Work and Activity Impairment in Individuals With Chronic Kidney Disease According to Renin-Angiotensin-Aldosterone System Inhibitor (RAASi) Use

PCR44

Richard Ofori-Asenso,[1] Ewelina Palmer,[2] Hungta Chen,[3] Irum Khan,[4] Naveen Rao,[1] Steven Fishbane,[5] Naoki Kashihara,[6] Eiichiro Kanda[6]

[1]BioPharmaceuticals Medical, AstraZeneca, Cambridge, UK; [2]Patient Centered Science, AstraZeneca, Cambridge, UK; [3]Medical and Payer Evidence Statistics, BioPharmaceuticals Medical, AstraZeneca, Gaithersburg, MD, USA; [4]Global Medical Affairs, AstraZeneca, New York, NY, USA; [5]Division of Nephrology, Zucker School of Medicine, Hempstead, NY, USA; [6]Department of Nephrology, Kawasaki Medical School, Kurashiki, Okayama, Japan

Background and objectives

- The use of renin-angiotensin-aldosterone system inhibitor (RAASi) medication in individuals with chronic kidney disease (CKD) has been associated with improved health outcomes, including delayed estimated glomerular filtration rate decline and lowered risk of cardiovascular complications[1]
- However, it is unclear whether the benefits of RAASi use also extend to improving work productivity and daily activities of life for individuals living with CKD
- In this study, we compared the work productivity and activity levels of patients in the DISCOVER CKD cohort with or without RAASi use at baseline

Methods

- DISCOVER CKD (ClinicalTrials.gov identifier: NCT04034992) is an observational cohort study characterising contemporary real-world management of CKD to provide insights into the current gaps in CKD treatment[2]
  - The study includes both retrospective and prospective cohorts, integrating primary and secondary data collection
- The prospective study captured data from the prospective cohort, which comprised 1051 patients with CKD from the USA, the UK, Spain, Italy, Sweden and Japan, enrolled over the course of 2 years (September 2019 to June 2022)
- A secondary objective of DISCOVER CKD is to measure the impact of disease on paid and unpaid work and daily activities of life, using the Work Productivity and Activity Impairment CKD (WPAI-CKD) questionnaire; five out of six questions are based on a 7-day recall period[3]
  - Only employed patients were asked to complete the work productivity section of the WPAI-CKD questionnaire
- Domain scores were compared between individuals with and without RAASi treatment at baseline using an analysis of covariance (ANCOVA) model with adjustments for age, sex, country, CKD stage, comorbidity and number of other medications
  - WPAI-CKD outcomes are expressed as impairment percentages, with higher numbers indicating greater impairment and less productivity
  - Percentage difference was calculated as: [((Least squares mean [LSM] of RAASi use–LSM of non-RAASi use)/average of LSM of RAASi use and LSM of non-RAASi use)]×100
  - $P<0.05$ was considered statistically significant
- The study received ethics approval and all patients provided informed consent

Results

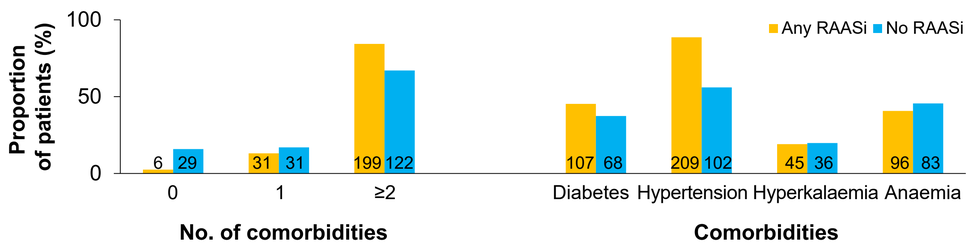
- The DISCOVER CKD prospective study includes 1051 patients; 236 RAASi users and 182 non-RAASi users were analysed here
- Baseline demographics and characteristics of patients with or without RAASi use are summarised in **Table 1**
- RAASi users and non-RAASi users were similar in terms of age and body mass index. However, the RAASi use group had a lower proportion of females, and the non-RAASi use group had greater proportions of patients with higher stages of CKD
- Comorbidities at baseline are summarised in **Figure 1**
- At baseline, RAASi users had more comorbidities and greater proportions of patients with diabetes and hypertension than the non-RAASi use group
- Non-RAASi medication use is illustrated in **Figure 2**
- Compared with the non-RAASi use group, a substantially greater proportion of RAASi users received four or more non-RAASi medications (64.0% vs 40.7%)
- Individuals receiving RAASi therapy versus those not receiving RAASi therapy experienced a lower impact of CKD on all WPAI-CKD outcomes:
  - Overall work productivity loss (LSM: 4.3% vs 14.7%; difference: –10.3%; % difference: −108.9; P=0.009)
  - Activity impairment (LSM: 15.0% vs 23.9%; difference: –8.9%; % difference: −45.6; P<0.001)
  - Work impairment (LSM: 3.5% vs 11.1%; difference: –7.5%; % difference: −103.0; P=0.025)
  - Missed work time (LSM: 0.01% vs 5.5%; difference: –5.5%; % difference: −199.1; P=0.017)
- The findings are illustrated in **Figure 3**

Table 1. Baseline demographics and characteristics

Demographic	Any RAASi (N=236)	No RAASi (N=182)
Age, years, mean (SD)	60.0 (13.5)	60.5 (14.0)
Sex, n (%)		
Female	72 (30.5)	73 (40.1)
Male	164 (69.5)	109 (59.9)
Country, n (%)		
UK	26 (11.0)	33 (18.1)
Italy	8 (3.4)	4 (2.2)
Japan	119 (50.4)	76 (41.8)
Spain	36 (15.3)	8 (4.4)
Sweden	14 (5.9)	3 (1.6)
USA	33 (14.0)	58 (31.9)
BMI, kg/m^2, mean (SD)	28.8 (6.6)†	28.3 (8.1)‡
CKD stage, n (%)		
2	26 (11.0)	14 (7.7)
3a	80 (33.9)	42 (23.1)
3b	66 (28.0)	56 (30.8)
4	38 (16.1)	35 (19.2)
5	26 (11.0)	35 (19.2)
CKD aetiology, most common, n (%)		
Diabetic nephropathy, type 2	53 (22.5)	30 (16.5)
Ischaemic/hypertensive nephropathy	43 (18.2)	28 (15.4)
IgA nephropathy	24 (10.2)	14 (7.7)
Polycystic kidney disease	15 (6.4)	6 (3.3)
Other	86 (36.4)	64 (35.2)
Unknown	15 (6.4)	40 (22.0)
Family history of CKD, n (%)		
No	143 (60.6)	108 (59.3)
Yes	52 (22.0)	28 (15.4)
Unknown	41 (17.4)	46 (25.3)

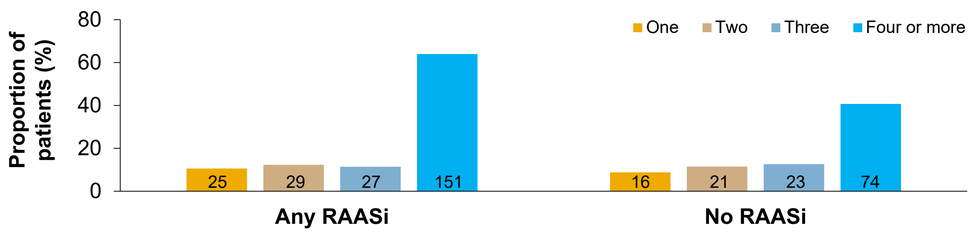
†Missing: 97. ‡Missing: 105.
BMI, body mass index; CKD, chronic kidney disease; IgA, immunoglobulin A; RAASi, renin-angiotensin-aldosterone system inhibitor; SD, standard deviation.

Figure 1. Comorbidities at baseline



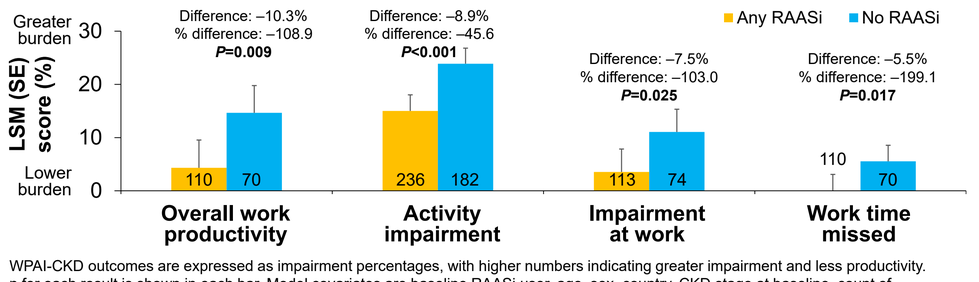
Any RAASi, N=236; no RAASi, N=182. n for each result is shown in each bar.
RAASi, renin-angiotensin-aldosterone system inhibitor.

Figure 2. Number of non-RAASi medications



Any RAASi, N=236; no RAASi, N=182. n for each result is shown in each bar.
RAASi, renin-angiotensin-aldosterone system inhibitor.

Figure 3. Impact of RAASi use on work productivity and activity levels (WPAI-CKD outcomes)



WPAI-CKD outcomes are expressed as impairment percentages, with higher numbers indicating greater impairment and less productivity. n for each result is shown in each bar. Model covariates are baseline RAASi user, age, sex, country, CKD stage at baseline, count of medications at baseline (excluding RAASi therapy) and comorbidity flag. Comorbidity flag includes hypertension, diabetes (type 1 or 2), hyperlipidaemia, anaemia, respiratory diseases, cardiovascular disease, hyperkalaemia and cancer. Medication count at baseline is based on the number of distinct medication terms that are being taken at baseline date (excluding RAASi therapy). Count of medications is treated as a continuous variable. Percentage difference is calculated as: [((LSM of RAASi use–LSM of non-RAASi use)/average of LSM of RAASi use and LSM of non-RAASi use)]×100. CKD, chronic kidney disease; LSM, least squares mean; RAASi, renin-angiotensin-aldosterone system inhibitor; SE, standard error; WPAI-CKD, Work Productivity and Activity Impairment-CKD.

Conclusions

- These results show an association between RAASi use and increased work productivity and activity levels in individuals with CKD
- These findings suggest that working capability can be further improved through enhanced CKD management, such as RAASi use
- Work capability and activity levels could be considered as part of multifaceted CKD management and may have broader societal and economic impacts

References

1. Cheung AK et al. *Kidney Int*. 2021;99:559–569.
2. Pecoits-Filho R et al. *Clin Kidney J*. 2021;14:1570–1578.
3. Shang W et al. *Arthritis Res Ther.* 2010;12:R177.

Acknowledgements

This analysis was funded by AstraZeneca. Medical writing support was provided by Katie Webster, BSc, and Editorial support was provided by Jess Galbraith, BSc, both of Core (a division of Prime), London, UK, funded by AstraZeneca.

Disclosures

R.O.A., H.C. and N.R. are employees of and may hold stock and/or stock options in AstraZeneca. E.P. and I.K. declare no conflicts of interest. S.F. reports research support and consulting fees from AstraZeneca; and research support from Akebia Inc., MegaPro Biomedical Co., Ltd., Ardelyx, Corvidia Therapeutics, Inc. and Cara Therapeutics. N.K. is a consultant for AstraZeneca, Boehringer Ingelheim and Kyowa Hakko Kirin; and receives honoraria from Kyowa Hakko Kirin and Daiichi Sankyo. E.K. is a consultant for AstraZeneca.

Sponsored by AstraZeneca

Presented at ISPOR Europe 2023, 12–15 November 2023, Bella Center Copenhagen, Copenhagen, Denmark

Scan the QR code to download a PDF version of this poster