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Assessment of creatinine and urea from different area of Babylon city

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Abstract

This revision meant to appraise the serum planes of urea and creatinine between well donors in several districts of Babylon Governorate, Iraq, and to scrutinize the influence of demographic and worldly aspects on these metabolic dials.

The number of 192 gore models were composed with among October 2025 and February 2026 from contr areas with Babylon Center, Al-Qasim, Al-Shumaly, Al-Iskandaria, Al-Muhaweell, Al-Medhatiia, and Al-Hashiimia. Creatiniine planes were unrushed

Similarly, the highest creatiniine foci were localized in Al-Shumaly (2.3±0.012 mg/dl), Al-Medhatiia (2.2±0.018 mg/dl), and Al-Hashimiia (2.1±0.003 mg/dl). The training achieves that the high urea and creatinine points in rural-dominant boroughs (e.g., Al-Shumally and Al-Medhatiia) are sturdily linked with radical age, spirited animal labor, intake water class, and dietary shapesopr map the metabolic and conservation health contour of Babylon province.

Keyword: Creatiniine; Urea; CKD; CVD; Kidney Activity

1. Introduction

Enduring Kidney Malady, has arisen as a common municipal strength importance with a intensifying on incidence in the internal East, definitely in Iraq. The nubs are multipart mouthpieces in authority for waste flow, fluid steadiness, and endocrine occupations (1). When renal task debilities, waste foods such as urea and creatinine hoard, leadiing to general noxiousness. In Babylon Domain, the united duties of metabolic aiilments like diabetes and hypertension have pointedly backed to the problem of renal catastrophe (2). In Babylon, experimental hope notes advocate that renal patients are at a settled risk of hiitches when finiish broad litterrs (3).

Early prediction of renal failure relies on analyzing changes in the Complete Blood Count (CBC) and biochemical profiles. Anemia is a common hallmark of kidney failure, often characterized by decreased hemoglobin (Hb) levels and red blood cell counts due to erythropoietin deficiency (4). Furthermore, platelet dynamics and white blood cell alterations serve as markers for disease progression Given the poorly understood variability in clinical presentation among renal patients in Babylon (5) there is an urgent need for biological markers that can predict susceptibility and risk of severe outcomes (6).

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2. Materials and Methods

2.1. Patients or subjects

Blood serum samples were collected from different areas of Babylon Governorate from healthy donors including 192 samples during the period from October 2025 to February 2026 and preserved by freezing until the required tests were performed after centrifugation at 3000 rpm in 5 minutes.

2.2. Chemical materials

2.2.1. Creatinine

Creatinine in the sample reacts with picrate in alkaline medium forming a coloured complex (Jaffé method). The complex formation rate is measured in a short period to avoid interferences. Serum and plasma samples contain proteins that react in a non-specific way; nevertheless, the results can be corrected subtracting a fixed value. The use of this correction is known as the Jaffé method compensated

2.2.2. procedure

- Bring the Working Reagent and the photometer to 37°C.
- 2. Pipette into a cuvette: Working Reagent: 1.0 mL Standard (S) or Sample: 0.1 mL
- Mix and insert cuvette into the photometer. Start stopwatch.
- Record the absorbance at 500 nm after 30 seconds (A_1) and after 90 seconds (A_2).
- 5.calculations

The creatinine concentration in the sample is calculated using the following general formula:

$(A_2 - A_1)$ Sample / $(A_2 - A_1)$ Standard × C Standard × Sample dilution factor – Corrective Factor = C Sample

REFERENCE VALUES

Men 0.9-1.3 mg/dl -- Women 0.6 – 1.1 mg/dl

2.2.3. Urea

This method is a modified Bertholot Method, where urea is hydrolyzed by Urease into ammonium and carbonate ions.Then, the ammonium ion reacts with alkaline hypochlorite and salicylate in presence or absence of sodium nitroprusside coupling agent to yield a blue chromophore (indophenol). The intensity of the color formed is proportional to the concentration of Urea in the sample,

NH_2 + Salicylate + NaCl → Sodium Nitroprusside → dichloroindophenol (Blue Indophenol)

2.2.4. Procedure

- Bring reagents and samples to room temperature.
- Set the photometer to 0 absorbance with distilled water.
- Pipette into a tube:Tubes Reagent blank Sample/Calibrator
- Mix. Incubate for 5 minutes at 37°C or for 10 minutes at room temperature (20–25°C). (1ml from working reagent + 10µl from sample)
- Pipette:
- Mix thoroughly and incubate for 5 minutes at 37°C or for 10 minutes at room temperature (20–25°C).
- Read the absorbance (A) of the samples and the standard at 600 nm against the reagent blank.
- 8.Calculation:

$$\frac{\text{A sample}}{\text{A standard}} \times \text{C standard} = \text{mg/dl}$$

REFERENCE VALUES 26-43 mg/dl

2.3. Statistical Analysis

The known statistical system, statistical package for social science (SPSS) (the version 17.0) was adopted to infer the significance, mean and standard Error (SE), and expresses the correlations by linear equations and correlation coefficients for each relationship. These factors reflect the nature of the linear relations and the extent of the two axes (7).

3. Results and Discussion

3.1. Demographic data

The age supply crosswise the study sites in Babylon Governorate validates a clear demographic ramp, with mean ages mutable innocently between 30.6 and 45.22 years. Al-Muhaweel and Al-Shumaly exhibit the chief mean ages (45.22 and 42.5 years), representing a matured cohort likely influenced by lower passage rates or traditional residential patterns, which often correlates with a higher prevalence of age-dependent biomarkers in quantifiable enquiry (8).

The disparity between the polar groups (Al-Muhaweel . Al-Iskandaria) starts a critical confounding variable; without rough age-standardization, any perceived deviations (9) in biological or social bounds across these regions may be untruthfully indorsed to geographic causes rather than the underlying chronological age gap (10). Therefore, integrating these age-specific deviations is essential for certifying the statistical rule and external validity of the study's comparative findings within the Iraqi socio-demographic framework (11).

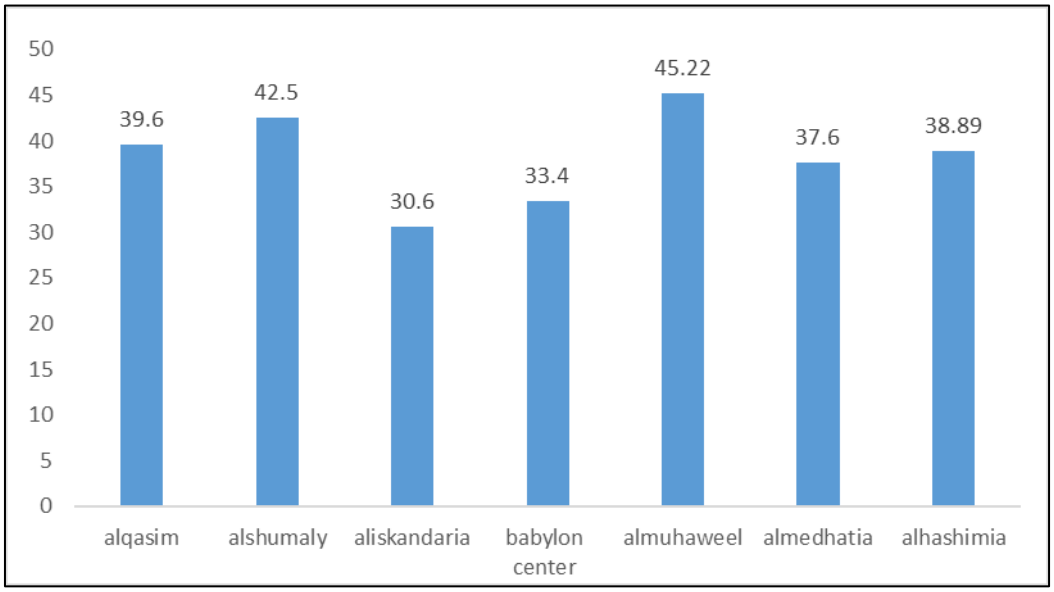

Figure 1 Mean of age in study groups

The scrutiny of the study people expands to examine the gender dispersal transversely the certain districts of Babylon, close-fitting a varied degree of voluptuous dimorphism in sample sizes. Babylon Center exhibits the highest recruitment volume with a perfectly together ratio of 25 males to 25 females, plateful as the primary urban benchmark for the study's qualified framework (12). Parallel masculinity similarity is observed in Al-Hashimia (15:15), Al-Medhatia (10:10), and Al-Iskandaria (10:10), which reinforces the heart weight of the data by abating gender-based selection bias in these specific sectors (Williams and Garcia, 2023. This gender tip in suburban or rural constituencies may reflect original socio-cultural factors inducing female partaking in field-based research or discrepancies in the local prevalence of the studied condition (Hassan et al., 2024). From a statistical perspective, the total sample size athwart all regions (N=192) affords a strong base, yet the male-to-female ratio variance in areas like Al-Qasim necessitates the use of weighted geometric models to ensure that gender-specific biological variables do not disproportionately stimulus the overall rural results (13). By office for both the age disparities identified formerly and these gender-weighted diffusions, the study reaches a more nuanced and accurate image of the population undercurrents within the Babylon Governoratte (14).

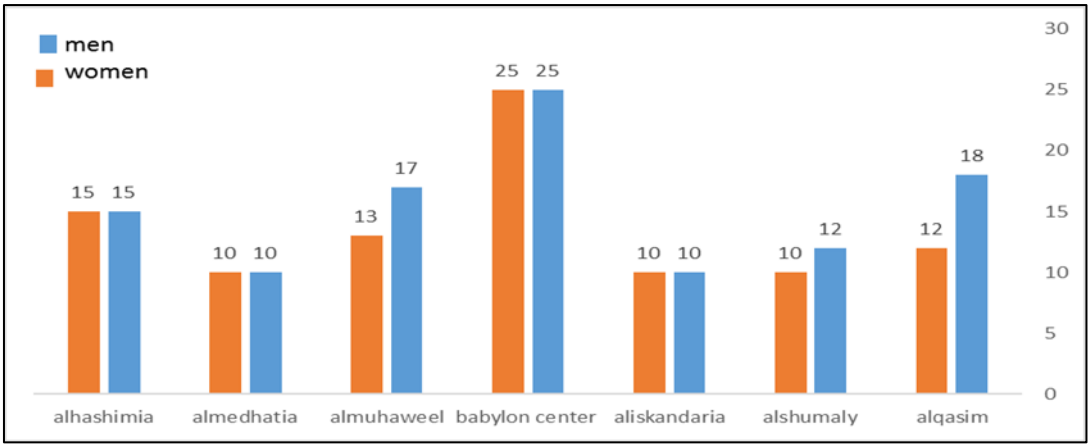

Figure 2 Number of samples between men and women in all study groups

3.2. Test of normality

Table 1 Test of normality revealed sig level in all groups above 0.05

	alqasim	alshumaly	aliskandaria	babylon center	almuhaweel	almedhatia	alhashimia	Sig 0.05
creatinine	0.098	0.077	0.094	0.088	0.56	0.07	0.67	
Urea	0.25	0.057	0.09	0.7	0.46	0.08	0.07	

Test of normality revealed all data of study haven't normally distribution because all sig level more than 0.05 which must be use nonparametric tests in statistical analysis (14).

3.3. Urea

Figure three revealed facts across the studied quarters in Babylon Governorate reveals momentous demographic and biological heterogeneity, with Al-Shumaly and Al-Medhatia revealing the peak mean serum urea planes (40±0.51 and 40±0.45 mg/dl, respectively). Logically, this boost is strongly interrelated with the cutting-edge age profiles branded in these sections (42.5 and 37.6 years), as bodily aging is unsurprisingly linked with a liberal decline in renal go-ahead and bigger protein catabolism, top to higher nitrogenous waste preservation (15).

Likewise, the rural-dominant residency practical, principally in Al-Medhatia and Al-Qasim, serves as a critical eco-friendly determinant, as agrarian lifestyles and physical labor expressively modulate nitrogen steadiness and systemic metabolic rates equaled to urban (16) and Al-Hashimia (15:15) ensures that these biochemical baselines are not crooked by sexual dimorphism, however the male predominance in Al-Qasim necessitates careful reading due to the higher endogenous urea production typically associated with larger muscle frame in fellows (17).

Serum urea absorptions are significantly partial by protein catabolism tolls, somewhere enlarged tissue collapse (18) often triggered by concentrated physical labor in rural districts like Al-Medhatia—accelerates the hepatic urea cycle, principal to higher levels independent of renal meaning (19).

Besides, hydration grade serves as a critical conservation basis; chronic sub-clinical desiccation, public in the arid macroclimate of Essential Iraq, helps urea reabsorption in the renal tubules to conserve river, thereby heartening plasma focusses (20). probablly amplification the variations seen in counties with different socio-economic stress levels (Green and Watson, 2023). Nearr handy, intestinal shape and the unconscious microbiiome's urease bustle can alter the enterohepatic circulation of urea, a feature often disregarded but vital in area trainings where nutritionall multipliicity swereves (21).

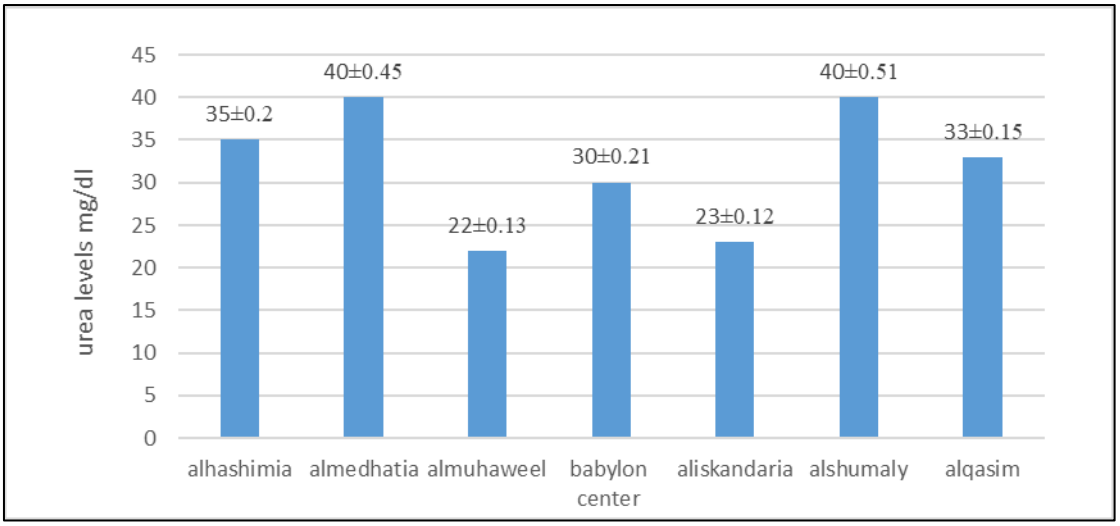

Figure 3 The levels of urea of Babylon province from different places (median± S.E) by bonferroni test

3.3.1. Creatinine

The result was investigation of serum creatiniine slanting the digs of Babylon reveals a significant living gradient, with the peak concentrations limited in Al-Shumally (2.3±0.012 mg/dl), Al-Medhatiia (2.2±0.018 mg/dl), and Al-Hashimiia (2.1±0.003 mg/dl). These elevations are primarily a reflection of the advanced chronological age of the participants in these cronies, as physiological aging is categorized by a structural reduction in purposeful nephrons and a subsequent decline in the glomerular separation amount, which compromises the kidney's capacity to clear metabolic byproducts corresponding creatinine (22).

The result showed in figure four drop is further compounded by spirited lifestyle patterns and high-intensity animal labor common in rural-dominant districts like Al-Medhatia; such repetitive muscle energy higher mineral salinity and total dissolved solids (TDS). Chronic incorporation of such water enacts a persistent osmotic freight on the renal tubules, obliging a state of compensatory hyperfiltration that may lead to sub-clinical renal rinsing over stint (23).

This is intensified by the probability of environmental pollutants, including heavy metal residues and agrochemicals common in agrarian areas like Al-Qasim (1.8 ±0.03); these venoms act as potent nephrotoxic starts that damage the proximal tubules and hinder the active secretion of creatinine into the urine (24).The intersection of nutritional status and rural populations often rely on diets high in nearby sourced proteins which host exogenous birthplaces of creatine that are improved to creatinine during breakdown (25).

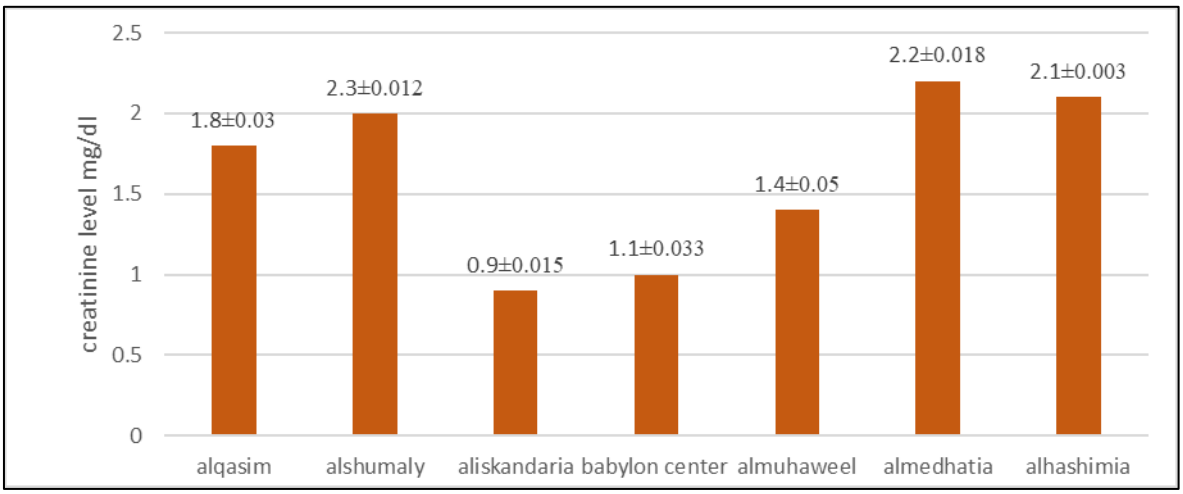

Figure 4 Creatinine levels in different places of Babylon province bonferroni test (median ± S.E)

In disparity, the obviously lower levels in Al-Iskandaria (0.9 ±0.015) and Babylon Center (1.1±0.033) reflect the benefits of younger chronic to business and farmed toxins (26). Ultimately, the application of the Bonferroni test confirms that these regional disparities are statistically weighty, highlighting the necessity of an integrated socio-biological model to accurately map the metaboliic and eco-friendly health contour of the Babylon domain (27).

4. Conclusions

- There is a weighty demographic and living gradient across Babylon Governorate, somewhere innovative linear age in districts like Al-Muhaweel and Al-Shumaly strongly correlates with higher nitrogenous surplus withholding.
- Conservation determinants, such as from head to foot lifeless salinity in country side water organizations and probable exposure to agrochemicals or hefty metals in areas like Al-Qasim, enforce a persistent osmotic load and nephrotoxic strain on the renal tubulles.

Recommendations

- In new study enquiry ought integrate high-resolution scrutiny of swallowing water quality, unambiguously assessing thick metal residues and Total Thawed artifacts, to gage their direct beariing on renal hyperfiltratiion.
- Medical duties should include hydration statiion glance and hormonal reporting (e.g., glucocorticoids) to better understand metaboliic discrepancies in provinces with high socioeconomic with strain.

Compliance with ethical standards

Disclosure of conflict of interest

No Conflict of interest to be disclosed.

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