

Original Article

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Odor olfactory dysfunction in chronic kidney disease and diabetes mellitus and its association with nutritional factors

Abstract

Background: Olfactory changes connection to deteriorated quality of life in chronic kidney disease cases (CKD) and diabetes mellitus (DM). The nutritional status is altered in CKD and DM and it closely interconnected with olfactory function. We aimed to study the olfactory dysfunction in these populations.

Methods: We conducted a cross-sectional research on CKD and DM cases aged 20-50 (27 healthy controls, 77 CKD patients, and 36 DM patients). We used the Iran Smell Identification Test (Iran-SIT) version of the University of Pennsylvania Smell Identification Test (UPSIT) to evaluate the olfactory function. The significant level was set as <0.05.

Results: Our 140 cases included 51.4% of men (mean age of 46.7±10.6 years). The total score of the Iran-SIT test indicated that olfactory impairment in the CKD was higher (16.2±4.2) than in the DM (18.8±2.1) and control groups (20.4±1.2) (P=0.001). It was determined that 54.5% of CKD patients and 38.9% of the DM group had olfactory dysfunction compared to 7.4% of the controls (P=0.001). Multiple regression analysis indicated that being men and low-density lipoprotein cholesterol (LDL-C) were related to olfactory dysfunction in the total population (OR: 4.55, P=0.037, and OR: 0.94, P=0.037). Still, it was only associated with LDL-C in the CKD group (OR: 0.93, P=0.013).

Conclusion: Based on the findings of this study, CKD and DM patients had a higher prevalence of olfactory dysfunction than the controls, which could be associated with some preventive nutritional factors. This information may help perform a screening program and early intervention on olfactory dysfunction in these systematic diseases.

Keywords: Chronic kidney disease, Diabetes mellitus, Hyposmia, Olfaction disorders, Uremia

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Olfactory dysfunction is frequent in people, especially the elderly, but they are not usually unknowing of this problem (1, 2). The prevalence of olfactory loss was reported as 1-20% (3). Several conditions may play a role in this dysfunction, as nasal infections, head injury, neurodegenerative diseases, chemical contact, aging, post-viral olfactory loss, and some chronic disorders, including chronic kidney disease (CKD) and diabetes mellitus (DM) (4-6). CKD is a significant health problem, mainly in developing countries; (7), as previously described, we have a notable CKD distribution (8, 9). Impaired olfactory function has recently been shown in CKD patients, as a common problems in these patients (1, 5). It can be due to uremic toxins, neuropathy, inflammation-oxidative stress, and malnutrition (1, 10-14). Our understanding of olfactory impairment is inadequate, so a broad explanation of the olfactory problem in CKD patients is needed (5). In addition, DM is a chronic disease associated with significant health-related complications (15, 16).



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objective olfactory test. Although UPSIT is the best tool available for smell function assessment, it is a psychophysical test affected by subjective factors. The strength of current research was the evaluation of nutritional parameters that could disturb olfactory function in CKD and DM patients. This study establishes a higher frequency of olfactory impairment in CKD and DM patients compared to controls. Male and low LDL-C levels meaningfully correlated with olfactory dysfunction in CKD and diabetic patients. LDL as a nutritional factor is altered due to impaired renal function significantly related to olfactory functioning. Therefore, some interventions with improving nutritional approach may help with these issues in this population. Current results may help better diagnose, and disease control monitoring warrants further investigations of the mechanisms involved.

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