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The consequences of the arbitrary herbal and analgesics on renal function

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ABSTRACT

Background: Many modifiable risk factors have been linked to the etiology of the increased renal disease worldwide. The objective of this study was to assess the consequences of arbitrary herbal and analgesics on renal function in a series of Saudi patients. *Methodology:* This study investigated 2944 Saudi volunteers who have joined during a cross-sectional survey conducted in Hai'l region. Renal function status was established corresponding to Glomerular infiltrating Rate (GFR) estimation using creatinine level, age, and sex. GFR was categorized into: Stage III CKD (GFR = <60 - 30 mL/min). Stage IV (GFR = <30 – 15 mL/min). Stage V (GFR = <15 mL/min). *Results:* Around 14.4% of participants claimed using non-steroidal anti-inflammatory drugs (NSAIDs). Of the 391 analgesics users, about 12.8% were found with impaired renal function. The risk of analgesics uses in deteriorating renal function, the relative risk (RR) and the 95% confidence interval (95%CI), RR (95%CI) = 1.7926 (1.3313 to 2.4137), P = 0.0001. Out of the 426/2714(15.7%) herbal users, 45/426(10.6%) were found with impaired renal function. The risk of herbal uses in deteriorating renal function, the RR (95%CI) = 1.3659 (1.0366 to 1.7999), P = 0.0268. *Conclusion:* Significant Reverse associations between arbitrary herbal use as well as, frequent NSAIDs renal function. The frequent use of Arbitrary herbal and NSAIDs is common among the Saudi Community, particularly among women.

Keywords: NSAIDs, GFR, herbal medication, renal function, Saudi Arabia

1. INTRODUCTION

The most common renal disease associated with deteriorated kidney function or structure is chronic kidney disease (CKD). CKD has multiple complications and irreversible damage leading to a constant deterioration of the kidney structure or function (Yan et al., 2021). High mortality associated with CKD can occur in the general adult population, particularly those with comorbidities, such as diabetic and hypertensive patients (Kalantar-Zadeh et

al., 2021). The core of CKD treatment is to prevent the prevention of the disease and its complications (Yan 2021). The key determining factor of CKD is hypothetically modifiable risk factors (Dehghani et al., 2022). Many modifiable risk factors have been implicated in the increased epidemiology of CKD and acute kidney injury (AKI) including diabetes, hypertension, non-steroidal anti-inflammatory analgesics (NSAIDs), and arbitrary herbal usage (Ginawi et al., 2013). Studies from Saudi Arabia have shown that CKD is prevalent due to the presence of diverse modifiable risk factors (Ahmed et al., 2014; Ginawi et al., 2015). Implementation of CKD early detection through screening at-risk individuals represents a major preventive measure. Moreover establishing lifestyle modification programs, and risk factors assessment and prevention can lead to better disease control (Dehghani et al., 2022). Dietary interventions may have beneficial effects on health-related quality of life for people with advanced diseases (Palmer et al., 2017).

Research in both CKD and AKI has been categorized as a leading source of improving kidney disease management and prevention. However, there is still a gap in research regarding the overlapping between each effect, as well as their etiological factors (Lameire et al., 2021). Therefore, the present study aimed at the consequences of arbitrary herbal and analgesics on renal function in a series of Saudi patients.

2. MATERIALS AND METHODS

In this prospective investigation, 2944 Saudi volunteers have joined during a cross-sectional survey conducted in Hai'l region during the period from March 2021 to April 2022. Contributors were randomly included regardless of their gender, age, and other demographical characteristics. Renal function status was establishedcorresponding to Glomerular infiltrating Rate (GFR) estimation using creatinine level, age, and sex. GFR was categorized into: Stage III CKD (GFR = <60 - 30 mL/min). Stage IV (GFR = <30 – 15 mL/min). Stage V (GFR = <15 mL/min).

Ethical consent

The proposal of this study, including its informed ethical consent, was approved by the ethical committee Research board at the College of Medicine, University of Hai'l, Hai'l, Saudi Arabia. Each participant was consented and asked to sign a written ethical consent.

Statistical analysis

Data were entered into SPSS software and analyzed to obtain frequencies, cross-tabulations, relative risk (RR), and Pearson Chi-square test for statistical significance (P-value). Statistically significant was considered when P- value <0.05 considering a 95% confidence interval (CI).

3. RESULTS

Of the 2944 respondents, 1369(46.5%) were males and 1575(53.5%) were females. Their ages ranged from 14 to 90 years with a mean age of 43 years. About 256/2944(8.7%) participants were found with deteriorated renal function, including 11/256(4.3%) were found with GFR < 14 mL/min, 16/256(6.3%), and 229/256(89.4%). Of the 256 patients, 119/256(46.5%) were males and 137/256(53.5%) were females. Impaired renal function stages were revealed in 10/651(1.5%) of the age group < 25 years, 27/803(3.4%) of the age group 25-39 years, 59/734(8%) of the age range 40-54 years, 98/572(17%) of the age range 55-69 years, and 62/184(33.7%) of the age group ≥70 years, as indicated in Table 1 and Fig 1.

Table 1 Renal function status by gender and age

Variable		Renal function status				
GFR	90+ mL/min	60-89	30-59	15-29	<14	Total
Gender						
Males	666	584	99	11	9	1369
Females	964	474	130	5	2	1575
Total	1630	1058	229	16	11	2944
Age						
< 25 years	547	94	8	0	2	651
25-39	530	246	20	3	4	803
40-54	353	322	54	3	2	734

55-69	171	303	90	7	1	572
≥70	27	95	57	3	2	184
Total	1628	1060	229	16	11	2944

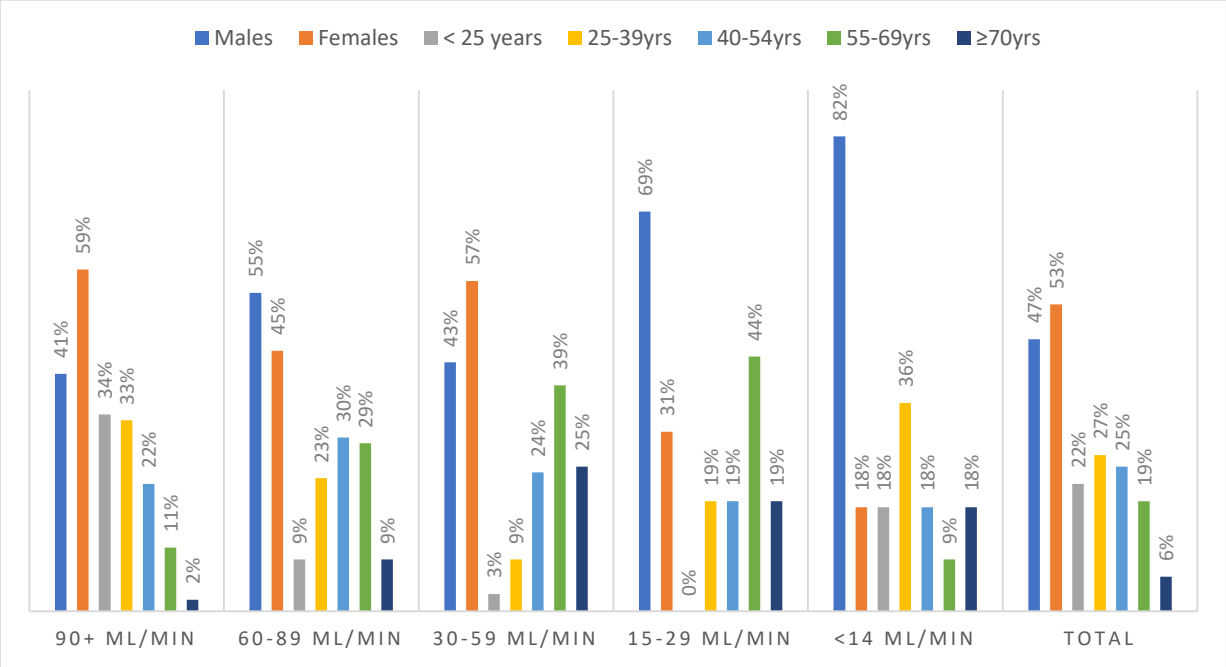

Figure 1 Renal function status by gender and age

About 391/2718 (14.4%) respondents claimed to use non-steroidal anti-inflammatory drugs (NSAIDs). Out of the 391 analgesics users, 50/391(12.8%) were found with impaired renal function. The risk of analgesics uses in deteriorating renal function, the relative risk (RR) and the 95% confidence interval (95%CI), RR (95%CI) = 1.7926 (1.3313 to 2.4137), P = 0.0001. Out of the 426/2714(15.7%) herbal users, 45/426(10.6%) were found with impaired renal function. The risk of herbal uses in deteriorating renal function, the RR (95%CI) =1.3659 (1.0366 to 1.7999), P = 0.0268 (table 2 and figure 2).

Table 2 Renal function status by analgesics and arbitrary herbal use

Variable		Renal function status				
GFR	90+ mL/min	60-89	30-59	15-29	<14	Total
Analgesics use						
Yes	171	170	43	4	3	391
No	1356	805	147	11	8	2327
Total	1527	975	190	15	11	2718
Herbal use						
Yes	198	183	37	4	4	426
No	1325	792	153	11	7	2288
Total	1523	975	190	15	11	2714

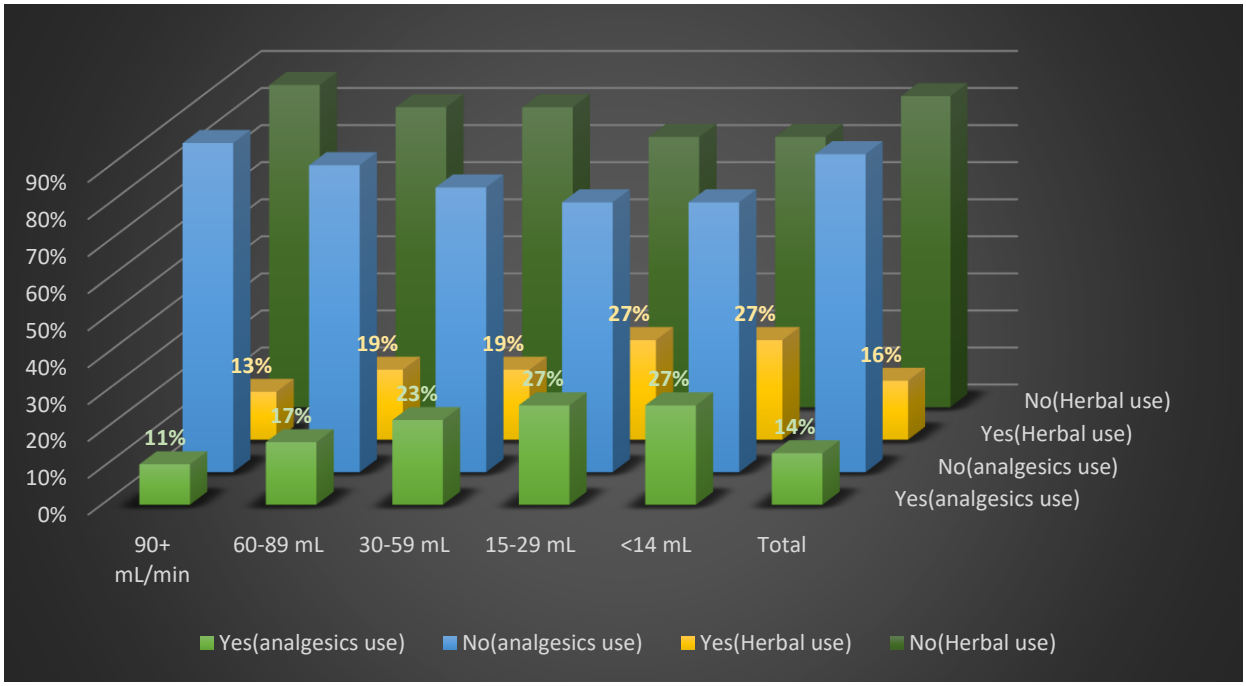

Figure 2 renal function statuses by analgesics and herbal use

Around 270/391(69%) of the females were categorized as analgesics vs. 121/391(31%) of the males. The risk of analgesics uses among females, the RR (95%CI) = 2.2991 (1.8788 to 2.8134), P < 0.0001. The proportions of analgesics use within <25 years, 25-39, 40-54, 55-69, and ≥70 years, were 30/710(4.2%), 100/830(12%), 120/700(17%),100/480(21%), and 41/224(18%), in this order, as indicated in Table 3.

Table 3 Analgesics use by gender and age

Variable		Analgesics use	
	Yes	No	Total
Gender			
Males	121	1373	1494
Females	270	1180	1450
Total	391	2553	2944
Age			
< 25 years	30	680	710
25-39	100	730	830
40-54	120	580	700
55-69	100	380	480
≥70	41	183	224
Total	391	2553	2944

As indicated in Table 4, Fig 3, Arbitrary herbal use was claimed by 573/2944(19.4%) participants, 209/573(36.5%) males, and 364/573(63.5%) females. The significance of arbitrary herbal uses among females, the RR (95%CI) = 1.7945 (1.5384 to 2.0932), P < 0.0001. The proportions of herbal use within entre age groups <25 years, 25-39, 40-54, 55-69, and ≥70 years were 85/710(12%), 164/830(20%), 176/700(25%),115/480(24%), and 33/224(15%).

Table 4 Arbitrary herbal use by gender and age

Variable		herbal use	
	Yes	No	Total
Gender			
Males	209	1285	1494
Females	364	1086	1450
Total	573	2371	2944
Age			
< 25 years	85	625	710
25-39	164	666	830
40-54	176	524	700
55-69	115	365	480
≥70	33	191	224
Total	573	2371	2944

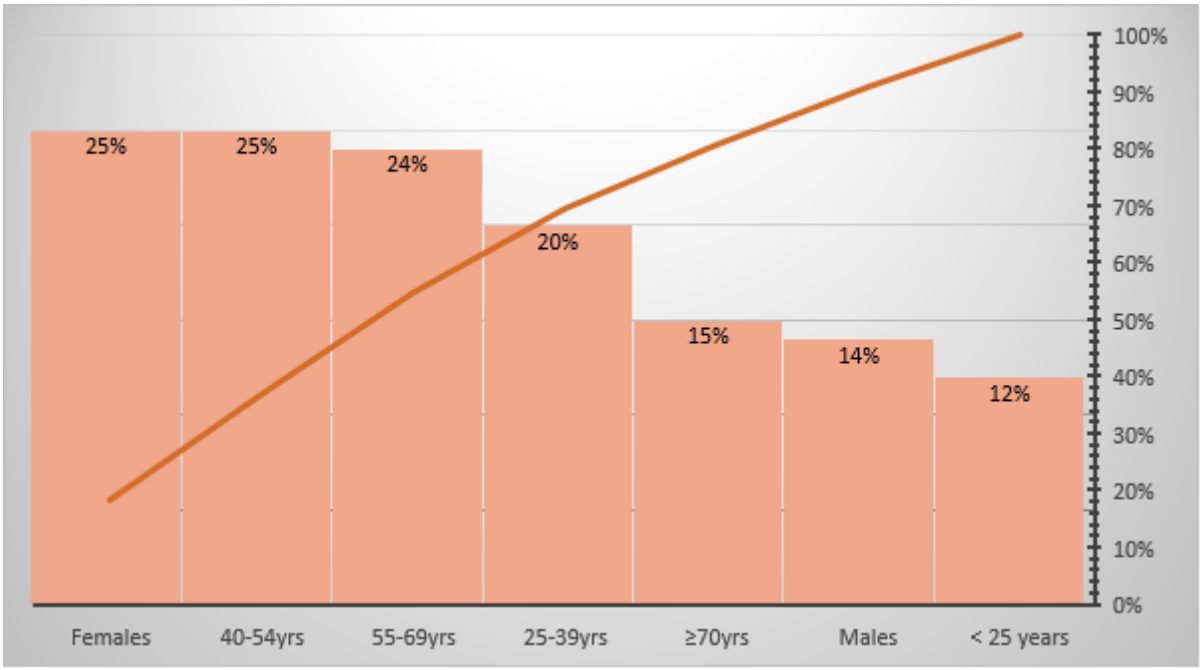

Figure 3 Proportions of arbitrary herbal use within entre gender and age groups

4. DISCUSSION

In recent years Saudi Arabia has witnessed an increasing burden of kidney disease, especially CKD due to the increasing prevalence of its modifiable risk factors, such as diabetes, and hypertension. The findings of the present study indicate the worry come out about CKD. Our findings revealed that CKD was more prevalent in women than men. It was previously reported that females are more likely to develop CKD than males (Hödlmoser et al., 2021), yet females had a lower CKD progression compared to males (Swartling et al., 2021).

In the current study, about 14.4% were found to use NSAIDs in regular form, which significantly deteriorated their kidney function. NSAIDs are widely used as analgesics among people with diverse chronic diseases and older people (Lim et al., 2022). CKD, CVD, gout, lower pain severity, and peptic are significantly linked to a potential risk of inappropriate NSAID use (Nguyen et al., 2021). However, prolonged systemic use of NSAIDs is well documented as incriminated as a prime suspect for acute kidney events (Lim et al., 2022). Moreover, some studies suggested that NSAID use in hospitalized patients has been connected to an increased risk of AKI, particularly among those with impaired renal function (Jeon et al., 2021).

Analgesics such aasprin, paracetamol and ibuprofen are associated with analgesics nephropathy. Nevertheless, COX-2 inhibitors were developed to reduce this complication though later evidence indicated that the risk of CKD is at least similar.

However, the long-term safety of these drugs is contradictory, particularly in the elderly population. Even for those considering NSAIDs as safe, regular long-term use can be associated with a risk of renal function deterioration, which can progress into non-reverse CKD that can be stopped by quitting the causative analgesic (Keen and Aeddula, 2022).

About 15.7% of the study subjects in this study affirmed that arbitrary herbal use and their use statistically significantly affected their renal functions. Although herbal medications have been used for thousands of years, and many pharmaceutical drugs were developed from herbal, their arbitrary use has diverse side effects, particularly on the kidney. Over 100 types of herbal medications can induce nephrotoxicity (Xuet al., 2020). Herbal medications encompass the usage of natural composites, with relatively multipart active constituents with varying grades of side effects. May herbal ingredients, such as aristolochic acids or other plant alkaloids can cause nephrotoxicity (Yang et al., 2018). About 30-35% of all cases of acute renal failure in Africa were attributed to herbal medications (Akpan and Ekrikpo, 2015). Despite the advances in manufacturing technology of synthetic drugs in Europe, natural herbal remedies continue to grow due to the supposition that natural equals safe (Kiliś-Pstrusińska and Wiela-Hojeńska, 2021). Therefore, screening of herbal ingredients for a nephrotoxic compound such as aristolochine represents a global priority (Qin et al., 2021). Arbitrary herbal use was significantly higher among females compared to males. Such findings were previously reported from the Middle East and Saudi Arabia (Ahmadi et al., 2021; Almoayad et al., 2021).

The use of traditional herbal medications is very prevalent in Saudi Arabia. It was reported that about 75% of the Saudi population uses traditional and complementary medicine (Aboushanab et al., 2019). Unfortunately, a high percentage of the users ignore the side effects of these medications (Alkhamaiseh and Aljofan, 2020), which necessitate the role of awareness in this context.

5. CONCLUSION

Arbitrary herbal use and frequent NSAIDs have a significant role in deteriorating renal function. There is an increased prevalence of Arbitrary herbal and NSAIDs among the Saudi Community, particularly among women. Community-based awareness of the side effects of Arbitrary herbal and NSAIDs is needed.

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Ethical approval for human

All procedures performed in studies involving human participants were following the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards (ethical approval number: HREC00139/CM-UOH.03/21.

Informed consent

Informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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