OPEN ACCESS Microbiology Journal

ISSN 2153-0696
DOI: 10.3923/mj.2025.1.31

Research Article
Prevalence and Resistance Profile of Enteric Bacteria Isolated in Chronic Kidney Disease Patients at Laquintinie Hospital of Douala: A Cross-Sectional Study

Ballue Serges Tatiefo Dadjo, Michael Francis Kengne, Ornella Djiolieu Tsobeng, Armelle Tsafack Mbaveng and Victor Kuete

Department of Biochemistry, Faculty of Science, University of Dschang, Dschang, Cameroon

Abstract

Background and Objective: Chronic Kidney Disease (CKD) is a major increasing problem globally and causes mortality and morbidity in the general population. Patients with CKD have a high level of uremic toxin, which exposes them to gastrointestinal complications. This study aims to determine the frequency of gastrointestinal infections and the resistance profile of enteric bacteria isolates in chronic kidney disease patients at the Laquintinie Hospital in Douala (Cameroon). **Materials and Methods:** Stool samples from 142 patients with chronic kidney diseases and 215 patients without chronic kidney diseases, all suffering from gastrointestinal troubles, were collected to isolate pathogenic intestinal bacteria using selective and differential culture media. The Chi-square test was used for statistical analysis to measure the frequencies of pathogen isolates, the rate of antibiotic resistance and the frequencies of multidrug-resistant isolates obtained from patients. A value of $p<0.05$ was considered significant. **Results:** The frequency of gastrointestinal infections in the population study was 77.95% (n = 357), divided into 60.22% (n = 215) for patients without chronic kidney disease and 39.78% (n = 142) for patients with chronic kidney disease. All isolates (100%) of *Enterobacter cloacae*, *Shigella* spp., *Yersinia pestis* and *Citrobacter freundii* in patients with chronic kidney disease were resistant to the usual antibiotics. Multidrug-resistant bacteria of *Enterobacter cloacae*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Shigella* spp. and *Yersinia pestis* were found more frequently (72.73, 66.67, 71.43, 83.33 and 88.89%, respectively) in patients with chronic kidney disease compared to patients without chronic kidney disease (27.27, 33.33, 28.57, 16.67 and 11.11%, respectively). **Conclusion:** These results underlined the necessity to prevent and manage gastrointestinal complications (symptoms and infections) in chronic kidney disease patients at Laquintinie Hospital of Douala.

Key words: Chronic kidney diseases, dysbiosis, gastrointestinal infections, enteropathogens bacteria, antimicrobial resistance, multidrug resistance

Citation: Dadjo, B.S.T., M.F. Kengne, O.D. Tsobeng, A.T. Mbaveng and V. Kuete, 2025. Prevalence and resistance profile of enteric bacteria isolated in chronic kidney disease patients at Laquintinie Hospital of Douala: A cross-sectional study. Microbiol. J., 15: 1-31.

Corresponding Author: Armelle Tsafack Mbaveng and Victor Kuete, Department of Biochemistry, Faculty of Science, University of Dschang, Dschang, Cameroon

Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Chronic Kidney Disease (CKD) is an abnormality of the structure or function of the kidney and constitutes a major public health problem globally[1]. The kidney can interact with the intestine via the kidney-colon axis[2,3]. It is a complex association that reveals, on the one hand, that the intestinal microbiota participates in the progression of chronic kidney disease[4]. On the other hand, alteration of the intestinal microbiota and persistent inflammation of the intestinal mucosa during the disease lead to dysbiosis. These are harmful effects that influence the function of the digestive tract, dysfunction of the digestive barrier and increased intestinal translocation of derived factors, characterized by gastrointestinal disorders[5,6]. These gastrointestinal disorders are the main and most frequent problems encountered during chronic kidney disease[7]. In most cases, they are asymptomatic and failure to manage them constitutes a risk for more serious complications[6]. The bidirectional relationship between the gastrointestinal (GI) tract and complications of Chronic Kidney Disease (CKD) has become increasingly recognized in recent years[5]. The GI disorders occurring in CKD patients include constipation, diarrhea, dysgeusia, anorexia, dyspepsia, hiccups, nausea and vomiting and contribute to the progression of CKD[7,8]. Some studies explain that many gastrointestinal disorders, like constipation, may increase the risk of development of CKD[2]. In Chronic Kidney Disease (CKD), dysbiosis intestinal microflora has been reported with an increase in pathogenic flora compared to symbiotic flora and the occurrence of gastrointestinal infections[9]. They are responsible for substantial morbidity and mortality among CKD patients in developing countries[10]. A cohort study demonstrated that patients with chronic kidney diseases have a rate of Enterobacteriaceae (especially *Enterobacter*, *Klebsiella* and *Escherichia*) that is higher than that of controls. The study by Guobin *et al.*[11] showed that patients with impaired renal function have a 68.9% risk of being infected by multi-resistant bacteria (*Staphylococcus aureus*, *Enterococcus* spp., *Enterobacteriaceae*, *Pseudomonas aeruginosa* and *Acinetobacter* spp.)[11]. The most frequently isolated bacteria are *E. coli* and *Klebsiella* which present a high resistance rate to usual antibiotics[12]. The family of Enterobacteriaceae most isolated in CKD patients has the most multidrug resistance compared to healthy people. Antibiotic resistance in pathogenic bacteria is now a challenge in clinical practice and patients suffering from chronic kidney disease in particular[13]. Although antimicrobials have successfully eradicated and cured many infectious diseases, inappropriate antimicrobial use and the emergence of resistant organisms have exacerbated disease severity, as seen in secondary renal amyloidosis with chronic persistent infection. The re-emergence of various infections has been a recent trend in the developed worng leading to uncertain diagnostic challenges and associations with kidney diseases[14]. No clear management guidelines currently exist for many of the gastrointestinal problems that accompany renal failure[2]. Thus, this study aimed to investigate the various gastrointestinal disorders and the resistance profile of enteric pathogens observed in patients suffering from chronic kidney disease at the Laquintinie Hospital in Douala.

MATERIALS AND METHODS

Study design: This was cross-sectional epidemiological research conducted between January, 2022 and December, 2023. This research was conducted in the Laquintinie Hospital in Douala, Littoral Region of Cameroon. It is one of the reference centers that houses a Nephrology Department in Douala, Cameroon.

Population studied: This study included 197 patients with chronic renal failure and 261 patients without chronic renal failure suffering from urinary disorders who came for consultation. The 458 people were willing to participate voluntarily in this study. Patients whose doctor ordered a stool test and who had not received any specific antibacterial treatment in the previous two weeks were included in this study. Pregnant women, burn patients, hemodialysis patients, kidney transplant patients and patients on immunosuppressive therapy were not included in this study.

Ethical approval: The National Ethics Committee for Research on Human Health of Yaoundé, Cameroon (NECRHH), N°2021/12/107/CE/CNERSH/SP, approved experimental procedures and protocols used in this study. The study design was explained to the participants and a signed informed consent to participate in the study was obtained by each participant. A questionnaire was administered to each participant. Each participant responded to a questionnaire designed to collect information on age, gender and socio-demographic information.

Stool sample collection: The patient carried out 458 fecal samples. The stool samples were collected in sterile containers by taking all precautions to avoid contamination.

Isolation and identification of bacteria: Stool samples from each participant were immediately transported to the laboratory for culture. After diluting a fraction of the stool in physiological water until an opalescent suspension was obtained, a suspension of the inoculum was collected with a

platinum loop and streaked into Hektoen enteric agar. The plates were incubated at 37°C for 24 hrs. Primary bacterial isolates were identified based on their morphological characteristics.

The yellow-orange colonies (acidification of the medium) were reseeded on eosin-methylene blue agar (EMB) medium. Pink mucoid colonies obtained were suspected to be *Klebsiella* spp. The pink colonies with no sparkle were possibly *Enterobacter*. *Citrobacter* had a pale violet color with a faint metallic sheen. The yellow colonies with black centers were bacteria of the genus *Proteus* spp. The green or blue colonies (not acidification) were reseeded on Salmonella-Shigella (SS) agar medium. Black colonies that invaded a medium were possibly *Proteus* spp.; translucent colonies with a black center were sweetly *Salmonella* spp.; non-colored colonies were suggestively *Shigella* spp. For all the confirmation, the API 20 E Gallery (Biomérieux, Lyon, France) was used.

Antibiotic susceptibility test: *In vitro* susceptibility testing of bacterial isolates to various standard antibiotics was carried out using the Kirby-Bauer diffusion method[15]. Antibiotics tested included the beta-lactam family (amoxicillin (AMO, 10 µg), imipenem (IMP, 10 µg), aztreonam (ATM, 50 µg), ceftriaxone (CRO, 30 µg), cefepime (CPM, 50 µg), cefotaxime (CTX, 5 µg), amoxicillin/clavulanic acid (AMC, 20/10 µg)); fluoroquinolones (ciprofloxacin (CIP, 5 µg), ofloxacin (OFX, 10 µg), nalidixic acid (NAL, 10 µg)), aminoglycosides [amikacin (AMK, 30 µg), gentamycin (GEN, 50 µg)), fosfomycin (FOS, 200 µg) and trimethoprim-sulfamethoxazole (SXT, 25 µg) (Singapore Biosciences PTE Ltd, Singapore). Briefly, the bacterial isolate tested was emulsified in physiological water until turbidity was like that of the 0.5 McFarland standard. Previously prepared Mueller Hinton agar (MHA) was aseptically cast to a thickness of 90 mm in Petri dishes. After solidification, the agar was inoculated with a sterile swab to obtain a semi-fluent growth, followed by the deposition of the antibiotic discs. The assembly was then incubated at 37°C for 24 hrs. After incubation, the zones of inhibition around the antibiotic discs were measured and interpreted according to the European Committee on Antimicrobial Susceptibility Testing (EUCAST)[16]. Quality control of antibiotic discs (Oxoid, Cheshire, UK), media (Accumix, Geel, Belgium) and incubation conditions were ensured using *Escherichia coli* ATCC 25922. Bacterial isolates showing resistance to three or more antibiotic families were Multidrug-Resistant (MDR) bacteria[13].

Statistical analysis: The Chi-square test was used to compare the frequencies of pathogenic enterobacteria and multidrug-resistant enterobacteria in patients suffering from chronic kidney disease and in participants without chronic kidney disease. A value of $p<0.05$ was considered significant. The visual dashboard test was used to compare odds ratios at 95% Confidence Intervals (CI) of enterobacterial resistance in the different groups, to infer a possible relationship between resistance profile and chronic kidney diseases. All these analysis were performed using Epi Info™ software version 7.2.4 (CDC, Atlanta, USA).

RESULTS

Sociodemographic characteristics and prevalence of gastrointestinal infections in the study population: In the present study, a total of 458 participants were involved with and without chronic kidney disease, to whom the doctor had prescribed a stool culture test. Only patients with and without chronic kidney disease with a positive stool culture test were considered. The frequency of gastrointestinal infections was 77.95% (n = 357), divided into 60.22% (n = 215) for patients without chronic kidney disease and 39.78% (n = 142) for patients with chronic kidney disease. The mean age in the general population was 47.11±16.86; 55.74±13.89 in patients with chronic kidney disease and 41.41±16.24 in patients without chronic kidney disease. The most significantly represented age group ($p<0.001$) was[40-60]. In the total population and patients without chronic kidney disease, female participants were more represented (51.54 vs 48.46%; 57.21 vs 42.79%) than male participants. In contrast, in CKD patients, male participants were more represented than female participants (54.04 vs 42.96%) Table 1.

Frequency of gastrointestinal symptoms and association with gastrointestinal infections: The patients suffering from chronic kidney disease were more likely to present with gastrointestinal disorders (54.04 vs 42.96%). The frequency of participants having gastrointestinal symptoms in the study population was 10.64% (n = 38). A highly significant difference ($p<0.001$) between patients with and without chronic kidney disease (76.32 vs 23.68%) was observed. Diarrhea (20.48%) was the most common complaint, followed by vomiting (18.07%) and constipation (16.87%). The frequency of constipation, diarrhea and vomiting showed a significant difference ($p\leq0.05$) between people with chronic kidney disease and those without (Table 1).

The association between gastrointestinal symptoms and gastrointestinal infection in patients with chronic kidney diseases was shown in Table 2. Vomiting (OR: 2.22; 95% CI: 0.47-10.38); nausea (OR: 1.97; 95% CI: 0.22-17.26) and diarrhea (OR: 1.89; 95% CI: 0.52-6.87) in chronic kidney disease patients were strongly correlated with gastrointestinal infections (Table 2).

Table 1: Sociodemographic characteristics and gastrointestinal symptoms of the studied population

	All participants (n = 357)	CKD (n = 142; 39.78%)	W-CKD (n = 215; 60.22%)	Chi-square (χ^2)	p-value
Mean age (years)	47.11±16.86	55.74±13.89	41.41±16.24	4.05	0.044
Sex					
Female	184 (51.54%)	61 (42.96%)	123 (57.21%)	6.95	0.008
Male	173 (48.46%)	81 (54.04%)	92 (42.79%)		
Age range					
<20	13 (3.64%)	1 (7.69%)	12 (92.31%)		
20-40	113 (31.65%)	18 (15.93%)	95 (84.07%)		
40-60	134 (37.54%)	57 (42.54%)	77 (57.46%)		
60-80	90 (25.21%)	64 (71.11%)	26 (28.89%)	70.10	<0.001
≥80	7 (1.96%)	2 (28.57%)	5 (71.43%)		
Gastrointestinal symptoms					
Vomiting	15 (18.07%)	11 (18.96%)	4 (26.67%)	7.36	0.006
Nausea	6 (7.22%)	5 (8.62%)	1 (16.67%)	4.83	0.027
Abdominal bloating	10 (12.04%)	7 (12.07%)	3 (30.00%)	3.92	0.047
Fever	8 (9.64%)	2 (3.44%)	6 (75.00%)	0.74	0.387
Abdominal pain	13 (15.66%)	7 (12.07%)	6 (46.15%)	1.11	0.291
Diarrhea	17 (20.48%)	14 (24.14%)	3 (17.65%)	13.51	0.000
Constipation	14 (16.87%)	12 (20.69%)	2 (14.29%)	12.84	0.000
Recruitment place					
Consultation department (outpatient)	331 (92.72%)	118 (35.65%)	213 (64.35%)	32.30	< 0.001
Hospitalization department (in-patient)	26 (7.28%)	24 (92.31%)	2 (7.69%)		

CKD: Chronic Kidney Diseases patients, W-CKD: Ppatients without chronic kidney diseases and p-values in bold are significant

Table 2: Relationship between gastrointestinal symptoms and gastrointestinal infections

	Gastrointestinal infections		
Gastrointestinal symptoms	OR	95% CI	p-value
Constipation	1.60	0.43-5.90	0.476
Diarrhea	1.89	0.52-6.87	0.323
Abdominal pain	1.37	0.27-6.82	0.696
Fever	0.00	ND	0.376
Abdominal bloating	0.66	0.18-2.35	0.521
Nausea	1.97	0.22-17.26	0.532
Vomiting	2.22	0.47-10.38	0.297

ND: Not defined, OR: Odds ratio and CI: Interval of Confidence

Table 3: Profile of enteric bacteria isolated in the different groups of participants

Enteric bacteria (n = 238, 100%)	CKD	W-CKD	χ^2	p-value
Enterobacter cloacae (n = 13, 5.46%)	10 (76.92%)	3 (23.08%)	6.28	0.012
Klebsiella oxytoca (n = 23, 9.66%)	0 (0.00%)	23 (100.00%)	18.28	0.000
Klebsiella pneumoniae (n = 32, 13.45%)	20 (62.50%)	12 (37.50%)	5.32	0.020
Proteus mirabilis (n = 86, 36.13%)	65 (75.58%)	21 (24.42%)	45.81	<0.001
Proteus vulgaris (n = 46, 19.33%)	0 (0.00%)	46 (100.00%)	38.59	<0.001
Salmonella typhi (n = 8, 3.36%)	3 (37.50%)	5 (62.50%)	0.10	0.750
Shigella spp. (n = 10, 4.20%)	9 (90.00%)	1 (10.00%)	9.20	0.002
Yersinia pestis (n = 10, 4.20%)	9 (90.00%)	1 (10.00%)	9.20	0.002
Citrobacter freundii (n = 10, 4.20%)	10 (100.00%)	0 (0.00%)	13.54	0.000

CKD: Chronic Kidney Diseases patients, W-CKD: Patients without chronic kidney diseases and p-values in bold are significant

Frequency of enteric bacteria isolates and susceptibility profile: In this study, *Enterobacter cloacae* (76.92 vs 23.08%), *Klebsiella pneumoniae* (62.50 vs 37.50%), *Proteus mirabilis* (75.58 vs 24.42%), *Shigella* spp. (90.00 vs 10.00%), *Yersinia pestis* (90.00 vs 10.00%) and *Citrobacter freundii* (100.00 vs 0.00%) were more represented in patients with chronic kidney diseases compared to patients without it, respectively. In contrast, *Klebsiella oxytoca* (100.00%), *Salmonella typhi* (37.50 vs 62.50%) and *Proteus vulgaris* (100.00%) were more frequent in patients without chronic kidney diseases than patients suffering from chronic kidney diseases (Table 3).

Table 4: Susceptibility profile of *Salmonella typhi*, *Yersinia pestis* and *Shigella* spp.

		Bacteria, patients, number of isolates, susceptibility profiles and percentage in brackets					
		Salmonella typhi		*Yersinia pestis*		*Shigella* spp.	
Antibiotics	Susceptibility profile	CKD n = 3 (37.50%)	W-CKD n = 5 (62.50%)	CKD n = 9 (90.00%)	W-CKD n = 1 (10.00%)	CKD n = 9 (90.00%)	W-CKD n = 1 (100.00%)
AMC	S	0 (0.00%)	2 (40.00%)	1 (11.11%)	0 (0.00%)	2 (22.22%)	0 (0.00%)
	R	3 (100.00%)	3 (60.00%)	8 (88.89%)	1 (100.00%)	7 (77.78%)	1 (100.00%)
AMX	S	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (11.11%)	0 (0.00%)
	R	3 (100.00%)	5 (100.00%)	9 (100.00%)	1 (100.00%)	8 (88.89%)	1 (100.00%)
CRO	S	3 (100.00%)	2 (40.00%)	4 (44.44%)	0 (0.00%)	4 (44.44%)	0 (0.00%)
	R	0 (0.00%)	3 (60.00%)	5 (55.56%)	1 (100.00%)	5 (55.56%)	1 (100.00%)
CTX	S	2 (66.67%)	2 (40.00%)	4 (44.44%)	0 (0.00%)	4 (44.44%)	0 (0.00%)
	R	1 (33.33%)	3 (60.00%)	5 (55.56%)	1 (100.00%)	5 (55.56%)	1 (100.00%)
FEP	S	1 (33.33%)	4 (80.00%)	2 (22.22%)	0 (0.00%)	4 (44.44%)	0 (0.00%)
	I	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (11.11%)	0 (0.00%)
	R	2 (66.67%)	1 (20.00%)	7 (77.78%)	1 (100.00%)	5 (44.44%)	1 (100.00%)
ATM	S	1 (33.33%)	4 (80.00%)	3 (33.33%)	0 (0.00%)	3 (33.33%)	0 (0.00%)
	I	1 (33.33%)	0 (0.00%)	1 (11.11%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
	R	1 (33.33%)	1 (20.00%)	5 (55.56%)	1 (100.00%)	6 (66.67%)	1 (100.00%)
IMP	S	2 (66.67%)	5 (100.00%)	4 (44.44%)	1 (100.00%)	7 (77.78%)	0 (0.00%)
	R	1 (33.33%)	0 (0.00%)	5 (55.56%)	0 (0.00%)	2 (22.22%)	1 (100.00%)
CIP	S	3 (100.00%)	2 (40.00%)	3 (33.33%)	1 (100.00%)	5 (55.56%)	1 (100.00%)
	I	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
	R	0 (0.00%)	3 (60.00%)	6 (66.67%)	0 (0.00%)	4 (44.44%)	0 (0.00%)
NAL	S	3 (100.00%)	0 (0.00%)	3 (33.33%)	1 (100.00%)	4 (44.44%)	0 (0.00%)
	R	0 (0.00%)	5 (100.00%)	6 (66.67%)	0 (0.00%)	5 (55.56%)	1 (100.00%)
OFX	S	2 (66.67%)	2 (40.00%)	3 (33.33%)	1 (100.00%)	5 (55.56%)	0 (0.00%)
	I	1(33.33%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
	R	0 (0.00%)	3 (60.00%)	6 (66.67%)	0 (0.00%)	4 (44.44%)	1 (100.00%)
SXT	S	3 (100.00%)	0 (0.00%)	1 (11.11%)	0 (0.00%)	6 (66.67%)	0 (0.00%)
	R	0 (0.00%)	5 (100.00%)	8 (88.89%)	1 (100.00%)	3 (33.33%)	1 (100.00%)
FOS	S	2 (66.67%)	4 (80.00%)	1 (11.11%)	1 (100.00%)	5 (55.56%)	0 (0.00%)
	R	1 (33.33%)	1 (20.00%)	8 (88.89%)	0 (0.00%)	4 (44.44%)	1 (100.00%)
GEN	S	3 (100.00%)	5 (100.00%)	5 (55.56%)	1 (100.00%)	7 (77.78%)	1 (100.00%)
	R	0 (0.00%)	0 (0.00%)	4 (44.44%)	0 (0.00%)	2 (22.22%)	0 (0.00%)
AMK	S	1 (33.33%)	5 (100.00%)	6 (66.67%)	0 (0.00%)	4 (44.44%)	0 (0.00%)
	R	2 (66.67%)	0 (0.00%)	3 (33.33%)	1 (100.00%)	5 (55.56%)	1 (100.00%)

S: Sensitive, I: Intermediate, R: Resistant, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CTX: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalidixic acid, OFX: Ofloxacin, SXT: Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin and AMK: Amikacin

Klebsiella pneumoniae, *Proteus mirabilis*, *Salmonella typhi*, *Enterobacter cloacae* and *Citrobacter freundii* showed higher rates of resistance to the antibiotic AMC in patients with chronic kidney disease compared to those without diseases (85.00, 58.46, 100.00, 70.00, 50.00 vs 50.00, 57.14, 60.00, 66.67, 0.00%, respectively). *Salmonella typhi* and *Yersinia pestis* showed a 100% resistance rate to amoxicillin in the two groups of participants, while *Shigella* spp. and *Citrobacter freundii* showed a 100% resistance rate to amoxicillin only in the group of patients without chronic kidney disease. *Enterobacter cloacae* isolates were more resistant to AMC, AMX, CTX, FEP, SXT and FOS (70.00, 100.00, 70.00, 70.00, 80.00 and 70.00%, respectively) in patients with CKD than patients without CKD (66.67, 66.67, 33.33, 33.33, 33.33 and 33.33%, respectively). *Yersinia pestis* presented a high rate of resistance to the antibiotics IMP, CIP, NAL, OFX and FOS in the patients with CKD compared to patients without CKD (55.56 vs 0.00%, 66.67 vs 0.00%, 66.67 vs 0.00%, 66.67 vs 0.00% and 88.89 vs 0.00%, respectively). For *Salmonella typhi*, in patients with chronic kidney disease compared to those without, high rates of resistance to AMC, FEP, ATM and IMP antibiotics (100.00, 66.67 and 66.67% vs 60.00, 20.00 and 0.00%, respectively) was observed. *Klebsiella pneumoniae* and *Proteus mirabilis* have expressed the high rates of resistance in patients with chronic kidney disease compared to other participants for AMC (85.00 and 58.46% vs 50.00 and 57.14%, respectively), ATM (40.00 and 33.85% vs 33.33 and 23.81%, respectively), OFX (60.00 and 50.77% vs 33.33 and 42.86%, respectively), SXT (80.00 and 50.77% vs 41.67 and 33.33%, respectively) and FOS (55.00 and 47.69% vs 8.33 and 23.81%, respectively) (Table 4 and 6).

Table 5: Susceptibility profile of *Klebsiella pneumoniae*, *Klebsiella oxytoca*, *Proteus mirabilis* and *Proteus vulgaris*

		Bacteria, patients, number of isolates, susceptibility profiles and percentage in brackets							
		Klebsiella pneumoniae		*Klebsiella oxytoca*		*Proteus mirabilis*		*Proteus vulgaris*	
Antibiotics	Susceptibility profile	CKD n = 20 (62.50%)	W-CKD n = 12 (37.50%)	CKD n = 0 (0.00%)	W-CKD n = 23 (100.00%)	CKD n = 65 (75.58%)	W-CKD n = 21 (24.42%)	CKD n = 0 (0.00%)	W-CKD n = 46 (100.00%)
AMC	S	3(15.00%)	6(50.00%)	0 (0.00%)	16(69.57%)	27(41.54%)	9(42.86%)	0 (0.00%)	27(58.70%)
	R	17(85.00%)	6(50.00%)	0 (0.00%)	7(30.43%)	38(58.46%)	12(57.14%)	0 (0.00%)	19(41.30%)
AMX	S	0(0.00%)	1(8.33%)	0 (0.00%)	5(21.74%)	9(13.85%)	2(9.52%)	0 (0.00%)	11(23.91%)
	R	20(100.00%)	11(91.67%)	0 (0.00%)	18(78.26%)	56(86.15%)	19(90.48%)	0 (0.00%)	35(76.09%)
CRO	S	9(45.00%)	7(58.33%)	0 (0.00%)	13(56.52%)	42(64.62%)	9(42.86%)	0 (0.00%)	29(63.04%)
	R	11(55.00%)	5(41.67%)	0 (0.00%)	10(43.48%)	23(35.38%)	12(57.14%)	0 (0.00%)	17(36.96%)
CTX	S	7(35.00%)	5(41.67%)	0 (0.00%)	15(65.22%)	41(63.08%)	8(38.10%)	0 (0.00%)	29(63.04%)
	I	0(0.00%)	0(0.00%)	0 (0.00%)	0(0.00%)	1(1.54%)	0(0.00%)	0 (0.00%)	0(0.00%)
	R	13(65.00%)	7(58.33%)	0 (0.00%)	8(34.78%)	23(35.38%)	13(61.90%)	0 (0.00%)	17(36.96%)
FEP	S	7(35.00%)	6(50.00%)	0 (0.00%)	14(60.87%)	27(41.54%)	6(28.57%)	0 (0.00%)	29(63.04%)
	I	1(5.00%)	0(0.00%)	0 (0.00%)	0(0.00%)	9(13.85%)	3(14.29%)	0 (0.00%)	0(0.00%)
	R	12(60.00%)	6(50.00%)	0 (0.00%)	9(39.13%)	29(44.62%)	12(57.14%)	0 (0.00%)	17(36.96%)
ATM	S	11(55.00%)	8(66.67%)	0 (0.00%)	16(69.57%)	36(55.38%)	13(61.90%)	0 (0.00%)	33(71.74%)
	I	1(5.00%)	0(0.00%)	0 (0.00%)	0(0.00%)	7(10.77%)	3(14.29%)	0 (0.00%)	2(4.35%)
	R	8(40.00%)	4(33.33%)	0 (0.00%)	7(30.43%)	22(33.85%)	5(23.81%)	0 (0.00%)	11(23.91%)
IMP	S	13(65.00%)	11(91.67%)	0 (0.00%)	23(100.00%)	41(63.08%)	18(85.71%)	0 (0.00%)	45(97.83%)
	I	3(15.00%)	0(0.00%)	0 (0.00%)	0(0.00%)	7(10.77%)	1(4.76%)	0 (0.00%)	0(0.00%)
	R	4(20.00%)	1(8.33%)	0 (0.00%)	0(0.00%)	17(26.15%)	2(9.52%)	0 (0.00%)	1(2.17%)
CIP	S	8(40.00%)	7(58.33%)	0 (0.00%)	13(56.52%)	41(63.08%)	10(47.62%)	0 (0.00%)	28(60.87%)
	I	2(10.00%)	1(8.33%)	0 (0.00%)	1(4.35%)	5(7.69%)	2(9.52%)	0 (0.00%)	2(4.35%)
	R	10(50.00%)	4(33.33%)	0 (0.00%)	9(38.13%)	19(29.23%)	9(42.86%)	0 (0.00%)	16(34.78%)
NAL	S	14 (70.00%)	4 (33.33%)	0 (0.00%)	10 (43.48%)	42 (64.62%)	12 (57.14%)	0 (0.00%)	20 (43.48%)
	R	6 (30.00%)	8 (66.67%)	0 (0.00%)	13 (56.52%)	23 (35.38%)	9 (42.86%)	0 (0.00%)	26 (56.52%)
OFX	S	8 (40.00%)	7 (58.33%)	0 (0.00%)	13 (56.52%)	31 (47.69%)	12 (57.14%)	0 (0.00%)	26 (56.52%)
	I	0 (0.00%)	1 (8.33%)	0 (0.00%)	1 (4.35%)	1 (1.54%)	0 (0.00%)	0 (0.00%)	4 (8.70%)
	R	12 (60.00%)	4 (33.33%)	0 (0.00%)	9 (39.13%)	33 (50.77%)	9 (42.86%)	0 (0.00%)	16 (34.78%)
SXT	S	4 (20.00%)	7 (58.33%)	0 (0.00%)	15 (65.22%)	30 (46.15%)	13 (61.90%)	0 (0.00%)	30 (65.22%)
	I	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	2 (3.08%)	1 (4.76%)	0 (0.00%)	0 (0.00%)
	R	16 (80.00%)	5 (41.67%)	0 (0.00%)	8 (34.78%)	33 (50.77%)	7 (33.33%)	0 (0.00%)	16 (34.78%)
FOS	S	9 (45.00%)	11 (91.67%)	0 (0.00%)	17 (73.91%)	34 (52.31%)	16 (76.19%)	0 (0.00%)	41 (89.13%)
	I	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (4.35%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
	R	11 (55.00%)	1 (8.33%)	0 (0.00%)	5 (21.74%)	31 (47.69%)	5 (23.81%)	0 (0.00%)	5 (10.87%)
GEN	S	14 (70.00%)	12 (100.00%)	0 (0.00%)	21 (91.30%)	51 (78.46%)	17 (80.95%)	0 (0.00%)	45 (97.83%)
	R	6 (30.00%)	0 (0.00%)	0 (0.00%)	2 (8.70%)	14 (21.54%)	4 (19.05%)	0 (0.00%)	1 (2.17%)
AMK	S	16 (80.00%)	10 (83.33%)	0 (0.00%)	22 (95.65%)	40 (61.54%)	12 (57.14%)	0 (0.00%)	40 (86.96%)
	I	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (2.17%)
	R	4 (20.00%)	2 (16.67%)	0 (0.00%)	1 (4.35%)	25 (38.46%)	9 (42.86%)	0 (0.00%)	5 (10.87%)

S: Sensitive, I: Intermediate, R: Resistant, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CTX: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalixidic acid, OFX: Ofloxacin, SXT: Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin and AMK: Amikacin

Table 6: Susceptibility profile of *Enterobacter cloacae* and *Citrobacter freundii*

		Bacteria, patients, number of isolates, susceptibility profiles and percentage in brackets			
		Enterobacter cloacae		*Citrobacter freundii*	
Antibiotics	Susceptibility profile	CKD n = 10 (76.92%)	W-CKD n = 3 (23.08%)	CKD n = 10 (100.00%)	W-CKD n = 0 (0.00%)
AMC	S	3 (30.00%)	1 (33.33%)	5 (50.00%)	0 (0.00%)
	R	7 (70.00%)	2 (66.67%)	5 (50.00%)	0 (0.00%)
AMX	S	0 (0.00%)	1 (33.33%)	0 (0.00%)	0 (0.00%)
	R	10 (100.00%)	2 (66.67%)	10 (100.00%)	0 (0.00%)
CRO	S	5 (50.00%)	1 (33.33%)	3 (30.00%)	0 (0.00%)
	R	5 (50.00%)	2 (66.67%)	7 (70.00%)	0 (0.00%)
CTX	S	3 (30.00%)	2 (66.67%)	3 (30.00%)	0 (0.00%)
	R	7 (70.00%)	1 (33.33%)	7 (70.00%)	0 (0.00%)
FEP	S	3 (30.00%)	2 (66.67%)	1 (10?00%)	0 (0.00%)
	I	0 (0.00%)	0 (0.00%)	1 (10?00%)	0 (0.00%)
	R	7 (70.00%)	1 (33.33%)	8 (80.00%)	0 (0.00%)
ATM	S	2 (20.00%)	2 (66.67%)	7 (70.00%)	0 (0.00%)
	I	3 (30.00%)	0 (0.00%)	1 (10.00%)	0 (0.00%)
	R	5 (50.00%)	1 (33.33%)	2 (20.00%)	0 (0.00%)
IMP	S	6 (60.00%)	2 (66.67%)	6 (60.00%)	0 (0.00%)
	R	4 (40.00%)	1 (33.33%)	4 (40.00%)	0 (0.00%)
CIP	S	4 (40.00%)	1 (33.33%)	6 (60.00%)	0 (0.00%)
	I	0 (0.00%)	0 (0.00%)	1 (10.00%)	0 (0.00%)
	R	6 (60.00%)	2 (66.67%)	3 (30.00%)	0 (0.00%)
NAL	S	4 (40.00%)	1 (33.33%)	5 (50.00%)	0 (0.00%)
	R	6 (60.00%)	2 (66.67%)	5 (50.00%)	0 (0.00%)
OFX	S	5 (50.00%)	1 (33.33%)	6 (60.00%)	0 (0.00%)
	I	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
	R	5 (50.00%)	2 (66.67%)	4 (40.00%)	0 (0.00%)
SXT	S	2 (20.00%)	2 (66.67%)	2 (20.00%)	0 (0.00%)
	R	8 (80.00%)	1 (33.33%)	8 (80.00%)	0 (0.00%)
FOS	S	3 (30.00%)	2 (66.67%)	3 (30.00%)	0 (0.00%)
	R	7 (70.00%)	1 (33.33%)	7 (70.00%)	0 (0.00%)
GEN	S	9 (90.00%)	3 (100.00%)	7 (70.00%)	0 (0.00%)
	R	1 (10.00%)	0 (0.00%)	3 (30.00%)	0 (0.00%)
AMK	S	5 (50.00%)	3 (100.00%)	6 (60.00%)	0 (0.00%)
	R	5 (50.00%)	0 (0.00%)	4 (40.00%)	0(0.00%)

S: Sensitive, I: Intermediate, R: Resistant, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CTX: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalidixic acid, OFX: Ofloxacin, SXT: Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin and AMK: Amikacin

The susceptibility profiles revealed that *Salmonella typhi*, *Yersinia pestis* and *Shigella* spp. displayed variable responses to antibiotics. High resistance was observed against amoxicillin and amoxicillin-clavulanic acid across all bacteria, while ceftriaxone and ciprofloxacin showed moderate to high sensitivity. Imipenem and gentamicin exhibited better efficacy, with high sensitivity, particularly in *Yersinia pestis*. Resistance trends differed between CKD and non-CKD patients, highlighting variations in susceptibility based on patient conditions Table 4.

The susceptibility profiles of *Klebsiella pneumoniae*, *Klebsiella oxytoca*, *Proteus mirabilis* and *Proteus vulgaris* revealed significant variability across antibiotics and patient groups. High sensitivity was observed for imipenem (63-100%), gentamicin (70-100%) and amikacin (57-96%). Conversely, amoxicillin showed high resistance across isolates (78-100%). Variations in susceptibility were notable between CKD and non-CKD patients, with non-CKD groups generally demonstrating better sensitivity to antibiotics Table 5.

The susceptibility profiles of *Enterobacter cloacae* and *Citrobacter freundii* showed varying resistance patterns among CKD and W-CKD patients. *Enterobacter cloacae* isolates demonstrated high resistance to AMX, SXT and FOS but higher sensitivity to GEN (90%) and AMK (50-100%). *Citrobacter freundii* isolates from CKD patients showed complete resistance to AMX but high sensitivity to ATM (70%) and GEN (70%). The W-CKD isolates of both bacteria exhibited negligible susceptibility due to limited isolate counts (Table 6).

Resistance and multidrug resistance profiles in different groups of the population: The resistance of isolates was evaluated and the results obtained were divided according to the chronic kidney disease status (Fig. 1). All isolates (100%) of

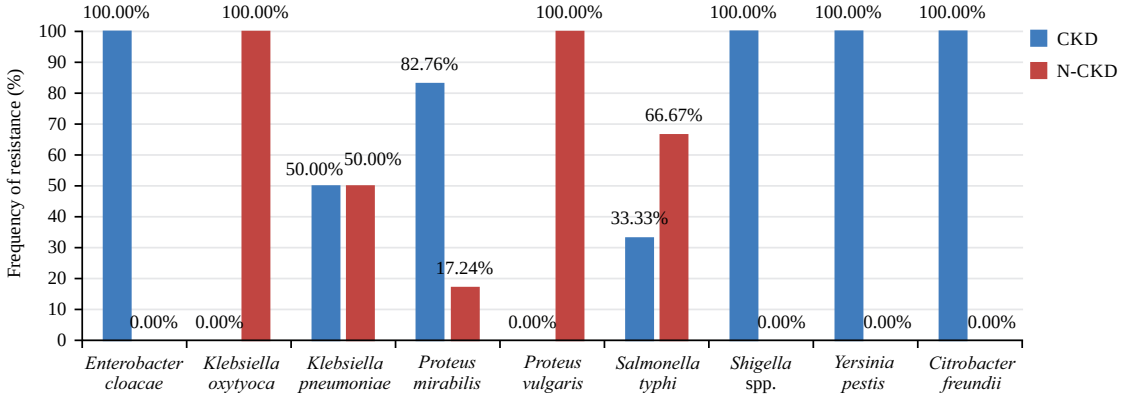

Fig. 1: Distribution of resistance of isolates in patients with CKD and without N-CKD chronic kidney disease

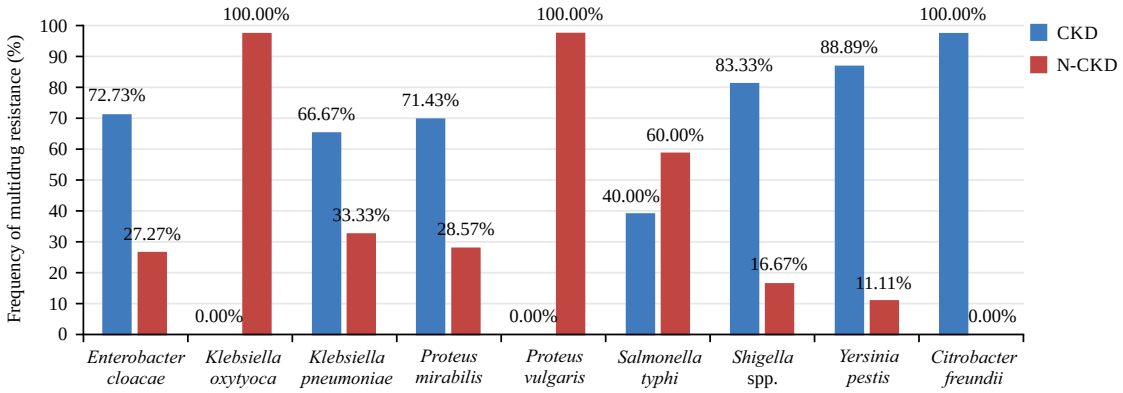

Fig. 2: Distribution of multidrug resistance of isolates in patients with CKD and without N-CKD chronic kidney disease

Enterobacter cloacae, *Shigella* spp., *Yersinia pestis* and *Citrobacter freundii* in patients suffering from chronic kidney disease were resistant to the usual antibiotics. Resistant isolates of *Proteus mirabilis* germs were frequently found (82.76%) in participants suffering from chronic kidney disease compared with patients not suffering from chronic kidney disease (17.24%). The Multidrug-Resistant (MDR) isolates according to chronic kidney disease status as displayed in Fig. 2. The MDR bacteria of the genus *Enterobacter cloacae*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Shigella* spp. and *Yersinia pestis* were found more frequently (72.73, 66.67, 71.43, 83.33 and 88.89%) in patients with chronic kidney disease than in patients without chronic kidney disease (27.27, 33.33, 28.57, 16.67 and 11.11%).

The data used to support the findings of this study are included in the supplementary information file (S1). Characteristics of the study population (S2). Gastrointestinal symptoms and enteric bacteria isolates (S3). Antibiotic resistance of *Klebsiella pneumoniae* (S4). Antibiotic resistance of *Proteus mirabilis* (S5). Antibiotic resistance of *Enterobacter cloacae* (S6). Antibiotic resistance of *Citrobacter freundii* (S7). Antibiotic resistance of *Shigella* spp. (S8). Antibiotic resistance of *Yersinia pestis* (S9). Antibiotic resistance of *Salmonella typhi* (S10). Antibiotic resistance of *Klebsiella oxytoca* (S11). Antibiotic resistance of *Proteus vulgaris*.

DISCUSSION

In this study, the incidence of chronic kidney diseases in female participants was evaluated at 42.50% (n = 61) compared to male participants (54.04%, n = 81). A higher rate of male patients than female patients suffering from chronic kidney diseases was observed. This increasing rate of men with chronic kidney diseases can be explained by the high frequency of renal diseases in male patients and their rapid progression to chronic kidney diseases[17-25]. Also due to the financial disadvantage of women for multiple reasons, like non-employment, low income dependent on the male partner. These results were classic in the review literature[26-30].

The mean age of participants with chronic kidney disease was 55.74±13.89, significantly different (p = 0.044) from patients without chronic kidney disease. This could be

explained because age is known as a risk factor for chronic nephropathy according to low awareness and low exposure to primary CKD prevention measures in the general population[30]. This result correlated approximately with the results of other studies[27,28,31,32].

The prevalence of gastrointestinal infections in chronic kidney disease patients was 60.22% (n = 215) and the incidence of symptoms was 10.64% (n = 38). This moderate prevalence of gastrointestinal symptoms might reflect the non-dialysis status of these patients and the low production of uremic toxins linked to gastrointestinal symptoms[33-35]. This prevalence of gastrointestinal symptoms was very low compared to the frequencies reported in the literature[6,24,36-41].

In CKD patients, vomiting (18.96%), nausea (8.62%), abdominal bloating (12.07%), constipation (20.69%) and diarrhea (24.14%) were the frequent gastrointestinal symptoms observed. Renal impairment causes dysfunction of the intestine, alteration in the composition of gut microflora and encourages the high production of uremic toxin in the digestive tube responsible for the emergence of gastrointestinal symptoms[2,4-10]. This rate obtained was low compared to other studies probably because a recent study has worked only in patients undergoing haemodialysis[6,25,33]. The relationship between these gastrointestinal symptoms and the incidence of gastrointestinal infections was also evaluated. Results showed that CKD patients presenting vomiting, nausea, diarrhea and commonly encountered gastrointestinal complications are highly at risk of contracting gastrointestinal infections.

Enterobacter cloacae, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Shigella* spp., *Yersinia pestis* and *Citrobacter freundii* were more frequent in patients with chronic kidney diseases compared to patients without the disease. People with CKD are more likely to become infected than the general population considering the altered composition and functions of the gut microbiota in chronic kidney disease[13]. The CKD with intestinal microbiota may be associated with intestinal inflammation and epithelial barrier impairment, resulting in accelerated systemic translocation of bacterial-derived uremic toxins and oxidative stress injury to the kidney, cardiovascular and endocrine systems. Dysbiosis is defined as "an unbalanced intestinal microbial community with quantitative changes in the composition and metabolic activities of the gut microbiota". Dysbiosis intestinal microflora in CKD patients has been reported with an increase in pathogenic flora (Enterobacteriaceae like *Enterobacter*, *Klebsiella*) compared to symbiotic flora. These results join other research in the literature review[1,4,9,42-48].

The frequent enteric germs obtained in this study were: *Klebsiella* spp., *Proteus* spp. and *Enterobacter* spp. These results can be understood by the fact that these germs are the enteropathogens bacteria constantly found in the intestinal microbiota. Few authors have studied pathogen intestinal bacteria in chronic kidney disease patients and the comparison between patients with CKD and patients without it. The other studies encountered have shown that these gram-negative bacteria were the common germ isolated in patients with chronic kidney disease[10,12,42,49-56].

The results demonstrated the rate of resistance to amoxicillin was comprised of [50.00-100.00%] for mainly *Salmonella typhi*, *Yersinia pestis*, *Shigella* spp., *Enterobacter cloacae*, *Citrobacter freundii*, *Klebsiella pneumoniae* and *Proteus mirabilis.* Also, the germs tested have presented a considerable rate of resistance to the antibiotic class of cephalosporin. This resistance to amoxicillin or cephalosporin antibiotics was possibly explained by the production of resistance genes as Extended Spectrum Beta-Lactamases Genes frequently identified in enterobacteria[57]. These results were similar to other studies on gram-negative bacteria in patients with chronic kidney disease[50-52] and go along the same lines, who have shown a high rate (87.9%) of resistance of gram-negative bacteria to antibiotic amoxicillin[51].

The present work demonstrated that *Klebsiella pneumoniae* has a high resistance to the first and second generations of cephalosporin (55% to ceftriaxone), 60% were resistant to cefepime (fourth generation cephalosporin). In carbapenems, imipenem remains a reserve antibiotic with a good sensitivity to *K. pneumoniae* (65%). The antibiotic resistance to imipenem could be explained by the production of metalloenzymes by beta-lactamase-producing *Klebsiella*[57]. Similarly, to other studies, *Klebsiella pneumoniae* is the second most common bacterium isolated from CKD patients and is also sensitive to imipenem antibiotics[57].

High sensitivity to aminoglycosides may be explained by their reduced use in CKD due to nephrotoxicity (70% to gentamicin and 80% to amikacin). However, the resistance to gentamicin is still quite high (30%). Resistance is increased to trimethoprim/sulfamethoxazole (80%), probably due to more widespread use. The resistance of antibiotics can be demonstrated by the higher overexpression of efflux pumps of type Resistance Nodulation Cell Division (RND).

Enterobacter cloacae, *Proteus mirabilis*, *Shigella* spp., *Yersinia pestis* and *Citrobacter freundii* were more frequently resistant to the usual antibiotic germs encountered in patients with chronic kidney disease compared to patients without chronic kidney disease in this study. This resistance could be

explained by the fact that chronic kidney disease is an important factor in antimicrobial resistance[30]. Commonly, Abdeljalil *et al.*[12] showed that the frequent germ isolates in chronic kidney disease patients have presented a high level of resistance to usual antibiotics. In this study, multidrug resistance was defined as the resistance of an isolate to three or more families of antibiotics[58]. Bacterial resistance to multiple antibiotics has reached dangerously high levels worldwide[59]. The MDR bacteria of the genus *Enterobacter cloacae*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Shigella* spp. and *Yersinia pestis* were found more frequently in patients with chronic kidney disease than in patients without chronic kidney disease. Patients with chronic kidney diseases expressed a risk of 68.9% of being infected by multidrug-resistant bacteria[11]. These results were contrary to those obtained by Richa *et al.*[51] in India. In contrast, these corroborated with previous studies, which highlight the high rate of MDR bacterial infections in CKD patients at a tertiary care hospital in South India from January, 2020 to June, 2020[50].

The results of this study are of great importance in terms of public health, as bacterial infections including *Enterobacteriaceae* and their drug resistance still constitute a serious health problem. The study focused on the prevalence of enteric infection and drug resistance of bacteria in chronic kidney disease patients. The clinical application of this study resides in how to manage bacterial infection during chronic kidney diseases. The exponential growth of drug-resistant bacteria in our locality and the frequent kidney damage explain an urgent need to limit antibiotic consumption in clinical practice, take account of gastrointestinal symptoms presented by these patients as indicators of gastroenteritis and also include bacteriological stool culture reports in treatment monitoring of patients.

CONCLUSION

This study has demonstrated that the incidence of gastrointestinal infections and symptoms is 39.78 and 10.64%, respectively. *Enterobacter cloacae*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Shigella* spp., *Yersinia pestis* and *Citrobacter freundii* were the most frequent and most resistant encountered in patients with chronic kidney diseases compared to patients without chronic kidney disease. The multidrug-resistant bacteria were more common in CKD patients compared to their controls. It was observed that patients with gastrointestinal symptoms (vomiting, nausea and diarrhea) could be strongly infected by gastrointestinal pathogenic bacteria. All these results underlined the necessity to prevent and manage gastrointestinal complications (symptoms and infections) in chronic kidney disease patients at Laquintinie Hospital in Douala. At the present stage of the study, it was not possible to establish the reason for the high rate of resistance in chronic disease patients. Also, no other molecular studies are employed to determine which resistance genes are implicated in this multidrug resistance. Further studies will be planned further to fill this gap.

SIGNIFICANCE STATEMENT

The pathogen bacteria isolated from the gastrointestinal tract are identified as resistant to usual antibiotics. Antimicrobial resistance is a public health problem. In Cameroon, few studies have focused on bacterial resistance in these patients and even fewer on enteropathogens, despite chronic kidney disease affecting 15% of the adult population. The study therefore aims to determine the frequency of gastrointestinal diseases and the susceptibility profile of pathogenic bacteria causing enteric infections in chronic kidney disease patients. The results showed that enteric pathogen bacteria were more frequent, resistant and multidrug-resistant in patients with chronic kidney diseases compared to patients without chronic kidney disease. All of these findings emphasized the importance of preventing and managing gastrointestinal complications (symptoms and infections) in chronic kidney disease patients.

ACKNOWLEDGMENTS

The authors gratefully acknowledge all the study participants at Laquintinie Hospital. The authors are very grateful to the director of Laquintinie Hospital, Nephrologists and all the nurses and laboratory personnel who took part in the study.

REFERENCES

1. Jazani, N.H., J. Savoj, M. Lustgarten, W.L. Lau and N.D. Vaziri, 2019. Impact of gut dysbiosis on neurohormonal pathways in chronic kidney disease. Diseases, Vol. 7. 10.3390/diseases7010021.
2. Costa-Moreira, P., F. Vilas-Boas, A.T. Fraga and G. Macedo, 2020. Particular aspects of gastroenterological disorders in chronic kidney disease and end-stage renal disease patients: A clinically focused review. Scand. J. Gastroenterol., 55: 129-138.
3. Aseneh, J.B., B.L.A. Kemah, S. Mabouna, M.E. Njang, D.S.M. Ekane and V.N. Agbor, 2020. Chronic kidney disease in Cameroon: A scoping review. BMC Nephrol., Vol. 21. 10.1186/s12882-020-02072-5.

4. Li, Y., M. Dai, J. Yan, F. Liu and X. Wang *et al*., 2021. Colonic dialysis can influence gut flora to protect renal function in patients with pre-dialysis chronic kidney disease. Sci. Rep., Vol. 11. 10.1038/s41598-021-91722-1.
5. Grant, C.J., L.E. Harrison, C.L. Hoad, L. Marciani, P.A. Gowland and C.W. McIntyre, 2017. Patients with chronic kidney disease have abnormal upper gastro-intestinal tract digestive function: A study of uremic enteropathy. J. Gastroenterol. Hepatol., 32: 372-377.
6. Osorio, M.S. and G.C. Giraldo, 2017. Gastrointestinal manifestations of chronic kidney disease. Rev. Colomb. Nefrologia, 4: 3-12.
7. Wang, M., Y. Guo and W. Zhao, 2019. Gastrointestinal disorders in chronic kidney disease. Longhua Chin. Med., Vol. 2. 10.21037/lcm.2019.07.01.
8. Lew, S.Q. and J. Radhakrishnan, 2020. Chronic Kidney Disease and Gastrointestinal Disorders. In: Chronic Renal Disease, Kimmel, P.L. and M.E. Rosenberg (Eds.), Academic Press, Cambridge, Massachusetts, ISBN: 9780128158760, pp: 521-539.
9. Guldris, S.C., E.G. Parra and A.C. Amenós, 2017. Gut microbiota in chronic kidney disease. Nefrología, 37: 9-19.
10. Thomas, R., C. Panackal, M. John, H. Joshi, S. Mathai, J. Kattickaran and M. Iqbal, 2013. Gastrointestinal complications in patients with chronic kidney disease-A 5-year retrospective study from a tertiary referral center. Renal Fail., 35: 49-55.
11. Su, G., H. Xu, E. Riggi, Z. He and L. Lu *et al*., 2018. Association of kidney function with infections by multidrug-resistant organisms: An electronic medical record analysis. Sci. Rep., Vol. 8. 10.1038/s41598-018-31612-1.
12. Chemlal, A., F.A. Ismaili, I. Karimi, R. Elharraqui and N. Benabdellah *et al*., 2015. Urinary tract infections in patients with chronic renal failure hospitalized in the nephrology department: Bacteriological profile and risk factors [In French]. Pan Afr. Med. J., Vol. 20. 10.11604/pamj.2015.20.100.4356.
13. Jamil, B., M.T.M. Bokhari, A. Saeed, M.Z.M. Bokhari and Z. Hussain *et al*., 2016. Bacteremia: Prevalence and antimicrobial resistance profiling in chronic kidney diseases and renal transplant patients. J. Pak. Med. Assoc., 66: 705-709.
14. Prasad, N. and M.R. Patel, 2018. Infection-induced kidney diseases. Front. Med., Vol. 5. 10.3389/fmed.2018.00327.
15. Getahun, H., 2023. Antimicrobial Resistance. In: Global Health Essentials, Raviglione, M.C.B., F. Tediosi, S. Villa, N. Casamitjana and A. Plasència (Eds.), Springer International Publishing, Cham, Switzerland, ISBN: 978-3-031-33851-9, pp: 143-147.
16. Bauer, A.W., W.M.M. Kirby, J.C. Sherris and M. Turck, 1966. Antibiotic susceptibility testing by a standardized single disk method. Am. J. Clin. Pathol., 45: 493-496.
17. Hill, N.R., S.T. Fatoba, J.L. Oke, J.A. Hirst, C.A. O'Callaghan, D.S. Lasserson and F.D.R. Hobbs, 2016. Global prevalence of chronic kidney disease-A systematic review and meta-analysis. PLoS ONE, Vol. 11. 10.1371/journal.pone.0158765.
18. García-Agudo, R., N. Panizo, B.P. Vega, P.G. Martos and A.F. Rodríguez, 2020. Urinary tract infection in chronic kidney disease patients. Rev. Colomb. Nefrologia, 7: 70-83.
19. Dzotam, J.K., I.K. Simo, G. Bitchagno, I. Celik, L.P. Sandjo, P. Tane and V. Kuete, 2018. *In vitro* antibacterial and antibiotic modifying activity of crude extract, fractions and 3,4,7-trihydroxyflavone from *Myristica fragrans* Houtt against MDR Gram-negative enteric bacteria. BMC Complementaey Altern. Med., Vol. 18. 10.1186/s12906-018-2084-1.
20. Dzotam, J.K. and V. Kuete, 2017. Antibacterial and antibiotic-modifying activity of methanol extracts from six Cameroonian food plants against multidrug-resistant enteric bacteria. BioMed Res. Int., Vol. 2017. 10.1155/2017/1583510.
21. Seukep, J.A., L.P. Sandjo, B.T. Ngadjui and V. Kuete, 2016. Antibacterial and antibiotic-resistance modifying activity of the extracts and compounds from *Nauclea pobeguinii* against Gram-negative multi-drug resistant phenotypes. BMC Complementary Altern. Med., Vol. 16. 10.1186/s12906-016-1173-2.
22. Kuete, V., J.D. Wansi, A.T. Mbaveng, M.M.K. Sop and A.T. Tadjong *et al*., 2008. Antimicrobial activity of the methanolic extract and compounds from *Teclea afzelii* (Rutaceae). S. Afr. J. Bot., 74: 572-576.
23. Seukep, J.A., A.G. Fankam, D.E. Djeussi, I.K. Voukeng and S.B. Tankeo *et al*., 2013. Antibacterial activities of the methanol extracts of seven Cameroonian dietary plants against bacteria expressing MDR phenotypes. SpringerPlus, Vol. 2. 10.1186/2193-1801-2-363.
24. Kuete, V., B. Ngameni, A.T. Mbaveng, B. Ngadjui, J.J.M. Meyer and N. Lall, 2010. Evaluation of flavonoids from *Dorstenia barteri* for their antimycobacterial, antigonorrheal and anti-reverse transcriptase activities. Acta Trop., 116: 100-104.
25. Omosa, L.K., J.O. Midiwo, A.T. Mbaveng, S.B. Tankeo and J.A. Seukep *et al*., 2016. Antibacterial activities and structure-activity relationships of a panel of 48 compounds from Kenyan plants against multidrug resistant phenotypes. SpringerPlus, Vol. 5. 10.1186/s40064-016-2599-1.
26. Patrice, H.M., K.A. Pascal, K.F. François, D. Hilaire, D.M. Solange, A.E. Gloria and C.S. Pierre, 2020. Markers and risk factors for chronic kidney disease in Sub-Saharan Africans: Baseline levels and 12-month trajectories in newly referred patients in Cameroon. BMC Nephrol., Vol. 21. 10.1186/s12882-020-01760-6.
27. Patrice, H.M., N. Joiven, F. Hermine, B.J. Yves, K.F. François and A.E. Gloria, 2019. Factors associated with late presentation of patients with chronic kidney disease in nephrology consultation in Cameroon-A descriptive cross-sectional study. Renal Fail., 41: 384-392.

28. Doualla, M., M.P. Halle, J. Moutchia, S. Tegang and G. Ashuntantang, 2018. Determinants of hyperuricemia in non-dialysed chronic kidney disease patients in three hospitals in Cameroon. BMC Nephrol., Vol. 19. 10.1186/s12882-018-0959-5.
29. Kaze, F.F., M. Maimouna, A.F. Beybey, E.W. Pefura-Yone and A.D. Balkissou *et al*., 2021. Prevalence and determinants of chronic kidney disease in urban adults' populations of Northern Cameroon. Clin. Exp. Nephrol., 25: 718-726.
30. Vacaroiu, I.A., E. Cuiban, B.F. Geavlete, V. Gheorghita and C. David *et al*., 2022. Chronic kidney disease-An underestimated risk factor for antimicrobial resistance in patients with urinary tract infections. Biomedicines, Vol. 10. 10.3390/biomedicines10102368.
31. Sepanlou, S.G., H. Barahimi, I. Najafi, F. Kamangar and H. Poustchi *et al*., 2017. Prevalence and determinants of chronic kidney disease in Northeast of Iran: Results of the Golestan cohort study. PLoS ONE, Vol. 12. 10.1371/journal.pone.0176540.
32. Manto, A., A. Dzudie, M.P. Halle, L.N. Aminde, M.H. Abanda, G. Ashuntantang and K.N. Blackett, 2018. Agreement between home and ambulatory blood pressure measurement in non-dialysed chronic kidney disease patients in Cameroon. Pan Afr. Med. J., Vol. 29. 10.11604/pamj.2018.29.71.12078.
33. Kaze, F.F., M.P. Kowo, E.N.A.A. Ndikum, H.D.M.E. Fouda, V. Nzana, E. Ndjong and M.P. Halle, 2020. Prevalence and determinants of gastrointestinal symptoms in adults on maintenance hemodialysis in Cameroon. Open J. Nephrol., 10: 212-222.
34. Gamondi, C., N. Galli, C. Schönholzer, C. Marone and H. Zwahlen *et al*., 2013. Frequency and severity of pain and symptom distress among patients with chronic kidney disease receiving dialysis. Swiss Med. Wkly., Vol. 143. 10.4414/smw.2013.13750.
35. Abu Farsakh, N.A., E. Roweily, M. Rababaa and R. Butchoun, 1996. Evaluation of the upper gastrointestinal tract in uraemic patients undergoing haemodialysis. Nephrol. Dialysis Transplant., 11: 847-850.
36. Dong, R., Z.Y. Guo, J.R. Ding, Y.Y. Zhou and H. Wu, 2014. Gastrointestinal symptoms: A comparison between patients undergoing peritoneal dialysis and hemodialysis. World J. Gastroenterol., 20: 11370-11375.
37. Zuvela, J., C. Trimingham, R.L. Leu, R. Faull, P. Clayton, S. Jesudason and A. Meade, 2018. Gastrointestinal symptoms in patients receiving dialysis: A systematic review. Nephrology, 23: 718-727.
38. Fiderkiewicz, B., A. Rydzewska-Rosołowska, M. Myśliwiec, M. Birecka, B. Kaczanowska, G. Rydzewska and A. Rydzewski, 2011. Factors associated with irritable bowel syndrome symptoms in hemodialysis patients. World J. Gastroenterol., 17: 1976-1981.
39. Shirazian, S. and J. Radhakrishnan, 2010. Gastrointestinal disorders and renal failure: Exploring the connection. Nat. Rev. Nephrol., 6: 480-492.
40. Chong, V.H. and J. Tan, 2013. Prevalence of gastrointestinal and psychosomatic symptoms among Asian patients undergoing regular hemodialysis. Nephrology, 18: 97-103.
41. Salamon, K., J. Woods, E. Paul and C. Huggins, 2013. Peritoneal dialysis patients have higher prevalence of gastrointestinal symptoms than hemodialysis patients. J. Renal Nutr., 23: 114-118.
42. Ikhlas, M., H. Hana, H. Abdesalam, E.A. Hajar, F. Wafaa, L. Inass and S. Nabila, 2018. Urinary tract infections in patients admitted to the nephrology department. Int. J. Infect. Dis. Ther., 3: 34-39.
43. Rysz, J., B. Franczyk, J. Ławiński, R. Olszewski, A. Ciałkowska-Rysz and A. Gluba-Brzózka, 2021. The impact of CKD on uremic toxins and gut microbiota. Toxins, Vol. 13. 10.3390/toxins13040252.
44. Vanholder, R. and G. Glorieux, 2015. The intestine and the kidneys: A bad marriage can be hazardous. Clin. Kidney J., 8: 168-179.
45. Yang, T., E.M. Richards, C.J. Pepine and M.K. Raizada, 2018. The gut microbiota and the brain–gut–kidney axis in hypertension and chronic kidney disease. Nat. Rev. Nephrol., 14: 442-456.
46. Ramezani, A. and D.S. Raj, 2014. The gut microbiome, kidney disease, and targeted interventions. J. Am. Soc. Nephrol., 25: 657-670.
47. Vaziri, N.D., T. Cesario, K. Mootoo, L. Zeien, S. Gordon and C. Byrne, 1982. Bacterial infections in patients with chronic renal failure: Occurrence with spinal cord injury. Arch. Intern. Med., 142: 1273-1276.
48. Wing, M.R., S.S. Patel, A. Ramezani and D.S. Raj, 2016. Gut microbiome in chronic kidney disease. Exp. Physiol., 101: 471-477.
49. Sumon, A.H.M.S.H., M.R. Al-Mahmood, K. Amirul Islam, A.N.M. Ehsanul Karim and P. Aker *et al*., 2023. Multidrug resistance urinary tract infection in chronic kidney disease patients: An observational study. Cureus, Vol. 15. 10.7759/cureus.38571.
50. Shankar, M., S. Narasimhappa and N.S. Madhura, 2021. Urinary tract infection in chronic kidney disease population: A clinical observational study. Cureus, Vol. 13. 10.7759/cureus.12486.
51. Richa, C., C.S. Bhushan, S.P. Kumar, P.N. Dev and P. Nabaraj, 2016. Bacteriology of urinary tract infection of chronic renal failure patients undergoing for hemodialysis. J. Microbiol. Exp., Vol. 3, No. 3. 10.15406/jmen.2016.03.00089.
52. Jamil, B., M.T.M. Bokhari, A. Saeed, M.Z.M. Bokhari and Z. Hussain *et al*., 2018. Multidrug resistance in Gram-negative pathogens isolated from patients with chronic kidney diseases and renal transplant. J. Pak. Med. Assoc., 68: 642-645.

53. Hsiao, C.Y., H.L. Lin, Y.K. Lin, C.W. Chen, Y.C. Cheng, W.C. Lee and T.C. Wu, 2014. Urinary tract infection in patients with chronic kidney disease. Turk. J. Med. Sci., 44: 145-149.
54. Gilbert, D.N., 2006. Urinary tract infections in patients with chronic renal insufficiency. Clin. J. Am. Soc. Nephrol., 1: 327-331.
55. Jaiswal, S., R. Das, S. Sharma, P. Paudel and S.R. Lamichhane, 2013. Bacteriological study of urinary tract infection in male patients undergoing dialysis due to chronic kidney disease in tertiary care hospitals in Nepal. Res. Rev.: J. Life Sci., 3: 8-19.
56. Cristea, O.M., C.S. Avrămescu, M. Bălă oiu, F.D. Popescu, F. Popescu and M.O. Amzoiu, 2017. Urinary tract infection with *Klebsiella pneumoniae* in patients with chronic kidney disease. Curr. Health Sci. J., 43: 137-148.
57. Majeed, H.T. and A.A.J. Aljanaby, 2019. Antibiotic susceptibility patterns and prevalence of some extended spectrum beta-lactamases genes in gram-negative bacteria isolated from patients infected with urinary tract infections in Al-Najaf city, Iraq. Avicenna J. Med. Biotechnol., 11: 192-201.
58. Biliński, J., P. Grzesiowski, J. Muszyński, M. Wróblewska and K. Mądry *et al.*, 2016. Fecal microbiota transplantation inhibits multidrug-resistant gut pathogens: Preliminary report performed in an immunocompromised host. Arch. Immunol. Ther. Exp., 64: 255-258.
59. Fongang, H., A.T. Mbaveng and V. Kuete, 2023. Global Burden of Bacterial Infections and Drug Resistance. In: African Flora to Fight Bacterial Resistance, Part I: Standards for the Activity of Plant-Derived Products, Kuete, V. (Ed.), Academic Press, Cambridge, Massachusetts, ISBN: 9780443158162, pp: 1-20.

SUPPLEMENTARY DATA

Table S1: Characteristic of the study population

					Age range					
Code_patient	Recruitment_place	CKD status	Sex	Age	<20	20-40	40-60	60-80	≥80	GI infection
B1	Consultation	CKD	Female	49	No	No	Yes	No	No	Yes
B2	Consultation	CKD	Female	50	No	No	Yes	No	No	Yes
B3	Consultation	CKD	Male	44	No	No	Yes	No	No	Yes
B4	Consultation	CKD	Female	69	No	No	No	Yes	No	Yes
B5	Consultation	CKD	Male	62	No	No	No	Yes	No	Yes
B6	Consultation	CKD	Male	36	No	Yes	No	No	No	No
B7	Consultation	CKD	Female	71	No	No	No	Yes	No	Yes
B8	Consultation	CKD	Male	35	No	Yes	No	No	No	No
B9	Consultation	CKD	Female	49	No	No	Yes	No	No	Yes
B10	Hospitalization	CKD	Male	71	No	No	No	Yes	No	Yes
B11	Hospitalization	CKD	Male	47	No	No	Yes	No	No	No
B12	Consultation	CKD	Male	76	No	No	No	Yes	No	Yes
B13	Consultation	CKD	Female	41	No	No	Yes	No	No	No
B14	Consultation	CKD	Male	70	No	No	No	Yes	No	Yes
B15	Consultation	CKD	Male	52	No	No	Yes	No	No	Yes
B16	Consultation	CKD	Male	66	No	No	No	Yes	No	Yes
B17	Consultation	CKD	Male	74	No	No	No	Yes	No	Yes
B18	Consultation	CKD	Male	60	No	No	No	Yes	No	Yes
B19	Consultation	CKD	Female	45	No	No	Yes	No	No	Yes
B20	Consultation	CKD	Male	40	No	No	Yes	No	No	Yes
B21	Consultation	CKD	Male	70	No	No	No	Yes	No	Yes
B22	Hospitalization	CKD	Male	53	No	No	Yes	No	No	Yes
B23	Hospitalization	CKD	Male	31	No	Yes	No	No	No	Yes
B24	Consultation	CKD	Female	32	No	Yes	No	No	No	Yes
B25	Consultation	CKD	Male	32	No	Yes	No	No	No	Yes
B26	Consultation	CKD	Female	77	No	No	No	Yes	No	Yes
B27	Consultation	CKD	Male	69	No	No	No	Yes	No	Yes
B28	Consultation	CKD	Male	68	No	No	No	Yes	No	Yes
B29	Consultation	CKD	Male	56	No	No	Yes	No	No	No
B30	Hospitalization	CKD	Male	61	No	No	No	Yes	No	Yes
B31	Consultation	CKD	Male	79	No	No	No	Yes	No	Yes
B32	Consultation	CKD	Male	66	No	No	No	Yes	No	Yes
B33	Consultation	CKD	Female	54	No	No	Yes	No	No	Yes
B34	Consultation	CKD	Female	55	No	No	Yes	No	No	Yes
B35	Consultation	CKD	Female	38	No	Yes	No	No	No	Yes
B36	Consultation	CKD	Female	47	No	No	Yes	No	No	Yes

Table S1: Continue

				Age range						
Code_patient	Recruitment_place	CKD status	Sex	Age	<20	20-40	40-60	60-80	≥80	GI infection
B37	Consultation	CKD	Male	63	No	No	No	Yes	No	No
B38	Consultation	CKD	Male	18	Yes	No	No	No	No	No
B39	Consultation	CKD	Female	53	No	No	Yes	No	No	Yes
B40	Consultation	CKD	Male	40	No	No	Yes	No	No	Yes
B41	Consultation	CKD	Female	54	No	No	Yes	No	No	Yes
B42	Consultation	CKD	Male	60	No	No	No	Yes	No	Yes
B43	Consultation	CKD	Male	44	No	No	Yes	No	No	No
B44	Consultation	CKD	Male	60	No	No	No	Yes	No	Yes
B45	Consultation	CKD	Female	57	No	No	Yes	No	No	Yes
B46	Consultation	CKD	Female	72	No	No	No	Yes	No	Yes
B47	Hospitalization	CKD	Female	33	No	Yes	No	No	No	Yes
B48	Consultation	CKD	Female	42	No	No	Yes	No	No	Yes
B49	Consultation	CKD	Male	62	No	No	No	Yes	No	No
B50	Consultation	CKD	Male	61	No	No	No	Yes	No	Yes
B51	Consultation	CKD	Female	64	No	No	No	Yes	No	Yes
B52	Consultation	CKD	Male	75	No	No	No	Yes	No	Yes
B53	Consultation	CKD	Male	51	No	No	Yes	No	No	Yes
B54	Consultation	CKD	Female	60	No	No	No	Yes	No	No
B55	Consultation	CKD	Male	60	No	No	No	Yes	No	Yes
B56	Consultation	CKD	Female	29	No	Yes	No	No	No	No
B57	Consultation	CKD	Female	54	No	No	Yes	No	No	No
B58	Consultation	CKD	Male	49	No	No	Yes	No	No	No
B59	Consultation	CKD	Female	50	No	No	Yes	No	No	Yes
B60	Consultation	CKD	Male	41	No	No	Yes	No	No	Yes
B61	Consultation	CKD	Female	45	No	No	Yes	No	No	Yes
B62	Consultation	CKD	Male	65	No	No	No	Yes	No	Yes
B63	Consultation	CKD	Male	62	No	No	No	Yes	No	Yes
B64	Consultation	CKD	Male	87	No	No	No	No	Yes	No
B65	Consultation	CKD	Female	41	No	No	Yes	No	No	No
B66	Consultation	CKD	Female	61	No	No	No	Yes	No	Yes
B67	Consultation	CKD	Male	57	No	No	Yes	No	No	No
B68	Consultation	CKD	Male	72	No	No	No	Yes	No	Yes
B69	Hospitalization	CKD	Female	37	No	Yes	No	No	No	Yes
B70	Consultation	CKD	Female	58	No	No	Yes	No	No	Yes
B71	Consultation	CKD	Female	76	No	No	No	Yes	No	No
B72	Consultation	CKD	Female	67	No	No	No	Yes	No	Yes
B73	Consultation	CKD	Female	37	No	Yes	No	No	No	Yes
B74	Consultation	CKD	Female	48	No	No	Yes	No	No	Yes
B75	Consultation	CKD	Male	18	Yes	No	No	No	No	Yes
B76	Hospitalization	CKD	Female	70	No	No	No	Yes	No	No
B77	Hospitalization	CKD	Female	47	No	No	Yes	No	No	Yes
B78	Hospitalization	CKD	Female	68	No	No	No	Yes	No	Yes
B79	Consultation	CKD	Male	61	No	No	No	Yes	No	Yes
B80	Consultation	CKD	Female	41	No	No	Yes	No	No	Yes
B81	Consultation	CKD	Male	68	No	No	No	Yes	No	Yes
B82	Consultation	CKD	Female	54	No	No	Yes	No	No	No
B83	Consultation	CKD	Male	75	No	No	No	Yes	No	No
B84	Consultation	CKD	Male	52	No	No	Yes	No	No	Yes
B85	Consultation	CKD	Male	56	No	No	Yes	No	No	Yes
B86	Consultation	CKD	Male	44	No	No	Yes	No	No	Yes
B87	Consultation	CKD	Female	22	No	Yes	No	No	No	Yes
B88	Consultation	CKD	Female	62	No	No	No	Yes	No	Yes
B89	Consultation	CKD	Male	62	No	No	No	Yes	No	Yes
B90	Consultation	CKD	Male	55	No	No	Yes	No	No	Yes
B91	Consultation	CKD	Male	78	No	No	No	Yes	No	Yes
B92	Consultation	CKD	Female	51	No	No	Yes	No	No	Yes
B93	Consultation	CKD	Male	47	No	No	Yes	No	No	Yes
B94	Consultation	CKD	Female	59	No	No	Yes	No	No	No
B95	Consultation	CKD	Female	74	No	No	No	Yes	No	No

Table S1: Continue

				Age range						
Code_patient	Recruitment_place	CKD status	Sex	Age	<20	20-40	40-60	60-80	≥80	GI infection
B96	Consultation	CKD	Male	59	No	No	Yes	No	No	Yes
B97	Hospitalization	CKD	Female	68	No	No	No	Yes	No	No
B98	Hospitalization	CKD	Male	54	No	No	Yes	No	No	Yes
B99	Consultation	CKD	Male	69	No	No	No	Yes	No	Yes
B100	Consultation	CKD	Female	32	No	Yes	No	No	No	Yes
B101	Consultation	CKD	Female	45	No	No	Yes	No	No	Yes
B102	Consultation	CKD	Male	70	No	No	No	Yes	No	Yes
B103	Consultation	CKD	Male	70	No	No	No	Yes	No	Yes
B104	Consultation	CKD	Male	44	No	No	Yes	No	No	Yes
B105	Consultation	CKD	Male	62	No	No	No	Yes	No	No
B106	Consultation	CKD	Male	47	No	No	Yes	No	No	Yes
B107	Consultation	CKD	Female	59	No	No	Yes	No	No	Yes
B108	Consultation	CKD	Male	61	No	No	No	Yes	No	No
B109	Consultation	CKD	Male	59	No	No	Yes	No	No	Yes
B110	Consultation	CKD	Male	70	No	No	No	Yes	No	No
B111	Consultation	CKD	Male	62	No	No	No	Yes	No	Yes
B112	Consultation	CKD	Female	67	No	No	No	Yes	No	Yes
B113	Consultation	CKD	Male	41	No	No	Yes	No	No	Yes
B114	Hospitalization	CKD	Male	70	No	No	No	Yes	No	Yes
B115	Consultation	CKD	Female	59	No	No	Yes	No	No	Yes
B116	Consultation	CKD	Female	54	No	No	Yes	No	No	Yes
B117	Consultation	CKD	Female	37	No	Yes	No	No	No	No
B118	Consultation	CKD	Male	57	No	No	Yes	No	No	No
B119	Consultation	CKD	Male	58	No	No	Yes	No	No	No
B120	Consultation	CKD	Female	41	No	No	Yes	No	No	No
B121	Consultation	CKD	Male	34	No	Yes	No	No	No	Yes
B122	Consultation	CKD	Female	50	No	No	Yes	No	No	No
B123	Consultation	CKD	Female	33	No	Yes	No	No	No	No
B124	Consultation	CKD	Male	62	No	No	No	Yes	No	Yes
B125	Hospitalization	CKD	Female	58	No	No	Yes	No	No	Yes
B126	Hospitalization	CKD	Female	77	No	No	No	Yes	No	Yes
B127	Consultation	CKD	Female	47	No	No	Yes	No	No	No
B128	Hospitalization	CKD	Female	65	No	No	No	Yes	No	Yes
B129	Hospitalization	CKD	Female	57	No	No	Yes	No	No	No
B130	Consultation	CKD	Female	84	No	No	No	No	Yes	Yes
B131	Consultation	CKD	Male	52	No	No	Yes	No	No	Yes
B132	Consultation	CKD	Male	76	No	No	No	Yes	No	Yes
B133	Consultation	CKD	Female	45	No	No	Yes	No	No	Yes
B134	Consultation	CKD	Male	81	No	No	No	No	Yes	Yes
B135	Consultation	CKD	Female	53	No	No	Yes	No	No	Yes
B136	Consultation	CKD	Male	72	No	No	No	Yes	No	Yes
B137	Consultation	CKD	Male	53	No	No	Yes	No	No	Yes
B138	Consultation	CKD	Male	54	No	No	Yes	No	No	No
B139	Hospitalization	CKD	Female	65	No	No	Yes	No	No	Yes
B140	Consultation	CKD	Male	60	No	No	No	Yes	No	Yes
B141	Consultation	CKD	Male	54	No	No	No	Yes	No	No
B142	Consultation	CKD	Female	46	No	No	Yes	No	No	No
B143	Consultation	CKD	Male	43	No	No	Yes	No	No	No
B144	Hospitalization	CKD	Male	73	No	No	Yes	No	No	Yes
B145	Consultation	CKD	Male	63	No	No	No	Yes	No	Yes
B146	Consultation	CKD	Male	66	No	No	No	Yes	No	No
B147	Consultation	CKD	Female	61	No	No	No	Yes	No	Yes
B148	Consultation	CKD	Female	56	No	No	No	Yes	No	Yes
B149	Consultation	CKD	Male	62	No	No	Yes	No	No	No
B150	Consultation	CKD	Male	60	No	Yes	No	No	No	No
B151	Hospitalization	CKD	Female	30	No	No	No	Yes	No	No
B152	Hospitalization	CKD	Female	54	No	No	No	Yes	No	No
B153	Hospitalization	CKD	Male	25	No	Yes	No	No	No	No
B154	Hospitalization	CKD	Male	51	No	No	Yes	No	No	No

Table S1: Continue

					Age range					
Code_patient	Recruitment_place	CKD status	Sex	Age	<20	20-40	40-60	60-80	≥80	GI infection
B155	Consultation	CKD	Male	73	No	Yes	No	No	No	Yes
B156	Hospitalization	CKD	Male	74	No	No	Yes	No	No	No
B157	Hospitalization	CKD	Male	32	No	Yes	No	No	No	Yes
B158	Hospitalization	CKD	Male	40	No	No	No	Yes	No	Yes
B159	Hospitalization	CKD	Male	76	No	No	No	Yes	No	No
B160	Hospitalization	CKD	Male	47	No	Yes	No	No	No	Yes
B161	Hospitalization	CKD	Male	67	No	No	Yes	No	No	Yes
B162	Hospitalization	CKD	Male	37	No	No	No	Yes	No	Yes
B163	Hospitalization	CKD	Female	34	No	No	Yes	No	No	Yes
B164	Hospitalization	CKD	Male	36	No	No	No	Yes	No	No
B165	Consultation	CKD	Female	53	No	Yes	No	No	No	No
B166	Consultation	CKD	Female	64	No	Yes	No	No	No	No
B167	Hospitalization	CKD	Female	55	No	Yes	No	No	No	No
B168	Consultation	CKD	Male	46	No	No	Yes	No	No	Yes
B169	Consultation	CKD	Male	44	No	No	No	Yes	No	Yes
B170	Consultation	CKD	Female	31	No	No	Yes	No	No	Yes
B171	Consultation	CKD	Female	37	No	No	Yes	No	No	Yes
B172	Hospitalization	CKD	Female	64	No	No	Yes	No	No	Yes
B173	Consultation	CKD	Female	61	No	No	Yes	No	No	Yes
B174	Consultation	CKD	Male	59	No	Yes	No	No	No	Yes
B175	Consultation	CKD	Female	63	No	Yes	No	No	No	Yes
B176	Consultation	CKD	Male	32	No	No	No	Yes	No	No
B177	Consultation	CKD	Male	64	No	No	No	Yes	No	Yes
B178	Consultation	CKD	Female	34	No	No	Yes	No	No	No
B179	Consultation	CKD	Male	57	No	No	No	Yes	No	Yes
B180	Consultation	CKD	Male	56	No	Yes	No	No	No	Yes
B181	Consultation	CKD	Male	65	No	No	No	Yes	No	Yes
B182	Consultation	CKD	Male	41	No	Yes	No	No	No	Yes
B183	Consultation	CKD	Male	62	No	No	Yes	No	No	Yes
B184	Consultation	CKD	Female	21	No	No	Yes	No	No	Yes
B185	Consultation	CKD	Male	51	No	No	No	Yes	No	Yes
B186	Consultation	CKD	Male	50	No	No	Yes	No	No	Yes
B187	Consultation	CKD	Female	75	No	No	No	Yes	No	Yes
B188	Consultation	CKD	Female	50	No	Yes	No	No	No	No
B189	Consultation	CKD	Female	70	No	No	Yes	No	No	Yes
B190	Consultation	CKD	Female	68	No	No	Yes	No	No	Yes
B191	Consultation	CKD	Male	62	No	No	No	Yes	No	Yes
B192	Consultation	CKD	Female	34	No	No	Yes	No	No	Yes
B193	Hospitalization	CKD	Female	25	No	No	No	Yes	No	Yes
B194	Hospitalization	CKD	Female	64	No	No	No	Yes	No	Yes
B195	Consultation	CKD	Male	56	No	No	No	Yes	No	Yes
B196	Consultation	CKD	Male	71	No	Yes	No	No	No	Yes
B197	Hospitalization	CKD	Female	53	No	Yes	No	No	No	No
D1	Consultation	W-CKD	Female	23	No	No	No	Yes	No	Yes
D2	Consultation	W-CKD	Female	34	No	No	Yes	No	No	Yes
D3	Consultation	W-CKD	Female	45	No	No	No	Yes	No	Yes
D4	Consultation	W-CKD	Male	49	No	Yes	No	No	No	Yes
D5	Consultation	W-CKD	Female	25	Yes	No	No	No	No	No
D6	Consultation	W-CKD	Male	18	No	Yes	No	No	No	No
D7	Consultation	W-CKD	Male	38	No	No	Yes	No	No	No
D8	Consultation	W-CKD	Male	43	No	Yes	No	No	No	No
D9	Consultation	W-CKD	Male	32	No	No	Yes	No	No	Yes
D10	Consultation	W-CKD	Male	43	No	Yes	No	No	No	Yes
D11	Consultation	W-CKD	Male	21	No	No	Yes	No	No	Yes
D12	Consultation	W-CKD	Male	50	No	No	No	Yes	No	No
D13	Consultation	W-CKD	Male	64	No	Yes	No	No	No	No
D14	Consultation	W-CKD	Female	34	No	Yes	No	No	No	No
D15	Consultation	W-CKD	Female	39	No	Yes	No	No	No	Yes
D16	Consultation	W-CKD	Male	31	No	Yes	No	No	No	Yes

Table S1: Continue

					Age range					
Code_patient	Recruitment_place	CKD status	Sex	Age	<20	20-40	40-60	60-80	≥80	GI infection
D17	Consultation	W-CKD	Male	37	No	No	Yes	No	No	Yes
D18	Consultation	W-CKD	Male	45	No	Yes	No	No	No	No
D19	Consultation	W-CKD	Male	32	No	No	Yes	No	No	No
D20	Consultation	W-CKD	Male	59	No	No	No	No	Yes	Yes
D21	Consultation	W-CKD	Female	83	No	Yes	No	No	No	Yes
D22	Consultation	W-CKD	Male	38	No	No	Yes	No	No	Yes
D23	Consultation	W-CKD	Female	53	No	Yes	No	No	No	No
D24	Hospitalization	W-CKD	Male	27	No	Yes	No	No	No	Yes
D25	Hospitalization	W-CKD	Female	36	No	No	Yes	No	No	Yes
D26	Consultation	W-CKD	Male	56	No	No	No	Yes	No	No
D27	Hospitalization	W-CKD	Male	75	No	Yes	No	No	No	No
D28	Consultation	W-CKD	Female	23	No	No	Yes	No	No	No
D29	Hospitalization	W-CKD	Female	57	No	Yes	No	No	No	No
D30	Consultation	W-CKD	Female	28	No	No	No	Yes	No	No
D31	Consultation	W-CKD	Male	68	No	No	No	No	Yes	No
D32	Consultation	W-CKD	Female	86	Yes	No	No	No	No	No
D33	Hospitalization	W-CKD	Male	19	No	Yes	No	No	No	No
D34	Consultation	W-CKD	Female	23	No	No	Yes	No	No	No
D35	Consultation	W-CKD	Female	43	No	No	Yes	No	No	No
D36	Consultation	W-CKD	Female	28	No	Yes	No	No	No	No
D37	Hospitalization	W-CKD	Female	34	No	Yes	No	No	No	No
D38	Hospitalization	W-CKD	Male	66	No	No	No	Yes	No	No
D39	Consultation	W-CKD	Female	76	No	No	No	Yes	No	No
D40	Consultation	W-CKD	Male	67	No	No	No	Yes	No	No
D41	Consultation	W-CKD	Male	70	No	No	No	Yes	No	No
D42	Consultation	W-CKD	Female	33	No	Yes	No	No	No	No
D43	Consultation	W-CKD	Female	31	No	Yes	No	No	No	No
D44	Consultation	W-CKD	Female	63	No	No	No	Yes	No	No
D45	Consultation	W-CKD	Female	48	No	No	Yes	No	No	No
D46	Consultation	W-CKD	Male	56	No	No	Yes	No	No	No
D47	Consultation	W-CKD	Female	41	No	No	Yes	No	No	No
D48	Consultation	W-CKD	Female	32	No	Yes	No	No	No	No
D49	Hospitalization	W-CKD	Male	71	No	No	No	Yes	No	No
D50	Consultation	W-CKD	Female	30	No	Yes	No	No	No	No
D51	Consultation	W-CKD	Male	73	No	No	No	Yes	No	No
D52	Consultation	W-CKD	Female	69	No	No	No	Yes	No	No
D53	Hospitalization	W-CKD	Male	39	No	Yes	No	No	No	No
D54	Consultation	W-CKD	Female	26	No	Yes	No	No	No	No
D55	Consultation	W-CKD	Male	64	No	No	No	Yes	No	No
D56	Consultation	W-CKD	Female	23	No	Yes	No	No	No	No
D57	Consultation	W-CKD	Male	68	No	No	No	Yes	No	No
D58	Consultation	W-CKD	Male	29	No	Yes	No	No	No	No
D59	Consultation	W-CKD	Female	34	No	Yes	No	No	No	No
D60	Consultation	W-CKD	Female	80	No	No	No	No	Yes	No
D61	Consultation	W-CKD	Male	12	Yes	No	No	No	No	No
D62	Consultation	W-CKD	Male	45	No	No	Yes	No	No	Yes
D63	Consultation	W-CKD	Female	64	No	No	No	Yes	No	Yes
D64	Consultation	W-CKD	Female	52	No	No	Yes	No	No	Yes
D65	Consultation	W-CKD	Male	42	No	No	Yes	No	No	Yes
D66	Consultation	W-CKD	Male	69	No	No	No	Yes	No	Yes
D67	Consultation	W-CKD	Female	34	No	Yes	No	No	No	Yes
D68	Consultation	W-CKD	Male	49	No	No	Yes	No	No	Yes
D69	Consultation	W-CKD	Female	44	No	No	Yes	No	No	Yes
D70	Consultation	W-CKD	Male	77	No	No	No	Yes	No	Yes
D71	Consultation	W-CKD	Male	10	Yes	No	No	No	No	Yes
D72	Consultation	W-CKD	Male	40	No	No	Yes	No	No	Yes
D73	Consultation	W-CKD	Male	31	No	Yes	No	No	No	Yes
D74	Consultation	W-CKD	Female	38	No	Yes	No	No	No	Yes
D75	Consultation	W-CKD	Female	55	No	No	Yes	No	No	Yes

Table S1: Continue

					Age range					
Code_patient	Recruitment_place	CKD status	Sex	Age	<20	20-40	40-60	60-80	≥80	GI infection
D76	Consultation	W-CKD	Female	41	No	No	Yes	No	No	Yes
D77	Consultation	W-CKD	Female	20	No	Yes	No	No	No	Yes
D78	Consultation	W-CKD	Female	61	No	No	No	Yes	No	Yes
D79	Consultation	W-CKD	Female	23	No	Yes	No	No	No	Yes
D80	Consultation	W-CKD	Female	53	No	No	Yes	No	No	Yes
D81	Consultation	W-CKD	Female	34	No	Yes	No	No	No	Yes
D82	Consultation	W-CKD	Female	36	No	Yes	No	No	No	Yes
D83	Consultation	W-CKD	Male	10	Yes	No	No	No	No	Yes
D84	Consultation	W-CKD	Male	28	No	Yes	No	No	No	Yes
D85	Consultation	W-CKD	Female	22	No	Yes	No	No	No	Yes
D86	Consultation	W-CKD	Female	38	No	Yes	No	No	No	Yes
D87	Consultation	W-CKD	Female	20	No	Yes	No	No	No	Yes
D88	Consultation	W-CKD	Male	35	No	Yes	No	No	No	Yes
D89	Consultation	W-CKD	Female	40	No	No	Yes	No	No	Yes
D90	Consultation	W-CKD	Female	53	No	No	Yes	No	No	Yes
D91	Consultation	W-CKD	Female	45	No	No	Yes	No	No	Yes
D92	Consultation	W-CKD	Female	36	No	Yes	No	No	No	Yes
D93	Consultation	W-CKD	Male	63	No	No	No	Yes	No	Yes
D94	Consultation	W-CKD	Female	22	No	Yes	No	No	No	Yes
D95	Consultation	W-CKD	Female	38	No	Yes	No	No	No	Yes
D96	Consultation	W-CKD	Male	57	No	No	Yes	No	No	Yes
D97	Consultation	W-CKD	Female	20	No	Yes	No	No	No	Yes
D98	Consultation	W-CKD	Female	54	No	No	Yes	No	No	Yes
D99	Consultation	W-CKD	Female	27	No	Yes	No	No	No	Yes
D100	Consultation	W-CKD	Female	25	No	Yes	No	No	No	Yes
D101	Consultation	W-CKD	Female	58	No	No	Yes	No	No	Yes
D102	Consultation	W-CKD	Male	27	No	Yes	No	No	No	Yes
D103	Consultation	W-CKD	Female	66	No	No	No	Yes	No	Yes
D104	Consultation	W-CKD	Male	10	Yes	No	No	No	No	Yes
D105	Consultation	W-CKD	Female	37	No	Yes	No	No	No	Yes
D106	Consultation	W-CKD	Female	78	No	No	No	Yes	No	Yes
D107	Consultation	W-CKD	Male	63	No	No	No	Yes	No	Yes
D108	Consultation	W-CKD	Male	43	No	No	Yes	No	No	Yes
D109	Consultation	W-CKD	Female	63	No	No	No	Yes	No	Yes
D110	Consultation	W-CKD	Male	52	No	No	Yes	No	No	Yes
D111	Consultation	W-CKD	Female	23	No	Yes	No	No	No	Yes
D112	Consultation	W-CKD	Male	42	No	No	Yes	No	No	Yes
D113	Consultation	W-CKD	Female	23	No	Yes	No	No	No	Yes
D114	Consultation	W-CKD	Female	54	No	No	Yes	No	No	Yes
D115	Consultation	W-CKD	Female	31	No	Yes	No	No	No	Yes
D116	Consultation	W-CKD	Male	44	No	No	Yes	No	No	Yes
D117	Consultation	W-CKD	Male	43	No	No	Yes	No	No	Yes
D118	Consultation	W-CKD	Male	40	No	No	Yes	No	No	Yes
D119	Consultation	W-CKD	Male	47	No	No	Yes	No	No	Yes
D120	Consultation	W-CKD	Male	10	Yes	No	No	No	No	Yes
D121	Consultation	W-CKD	Male	41	No	No	Yes	No	No	Yes
D122	Consultation	W-CKD	Male	37	No	Yes	No	No	No	Yes
D123	Consultation	W-CKD	Female	17	Yes	No	No	No	No	Yes
D124	Consultation	W-CKD	Female	30	No	Yes	No	No	No	Yes
D125	Consultation	W-CKD	Female	38	No	Yes	No	No	No	Yes
D126	Consultation	W-CKD	Male	30	No	Yes	No	No	No	Yes
D127	Consultation	W-CKD	Female	33	No	Yes	No	No	No	Yes
D128	Consultation	W-CKD	Female	84	No	No	No	No	Yes	Yes
D129	Consultation	W-CKD	Female	38	No	Yes	No	No	No	Yes
D130	Consultation	W-CKD	Male	48	No	No	Yes	No	No	Yes
D131	Consultation	W-CKD	Female	39	No	Yes	No	No	No	Yes
D132	Consultation	W-CKD	Female	44	No	No	Yes	No	No	Yes
D133	Consultation	W-CKD	Female	34	No	Yes	No	No	No	Yes
D134	Consultation	W-CKD	Female	10	Yes	No	No	No	No	Yes

Table S1: Continue

				Age range						
Code_patient	Recruitment_place	CKD status	Sex	Age	<20	20-40	40-60	60-80	≥80	GI infection
D135	Consultation	W-CKD	Female	42	No	No	Yes	No	No	Yes
D136	Consultation	W-CKD	Female	36	No	Yes	No	No	No	Yes
D137	Consultation	W-CKD	Male	29	No	Yes	No	No	No	Yes
D138	Consultation	W-CKD	Female	20	No	Yes	No	No	No	Yes
D139	Consultation	W-CKD	Male	29	No	Yes	No	No	No	Yes
D140	Consultation	W-CKD	Female	10	Yes	No	No	No	No	Yes
D141	Consultation	W-CKD	Male	81	No	No	No	No	Yes	Yes
D142	Consultation	W-CKD	Female	29	No	Yes	No	No	No	Yes
D143	Consultation	W-CKD	Female	51	No	No	Yes	No	No	Yes
D144	Consultation	W-CKD	Male	35	No	Yes	No	No	No	Yes
D145	Consultation	W-CKD	Female	51	No	No	Yes	No	No	Yes
D146	Consultation	W-CKD	Female	42	No	No	Yes	No	No	Yes
D147	Consultation	W-CKD	Male	64	No	No	No	Yes	No	Yes
D148	Consultation	W-CKD	Male	56	No	No	Yes	No	No	Yes
D149	Consultation	W-CKD	Female	33	No	Yes	No	No	No	Yes
D150	Consultation	W-CKD	Male	34	No	Yes	No	No	No	Yes
D151	Consultation	W-CKD	Male	58	No	No	Yes	No	No	Yes
D152	Consultation	W-CKD	Male	54	No	No	Yes	No	No	Yes
D153	Consultation	W-CKD	Male	49	No	No	Yes	No	No	Yes
D154	Consultation	W-CKD	Male	48	No	No	Yes	No	No	Yes
D155	Consultation	W-CKD	Male	52	No	No	Yes	No	No	Yes
D156	Consultation	W-CKD	Female	34	No	Yes	No	No	No	Yes
D157	Consultation	W-CKD	Female	29	No	Yes	No	No	No	Yes
D158	Consultation	W-CKD	Male	25	No	Yes	No	No	No	Yes
D159	Consultation	W-CKD	Female	55	No	No	Yes	No	No	Yes
D160	Consultation	W-CKD	Male	41	No	No	Yes	No	No	Yes
D161	Consultation	W-CKD	Female	48	No	No	Yes	No	No	Yes
D162	Consultation	W-CKD	Female	42	No	No	Yes	No	No	Yes
D163	Consultation	W-CKD	Female	45	No	No	Yes	No	No	Yes
D164	Consultation	W-CKD	Female	23	No	Yes	No	No	No	Yes
D165	Consultation	W-CKD	Male	47	No	No	Yes	No	No	Yes
D166	Consultation	W-CKD	Male	15	Yes	No	No	No	No	Yes
D167	Consultation	W-CKD	Female	68	No	No	No	Yes	No	Yes
D168	Consultation	W-CKD	Male	39	No	Yes	No	No	No	Yes
D169	Consultation	W-CKD	Male	47	No	No	Yes	No	No	Yes
D170	Consultation	W-CKD	Female	36	No	Yes	No	No	No	Yes
D171	Consultation	W-CKD	Male	45	No	No	Yes	No	No	Yes
D172	Consultation	W-CKD	Female	42	No	No	Yes	No	No	Yes
D173	Consultation	W-CKD	Female	20	No	Yes	No	No	No	Yes
D174	Consultation	W-CKD	Female	23	No	Yes	No	No	No	Yes
D175	Consultation	W-CKD	Male	47	No	No	Yes	No	No	Yes
D176	Consultation	W-CKD	Male	20	No	Yes	No	No	No	Yes
D177	Consultation	W-CKD	Female	68	No	No	No	Yes	No	Yes
D178	Consultation	W-CKD	Male	39	No	Yes	No	No	No	Yes
D179	Consultation	W-CKD	Male	47	No	No	Yes	No	No	Yes
D180	Consultation	W-CKD	Female	36	No	Yes	No	No	No	Yes
D181	Consultation	W-CKD	Male	32	No	Yes	No	No	No	Yes
D182	Consultation	W-CKD	Female	80	No	No	No	No	Yes	Yes
D183	Consultation	W-CKD	Female	53	No	No	Yes	No	No	Yes
D184	Consultation	W-CKD	Female	29	No	Yes	No	No	No	Yes
D185	Consultation	W-CKD	Male	66	No	No	No	Yes	No	Yes
D186	Consultation	W-CKD	Male	71	No	No	No	Yes	No	Yes
D187	Consultation	W-CKD	Male	42	No	No	Yes	No	No	Yes
D188	Consultation	W-CKD	Female	28	No	Yes	No	No	No	Yes
D189	Consultation	W-CKD	Male	33	No	Yes	No	No	No	Yes
D190	Consultation	W-CKD	Female	72	No	No	No	Yes	No	Yes
D191	Consultation	W-CKD	Female	60	No	No	No	Yes	No	Yes
D192	Consultation	W-CKD	Female	70	No	No	No	Yes	No	Yes
D193	Consultation	W-CKD	Male	29	No	Yes	No	No	No	Yes
D194	Consultation	W-CKD	Female	35	No	Yes	No	No	No	Yes

Table S1: Continue

					Age range					
Code_patient	Recruitment_place	CKD status	Sex	Age	<20	20-40	40-60	60-80	≥80	GI infection
D195	Consultation	W-CKD	Male	46	No	No	Yes	No	No	Yes
D196	Consultation	W-CKD	Male	39	No	Yes	No	No	No	Yes
D197	Consultation	W-CKD	Female	65	No	No	Yes	No	No	Yes
D198	Consultation	W-CKD	Male	44	No	No	Yes	No	No	Yes
D199	Consultation	W-CKD	Female	65	No	No	No	Yes	No	Yes
D200	Consultation	W-CKD	Female	44	No	No	Yes	No	No	Yes
D201	Consultation	W-CKD	Female	64	No	No	No	Yes	No	Yes
D202	Consultation	W-CKD	Female	56	No	No	Yes	No	No	Yes
D203	Consultation	W-CKD	Female	66	No	No	No	Yes	No	Yes
D204	Consultation	W-CKD	Male	34	No	Yes	No	No	No	Yes
D205	Consultation	W-CKD	Female	58	No	No	Yes	No	No	Yes
D206	Consultation	W-CKD	Female	54	No	No	Yes	No	No	Yes
D207	Consultation	W-CKD	Female	48	No	No	Yes	No	No	Yes
D208	Consultation	W-CKD	Male	52	No	No	Yes	No	No	Yes
D209	Consultation	W-CKD	Male	34	No	Yes	No	No	No	Yes
D210	Consultation	W-CKD	Female	29	No	Yes	No	No	No	Yes
D211	Consultation	W-CKD	Female	38	No	Yes	No	No	No	Yes
D212	Consultation	W-CKD	Female	36	No	Yes	No	No	No	Yes
D213	Consultation	W-CKD	Male	10	Yes	No	No	No	No	Yes
D214	Consultation	W-CKD	Male	28	No	Yes	No	No	No	Yes
D215	Consultation	W-CKD	Female	22	No	Yes	No	No	No	Yes
D216	Consultation	W-CKD	Female	38	No	Yes	No	No	No	Yes
D217	Consultation	W-CKD	Female	20	No	Yes	No	No	No	Yes
D218	Consultation	W-CKD	Male	35	No	Yes	No	No	No	Yes
D219	Consultation	W-CKD	Female	40	No	No	Yes	No	No	Yes
D220	Consultation	W-CKD	Female	53	No	No	Yes	No	No	Yes
D221	Consultation	W-CKD	Female	45	No	No	Yes	No	No	Yes
D222	Consultation	W-CKD	Female	36	No	Yes	No	No	No	Yes
D223	Consultation	W-CKD	Male	63	No	No	No	Yes	No	Yes
D224	Consultation	W-CKD	Female	22	No	Yes	No	No	No	Yes
D225	Consultation	W-CKD	Female	38	No	Yes	No	No	No	Yes
D226	Consultation	W-CKD	Male	57	No	No	Yes	No	No	Yes
D227	Consultation	W-CKD	Female	20	No	Yes	No	No	No	Yes
D228	Consultation	W-CKD	Female	54	No	No	Yes	No	No	Yes
D229	Consultation	W-CKD	Female	27	No	Yes	No	No	No	Yes
D230	Consultation	W-CKD	Female	25	No	Yes	No	No	No	Yes
D231	Consultation	W-CKD	Female	58	No	No	Yes	No	No	Yes
D232	Consultation	W-CKD	Male	27	No	Yes	No	No	No	Yes
D233	Consultation	W-CKD	Female	66	No	No	No	Yes	No	Yes
D234	Consultation	W-CKD	Male	10	Yes	No	No	No	No	Yes
D235	Consultation	W-CKD	Female	37	No	Yes	No	No	No	Yes
D236	Consultation	W-CKD	Female	78	No	No	No	Yes	No	Yes
D237	Consultation	W-CKD	Male	63	No	No	No	Yes	No	Yes
D238	Consultation	W-CKD	Male	43	No	No	Yes	No	No	Yes
D239	Consultation	W-CKD	Female	63	No	No	No	Yes	No	Yes
D240	Consultation	W-CKD	Male	52	No	No	Yes	No	No	Yes
D241	Consultation	W-CKD	Female	23	No	Yes	No	No	No	Yes
D242	Consultation	W-CKD	Male	42	No	No	Yes	No	No	Yes
D243	Consultation	W-CKD	Female	23	No	Yes	No	No	No	Yes
D244	Consultation	W-CKD	Female	54	No	No	Yes	No	No	Yes
D245	Consultation	W-CKD	Female	31	No	Yes	No	No	No	Yes
D246	Consultation	W-CKD	Male	44	No	No	Yes	No	No	Yes
D247	Consultation	W-CKD	Male	43	No	No	Yes	No	No	Yes
D248	Consultation	W-CKD	Male	40	No	No	Yes	No	No	Yes
D249	Consultation	W-CKD	Male	47	No	No	Yes	No	No	Yes
D250	Consultation	W-CKD	Male	10	Yes	No	No	No	No	Yes
D251	Consultation	W-CKD	Male	41	No	No	Yes	No	No	Yes
D252	Consultation	W-CKD	Male	37	No	Yes	No	No	No	Yes
D253	Consultation	W-CKD	Female	17	Yes	No	No	No	No	Yes

Code with B: Patients with chronic kidney diseases, Code with D: Patients without chronic kidney diseases patients, CKD: Chronic Kidney Diseases, W-CKD: Without Chronic Kidney Diseases and GI Infection: Gastrointestinal infection

Table S2: Gastrointestinal symptoms and enteric bacteria isolates

Code_ patient	CKD_ status	GI infection	Diarrhea	Abdominal pain	Constipation	Vomiting	Abdominal bloating	Nausea	Fever	Enteric bacteria
B1	CKD	Yes	No	No	No	No	No	No	No	*Citrobacter freundii*
B2	CKD	Yes	No	No	No	No	No	No	No	*Enterobacter cloacae*
B3	CKD	Yes	No	No	No	No	No	No	No	*Enterobacter cloacae* and *Yersinia pestis*
B4	CKD	Yes	Yes	No	No	No	No	No	No	*Klebsiella pneumoniae* and *Proteus mirabilis*
B5	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Salmonella typhi*
B7	CKD	Yes	No	No	No	No	No	No	No	
B9	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*, *Proteus mirabilis* and *Enterobacter cloacae*
B10	CKD	Yes	Yes	No	Yes	Yes	No	Yes	No	*Klebsiella pneumoniae*
B12	CKD	Yes	No	No	No	No	No	No	No	
B14	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B15	CKD	Yes	No	No	No	Yes	No	Yes	No	*Proteus mirabilis*
B16	CKD	Yes	No	No	No	No	No	No	No	
B17	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B18	CKD	Yes	No	Yes	No	Yes	No	No	Yes	
B19	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B20	CKD	Yes	No	No	No	No	No	No	No	
B21	CKD	Yes	No	No	No	No	No	No	No	
B22	CKD	Yes	No	No	No	No	No	No	No	*Shigella* spp.
B23	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*, *Proteus mirabilis*
B24	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
B25	CKD	Yes	No	No	No	No	No	No	No	
B26	CKD	Yes	No	No	No	No	No	No	No	
B27	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B28	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B30	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B31	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae* and *Yersinia pestis*
B32	CKD	Yes	No	No	No	No	No	No	No	
B33	CKD	Yes	No	No	No	No	No	No	No	
B34	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
B35	CKD	Yes	No	No	No	No	No	No	No	*Yersinia pestis*
B36	CKD	Yes	No	No	No	No	No	No	No	*Enterobacter cloacae*
B39	CKD	Yes	No	No	No	No	No	No	No	*Enterobacter cloacae* and *Yersinia pestis*
B40	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae* and *Proteus mirabilis*
B41	CKD	Yes	No	No	No	No	No	No	No	
B42	CKD	Yes	No	No	No	No	No	No	No	*Citrobacter freundii*
B44	CKD	Yes	No	No	No	No	No	No	No	
B45	CKD	Yes	No	No	Yes	No	No	No	No	
B46	CKD	Yes	No	No	No	No	No	No	No	
B47	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Shigella* spp.
B48	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B50	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Yersinia pestis*
B51	CKD	Yes	No	No	No	No	No	No	No	
B52	CKD	Yes	No	No	No	No	No	No	No	
B53	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Shigella* spp.
B55	CKD	Yes	Yes	No	No	No	No	No	No	
B59	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B60	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B61	CKD	Yes	No	No	No	No	No	No	No	
B62	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B63	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B66	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B68	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Citrobacter freundii*
B69	CKD	Yes	No	No	No	No	No	No	No	
B70	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B72	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B73	CKD	Yes	No	No	No	No	No	No	No	
B74	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B75	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B77	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*

Table S2: Continue

Code_ patient	CKD_ status	GI infection	Diarrhea	Abdominal pain	Constipation	Vomiting	Abdominal bloating	Nausea	Fever	Enteric bacteria
B78	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
B79	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B80	CKD	Yes	No	No	Yes	No	No	No	No	*Proteus mirabilis*
B81	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B84	CKD	Yes	No	No	No	No	No	No	No	
B85	CKD	Yes	No	No	No	Yes	Yes	No	No	*Proteus mirabilis*
B86	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B87	CKD	Yes	No	Yes	Yes	No	Yes	No	No	*Proteus mirabilis*
B88	CKD	Yes	No	No	No	Yes	No	No	No	*Proteus mirabilis*
B89	CKD	Yes	No	Yes	No	No	No	No	No	*Proteus mirabilis*
B90	CKD	Yes	No	No	Yes	No	No	No	No	*Klebsiella pneumoniae* and *Proteus mirabilis*
B91	CKD	Yes	Yes	No	Yes	No	No	No	Yes	
B92	CKD	Yes	No	No	No	No	No	No	No	
B93	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis, Citrobacter freundii* and *Shigella* spp.
B96	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B98	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B99	CKD	Yes	No	No	Yes	No	No	No	No	*Proteus mirabilis*
B100	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B101	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Enterobacter cloacae*
B102	CKD	Yes	Yes	No	Yes	No	No	No	No	*Enterobacter cloacae*
B103	CKD	Yes	No	No	No	No	No	No	No	
B104	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae* and *Proteus mirabilis*
B106	CKD	Yes	No	No	No	No	No	No	No	
B107	CKD	Yes	No	No	Yes	No	No	No	No	*Proteus mirabilis*
B109	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B111	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B112	CKD	Yes	Yes	Yes	No	Yes	Yes	No	No	
B113	CKD	Yes	Yes	No	No	No	No	No	No	*Enterobacter cloacae*
B114	CKD	Yes	Yes	Yes	No	No	No	No	No	*Proteus mirabilis* and *Citrobacter freundii*
B115	CKD	Yes	Yes	Yes	No	No	Yes	Yes	No	
B116	CKD	Yes	Yes	Yes	No	Yes	Yes	Yes	No	*Enterobacter cloacae*
B121	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B124	CKD	Yes	Yes	No	No	Yes	No	Yes	No	*Proteus mirabilis*
B125	CKD	Yes	Yes	No	No	No	No	No	No	*Proteus mirabilis*
B126	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B128	CKD	Yes	No	No	No	No	No	No	No	
B130	CKD	Yes	No	No	No	No	No	No	No	*Shigella* spp.
B131	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
B132	CKD	Yes	No	No	No	No	No	No	No	
B133	CKD	Yes	No	No	No	No	No	No	No	
B134	CKD	Yes	No	No	No	No	No	No	No	
B135	CKD	Yes	No	No	No	No	No	No	No	
B136	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B137	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B139	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Yersinia pestis*
B140	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B144	CKD	Yes	No	No	No	No	No	Yes	Yes	*Shigella* spp. and *Yersinia pestis*
B145	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B147	CKD	Yes	No	No	No	No	No	No	No	
B148	CKD	Yes	No	Yes	No	Yes	No	No	No	*Citrobacter freundii*
B155	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B157	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
B158	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*, *Proteus mirabilis* and *Shigella* spp.
B160	CKD	Yes	No	No	No	No	No	No	No	
B161	CKD	Yes	No	No	No	No	No	No	No	
B162	CKD	Yes	No	No	No	No	No	No	No	*Salmonella typhi*
B163	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae* and *Proteus mirabilis*

Table S2: Continue

Code_ patient	CKD_ status	GI infection	Diarrhea	Abdominal pain	Constipation	Vomiting	Abdominal bloating	Nausea	Fever	Enteric bacteria
B168	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*, *Yersinia pestis* and *Salmonella typhi*
B169	CKD	Yes	No	No	No	No	No	No	No	
B170	CKD	Yes	No	No	No	No	No	No	No	
B171	CKD	Yes	No	No	No	No	No	No	No	
B172	CKD	Yes	No	No	No	No	No	No	No	
B174	CKD	Yes	No	No	No	No	No	No	No	
B175	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
B177	CKD	Yes	No	No	No	No	No	No	No	*Shigella* spp.
B179	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
B180	CKD	Yes	No	No	No	No	No	No	No	
B181	CKD	Yes	No	No	No	No	No	No	No	
B182	CKD	Yes	No	No	No	No	No	No	No	*Citrobacter freundii*
B183	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Citrobacter freundii*
B184	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
B185	CKD	Yes	No	No	No	No	No	No	No	*Yersinia pestis*
B186	CKD	Yes	No	No	No	No	No	No	No	*Enterobacter cloacae*
B187	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
B189	CKD	Yes	No	No	No	No	No	No	No	
B190	CKD	Yes	No	No	No	No	No	No	No	*Citrobacter freundii*
B191	CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
B192	CKD	Yes	No	No	No	No	No	No	No	*Shigella* spp.
B193	CKD	Yes	No	No	No	No	No	No	No	
B194	CKD	Yes	No	No	No	No	No	No	No	
B195	CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
B196	CKD	Yes	No	No	No	No	No	No	No	*Citrobacter freundii*
D1	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D2	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
D3	W-CKD	Yes	No	No	No	No	No	No	No	
D4	W-CKD	Yes	No	No	No	No	No	No	No	
D9	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Enterobacter cloacae*
D10	W-CKD	Yes	No	No	No	No	No	No	No	
D11	W-CKD	Yes	No	No	No	No	No	No	No	
D15	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae, Proteus mirabilis* and *Yersinia pestis*
D16	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D17	W-CKD	Yes	No	No	No	No	No	No	No	
D20	W-CKD	Yes	No	No	No	No	No	No	No	
D21	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D22	W-CKD	Yes	No	No	No	No	No	No	No	*Shigella* spp.
D24	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D25	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D62	W-CKD	Yes	No	No	No	No	No	No	No	
D63	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D64	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D65	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D66	W-CKD	Yes	No	No	No	No	No	No	No	
D67	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
D68	W-CKD	Yes	No	No	No	No	No	No	No	
D69	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D70	W-CKD	Yes	No	No	No	No	No	No	No	
D71	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D72	W-CKD	Yes	No	No	No	No	No	No	No	
D73	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D74	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Proteus vulgaris*
D75	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris* and *Klebsiella oxytoca*
D76	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D77	W-CKD	Yes	No	No	No	No	No	No	No	
D78	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D79	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D80	W-CKD	Yes	No	No	No	No	No	No	No	

Table S2: Continue

Code_ patient	CKD_ status	GI infection	Diarrhea	Abdominal pain	Constipation	Vomiting	Abdominal bloating	Nausea	Fever	Enteric bacteria
D81	W-CKD	Yes	No	No	No	No	No	No	No	
D82	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris* and *Klebsiella oxytoca*
D83	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D84	W-CKD	Yes	No	No	No	No	No	No	No	
D85	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D86	W-CKD	Yes	No	No	No	No	No	No	No	
D87	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D88	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D89	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D90	W-CKD	Yes	No	No	No	No	No	No	No	
D91	W-CKD	Yes	No	No	No	No	No	No	No	
D92	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris* and *Klebsiella oxytoca*
D93	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D94	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D95	W-CKD	Yes	No	No	No	No	No	No	No	
D96	W-CKD	Yes	No	No	No	No	No	No	No	
D97	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D98	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D99	W-CKD	Yes	No	No	No	No	No	No	No	
D100	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D101	W-CKD	Yes	No	No	No	No	No	No	No	
D102	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D103	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D104	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D105	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D106	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D107	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D108	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D109	W-CKD	Yes	No	No	No	No	No	No	No	
D110	W-CKD	Yes	No	No	No	No	No	No	No	
D111	W-CKD	Yes	No	No	No	No	No	No	No	
D112	W-CKD	Yes	No	No	No	No	No	No	No	
D113	W-CKD	Yes	No	No	No	No	No	No	No	
D114	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D115	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris* and *Klebsiella oxytoca*
D116	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D117	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris* and *Klebsiella oxytoca*
D118	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D119	W-CKD	Yes	No	No	No	No	No	No	No	*Enterobacter cloacae* and *Salmonella typhi*
D120	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D121	W-CKD	Yes	No	No	No	No	No	No	No	
D122	W-CKD	Yes	No	No	No	No	No	No	No	*Salmonella typhi* and *Proteus vulgaris*
D123	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D124	W-CKD	Yes	No	No	No	No	No	No	No	*Salmonella typhi* and *Proteus vulgaris*
D125	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D126	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D127	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D128	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D129	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D130	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D131	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae* and *Proteus mirabilis*
D132	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
D133	W-CKD	Yes	No	No	No	No	No	No	No	
D134	W-CKD	Yes	No	No	No	No	No	No	No	
D135	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D136	W-CKD	Yes	No	No	No	No	No	No	No	
D137	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D138	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
D139	W-CKD	Yes	No	No	No	No	No	No	No	
D140	W-CKD	Yes	No	No	No	No	No	No	No	
D141	W-CKD	Yes	No	No	No	No	No	No	No	

Table S2: Continue

Code_ patient	CKD_ status	GI infection	Diarrhea	Abdominal pain	Constipation	Vomiting	Abdominal bloating	Nausea	Fever	Enteric bacteria
D142	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
D143	W-CKD	Yes	No	No	No	No	No	No	No	
D144	W-CKD	Yes	No	No	No	No	No	No	No	
D145	W-CKD	Yes	No	No	No	No	No	No	No	
D146	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Proteus vulgaris*
D147	W-CKD	Yes	No	No	No	No	No	No	No	
D148	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D149	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D150	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D151	W-CKD	Yes	No	No	No	No	No	No	No	
D152	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis* and *Klebsiella oxytoca*
D153	W-CKD	Yes	No	No	No	No	No	No	No	*Enterobacter cloacae* and *Klebsiella oxytoca*
D154	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae* and *Proteus vulgaris*
D155	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D156	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D157	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D158	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D159	W-CKD	Yes	No	No	No	No	No	No	No	
D160	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
D161	W-CKD	Yes	No	No	No	No	No	No	No	
D162	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D163	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris* and *Klebsiella oxytoca*
D164	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D165	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D166	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D167	W-CKD	Yes	No	No	No	No	No	No	No	
D168	W-CKD	Yes	No	No	No	No	No	No	No	
D169	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus mirabilis*
D170	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae, Salmonella typhi* and *Proteus vulgaris*
D171	W-CKD	Yes	No	No	No	No	No	No	No	
D172	W-CKD	Yes	No	No	No	No	No	No	No	
D173	W-CKD	Yes	No	No	No	No	No	No	No	
D174	W-CKD	Yes	No	No	No	No	No	No	No	
D175	W-CKD	Yes	No	No	No	No	No	No	No	
D176	W-CKD	Yes	No	No	No	No	No	No	No	
D177	W-CKD	Yes	No	No	No	No	No	No	No	
D178	W-CKD	Yes	No	No	No	No	No	No	No	
D179	W-CKD	Yes	No	No	No	No	No	No	No	
D180	W-CKD	Yes	No	No	No	No	No	No	No	
D181	W-CKD	Yes	No	No	No	No	No	No	No	
D182	W-CKD	Yes	No	No	No	No	No	No	No	
D183	W-CKD	Yes	No	No	No	No	No	No	No	
D184	W-CKD	Yes	No	No	No	No	No	No	No	
D185	W-CKD	Yes	No	No	No	No	No	No	No	
D186	W-CKD	Yes	No	No	No	No	No	No	No	
D187	W-CKD	Yes	No	No	No	No	No	No	No	
D188	W-CKD	Yes	No	No	No	No	No	No	No	
D189	W-CKD	Yes	No	No	No	No	No	No	No	
D190	W-CKD	Yes	No	No	No	No	No	No	No	
D191	W-CKD	Yes	No	No	No	No	No	No	No	
D192	W-CKD	Yes	No	No	No	No	No	No	No	*Salmonella typhi*
D193	W-CKD	Yes	No	No	No	No	No	No	No	
D194	W-CKD	Yes	No	No	No	No	No	No	No	
D195	W-CKD	Yes	No	No	No	No	No	No	No	
D196	W-CKD	Yes	No	No	No	No	No	No	No	
D197	W-CKD	Yes	No	No	No	No	No	No	No	
D198	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D199	W-CKD	Yes	No	No	No	No	No	No	No	
D200	W-CKD	Yes	No	No	No	No	No	No	No	
D201	W-CKD	Yes	No	No	No	No	No	No	No	

Table S2: Continue

Code_ patient	CKD_ status	GI infection	Diarrhea	Abdominal pain	Constipation	Vomiting	Abdominal bloating	Nausea	Fever	Enteric bacteria
D202	W-CKD	Yes	No	No	No	No	No	No	No	
D203	W-CKD	Yes	No	No	No	No	No	No	No	
D204	W-CKD	Yes	No	No	No	No	No	No	No	
D205	W-CKD	Yes	No	No	No	No	No	No	No	
D206	W-CKD	Yes	No	No	No	No	No	No	No	
D207	W-CKD	Yes	No	No	No	No	No	No	No	
D208	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
D209	W-CKD	Yes	No	No	No	No	No	No	No	
D210	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D211	W-CKD	Yes	No	No	No	No	No	No	No	
D212	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D213	W-CKD	Yes	No	No	No	No	No	No	No	
D214	W-CKD	Yes	No	No	No	No	No	No	No	
D215	W-CKD	Yes	No	No	No	No	No	No	No	
D216	W-CKD	Yes	No	No	No	No	No	No	No	
D217	W-CKD	Yes	No	No	No	No	No	No	No	
D218	W-CKD	Yes	No	No	No	No	No	No	No	
D219	W-CKD	Yes	No	No	No	No	No	No	No	
D220	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D221	W-CKD	Yes	No	No	No	No	No	No	No	
D222	W-CKD	Yes	No	No	No	No	No	No	No	
D223	W-CKD	Yes	No	No	No	No	No	No	No	
D224	W-CKD	Yes	No	No	No	No	No	No	No	
D225	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D226	W-CKD	Yes	No	No	No	No	No	No	No	
D227	W-CKD	Yes	No	No	No	No	No	No	No	
D228	W-CKD	Yes	No	No	No	No	No	No	No	
D229	W-CKD	Yes	No	No	No	No	No	No	No	
D230	W-CKD	Yes	No	No	No	No	No	No	No	
D231	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D232	W-CKD	Yes	No	No	No	No	No	No	No	
D233	W-CKD	Yes	No	No	No	No	No	No	No	
D234	W-CKD	Yes	No	No	No	No	No	No	No	
D235	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella oxytoca*
D236	W-CKD	Yes	No	No	No	No	No	No	No	
D237	W-CKD	Yes	No	No	No	No	No	No	No	*Proteus vulgaris*
D238	W-CKD	Yes	No	No	No	No	No	No	No	
D239	W-CKD	Yes	No	No	No	No	No	No	No	*Klebsiella pneumoniae*
D240	W-CKD	Yes	No	No	No	No	No	No	No	
D241	W-CKD	Yes	No	No	No	No	No	No	No	
D242	W-CKD	Yes	No	No	No	No	No	No	No	
D243	W-CKD	Yes	No	No	No	No	No	No	No	
D244	W-CKD	Yes	No	No	No	No	No	No	No	
D245	W-CKD	Yes	No	No	No	No	No	No	No	
D246	W-CKD	Yes	No	No	No	No	No	No	No	
D247	W-CKD	Yes	No	No	No	No	No	No	No	
D248	W-CKD	Yes	No	No	No	No	No	No	No	
D249	W-CKD	Yes	No	No	No	No	No	No	No	
D250	W-CKD	Yes	No	No	No	No	No	No	No	
D251	W-CKD	Yes	No	No	No	No	No	No	No	
D252	W-CKD	Yes	No	No	No	No	No	No	No	
D253	W-CKD	Yes	No	No	No	No	No	No	No	
D254	W-CKD	Yes	No	No	No	No	No	No	No	
D255	W-CKD	Yes	No	No	No	No	No	No	No	
D256	W-CKD	Yes	No	No	No	No	No	No	No	
D257	W-CKD	Yes	No	No	No	No	No	No	No	
D258	W-CKD	Yes	No	No	No	No	No	No	No	
D259	W-CKD	Yes	No	No	No	No	No	No	No	
D260	W-CKD	Yes	No	No	No	No	No	No	No	
D261	W-CKD	Yes	No	No	No	No	No	No	No	

Code with B: Patients with chronic kidney diseases, Code with D: Patients without chronic kidney diseases, CKD: Chronic Kidney Diseases, W-CKD: Without Chronic Kidney Diseases and GI infection: Gastrointestinal infection

Table S3: Antibiotic resistance of *Klebsiella pneumoniae*

Code_patient	CKD_status	Resistance profile	CIP	ATM	AMC	AMK	OFX	GEN	NAL	FEP	CTX	CRO	AMX	IMP	FOS	SXT
B4	CKD	S	S	S	S	S	S	S	S	S	S	S	R	S	S	S
B9	CKD	MDR	R	S	R	S	R	S	S	S	S	S	R	I	S	R
B10	CKD	MDR	R	I	R	R	R	R	R	R	R	R	R	R	R	R
B23	CKD	MDR	S	S	S	S	S	S	S	R	R	R	R	S	R	S
B24	CKD	R	S	S	R	S	R	S	S	R	S	S	R	I	R	R
B31	CKD	MDR	R	S	R	S	R	R	R	S	R	R	R	I	S	R
B34	CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	R	R	R
B40	CKD	MDR	I	S	S	R	R	S	S	R	R	S	R	S	R	S
B78	CKD	MDR	I	R	R	S	R	R	S	R	R	R	R	S	R	R
B90	CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	R	R
B104	CKD	MDR	R	R	R	S	S	S	S	R	R	R	R	R	R	R
B131	CKD	MDR	R	S	R	S	S	S	S	S	S	S	R	S	R	R
B157	CKD	MDR	R	R	R	R	R	R	R	R	R	R	R	S	R	R
B158	CKD	MDR	S	R	R	S	R	R	S	R	R	R	R	S	S	R
B163	CKD	R	S	S	R	S	R	S	S	S	S	S	R	S	S	R
B175	CKD	R	S	S	R	S	S	S	S	S	S	S	R	S	S	S
B179	CKD	MDR	R	S	R	S	S	S	S	S	R	S	R	S	S	R
B184	CKD	MDR	S	S	R	R	S	S	S	I	S	S	R	S	S	R
B187	CKD	MDR	R	R	R	S	R	R	R	R	R	R	R	R	R	R
B191	CKD	MDR	S	R	R	S	S	S	S	R	R	R	R	S	S	R
D2	W-CKD	MDR	S	R	R	S	S	S	S	R	R	R	R	S	S	R
D15	W-CKD	MDR	S	S	R	R	S	S	S	R	R	R	R	S	S	R
D67	W-CKD	MDR	R	R	R	S	R	S	R	S	R	R	R	R	R	R
D131	W-CKD	R	S	S	S	S	S	S	R	S	S	S	R	S	S	S
D132	W-CKD	MDR	R	S	R	R	R	S	R	S	S	S	R	S	S	S
D138	W-CKD	MDR	S	S	S	S	S	S	S	R	R	S	R	S	S	S
D142	W-CKD	MDR	I	S	S	S	I	S	R	R	R	S	R	S	S	R
D154	W-CKD	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
D160	W-CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	S	R
D170	W-CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	S	S
D208	W-CKD	R	S	S	S	S	S	S	R	S	S	S	R	S	S	S
D239	W-CKD	R	S	S	S	S	S	S	R	S	S	S	R	S	S	S

Code with B: Patients with chronic kidney diseases, Code with D: Patients without chronic kidney diseases, S: Sensitive, R: Resistant, I: Intermediate, MDR: Multidrug Resistance, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CTX: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalidixic acid, OFX: Ofloxacin, SXT: Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin, AMK: Amikacin, CKD: Chronic Kidney Diseases and W-CKD: Without Chronic Kidney Diseases

Table S4: Antibiotic resistance of *Proteus mirabilis*

Code_patient	CKD_status	Resistance_profile	CIP	ATM	AMC	AMK	OFX	GEN	NAL	FEP	CTX	CRO	AMX	IMP	FOS	SXT
B4	CKD	MDR	S	R	S	R	I	S	S	I	I	S	R	R	R	S
B5	CKD	R	S	S	S	S	S	S	S	R	S	S	S	S	R	S
B9	CKD	MDR	S	S	R	R	S	S	S	S	R	S	R	R	R	I
B14	CKD	MDR	S	R	R	R	S	R	S	R	S	S	R	R	R	R
B15	CKD	MDR	I	S	R	R	R	S	R	S	R	S	R	R	R	S
B17	CKD	MDR	R	R	R	R	R	R	R	R	R	R	R	R	R	R
B19	CKD	MDR	S	R	R	S	S	S	S	R	S	S	R	R	R	S
B23	CKD	MDR	S	R	R	R	S	S	S	S	S	S	R	S	R	S
B27	CKD	MDR	R	R	R	R	R	S	R	R	R	R	R	I	R	R
B28	CKD	MDR	R	S	R	S	R	S	R	I	S	R	R	R	R	R
B30	CKD	R	S	S	S	S	S	R	S	S	S	S	R	S	S	S
B32	CKD	MDR	S	S	R	S	R	S	S	R	S	S	R	I	S	R
B33	CKD	MDR	S	S	S	S	R	S	S	I	R	R	S	S	R	S
B40	CKD	R	R	S	S	S	R	S	R	S	S	S	R	S	S	R
B47	CKD	MDR	S	I	R	R	S	S	S	S	S	S	R	S	S	S
B48	CKD	R	R	S	S	R	R	S	R	I	S	S	R	S	S	S
B50	CKD	MDR	R	I	R	S	R	S	R	S	R	R	R	S	S	R
B53	CKD	MDR	I	R	R	R	R	R	R	R	R	R	R	R	R	R
B59	CKD	R	S	S	S	R	S	R	R	R	R	R	R	S	S	S
B60	CKD	R	R	S	S	S	R	S	R	R	S	S	R	S	S	R
B62	CKD	MDR	S	R	R	S	R	S	R	S	R	R	R	S	R	R

Table S4: Continue

Code_patient	CKD_status	Resistance_profile	CIP	ATM	AMC	AMK	OFX	GEN	NAL	FEP	CTX	CRO	AMX	IMP	FOS	SXT
B63	CKD	R	S	S	R	S	S	S	S	S	S	S	R	S	S	S
B66	CKD	MDR	R	S	S	S	R	S	R	S	S	S	R	S	R	R
B68	CKD	MDR	I	S	R	S	R	S	R	S	R	R	R	S	S	R
B70	CKD	R	S	S	S	S	S	S	S	S	S	S	R	S	S	S
B72	CKD	R	S	S	S	S	R	S	S	S	S	S	S	S	S	S
B74	CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	S	I
B75	CKD	R	R	S	S	S	R	S	S	S	S	S	S	S	S	R
B77	CKD	MDR	S	S	R	S	R	S	S	S	S	S	R	S	R	R
B79	CKD	R	S	S	S	S	R	S	S	S	S	S	R	S	S	S
B80	CKD	MDR	S	R	R	S	S	S	S	R	S	S	R	S	S	R
B81	CKD	R	S	S	R	S	S	S	S	I	S	S	R	S	S	R
B85	CKD	MDR	I	R	R	S	R	S	R	I	S	R	R	R	R	R
B86	CKD	R	S	S	S	S	S	S	S	S	S	S	S	S	S	S
B87	CKD	MDR	R	S	R	R	R	R	S	S	S	S	R	S	S	R
B88	CKD	R	S	R	S	S	S	S	S	S	S	S	R	S	S	S
B89	CKD	R	S	S	R	S	S	S	S	R	S	S	R	S	S	R
B90	CKD	MDR	R	R	R	S	R	R	R	R	R	R	R	I	R	R
B93	CKD	MDR	R	S	R	S	R	S	R	R	S	S	R	I	R	R
B96	CKD	MDR	R	I	R	S	R	R	R	S	R	R	R	S	S	R
B98	CKD	MDR	S	R	R	R	S	S	S	R	S	S	R	R	R	S
B99	CKD	R	S	R	S	S	S	S	S	S	R	R	R	S	R	R
B100	CKD	R	R	S	S	S	S	S	S	R	S	S	R	S	R	S
B101	CKD	MDR	S	R	R	R	R	R	R	R	R	R	R	R	R	R
B104	CKD	R	S	S	S	S	S	S	S	S	S	S	R	S	S	R
B107	CKD	MDR	S	R	S	R	R	S	R	R	S	S	S	S	R	S
B109	CKD	R	S	R	S	S	S	S	S	S	S	S	S	S	S	S
B111	CKD	R	S	S	S	S	S	S	S	S	S	R	S	S	S	S
B114	CKD	MDR	S	R	R	R	S	S	S	S	S	S	R	R	R	S
B117	CKD	MDR	S	S	R	R	S	R	S	R	S	S	R	R	R	R
B121	CKD	MDR	R	R	S	R	R	S	S	R	S	S	R	S	R	R
B124	CKD	MDR	S	S	R	R	R	S	S	R	R	S	R	R	R	R
B125	CKD	MDR	R	R	R	R	R	R	R	R	R	R	R	S	R	R
B126	CKD	R	S	S	S	S	S	S	S	R	R	R	R	S	S	S
B136	CKD	MDR	S	S	R	R	S	S	S	R	S	S	R	I	S	S
B137	CKD	R	I	S	S	S	R	S	S	I	S	S	R	S	R	S
B139	CKD	MDR	S	I	R	S	S	S	S	I	R	R	R	S	S	S
B140	CKD	MDR	S	I	S	R	S	R	S	R	R	R	R	I	R	R
B145	CKD	R	S	S	S	S	R	S	S	R	S	S	S	I	S	S
B155	CKD	MDR	S	I	R	S	S	S	R	S	R	R	R	S	S	R
B158	CKD	MDR	S	S	R	R	S	R	S	R	S	S	R	R	S	S
B163	CKD	MDR	R	I	R	S	R	R	S	S	S	S	R	S	S	R
B168	CKD	R	S	S	R	R	S	S	S	R	S	S	R	S	S	S
B183	CKD	MDR	S	S	S	R	S	S	S	I	R	R	R	R	S	S
B195	CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	R	R	R
D1	W-CKD	MDR	S	R	R	R	S	R	S	I	R	R	R	S	S	S
D9	W-CKD	MDR	R	S	R	R	R	R	R	R	R	R	R	S	S	R
D15	W-CKD	MDR	S	S	R	R	S	S	S	I	S	S	R	S	S	S
D16	W-CKD	MDR	R	S	S	R	R	S	R	R	S	S	R	I	S	S
D21	W-CKD	MDR	I	I	R	S	S	S	R	I	R	R	S	S	S	I
D24	W-CKD	MDR	S	I	R	R	S	R	S	R	R	R	R	S	S	R
D25	W-CKD	MDR	R	S	R	R	R	S	R	S	R	R	R	I	S	R
D64	W-CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	S	R
D74	W-CKD	R	S	S	R	S	S	S	S	S	S	S	R	S	S	S
D85	W-CKD	R	S	S	R	S	S	S	S	S	R	S	R	S	R	S
D106	W-CKD	MDR	R	S	R	S	R	S	S	R	R	S	R	S	R	R
D123	W-CKD	MDR	I	S	S	S	R	S	S	R	S	R	R	S	S	S
D125	W-CKD	R	S	S	S	R	S	S	S	S	S	S	R	S	S	S
D126	W-CKD	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
D128	W-CKD	R	S	S	S	R	S	S	S	R	S	S	R	S	S	S

Table S4: Continue

Code_patient	CKD_status	Resistance_profile	CIP	ATM	AMC	AMK	OFX	GEN	NAL	FEP	CTX	CRO	AMX	IMP	FOS	SXT
D131	W-CKD	MDR	R	S	R	S	R	S	R	R	R	R	R	S	R	R
D137	W-CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	S	R
D146	W-CKD	MDR	S	I	S	S	S	S	S	R	R	R	R	R	S	S
D152	W-CKD	MDR	S	S	S	S	S	S	R	S	S	S	R	S	S	S
D166	W-CKD	MDR	R	R	S	R	R	R	R	R	R	R	R	S	R	S
D169	W-CKD	MDR	R	R	S	S	S	S	S	R	R	R	R	S	R	S

Code with B: Patients with chronic kidney diseases, Code with D: Patients without chronic kidney diseases, S: Sensitive, R: Resistant, I: Intermediate, MDR: Multidrug Resistance, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CTX: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalidixic acid, OFX: Ofloxacin, SXT: Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin, AMK: Amikacin, CKD: Chronic Kidney Diseases and W-CKD: Without chronic kidney diseases

Table S5: Antibiotic resistance of *Enterobacter cloacae*

Code_patient	CKD_status	Resistance_prolfile	CIP	ATM	AMC	AMK	OFX	GEN	NAL	FEP	CTX	CRO	AMX	IMP	FOS	SXT
B2	CKD	MDR	S	I	R	S	S	S	S	R	R	S	R	R	R	R
B3	CKD	MDR	S	I	S	S	S	S	R	S	R	S	R	R	R	R
B9	CKD	MDR	S	I	S	R	S	S	S	S	S	S	R	R	R	S
B36	CKD	MDR	R	R	R	R	R	S	R	R	R	R	R	R	S	R
B39	CKD	MDR	R	R	S	R	R	R	R	R	R	R	R	S	R	R
B101	CKD	R	R	S	R	R	R	S	R	R	S	S	R	S	S	R
B102	CKD	MDR	R	R	R	S	S	S	S	R	R	R	R	S	R	R
B113	CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	R	R
B116	CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	R	R
B186	CKD	R	S	S	R	R	S	S	S	S	S	S	R	S	S	S
D9	W-CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	R	R	R
D119	W-CKD	MDR	R	S	R	S	R	S	R	S	S	R	R	S	S	S
D153	W-CKD	MDR	S	S	S	S	S	S	S	S	S	S	S	S	S	S

Code with B: Patients with chronic kidney diseases, code with D: Patients without chronic kidney diseases, S: sensitive, R: Resistant, I: Intermediate, MDR: Multidrug Resistance, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CTX: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalidixic acid, OFX: Ofloxacin, SXT: Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin, AMK: Amikacin, CKD: Chronic Kidney Diseases and W-CKD: Without Chronic Kidney Diseases

Table S6: Antibiotic resistance of *Citrobacter freundii*

DICO_IU_ID	CKD_status	Resistance_profile	CIP	ATM	AMC	AMK	OFX	GEN	NAL	FEP	CTX	CRO	AMX	IMP	FOS	SXT
B1	CKD	MDR	S	I	R	R	S	S	S	R	R	R	R	S	R	R
B43	CKD	MDR	I	R	R	S	R	R	R	R	R	R	R	S	S	R
B69	CKD	R	R	S	S	S	R	S	R	R	S	S	R	S	S	S
B94	CKD	R	S	S	S	S	S	S	S	S	R	R	R	S	R	R
B115	CKD	MDR	R	S	R	R	R	R	R	I	R	R	R	R	R	R
B149	CKD	R	S	S	S	S	S	S	S	R	S	S	R	R	R	R
B183	CKD	MDR	S	S	S	S	S	S	R	R	R	R	R	S	R	R
B184	CKD	R	S	S	S	R	S	S	S	R	S	S	R	S	S	S
B191	CKD	MDR	S	S	R	S	S	R	S	R	R	R	R	R	R	R
B197	CKD	MDR	R	R	R	R	R	S	R	R	R	R	R	R	R	R

Code with B: Patients with chronic kidney diseases, S: Sensitive, R: Resistant, I: Intermediate, MDR: Multidrug Resistance, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CTX: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalidixic acid, OFX: Ofloxacin, SXT: Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin, AMK: Amikacin and CKD: Chronicles Kidney Diseases

Table S7: Antibiotic resistance of *Shigella* spp.

Code_patient	CKD_status	Resistance_profile	CIP	ATM	AMC	AMK	OFX	GEN	NAL	FEP	CTX	CRO	AMX	IMP	FOS	SXT
B22	CKD	MDR	R	S	R	S	R	S	R	I	S	S	S	S	S	R
B47	CKD	R	S	R	R	R	S	S	S	S	S	S	R	S	S	S
B53	CKD	MDR	R	R	R	R	R	R	R	R	R	R	R	R	R	R
B93	CKD	MDR	S	R	R	S	S	S	S	R	R	R	R	S	R	S
B130	CKD	R	R	R	S	R	R	S	R	S	R	R	R	S	S	S
B144	CKD	R	S	S	R	S	S	S	S	S	S	S	R	S	S	S
B158	CKD	MDR	R	R	R	R	R	R	R	R	R	R	R	R	R	R
B177	CKD	R	S	S	S	R	S	S	S	S	S	S	R	S	S	S
B192	CKD	MDR	S	R	R	S	S	S	R	R	R	R	R	S	R	S
D22	W-CKD	MDR	S	R	R	R	R	S	R	R	R	R	R	R	R	R

Code with B: Patients with chronic kidney diseases, Code with D: Patients without chronic kidney diseases, S: Sensitive, R: Resistant, I: Intermediate, MDR: Multidrug Resistance, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CT X: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalidixic acid, OFX: Ofloxacin, SXT: Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin, AMK: Amikacin, CKD: Chronic Kidney Diseases and W-CKD: Without Chronic Kidney Diseases

Table S8: Antibiotic resistance of *Yersinia pestis*

Code_patient	CKD_status	Resistance_profile	CIP	ATM	AMC	AMK	OFX	GEN	NAL	FEP	CTX	CRO	AMX	IMP	FOS	SXT
B3	CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	R	R	R
B31	CKD	MDR	R	R	R	R	R	R	R	R	R	R	R	R	R	R
B35	CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	R	R	R
B39	CKD	MDR	R	I	S	R	R	R	R	S	S	S	R	R	R	R
B50	CKD	MDR	S	S	R	S	S	S	S	R	R	R	R	S	R	R
B139	CKD	MDR	S	R	R	S	S	R	S	R	S	S	R	S	R	R
B144	CKD	R	S	S	R	S	S	S	S	S	S	S	R	S	S	S
B168	CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	R	R	R
B185	CKD	MDR	R	S	R	R	R	R	R	R	S	S	R	S	R	R
D15	W-CKD	MDR	S	R	R	R	S	S	S	R	R	R	R	S	S	R

Code with B: Patients with chronic kidney diseases, Code with D: Patients without chronic kidney diseases, S: Sensitive, R: Resistant, I: Intermediate, MDR: Multidrug Resistance, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CTX: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalidixic acid, OFX: Ofloxacin, SXT: Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin, AMK: Amikacin, CKD: Chronic Kidney Diseases and W-CKD: Without Chronic Kidney Diseases

Table S9: Antibiotic resistance of *Salmonella typhi*

Code_patient	CKD_status	Resistance_profile	CIP	ATM	AMC	AMK	OFX	GEN	NAL	FEP	CTX	CRO	AMX	IMP	FOS	SXT
B5	CKD	MDR	S	I	R	S	I	S	S	S	R	S	R	R	R	S
B162	CKD	MDR	S	R	R	R	S	S	S	R	S	S	R	S	S	S
B168	CKD	R	S	S	R	R	S	S	S	R	S	S	R	S	S	S
D119	W-CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	R	R
D122	W-CKD	MDR	R	S	S	S	R	S	R	S	R	R	R	S	S	R
D124	W-CKD	MDR	R	S	S	S	R	S	R	S	R	R	R	S	S	R
D170	W-CKD	R	S	S	R	S	S	S	R	S	S	S	R	S	S	R
D192	W-CKD	R	S	S	R	S	S	S	R	S	S	S	R	S	S	R

Code with B: Patients with chronic kidney diseases, Code with D: Patients without chronic kidney diseases, S: Sensitive, R: Resistant, I: Intermediate, MDR: Multidrug Resistance, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CTX: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalidixic acid, OFX: Ofloxacin, SXT: Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin, AMK: Amikacin, CKD: Chronic Kidney Diseases and W-CKD: Without Chronic Kidney Diseases

Table S10: Antibiotic resistance of *Klebsiella oxytoca*

Code_patient	CKD_status	Resistance_profile	CIP	ATM	AMC	AMK	OFX	GEN	NAL	FEP	CTX	CRO	AMX	IMP	FOS	SXT
D63	W-CKD	MDR	R	R	S	R	R	R	R	R	R	S	R	S	S	R
D65	W-CKD	R	S	S	R	S	S	S	R	R	R	R	R	S	S	S
D69	W-CKD	R	S	S	S	S	S	S	S	S	S	S	R	S	S	S
D75	W-CKD	MDR	R	S	R	S	R	S	R	R	S	S	R	S	S	S
D82	W-CKD	R	S	R	S	S	S	R	S	R	R	R	R	S	S	S
D88	W-CKD	R	S	S	S	S	S	S	R	S	S	S	S	S	S	R
D92	W-CKD	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
D97	W-CKD	MDR	R	S	S	S	R	S	R	S	S	S	R	S	S	S
D98	W-CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	S	R
D100	W-CKD	MDR	R	S	R	S	R	S	R	S	S	R	R	S	S	S
D114	W-CKD	R	S	R	S	S	S	S	R	S	S	S	R	S	S	S
D115	W-CKD	R	S	S	S	S	S	S	R	S	S	S	R	S	S	S
D117	W-CKD	R	S	S	S	S	S	S	S	S	S	R	R	S	R	R
D129	W-CKD	MDR	R	S	S	S	R	S	R	R	R	R	R	S	R	S
D148	W-CKD	MDR	S	R	R	S	S	S	S	R	R	S	R	S	S	S
D152	W-CKD	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
D153	W-CKD	R	R	S	S	S	R	S	S	S	S	S	S	S	S	S
D156	W-CKD	MDR	I	R	R	S	I	S	R	R	R	R	R	S	I	R
D157	W-CKD	MDR	R	S	R	S	R	S	R	R	R	R	R	S	R	R
D163	W-CKD	R	R	S	S	S	R	S	S	S	S	S	S	S	S	S
D164	W-CKD	MDR	S	R	S	S	S	S	R	S	S	S	R	S	S	S
D212	W-CKD	R	S	S	S	S	S	S	S	S	S	R	R	S	R	R
D235	W-CKD	R	S	S	S	S	S	S	S	S	S	R	R	S	R	R

Code with D: Patients without chronic kidney diseases patients, S: Sensitive, R: Resistant, I: Intermediate, MDR: Multidrug resistance, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CTX: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalidixic acid, OFX: Ofloxacin, SXT:Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin, AMK: Amikacin and W-CKD: Without Chronic Kidney Diseases

Table S11: Antibiotic resistance of *Proteus vulgaris*

Code_patient	CKD_status	Resistance_profile	CIP	ATM	AMC	AMK	OFX	GEN	NAL	FEP	CTX	CRO	AMX	IMP	FOS	SXT
D71	W-CKD	MDR	R	S	R	S	R	S	R	S	R	R	R	S	S	R
D73	W-CKD	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
D74	W-CKD	MDR	S	R	S	S	S	S	R	S	S	S	R	S	S	S
D75	W-CKD	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
D76	W-CKD	MDR	R	S	R	S	R	S	R	R	R	R	R	S	S	R
D78	W-CKD	MDR	R	S	R	I	R	S	R	S	R	S	R	S	S	S
D79	W-CKD	R	S	S	S	S	S	S	S	S	S	S	S	S	S	R
D82	W-CKD	R	S	S	S	S	S	S	S	S	S	S	S	S	S	S
D83	W-CKD	MDR	R	R	S	S	R	S	R	R	R	R	R	S	S	S
D87	W-CKD	MDR	S	S	S	S	S	S	R	R	S	R	R	S	S	R
D89	W-CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	S	R
D92	W-CKD	MDR	R	R	R	R	R	S	R	R	R	R	R	S	S	R
D93	W-CKD	MDR	R	S	R	S	R	S	R	R	R	R	R	S	S	R
D94	W-CKD	R	R	S	S	S	R	S	R	S	S	S	R	S	S	S
D102	W-CKD	MDR	S	S	S	S	S	S	R	S	S	S	R	S	S	S
D103	W-CKD	R	R	S	S	S	R	S	R	S	S	S	S	S	S	S
D104	W-CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	S	R
D105	W-CKD	R	S	S	S	S	S	S	S	S	S	S	R	S	S	R
D107	W-CKD	R	S	S	R	S	S	S	S	S	S	S	R	S	S	S
D108	W-CKD	MDR	S	S	R	S	S	S	S	R	R	R	R	S	S	R
D115	W-CKD	R	S	S	R	S	S	S	S	S	S	S	R	S	S	S
D116	W-CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	R	R
D117	W-CKD	R	S	S	S	S	S	S	S	S	S	S	R	S	S	R
D118	W-CKD	MDR	I	S	S	S	I	S	R	S	S	S	R	S	S	S
D120	W-CKD	MDR	S	S	S	S	S	S	R	R	R	R	R	S	S	S
D122	W-CKD	MDR	S	R	S	S	S	S	S	S	S	S	R	R	S	S
D124	W-CKD	R	S	R	S	S	S	S	R	S	S	S	S	S	S	S
D127	W-CKD	MDR	S	S	S	S	S	S	R	R	R	R	S	S	R	S
D130	W-CKD	S	S	I	S	S	S	S	S	S	S	S	R	S	S	S
D135	W-CKD	MDR	R	R	R	S	R	S	R	R	R	R	R	S	S	S
D146	W-CKD	R	S	S	S	S	S	S	S	S	S	S	R	S	S	S
D149	W-CKD	MDR	R	S	R	R	R	S	R	R	S	R	R	S	S	S
D150	W-CKD	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
D154	W-CKD	R	S	S	R	S	S	S	R	S	S	S	S	S	S	S
D155	W-CKD	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
D158	W-CKD	MDR	I	S	R	S	I	S	R	R	R	S	R	S	S	S
D162	W-CKD	R	S	I	S	R	I	R	S	S	S	S	R	S	S	S
D163	W-CKD	MDR	R	R	R	R	R	S	R	S	S	S	R	S	R	I
D165	W-CKD	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
D170	W-CKD	MDR	S	R	S	R	I	S	S	R	R	R	R	S	R	R
D198	W-CKD	R	S	S	S	S	S	S	R	S	S	S	R	S	S	S
D210	W-CKD	MDR	S	S	R	S	S	S	S	S	S	S	R	S	S	R
D220	W-CKD	MDR	R	S	R	S	R	S	S	S	S	S	R	S	R	R
D225	W-CKD	MDR	R	S	R	S	R	S	R	R	R	R	R	S	S	S
D231	W-CKD	MDR	S	S	S	S	S	S	R	R	R	R	R	S	S	S
D237	W-CKD	R	S	S	S	S	S	S	S	S	S	S	R	S	S	S

Code with D: Patients without chronic kidney diseases patients, S: Sensitive, R: Resistant, I: Intermediate MDR: Multidrug Resistance, AMC: Amoxicillin+clavulanic acid, AMX: Amoxicillin, CRO: Ceftriaxone, CTX: Cefotaxime, FEP: Cefepime, ATM: Aztreonam, IMP: Imipenem, CIP: Ciprofloxacin, NAL: Nalidixic acid, OFX: Ofloxacin, SXT: Sulfamethoxazole+trimethoprim, FOS: Fosfomycin, GEN: Gentamycin, AMK: Amikacin and W-CKD: Without Chronic Kidney Diseases