Seasonal Variances in General Urine Examination Findings among Al-Yarmouk Teaching Hospital Patients

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ABSTRACT
Background: Urinalysis is a common test done for several reasons; for instance, in UTI looking for, hematuria or pseudo-hematuria, pyuria, crystalluria and also looking for different microorganisms (etc...), many laboratories perform either a regular test light microscopy, or examine varying dilutions of urine sediment and fields of view with or without the use of stains or polarization, while other laboratories used analysis of urine using automated system. As being a human; the biological sex(female or male) and broadly influences diverse immune phenotypes, including immune responses to diseases at mucosal surfaces, all contribute to how an organism will respond to diseases of the urinary tract, on the other hand, a close relationship between four seasons and the incidence of UTI has been detected in various areas of the world, where the seasons alternate in a year, and the temperature fluctuates widely among these seasons.
Methods: present study was conducted on midstream sample was collected for acquiring accurate results from (68899) individuals (40800 females and 28099 males), these subjects were clinically suspected to have UTI, who were referred to the Department of Teaching Laboratories in AL-Yarmouk Teaching Hospital at Baghdad / Iraq, between January 2020 and December 2023, which examined by; Urilyzer 500 PRO (Analyticon) with Urine strips (dipstick) and Optical Microscope BA 210 (Motic).
Results: A total of 68899 urine specimens were tested, of which 28099 male (40.8%) and 40800 female (59.2%) with the highest percentage of urinalysis in 2022 (33.2%), furthermore, the higher percentage of urinalysis parameters was scored in 2021 as follows; pus cells 9012 (49.3%), red blood corpuscles 5284 (48.9%) and crystalluria 3956 (44.2%) with the most common type of crystal was amorphous urate 5032 (56.2%), while highest percentages of microorganisms 1050 (40.3%) in year 2022 , and Bacteria was exhibited the highest percentages 2036 (78.1%). Current study recorded significantly differences between males and females in all urine parameters which was higher percentage in female than male and in the Seasons of (Summer and Autumn) , during the four years of this study.
Conclusion: This study registered more accurate diagnostic results of UTI according to the urinary parameters in the microscopic routine urinalysis(centrifugation at 300xg at 5 min) when compared to machines (Urilyzer 500 PRO test/Urine strips) which frequently miss that , in addition, hot season in Iraq could affect to increase the seasonally variable incidence of UTI , as well, increased percentages and frequency of urinary parameters which observed in 2021-2022 out of four study years may indicates, high likelihood side effects of Covid-19 pandemic disease in study persons involved.

1. Introduction

A urinary sediment examination is an important type of non-invasive, repeatable morphological examination, its inexpensive, practical and gives productive results. Urinalysis encompasses a wide range of tests, which includes a variety of physical and chemical properties, urine microscopy like cells, casts, crystals, organisms and solutes, as well as, bacterial cultures, and molecular tests. (Dey,

et al, 2017), (Eltai, et al,2019).

Urine can be considered as a window to the body's inner workings, is used to screen for the presence of a lesion in the kidney or urinary tract; even other diseases, and to collect information on therapeutic and inverse effects of drugs administered (Japanese Association of Medical Technologists,2017), (Siagian, 2023).

For decades, the manual of urine sediment analysis was a gold standard in laboratory work (Siagian, 2023) to diagnose Urinary tract infections (UTIs) which are among the most common infections diagnosed in both hospitalized and outpatients (Andersen, et al 2014). In developed countries such as the USA, UTIs alone account for over eight million physician visits per year, and about 30% of women experiencing recurrent infections (Dibua, et al, 2014) while, in 2024 Al Lawati and et al reported that 50% - 60% of women have at least 1 UTI in their lifetime (Al Lawati, et al, 2024). Commonly, pyuria and hematuria are a common indication in diagnosing urological and nephrological diseases, and there is no conformity in the cut-off value of Pus cells (WBCs)and Red Blood Corpuscles (RBCs) to consider as pyuria and hematuria respectively, but ≥ 5 of these cells per high power field (HPF) in urine sediments microscope examination are generally considered as an important clinical symptom observed as a result of inflammation. In recent years, classical urinalysis has been replaced by automated microscopy method. (Shrestha, et al, 2019), (Delanghe, et al,2023)

Study of crystals in urine sediment (crystalluria) is of great importance to detected congenital and/or acquired pathophysiological conditions , in the same context, urolithiasis is usually classified according to the crystals in the stone composition as the following groups: non-infection stones (calcium oxalate, calcium phosphate, and uric acid), infection stones , genetic, and drug-induced stones , and for this, urinalysis could valuable answers for the assessment of therapeutic efficacy. (Katica, et al,2020) (Almannie, et al, 2021). The mechanism of how seasonality influences UTIs is unclear, however, previous studies in 2016 and 2019, clarified that a close relationship between four seasons and the incidence of ureterolithiasis has been detected in various areas of the world, where the seasons alternate in a year, and the temperature fluctuates widely among these seasons (Fukuhara, et al, 2016), (Hsu, et al, 2019).

Urine microscopy is a useful diagnostic method which meets all the requirements that can be made of an ideal prognostic test to fungi like Candida as well as other non-yeast fungi which are pathogenic agents that can cause disseminated infections involving UTI (Poloni and Rotta 2020), in the same context urine parasitological analysis espouse an expansive area of tests, comprise to be found of three common parasites in it; *Trichomonas vaginalis* as a result of vaginal contamination, *Schistosoma hematobium* and *Wuchereria bancrofti* ova may be seen in urinary sediments as a fecal contamination, as well as, these parasites can be identification by the molecular analysis (Siagian, 2023).

This study focusing on: estimation, prevalence, analyzing and identify of microorganisms (parasites, fungi and bacteria) causing urinary tract infections (UTIs) in centrifuged deposits urine taken from patients, as well as, particulate matter: hematuria, pyuria and crystalluria with any changes in urine samples in both genders and among different seasons.

2. Methodology

The present study was conducted on a sample collected from patients who were referred to the Department of Teaching Laboratories in AL-Yarmouk Teaching Hospital at Baghdad Capital of Iraq, between January 2020 and December 2023.

Sample collection:

The study covered (68899) individuals (40800 females and 28099 males). These subjects were clinically suspected to have UTI. One to 2 ounces of urine (30 to 59 milliliters) was collected by the mid-stream ‘clean catch’ method. The urine sample was tested immediately within 30 minutes to a

maximum of one hour after voiding, using standard procedures. (Delanghe and Speeckaert, 2014)

Apparatus used for Urinalysis:

The equipment's used in the examination of the samples include Centrifuge NF 400(NUVE), Urilyzer 500 PRO (Analyticon) with Urine strips (dipstick), Optical Microscope BA 210 (Motic) and Computer for input data then output results. Beside other appliances such as: glass slides, disposable gloves, centrifuge tubes, filter papers and sterilizer/disinfectant.

Techniques used for Urinalysis:

The urine was collected by the standard procedure in a disposable sterilized urine container. Part of the urine sample was put in a test tube for automated dipstick analysis, while the other part of the urine was used in microscopic analysis. which observed under lens 10 X then 40X. The remaining urine and the dipstick were disposed of, and the microscopic results were documented. (Dey, et al, 2017), (Siagian, 2023).

Statistical analysis:

Analysis of data was carried out using the available statistical package of IBM SPSS-29 (IBM Statistical Packages for Social Sciences- version 29, Chicago, IL, USA). Data were presented in simple measures of frequency and percentage. A statistical test was used to find the relationships between different variables, value of less than 0.05 was considered as significant. (Daniel and Cross ,2020).

3. Results and discussion

On the basis of the urinalysis test in Microbiology unit at Al-Yarmouk Teaching Hospital during 2020–2023 years, individuals both genders were undergoing at least one urinalysis test were included. A total of 68899 urine specimens were tested, of which 28099 male (40.8%) and 40800 female (59.2%). As shown in figure -1-, the highest number of urinalysis in 2022 (33.2%) then 2021 (31.7%) and the lowest in 2020(19.9%) followed by 2023 (15.2%), as well as, the lowest urine samples were tested for both genders can be seen in 2023 (6.8%) male and (8.4%) female, while the highest number of samples tested can be seen in female at 2021 and in male at 2022, (20.6%) and (13.1%) respectively.

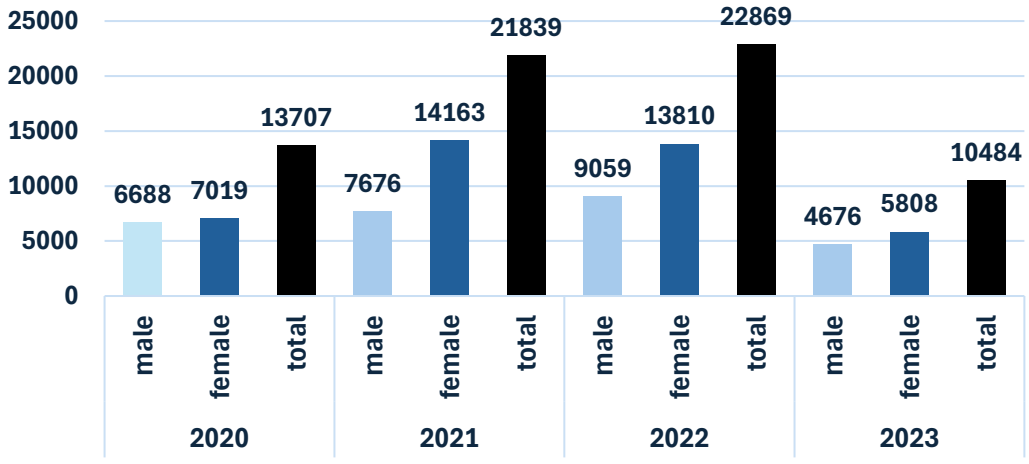

Figure 1: Distribution of urine samples according to sex

In this study, table -1- observed significant differences between males and females in pus cells (18272) and red blood corpuscles (10790) within the four years of study, also, we found higher pus cell and red blood corpuscles 10393(56.9%), 5936(55.0%) respectively in (Summer and Autumn)

seasons, in the same context, high percentage of pus cells 9012(49.3%) and red blood corpuscles 5284 (48.9%) were recorded in 2021. In addition, current study female recorded higher percentage with pus cell and red blood corpuscles11978 (65.6%),5692(52.8%), when compared with male 6294(34.4%) and 5098 (47.2%) respectively.

Table 1: Pus cells and RBCs found in urine examination during the four years' time of the study.

		2020		2021		2022		2023		Total	
		1st	**2nd**	**1st**	**2nd**	**1st**	**2nd**	**1st**	**2nd**	**1st**	**2nd**
Pus cells	**M**	776	628	1112	1864	565	673	359	317	2812	3482
	F	1340	708	2128	3908	1206	1717	393	578	5067	6911
	Total	2116	1336	3240	5772	1771	2390	752	895	7879	10393
	P-value	0.00001		0.0495		0.009		0.00001			
RBCs	**M**	856	440	828	1444	504	452	260	314	2448	2650
	F	376	408	1060	1952	667	617	303	309	2406	3286
	Total	1232	848	1888	3396	1171	1069	563	623	4854	5936
	P-value	0.00001		0.3474		0.7172		0.1464			
1st half: First half of the year (Winter & Spring), 2nd half: Second half of the year (Summer & Autumn), RBCs: Red Blood Corpuscles											

In present study, table -2- and -3- show, from the total of from 68899 urine specimens were tested only 8954(12.9%) was crystalluria, the most common type of crystal was amorphous urate 5032 (56.2%) followed by calcium oxalate 2857(31.9%) then uric acid and amorphous phosphate with less percentages 765 (8.5%) and 300(3.4%) respectively. Furthermore, all these types of crystals were higher percentage in (Summer and Autumn) seasons, firstly amorphous urate 3038(33.9%), secondly calcium oxalate 2033(22.7%), then uric acid and amorphous phosphate ,463 (5.2%) and 227 (2.5%) with lower percentages respectively, when comparable all the above mentioned with (Winter & Spring) seasons results. More of that, we scored significant differences in crystalluria between females 4982 (55.7%) and males 3972 (44.4) %, as well as, high percentage of crystalluria 3956(44.2%) were recorded in 2021 comparable with the other study years.

In present study, table-4-showed the most common microorganisms we founded in the urine samples. From the total 2606 (3.8%) organisms detected under microscope out of 68899 centrifuged urine samples examined, significantly Bacteria exhibited the highest percentages 2036 (78.1%) when compared with other organisms' percentages 570 (21.9%), which distributed as follows: *Candida* sp. 539 (20.7%), *Trichomonas vaginalis* and *Schistosoma hematobium*, lowest proportion 29(1.1%) and 2(0.1%) respectively. In general, females had higher percentage in all organism's infection 2104 (80.7%) than males 502 (19.3%) and in Bacterial infection comparable with males ,1653 (63.4%%) and 383(14.7%) respectively.

Furthermore, the year 2022 show highest percentages of organisms founded in urinalysis 1050 (40.3%), as well as, in the Summer and Autumn seasons 686 (42.2%) from total 1625 organisms founded in the second half of all our study years.

Table 2: Amorphous urate and Amorphous phosphate finding in urine examination during the four years' time of the study.

		2020		2021		2022		2023		Total	
		1st	**2nd**	**1st**	**2nd**	**1st**	**2nd**	**1st**	**2nd**	**1st**	**2nd**
A.U.	**M**	220	268	340	384	216	404	101	125	877	1181
	F	320	248	364	848	287	579	146	182	1117	1857
	Total	540	516	704	1232	503	983	247	307	1994	3038
	P-value	0.0003		0.00001		0.4652		0.9669			
A.P.	**M**	20	4	12	28	5	42	5	7	42	81
	F	8	24	12	60	5	51	6	11	31	146
	Total	28	28	24	88	10	93	11	18	73	227
	P-value	0.0217		0.0994		0.7704		0.7276			
1st half: First half of the year (Winter & Spring), 2nd half: Second half of the year (Summer & Autumn), A.U.: Amorphous urate, A.P.: Amorphous phosphate											

Table 3: Calcium and Uric acid finding in urine examination along the four years' time of the study.

		2020		2021		2022		2023		Total	
		1st	**2nd**	**1st**	**2nd**	**1st**	**2nd**	**1st**	**2nd**	**1st**	**2nd**
Calcium Oxalate	**M**	64	88	144	692	105	177	57	107	370	1064
	F	104	52	164	568	125	263	61	86	454	969
	Total	168	140	308	1260	230	440	118	193	824	2033
	P-value	.00002		.010		.00001		.2213			
Uric acid	**M**	48	64	60	128	20	20	7	10	135	222
	F	24	36	40	112	89	77	14	16	167	241
	Total	72	100	100	240	109	97	21	26	302	463
	P-value	0.7173		0.2599		0.6809		0.7160			
1st half: First half of the year (Winter & Spring), 2nd half: Second half of the year (Summer & Autumn)											

Table 4: Micro-organism detected in the examined urine sample

Microorganisms		2020			2021			2022			2023		
		1st	**2nd**	**T**	**1st**	**2nd**	**T**	**1st**	**2nd**	**T**	**1st**	**2nd**	**T**
Trichomonas vaginalis	**M**	-	-	-	-	-	-	-	-	-	-	-	-
	F	2	2	4	7	9	16	3	5	8	1	-	1
	Total	2	2	4	7	9	16	3	5	8	1	-	1
Schistosoma haematobium eggs	**M**	-	-	-	-	1	1	-	-	-	1	-	1
	F	-	-	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	1	1	-	-	-	1	-	1
Candida sp.	**M**	2	5	7	18	43	61	7	25	32	11	6	17
	F	23	37	60	55	123	178	41	89	130	18	36	54
	Total	25	42	67	73	166	239	48	114	162	29	42	71
	P-value	0.613			0.838			0.283			0.0217		
Bacteria	**M**	30	22	52	46	58	104	41	83	124	66	37	103
	F	78	102	180	105	203	308	272	484	756	154	255	409
	Total	108	124	232	151	261	412	313	567	880	220	292	512
	P-value	0.067			0.063			0.529			0.00001		
1st: First half of the year (Winter & Spring), 2nd: Second half of the year (Summer & Autumn) **T: total**													

Note: Chi-square test is not applicable for *T. vaginalis* and *Sch. haematobium* eggs because of the presence of cells containing zero value.

Discussion:

For decades, the manual of urine sediment analysis there was a gold standard in laboratory work and considered an ideal diagnostic specimen for its noninvasive, and easy method of collection (Hortin, et al. ,2000). A pristine light microscopy for centrifuged urine is, an integral part of ordinary laboratory work even now (Bunjevac, et al 2018), and is used as a diagnostic tool for a wide range of disorders, might be a severe renal disease without the presence of symptoms one of them, as well as, detection of frequent microscopic elements in urine such as red blood cells, white blood cells, and bacteria. (Dey, et al, 2017).

Our results in figure-1- compatible with Middelkoop and Bilsen when they published that urinary tract infections (UTIs) are generally more prevalent in women compared to men, this is due to a variety of factors, like anatomic differences and the differences in uropathogens exist between male and female, as well as, incidence increases with age (Middelkoop, et. al, 2021), (Bilsen, et. al, 2023).Furthermore, in 2024 , Al Lawati and et al reported the diagnosis and management of UTIs depended to risk factors which include ; female sex, recent sexual intercourse, diabetes mellitus, and structural or functional urological abnormalities (Al Lawati, et al, 2024), on the other hand, in 2021 and 2022 pandemic of Corona virus were globally , Iraq was one of the countries that undergo an

increase in the number of infections and deaths for both gender and the subsequent side effects as a result of Covid -19 disease, Demirelli and et al in 2023 explained UTI may occur during COVID-19 disease regardless of ;comorbidity and renal dysfunction (Demirelli, et al, 2023).

According to our results in table-1-, our results was approval but higher which agreement with other studies, like study in 2018 when analyzed 7,734 urine samples, most of them were males (61.7%), recorded significantly ($p < 0.007$) leukocyte 2.3% of the patients and red blood cells 1.7% (Nascimento, et al, 2018) followed by study in Nigeria published **,** out of the 100 students only 10 students had UTI(males only 2 and females only 8) had UTI (Oshiokhayamhe , et al, 2020), our results agreement with Tomatala and et al study, when observed significant differences between males and females in erythrocytes which were higher in females(Tomatala, et al ,2022),in addition ,table-1- result not correspondence with Demirelli and et al study when founded the pyuria 8.3% and hematuria 9.2% but our results convenient with Demirelli study when published higher UTI estimated during COVID-19 disease (Demirelli, et al, 2023), likewise , our study results favorable with (Hsu, et al , 2019) who showed ,adult women had a higher incidence of UTI in the summer and the seasonal changes role in UTI occurrence in the adults, and added, it is not surprising that prostatism in male and menopause in female can participate to a higher risk of developing UTI , however, (Saha, et al , 2022) explained the isolated hematuria may occur after exercise or prolonged recumbency, while pathological lesions in the kidney or urinary tract are likely to cause intermittent or persistent hematuria**.**

Despite our seasonal results not agreement with (Tae, et al ,2019) and (Kim, et al, 2020) which concluded that, different worse urinary symptoms and overactive bladder (OAB) rate were correlated with cold season than the other seasons either female and male, therefore, individuals must maintain a warm environment and it may be helpful to consider seasonal changes when managing patients with UTI symptoms.

In the present study, we found different types of crystals in 8953 (12.9%) from 68,899 urine samples were examinates , the most common type of crystals was amorphous urate (56.2%) followed by calcium oxalate (31.9%) then uric acid and amorphous phosphate with less percentages (8.5%) and (3.4%) respectively , but our results in table-2- and -3-, was higher and not agreement than other research reported in 2014 and 2021, when Dibua and et al scored from 211 microscopy of centrifuged urine samples only 14 (6.6%) samples calcium oxalate crystals were found(Dibua , et al, 2014) , and Saudi Arabia study by Almannie and et al recorded from 485 patients only 47 (9.7%) had crystalluria and the most common type of crystal was calcium oxalate (6.4%), followed by uric acid crystals (1.6%) (Almannie , et al, 2021) ,regardless of these results, (Katica, et al, 2020**)** confirmed when studying crystalluria by light microscopy, it is necessary to provide light polarization or bidirectional illumination in order to reduce the risk of diagnostic error.

Furthermore, our study showed a significant seasonal difference in the Summer and Autumn with an average ambient temperature that was higher than the other seasons this results agreeable with other studies in 2016 and 2019 which explanted : possible relative dehydration and insensible fluid loss in an environment with high temperatures and these can cause a decrease in urine output, which in turn contributes to an increase chance of UTI occurrence and may increase urinary stone risk by increasing the urinary excretion of calcium and leading to the supersaturation of calcium oxalate and calcium phosphate in the urine (Fukuhara, et al , 2016) (Hsu, et al, 2019), in addition, we scored significant differences in crystalluria between females (55.7%) and males (44.4) %, these results accepted but higher than that published at 2014 in Enugu state- southeast Nigeria where UTI with crystalluria in females 54 (36.2%) more than male12 (19.4%) (Dibua, et al, 2014) .Several research explained that the detection of crystals usually is difficult to study because of its low frequency and heterogeneity types, more that , accompanying changes in the levels of sex hormones may play a role in the response to UTI and crystalluria (Hortin, et al. ,2000),(Deltourbe, et al ,2022), subsequently , Al Lawati and et al , reported that the risk factors for UTIs include; female sex, recent sexual intercourse, diabetes mellitus, and structural or functional urological abnormalities, they also added

diagnosis and management depend on patient factors and the extent of disease (Al Lawati , et al,2024).

According results in table -2- and -3- , high percentage of crystalluria (44.2%) were recorded in 2021(COVID-19 pandemic) compared with the other study years, simultaneously, Morita and et al suggested that pre-renal injury factors might be largely involved in the pathogenesis of COVID-19-associated renal injuries when compared with non-COVID-19-associated renal injuries arising from surgery or sepsis (Morita, et al, 2022).

These study indicates the presence of various species of microorganisms in urine samples examined as referred in table -4-,our results was highest according to (Cheung, et al, 2017) when they recorded significantly 72 (36.2%) cases had bacteriuria out of 199 patients and they explanation that: Bacteria on urine microscopy may not associated with markers of systemic infection and may largely represent as a contamination, also, renal colic may be a risk factor to contaminated urine samples. In 2019 two studies mentioned to the role of genital hygiene may be contributory factor through the seasonal variations specially when increased perspiration and sebaceous secretion around the genital area in high temperatures which lead to a beneficial microenvironment for local bacterial colonization; hence, defeating the body's natural defenses and lead to UTI, then clarified role the phase-contrast microscopy seems to be feasible screening-test for bacteriuria in patients with UTI symptoms as a general practice and they should always send urine to culture when in doubt of bacterial infection (Beyer, et al, 2019), (Hsu, et al, 2019).

Urinary fungal infections were less prevalent than bacterial urinary infections, current study was found of that candiduria 539 (20.7%), out of 2606 urine samples had most common microorganisms, this reult highest than that mention in (Aydin, et al, 2014) research 5448 freshly collected urine specimens, only 491 samples (9%) gave positive result for yeast, as well as, (Gharanfoli , et al, 2019) study when conducted on 1450 urine samples obtained from patients suspected of UTI and out of this number, 19(1.3%) cases were candidiasis. (Poloni and Rotta ,2020) reported, the sediment analysis plays a key role in the identification of fungal and yeast in urine sample because both yeasts and pseudohyphae are easily identified and can be used as a clinical sign of fungal UTI , especially when markers of an immune response (leukocytes) , and urine markers of kidney disease (urinary casts) founded in urine samples, and this confirmed Aydin and et al study , when reported a high percentage of false positives and negatives in the yeast parameter, when urinalysis studied using the UriSed® (77 Elektronika , Hungary) ,as well as, any other instruments in the market, when comparable with direct urine examination result (Aydin, et al, 2014), consequently, Dias study in 2020 clarified, mentioned ,the presence of Candida species in the urine may represent contamination , colonization, UTI , and /or candidemia. Contamination condition could be confirmed by obtaining new urine specimens and checking whether Candida's laboratory finding persists. Other diagnostic methods are unnecessary if the second urine sample does not show the presence of fungi (Dias, 2020)

Our results lower than (Khurana et al, 2018) who scored from 33 cases , most common parasitic infection reported was *Trichomonas vaginalis* 25(75.8%), while we agreement with the urinalysis data from a Teaching Hospital in Linkou / Taoyuan / Taiwan during 2009–2013,a total of (839155) urine samples were tested, 410,952 from men and 428,203 specimens from women , of which 91 (0.02%) and 517 (0.12%) were had *T. vaginalis* infection respectively, then referred that Trichomoniasis affects 30.1 million people in the World Health Organization (WHO) Western Pacific Region and 187.0 million people globally , making it the most prevalent sexually transmitted disease(Wang, et al, 2019) , in the same context, most common parasitic infections described in Raj and Yadav literature were *T. vaginalis*, *Schistosoma hematobium* and Microfilaria. A wide morphology of parasites may be diagnosed through microscopic examination of centrifuged urine sediment, especially when present symptoms like pyuria, hematuria, diarrhoea, burning micturition and itching (Raj and Yadav, 2023), In the context of urinalysis, if there is a suspicion that the cause is an infectious parasites, then there are two possibilities : either the infection indeed occurring in the UT and the organism can be seen on direct examination , or the infection occurs elsewhere but the

metabolites can be found in the urine called accidental contamination, e.g., the ova of *Enterobius vermicularis,* and the possibility that these metabolites or other parasite product are dissolved in water and not in lipid, so excretion take place via the kidneys , in other words that indirectly infection could be found in the urine (Siagian, 2023).

Generally, the preanalytical stages for urine samples until preparation either for the direct examination under microscope or perform microscopic analysis only on specimens that have abnormalities on dipstick analysis, it is the most vulnerable part and accounting up to 75% of all laboratory errors (Hortin, et al , 2000**)** , and even though the laboratory is not directly involved in all these stages but still laboratory staff are responsible to correct and organized stages (Siagian , 2023) , some studies referred to the other reasons that may effect to UTI incidence , like in 2022 Deltourbe and et al study mention how personal hygiene especially proper toilet habits should strictly be adhered ,moreover , how sex influences disease and immunity , and how can imagine sex-specific therapies to better treat of UTI and potentially diseases of other mucosal tissues (Deltourbe ,et al ,2022), while, a team of Mititelu confirmed about a close connection between diet quality and obesity with the frequency of urinary infections which the highest percentage of got urinary infections were among persons who increased committing to an unhealthy diet (Mititelu , et al, 2024)

4. Conclusion and future scope

Overall diagnostic accuracy of urine parameters for diagnosing UTI were higher when used microscopic routine urine test (centrifugation at 300xg at 5 min) compared to machines (Urilyzer 500 PRO test/Urine strips) which frequently miss that at the area and time under study, also higher percentages in female than in male results to the Leukocytes(pyuria), Erythrocytes (hematuria) , Different Crystals (crystalluria)and various microorganisms (bacteriuria, candiduria etc.) which could affect to the patient care and antimicrobial stewardship efforts, as well as , to the researches, in the same context, diet (reduced consumption of fruit and/ or vegetables) and a sedentary lifestyle may increase risk of recurring urinary infections. Present study indicates that the consideration of the changes in seasonally ambient temperature when reached peaked during the hot season in Iraq could affect to increase the seasonally changing incidence of UTI and was clinically reflect in facilitating proper diagnosis of patients presenting with UTI either symptomatically or asymptomatically. Furthermore, increased percentages and frequency of urinary parameters which observed in 2021-2022 out of four study years may indicates, high likelihood side effects of Covid-19 pandemic disease in study persons involved.

Recommendations:

We need further studies to estimate, for which is more effective, our current study methods used in urine testing , either a traditional light microscope used in routine work or other type like phase-contrast microscope which enables to ; quantify the number of bacteria seen per field, there morphology and motility , also should be improved a diagnostic method in an automated systems for each of parasite and yeasts / pseudohyphae when prepared vital centrifuged urine sample and if finding is true or contamination , which may helped to be investigate, if microscopy may a cost-effective add on test to the automated analyzer method (urine dipstick) , in order to avoid both antibiotic over treatment and unnecessary urine cultures, simultaneously, it will be necessary to ensure that all technologists apply the same criterion in the laboratory urinalysis which requires a relatively long thorough training and the expertise must be maintained ,as well as, clinical settings and assess the analytical sensitivity of an automated analyzer.

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Conflicts of interest

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