Methodology:

The study was part of an ongoing research program in Uddanam - STOP CKDu (Study to Test and Operationalize Preventive approaches for CKD of undetermined aetiology). Details of the study design and sampling strategy have been published[1]. A total of 2402 adult subjects were selected using a cluster random sampling technique using probability proportionate to size methodology from 40 clusters comprising 67 villages. We collected primary data for this study between January and March 2020 from 221 randomly selected subjects who were part of the original cohort after obtaining approval from the Institute Ethics Committee of the George Institute for Global Health.

Trained research staff visited patients in their homes and explained the nature of the study. After obtaining consent, a standardised questionnaire (Supplementary file) was administered to collect clinical details, health seeking behaviour and the treatment cost incurred by each patient. The questionnaire included demographic information, disease specific questions, health seeking behaviour, treatment costs – both direct (medications, doctors fee, and laboratory and transportation to hospital) as well as indirect (traveling time, hospital waiting time and self-wage loss), source of treatment funding and information on distress financing.

We used modified Kuppuswamy scale to evaluate socioeconomic status (SES)[2]. This scale computes the SES of family using index parameters like education, occupation, and aggregate income of the family. These parameters are further divided into subgroups. The total score ranges from 3-29 and classifies families into 5 groups – upper, upper middle, lower middle, upper lower and lower socio-economic classes[2].

All participants were interviewed face-to-face and 100% of the completed questionnaires were verified after the interview by BG and RJ to ensure quality.

Treatment costs:

Two broad cost categories were estimated: out of pocket (OOP) expenses related to health care and indirect costs (productivity losses). Direct health care costs included doctor's fees and expenses related to medicines and laboratory services. Direct non–health care costs included transport costs for a round trip from home to the health facility [3]. Direct costs were

defined as the sum of direct health care and direct non–health care costs. Indirect costs were determined through the human capital approach[3,4]. Productivity losses were calculated by multiplying the working hours lost while seeking care, estimated by multiplying the estimated number of lost production hours by the official minimum wage (US$ 5.1 per day for the agricultural sector in 2019)[5]. We assumed an average workday of 8 hours/day and 22 working days/month.

We asked about all costs incurred on medical care in the last 6 months (26 weeks) and multiplied the figure by 2 to get the annual costs. All costs were calculated in 2020 Indian Rupees (INR). An average exchange rate of 2020, 1 United States Dollar (USD) = INR 74.132 was used for conversion. We defined catastrophic healthcare expenditure (CHE) as any expenditure greater than 10% of total household income, as recommended by the Inter-Agency Expert Group on Sustainable Development Goals. Income may not be the best measure to reflect a household's capacity to consume goods and service in settings with large proportion of employment outside of the formal sector, which is subject to fluctuating levels of income depending on season or availability of work. In such a case, consumption expenditure may be the more valid measure of economic resources. As we did not collect consumption expenditure data, we relied on income as denominator in this study. To report the uncertainty around using income for calculating CHE, we used different thresholds to check the proportion facing CHE. Distress financing or financial hardship was defined as borrowing from family and/or friends, selling possessions, or taking out loans to fund care [6-8].

Sample size

As no previous information is available on cost of CKD care among non-dialysis patients in India, we conducted a pilot study by recruiting 32 randomly selected patients with CKD and estimated the mean annual cost for CKD care at US$ 450 ± 358.9. With these assumptions, interviewing 13 patients from each of the 16 study clusters (total 208) would allow us to estimate the cost with an absolute precision of INR 5,000 (US$ 67.3), if we assume an inter-cluster correlation of 5% and considering a non-response rate of 20%.

Statistical analysis

Patients were stratified by type/ types of health facility visited. Descriptive statistics have been provided for summarizing the socio-demographic, clinical and economic characteristics as a proportion for categorical variables and mean (±SD, standard deviation) or median (IQR, inter-quartile range), respectively, for normally or non-normally distributed continuous data. All analyses were done by using STATA version 16.

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Supplementary Table 1: Demographic details of study participants

	Males	Females	Total
Number of cases	107	114	221
Age (years)	57.5±11.8	57.4±10	57.4± 10.9
Duration of CKD (months)	60 (36-96)	48 (36-84)	60 (36-84)
Medical visits in past 1 year	6 (4-12)	6 (4-10)	6 (4-10)
Annual household income (US$)	2701.6 (1859.6)	2250.1 (1423.5)	2468.7 (1660.8)
***Socio economic status**			
Lower	7 (3.2)	15 (6.8)	22 (9.9)
Lower middle	19 (8.6)	10 (4.5)	29 (13.1)
Upper lower	78 (35.3)	89 (40.3)	167 (75.6)
upper middle	3 (1.4)	0 (0)	3 (1.4)
Upper	0	0	0
Serum creatinine (mg/dl)	3.5±1.4	3.2 ±1.4	3.3 ±1.4
eGFR (ml/min/1.73m^2)	22.5 ± 9.4	19.4±9.2	20.8±9.4
Comorbidities			
No comorbidities	64 (59.8)	61 (53.5)	125 (56.6)
Hypertension	35 (32.7)	42 (36.8)	77 (34.8)
Diabetes	5 (4.6)	6 (5.3)	11 (4.9)
Both	3(2.8)	5(4.3)	8 (3.6)

*Modified Kuppuswamy scale was used for assessing the socioeconomic status. eGFR : estimated glomerular filtration rate (CKD-EPI formula)

Note: **Figures in parenthesis indicate interquartile range and percentages**

Supplementary Table 2: Catastrophic health expenditure by select patient demographics

		>10-20 % of total income	>20-30 % of total income	>30-40 % of total income	> 40 of total income
Number of cases	221	**63 (28.5)**	**49 (22.2)**	**11 (4.9)**	**26 (11.8)**
Gender					
Male	107	31 (28.9)	22 (20.5)	6 (5.6)	10 (9.3)
Female	114	32 (28.1)	27 (23.7)	5 (4.4)	16 (14.3)
Facility visited					
Government	51	5 (9.8)	4 (7.8)	0 (0)	0 (0)
Private	126	44 (34.9)	36 (28.6)	8 (6.4)	18 (14.3)
Both	44	14 (31.8)	9 (20.5)	3 (6.8)	8 (18.2)
Socioeconomic status**					
Lower	29	2 (9.1)	5 (22.7)	1 (4.5)	9 (40.9)
Lower middle	22	4 (13.8)	3 (10.3)	1 (3.4)	1 (3.4)
Upper lower	167	56 (33.5)	41 (24.5)	9 (5.4)	16 (9.6)
Upper middle	3	1 (33.3)	0 (0)	0 (0)	0 (0)
Comorbidities					
Yes	96	21 (21.9)	22 (22.9)	8 (8.3)	15 (15.6)
No	125	42 (33.6)	27 (21.6)	3 (2.4)	11 (8.8)

*Catastrophic health expenditure refers to health expenditure that exceeds a threshold proportion of a person or household's total income or consumption; **As measured by the modified Kuppuswamy scale

Fig 1: Showing healthcare spending according to the type of health facilities utilised for care of CKD