
Helps to reduce blood pressure, calms the mind and improves mental health.	Shavasana
Beneficial for hypertension	Sectional Breathing
Helps to improve neuromuscular coordination, blood circulation, blood pressure and relieves body ache.	Nadisuddhi
Lowers blood pressure, relieving hypertension, releases cerebral tension.	Bhramari
Manage immune function, blood pressure, cortisol levels and induce restful sleep, treats chronic pain and post-traumatic stress disorder	Yoga Nidra
Lowering blood pressure, reducing muscle tension and chronic pain	Deep Relaxation Technique(DRT)
Normalizes blood pressure and heart rate, Decrease state of anxiety.	Mind Sound Resonance Technique(MSRT)
Brings down the blood pressure, reduces the stress and relaxes the body.	Om meditation

**Table: 6 CKDu Yoga Module**

S.No	Name of Asanas	Time	Rounds
	Starting Prayer	1min	
<b>BREATHING EXERCISES</b>			
1.	Ankle stretching Breathing	1 min	9 Rounds
2.	Hands in and out Breathing	1 min	9 Rounds
3.	Hands –stretch Breathing (90, 135, 180)	2 min	9 Rounds
4.	Tiger Breathing	2 min	9 Rounds
5.	Shanshankasana Breathing	1 min	9 Rounds
<b>LOOSENING EXERCISES</b>			
6.	Sukasana Twisting	1 min	5 Rounds
7.	Parshva Sukhasana	1min	5 Rounds
8.	Waist Twisting	1 min	4 Rounds
9.	Pada Hastasana	1 min	3 Rounds
10.	Ardha kati Chakrasana	1 min	3 Rounds
<b>SITTING ASANAS</b>			
11.	Ardha Ustrasana	1 min	
12.	Shashankasana	1 min	
13.	Yoga Mudrasana	1 min	
14.	Gomukhasana	I min	
15.	Meru Vakrasana	1 min	

16.	Vakrasana	1 min	
17.	Ardha Matsendrasana	1 min	
PRONE ASANAS			
18.	Bhujangasana	1 min	
SUPINE ASANAS			
19.	Ardha Halasana	1 min	
20.	Pavana Mukthasana	1 min	
21.	Setubandasana	1 min	
22.	Vipareethakarni	4 min	
23.	Shavasana	1 min	
PRANAYAMA			
24.	Sectional Breathing	3 min	10 rounds
25.	Nadisudhi	5 min	9 rounds
26.	Bhramari	2 min	5 rounds
MEDITATION			
27.	Deep Relaxation Technique	5min	
28.	Yoga Nidra	5min	
29.	Mind Sound Resonance Technique	5min	
30.	Om Meditation	5min	
	Ending Prayer	1 min	

### Discussion

The comprehensive yoga module created as a result of this process demonstrates a structured and evidence-based approach to incorporating yoga into the CKDu management system. Creating a thorough yoga program specifically for people with Chronic Kidney Disease of Unknown Etiology (CKDu) required a

multidisciplinary approach that included traditional yogic texts, expert opinions, and the most recent scientific research [23]. Even though yoga's historical emphasis—especially in the Hatha yoga tradition—was on spiritual elevation, modern modifications highlight the practice's healing properties [24]. The purpose of this study was to maximize these advantages in order to improve CKDu patients' general mental and physical health, prevent chronic diseases, and increase their level of physical fitness. Expert input from a range of yoga schools was incorporated into the validation process for the yoga module, guaranteeing a thorough and well-rounded approach. The evaluation process assessed the appropriateness and relevance of each included practice through the use of the Content Validity Index (CVI) and the Content Validity Ratio (CVR). Expert participation guarantees that the module is based on both conventional wisdom and contemporary scientific knowledge [25]. A quantitative approach to content validation is offered by the use of CVR and CVI, guaranteeing that each module item is clear and pertinent. However, individuals must practice yoga under the supervision of qualified teachers and consult with medical professionals to ensure safety and appropriateness, especially for those with chronic health conditions [26]. Finally, the integration of expert consensus and rigorous validation processes resulted in a robust yoga module designed specifically for CKDu patients. This approach not only ensures that the practices are relevant and clear, but also emphasizes yoga's therapeutic potential as a complementary intervention for chronic diseases.

### **Conclusion**

This study underscores the potential benefits of yoga interventions for individuals with Chronic Kidney Disease of Unknown Etiology (CKDu). By designing yoga programs that are accessible, personalized, and adapted to the unique needs and abilities of CKDu patients, it is possible to enhance their overall quality of life and well-being. Integrating such interventions with standard medical care offers a holistic approach to managing the physical and psychological challenges associated with CKDu, providing an important complementary tool for patient care.

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### **Conflicts of interest**

None

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