Graver Alison (Orcid ID: 0000-0001-7585-0403)

Mount Peter F. (Orcid ID: 0000-0001-7637-3661)

Davies Matthew (Orcid ID: 0000-0001-8780-034X)

TITLE

DIALYSIS AND DRIVING: AN ANONYMOUS SURVEY OF PATIENTS RECEIVING DIALYSIS FOR END STAGE KIDNEY DISEASE

AUTHORS

Alison Graver
Positions at time of submission: Nephrologist, Austin Health; PhD student, Department of Medicine (Austin Health), Melbourne Medical School, University of Melbourne
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health
Contribution to the paper: data collection and analysis, drafting and revision of the manuscript

Natasha Cook
Positions at time of submission: Nephrologist and General Physician, Austin Health
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health
Contribution to the paper: principal investigator, study design and development, data collection and analysis, drafting and revision of the manuscript

Morris Odell
Positions at time of submission: Retired. Formerly Head of Clinical Forensic Medicine, Victorian Institute of Forensic Medicine; Adjunct Associate Professor of Forensic Medicine, Monash University
Institutional affiliations at which the work was carried out: Victorian Institute of Forensic Medicine
Contribution to the paper: study development, manuscript revision

Leonid Churilov
Positions at time of submission: Professor of Biostatistics, University of Melbourne
Institutional affiliations at which the work was carried out: Department of Medicine (Austin Health), Melbourne Medical School, University of Melbourne
Contribution to the paper: data analysis, manuscript revision

David Anthony Power
Positions at time of submission: Director of Nephrology, Austin Health; Professor of Nephrology, University of Melbourne
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health; Department of Medicine (Austin Health), Melbourne Medical School, University of Melbourne; Kidney Laboratory, Institute for Breathing and Sleep, Austin Health
Contribution to the paper: study development, manuscript revision

Peter Francis Mount
Positions at time of submission: Deputy Director of Nephrology, Austin Health; Clinical Associate Professor, University of Melbourne

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Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health; Department of Medicine (Austin Health), Melbourne Medical School, University of Melbourne; Kidney Laboratory, Institute for Breathing and Sleep, Austin Health
Contribution to the paper: study development, manuscript revision

Matthew RP Davies
Positions at time of submission: Nephrologist and General Physician, Austin Health
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health
Contribution to the paper: data collection, manuscript revision

Suet-Wan Choy
Positions at time of submission: Nephrologist and General Physician, Austin Health
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health
Contribution to the paper: manuscript revision

Kathy Paizis
Positions at time of submission: Nephrologist, Austin Health
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health
Contribution to the paper: manuscript revision

CORRESPONDING AUTHOR
Alison Graver

Post: Department of Nephrology, Austin Health
145 Studley Road
Heidelberg
Victoria
Australia 3079

Email: ali.graver@austin.org.au

Telephone: +61 438 564 581

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MAIN TEXT

Introduction

Austroads is the peak organisation of Australasian road transport and traffic agencies, and it publishes an Assessing Fitness to Drive Guideline jointly with the National Transport Commission that details the medical standards for driver licensing for use by health professionals and driver licensing authorities across Australia.[1] The current edition, Assessing Fitness to Drive 2016 (amended August 2017), does not specifically address aspects of advanced chronic kidney disease (CKD) in terms of how driving safety could be impacted.[1] In all Australian jurisdictions, it is obligatory for drivers to report any

potentially impairing chronic conditions to the licensing authority, which in Victoria is VicRoads.[1] However, there are no compulsory licence reviews unless VicRoads has received information regarding a medical condition.[2]

Driving is a complex task requiring processing of sensory inputs by multiple cognitive domains, to produce musculoskeletal actions that control a vehicle within a dynamic environment.[3] Although the tasks involved in routine driving can be well-learned and automatic, and thus still possible in the event of physical and cognitive decline, functional reserve for an adequate response in unusual situations is required.[2] The driving capacity of individuals receiving dialysis for end stage kidney disease (ESKD) is potentially affected by the dialysis treatment itself, as well as other conditions commonly associated with kidney disease.

Driving impairment has been associated with cognitive dysfunction in the elderly.[1] Cognitive impairment is highly prevalent in the CKD and ESKD population; up to 70% of haemodialysis patients aged 55 years and older have moderate to severe cognitive impairment, which is largely undiagnosed.[4-7] Standard risk factors for Alzheimer's disease and vascular cognitive impairment are prevalent in CKD and haemodialysis patients, and include diabetes, hypertension, dyslipidaemia, stroke, obesity and older age. [4, 8-12] Cognitive function is also affected by renal failure complications such as uraemia, anaemia and metabolic disturbances, as well as haemodynamic instability during and after dialysis.[4, 13]

In addition to cognitive impairment, common comorbidities that may affect driving ability in dialysis patients include cerebrovascular disease and diabetes mellitus.[1, 14] ESKD can also be associated with musculoskeletal, neurologic and cognitive impairments, which may not improve with dialysis.[3] Moreover, polypharmacy is common in ESKD patients; agents that are potentially hazardous for driving include narcotics, sedatives, antihistamines, hypoglycaemic agents, anti-seizure, antihypertensive and neuropsychiatric disorder medications.[3, 15-18] Vats and Duffy demonstrated a statistically significant

association between use of sedatives and driving impairment in dialysis patients (59.1% vs 37.4% p=0.005).[3]

Whilst no studies have shown a direct relationship between CKD and motor vehicle collisions, individuals with ESKD receiving dialysis treatment are potentially at risk of driving impairment. Driving impairment risk in dialysis patients has been defined by symptoms of common comorbidities, side effects of dialysis treatment, history of collisions post dialysis treatment, and subjective self-perception of driving safety.[3, 19] To date, there is no guideline with respect to establishing driving safety in dialysis patients, or how to proceed when there are concerns that it is compromised.

This study aimed to estimate the risk of driving impairment in dialysis patients based on symptoms of common comorbidities, symptoms and side effects related to dialysis, collision history and subjective self-perception of driving risk, and to investigate the agreement between objective and subjective markers of risk of driving impairment.

Methods

This was a single centre cross sectional study of chronic dialysis patients at Austin Health, between July 2018 and August 2019. Participants voluntarily and anonymously completed two questionnaires between dialysis sessions. Patients were excluded if they were receiving dialysis for acute kidney injury or for a duration of less than three months, or if unable to give informed consent. The number of competent patients declining participation was recorded.

Questionnaire 1 was adapted from a survey developed by Vats and Duffy in 2010,[3] and examined demographic and dialysis characteristics, medical history, and driving specifics. It was completed by all participants. Questionnaire 2 was adapted from the American Medical Association's "Am I a Safe Driver?" checklist,[20] and examined self-perception of driving safety. It was only completed by

participants who were driving. Both questionnaires were conducted in English, and are included in Appendix A.

Assistance with completion of questionnaires could be provided by family members; neither staff nor investigators assisted. Participants were able to withdraw consent prior to questionnaire completion. Because data was not identifiable, it could not be removed once obtained. No data was obtained from medical records for this study.

Outcomes included:

1. Proportion of dialysis patients currently driving
2. Proportion of driving patients who responded positively to the following in the first questionnaire:
    a. Dizziness post dialysis
    b. Syncope or loss of consciousness post dialysis
    c. Leg weakness or numbness
    d. Fatigue post dialysis (if identified as a common problem in response to question 11)
    e. Hypoglycaemic episodes
    f. Falling asleep while driving
    g. Collision related to dialysis
    h. Alcohol consumption greater than two standard drinks per day
3. Proportion of driving patients who responded positively to one or more statements in the second questionnaire
4. At-risk prevalence in haemodialysis compared to peritoneal dialysis patients
5. Proportion of driving patients with voluntary VicRoads notifications

An at-risk driver was defined by any positive response to either the second or third outcome.

The study protocol was reviewed and approved by the Austin Health Human Research Ethics Committee (HREC/18/Austin/94). All investigators had current Good Clinical Practice certification.

Statistical analysis was performed using Stata IC 15 statistical software (StataCorp, College Station, TX, USA). Frequencies were described as counts and proportions. A negative response was substituted for missing data for question 32 in Questionnaire 1 (Do you think there was any relationship between dialysis and any collision you have had?), if it was preceded by a negative response to question 30 in Questionnaire 1 (Have you had any collisions since starting dialysis?). For dichotomous at-risk analysis, participants were established to be at-risk as per the second outcome (positive response to any one of the eight pre-determined criteria in Questionnaire 1: dizziness post dialysis, syncope or loss of consciousness post dialysis, leg weakness or numbness, fatigue post dialysis, hypoglycaemic episodes, falling asleep while driving, collision related to dialysis, alcohol consumption greater than two standard drinks per day) and/or as per the third outcome (positive response to one or more statements in Questionnaire 2). The agreement between Questionnaire 1 and Questionnaire 2 for dichotomous at-risk status was estimated using Cohen's kappa, with values for agreement as follows: <0.0 poor, 0.01-0.20 slight, 0.21-0.40 fair, 0.41-0.60 moderate, 0.61-0.80 substantial and >0.81 almost perfect agreement.

Results

221 patients were receiving dialysis through Austin Health during the study period. Sixteen (7.2%) patients were incapable of consent, 28 (12.7%) had never driven, and 78 (35.3%) declined to participate.

Of the total cohort, 99 (44.8%) patients participated in the study by completing the first questionnaire. With respect to the first outcome, 76 (76.8%) of these 99 patients were driving, and therefore also completed the second questionnaire. Characteristics and demographic details of the study participants are shown in table 1. Most respondents (69.7%) were male, with a mean age of 62.7 years (standard deviation (SD) 14.9 years). The youngest respondent was 31 years old and the oldest was 87 years old, and both were current drivers. Drivers were on average five years younger than non-drivers, with a

mean age of 61.6 years (SD 14.6 years) versus 66.4 years (SD 15.7 years) respectively. The median time on dialysis was three years (interquartile range (IQR) 1.5 – 6.5 years) for all participants, and 2.5 years (IQR 1.3 – 6 years) for driving participants. Just over 60% of patients were receiving facility haemodialysis (combined satellite and in-centre), with 19.2% and 17.2% receiving peritoneal dialysis and home haemodialysis respectively. One individual was receiving a hybrid treatment combining in-centre haemodialysis and nocturnal peritoneal dialysis. Of the haemodialysis respondents, 45 of 62 (72.6%) were currently driving, whereas 16 (84.2%) peritoneal dialysis and 15 (88.2%) home haemodialysis respondents were currently driving. Thirty-one (41.3%) drivers had diabetes, 16 (21.6%) had sleep apnoea, and 11 (15.5%) reported taking sedative medications.

Questionnaire responses defining at-risk drivers as detailed in the second outcome are presented in table 2. The four most common positive responses were dizziness post dialysis (39.2%), leg weakness or numbness (26.7%), falling asleep while driving (17.6%) and hypoglycaemic episodes (17.3%). The proportion of those positive responses accounted for by haemodialysis patients are represented in figure 1. A total of 72.4% (n=55) of respondents met the second outcome criteria for an at-risk driver.

Figure 1 also depicts the number (n=29) of patients meeting the definition of an at-risk driver as described in the third outcome – responding yes to one or more statements in the second questionnaire; these 29 patients comprised 38.2% of the total driving cohort. As also shown in figure 1, 79.3% (23/29) of these patients were on haemodialysis, with the remainder on peritoneal dialysis. The number of positive responses to each statement in Questionnaire 2 is shown in figure 2.

Seventeen (58.6%) of 29 at-risk drivers per Questionnaire 2 responded yes to more than one statement, with two participants answering yes to more than six statements. In contrast, 45 of 55 (81.8%) at-risk drivers per Questionnaire 1 responded yes to only one or two statements. The total number of positive responses per patient in each questionnaire is shown in figure 3.

In addition to answering positively to criteria that defined at-risk drivers, 9 (11.8%) patients reported fainting after dialysis, 10 (13.2%) reported feeling as though dialysis had affected their ability to drive, and 16 (21.9%) patients had been involved in collisions since commencing dialysis. Fourteen of 76 (18.4%) drivers had notified VicRoads of a chronic medical condition, 11 of whom had a diagnosis of diabetes.

Overall, 58 of 76 drivers (76.3%) met at least one criterion for risk of driving impairment, according to either the objective or subjective questionnaire. Analysis of the agreement between the two questionnaires demonstrated the presence of slight agreement (Cohen's kappa 0.20), owing to a large number of at-risk drivers as per Questionnaire 1 not also being identified as at risk by Questionnaire 2 (table 3).

Discussion

We found 76 of the 99 respondents (76.8%) in our dialysis cohort were driving and based on our pre-determined definition of an at-risk driver, over 75% (58/76) fell into this category. A high proportion (11.8%) of patients reported fainting after dialysis, with an even higher proportion (17.6%) confirming they had difficulty staying awake whilst driving.

Interestingly, 31 drivers reported a diagnosis of diabetes, but only 11 had reported to VicRoads. The current Assessing Fitness to Drive Guideline indicates drivers must report in general any long-term or permanent injury or illness that may affect their ability to drive safely,[1] but does not specify conditions that are individually reportable. However, it does specify conditions that render a person unfit to hold an unconditional private driver's licence, such as diabetes with end-organ complications that may affect driving, as one relevant example.[1] It is likely that there was significant under-reporting to VicRoads, not only in the context of diabetes, but also with respect to other chronic medical conditions.

In 2018 in Victoria, 16,627 adult drivers were involved in 10,244 crashes that resulted in injury or death, as reported to Victoria Police; 213 fatalities were recorded.[21] The Victorian population consisted of 5,060,474 people aged 18 years or older as at 30 June 2018,[22] which equates to 0.33% of the adult population having involvement in a serious collision as a driver in 2018. In our study, 21.9% of patients reported involvement in collisions since commencing dialysis. This is a far higher proportion than reported in the Victorian general population data, despite the limitations of drawing comparisons between these datasets. Regardless, only 13.2% of study participants felt that dialysis had affected their ability to drive, suggesting a discrepancy between objective markers of risk and subjective self-perception of safety. Indeed, whilst 72.4% of drivers were determined to be at risk of driving impairment as per Questionnaire 1, only 38.2% of drivers were deemed to be at risk according to Questionnaire 2. The definition of an at-risk driver per Questionnaire 1 was broad, particularly given the inclusion of post dialysis fatigue as a criterion, which could contribute to the high detection rate. Nevertheless, the questionnaires clearly cannot be used interchangeably to determine risk of driving impairment.

No studies have shown a causal relationship between dialysis and driving impairment or motor vehicle collisions. This may reflect a lack of appropriate studies, since there is no prospective study tracking driving performance from dialysis commencement compared to an age-matched group from the general population. The literature is similarly limited with respect to the issue of driving impairment in dialysis patients.

A similar study to this one was undertaken by Vats and Duffy, who found that 56% of 186 dialysis patients in six dialysis units in Wisconsin were currently driving, and just under 5% of patients had a history of falling asleep at the wheel.[3] Fifteen patients were at absolute risk for unsafe driving due to a history of fainting during driving or falling asleep at the wheel; 136 patients were at relative risk for unsafe driving due to a history of sleep apnoea, loud snoring, weakness prior to dialysis or episodes of hypoglycaemia.[3] In addition, although 79 of 92 currently driving dialysis patients felt comfortable with

driving, 29% had had motor vehicle collisions after the initiation of dialysis.[3] 60 subjects reported feeling uncomfortable driving, 25 of whom were still driving despite this, and 7 of whom were at absolute risk for driving impairment.[3]

Varela et al went on in 2015 to determine the utility of the "Am I A Safe Driver?" checklist in detecting dialysis patients at risk for driving impairment, by surveying 106 dialysis patients from four centres in Texas.[19] Nearly 10% of patients reported they were not comfortable with their ability to drive, 18% reported that dialysis had affected their driving, and nearly 15% had been involved in at least one motor vehicle collision whilst on dialysis.[19] Overall, 30% of patients were categorised as at risk for driving impairment.[19] Answering yes to at least two statements in the "Am I A Safe Driver?" checklist was found to have the highest combined sensitivity (84%) and specificity (58%) in detecting those at risk of driving impairment, although it was acknowledged that the checklist did have poor specificity overall, and was more useful for ruling out driving impairment.[19]

Both published studies were preliminary and cross sectional and carried out in a few dialysis centres in two American states. To our knowledge, no similar studies have been performed in Australian dialysis units. Whilst the overall rate of patients involved in collisions since commencing dialysis was similar across these three studies, there was a much greater proportion of patients falling asleep while driving (18% vs <3%) in the current cohort compared to that of Varela et al.[19]

In consideration of the broader context of transportation for dialysis patients, it is prudent to acknowledge the difficulties some patients have in attending treatments, especially if they do not drive. In a survey-based study by Smith in 2015, 77% of Australian dialysis units reported inadequate transport access, with 12% of patients experiencing perpetually unresolved transport problems.[23] 46% of dialysis units were concerned about the lack of subsidised transport for regional and rural patients, but few had detailed knowledge of the costs involved with providing transport.[23] An Australian consumer perspectives survey in 2012 reported 71% of patients chose a satellite dialysis centre because of its

proximity to their home, and 41% of peritoneal dialysis patients chose the modality because of the reduced travel involved.[24] In addition, our study did not examine general driving risk, as compared to the specific situation of driving after a dialysis session; these circumstances may not be equivalent, and factors contributing to the risk of driving impairment may differ, such as fixed comorbidities in general versus dialysis-specific elements. These insights have important implications for our study and more generally; patients may have restricted their questionnaire responses and similarly, not disclosed their chronic medical conditions to VicRoads, for fear of creating or exacerbating transport difficulties. Our study primarily sought to establish the risk of driving impairment in dialysis patients, but the issue of poor access to alternative transport options is closely related and may actually contribute to patients continuing to drive despite the risk.

This study has several limitations. The voluntary nature of the study introduced selection bias, as drivers who may have been at much higher or lower risk were potentially excluded from analysis. The self-reporting method of data collection confers a risk of recall bias. The questionnaire was conducted in the English language only, which could have affected participation and responses from those with other primary languages. Questionnaire responses could have been influenced by patients' concern regarding any impact on their ability to hold a driver licence. The single centre aspect of the study limits its generalisability to other cohorts. The "Am I A Safe Driver" checklist has not been validated in any population, hence its utility in our cohort is uncertain. Finally, determination of driving risk in this study was based on signs and symptoms of medical conditions and historical driving behaviours. There may be a role for driving simulators, if these were to become more widely available. Practical, behind-the-wheel assessments could also be helpful, although they cannot reliably assess responses to sudden challenges or crisis situations.

Conclusion

In conclusion, this study provides evidence that dialysis patients have a high rate of motor vehicle collisions and are at risk of driving impairment, using self-reported objective and subjective

questionnaire-based indicators. There was, however, a discrepancy between the patients' perceptions and the objective markers of risk, as evidenced by disparate responses to the two questionnaires, and under-reporting of medical conditions to the licensing authority. CKD and ESKD are capable of adversely affecting driving fitness, and prospective studies may help to support the development of guidelines to assist clinicians and licensing bodies in this difficult area of medical practice.

Acronyms

CKD – chronic kidney disease

ESKD – end stage kidney disease

HREC – human research ethics committee

SD – standard deviation

IQR – interquartile range

LOC – loss of consciousness

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FIGURE LEGENDS

Figure 1. Questionnaire responses defining at-risk drivers and attributable proportions of haemodialysis patients. LOC, loss of consciousness. std, standard. Q2, Questionnaire 2. (■), all respondents; (■), haemodialysis respondents.

Figure 2. Number of respondents answering positively to each statement in Questionnaire 2.

Figure 3. Distribution of the total number of positive responses per patient to statements in each questionnaire. (■), Questionnaire 1 respondents, n = 55; (■), Questionnaire 2 respondents, n = 29.

	All	Drivers
	N=99	N=76

Male (n, %)	69 (69.7)	59 (77.6)
Age (mean, years)	62.7 (SD 14.9, range 31 – 87)	61.6 (SD 14.6, range 31-87)
Dialysis vintage (median, years)	3 (IQR 1.5 – 6.5)	2.5 (IQR 1.3 – 6)
Haemodialysis (satellite and in-centre) (n, %)	62 (62.6)	45 (59.2)
Peritoneal dialysis (n, %)	19 (19.2)	16 (21.0)
Home haemodialysis (n, %)	17 (17.2)	15 (19.7)
Hybrid dialysis (n, %)	1 (1.0)	0 (0)
Dialysis ultrafiltration volume (median, litres)	2.2 (IQR 1.5-2.8)	2.2 (IQR 1.5 – 2.8)

SD, standard deviation. IQR, interquartile range.

TABLES

Table 1. Characteristics and demographics of study participants

Table 2. Questionnaire 1 responses defining at-risk drivers

	Positive response (n, %)	Haemodialysis (n, %)

	N=76	N=60
Dizziness post dialysis	29 (39.2)	28 (46.7)
Syncope or loss of consciousness post dialysis	9 (12.0)	9 (15.0)
Leg weakness or numbness	20 (26.7)	15 (25.0)
Fatigue post dialysis	12 (16.2)	12 (20.0)
Hypoglycaemic episodes	13 (17.3)	9 (15.0)
Falling asleep while driving	13 (17.6)	11 (18.3)
Collision related to dialysis	0 (0)	0 (0)
Alcohol consumption > 2 standard drinks per day	5 (6.8)	2 (3.3)

Table 3. Agreement between questionnaires

QUESTIONNAIRE 1	QUESTIONNAIRE 2		TOTAL (n, %)
	Not at risk (n)	At risk (n)	
Not at risk (n)	15	3	18 (25.7)
At risk (n)	**28** †	24	52 (74.3)
TOTAL (n, %)	43 (61.4)	27 (38.6)	70 ‡

† Over half (n=28, 53.8%) of the participants determined to be at risk according to Questionnaire 1, were not deemed to be at risk according to Questionnaire 2

‡ Total participants = 70 due to missing data

APPENDIX A

Questionnaire 1: Dialysis Specific

This is the first of two questionnaires to be answered by participants in this study. It is designed to study current driving status, age, gender, dialysis details, dialysis side effects, medical history, driving and collision history. Please complete as fully as possible whether you currently drive or not.

Question	**Responses**
1. Do you drive?	☐ Yes ☐ No
2. If no, specify why you stopped	
3. If no, specify date you stopped	
4. What is your age?	
5. What is your gender?	☐ Male ☐ Female
6. Today's date	
7. What kind of dialysis do you do?	☐ Satellite Haemodialysis ☐ Peritoneal dialysis ☐Home Haemodialysis
8. What is your dialysis schedule?	How many hours? What days?
9. How long have you been on dialysis?	
10. How much fluid is usually removed?	
11. Are there any common problems for you after dialysis? Please specify	
Medical History	
12. Do you feel dizzy after dialysis?	☐Often ☐ Rarely ☐ No
13. Have you ever fainted or become unconscious after dialysis?	☐Often ☐ Rarely ☐ No
14. If yes, when was the last time?	
15. Do you have diabetes?	☐ Yes ☐ No
16. Do you experience low blood sugar levels?	☐ Yes ☐ No
17. Do you experience loud snoring? (reported by sleeping partner)	☐ Yes ☐ No

18. Do you have sleep apnoea?	☐ Yes ☐ No
19. Do you ever feel very tired or struggle to stay awake while you are driving?	☐ Yes ☐ Rarely ☐ No
20. Do you have any problems with weakness or numbness in your legs?	☐ Yes ☐ No
21. Do you have any problems with your vision?	☐ Yes ☐ No Specify:
22. Have you had any fits, faints or funny turns in the past year?	☐ Yes ☐ No
23. Do you take any medication that makes you drowsy? If yes, what medication?	☐ Yes ☐ No
24. Do you drink alcohol? If yes how many standard drinks per day?	☐ Yes ☐ No
Driving	
25. Do you drive to and from dialysis?	☐ Yes ☐ No
26. How many years have you been driving?	
27. Does dialysis affect your driving? If so, how?	☐ Yes ☐ No
When was your last collision? [yyyy]	
28. Was another vehicle involved? 29. Was another person involved?	☐ Yes ☐ No ☐ Yes ☐ No
30. Have you had any collisions since starting dialysis? 31. If yes, please specify years if possible	☐ Yes ☐ No
32. Do you think there was any relationship between dialysis and any collision you have had?	☐ Yes ☐ No
33. Is VicRoads aware that you are on dialysis or have a chronic medical condition?	☐ Yes ☐ No

(Adapted from Vats et al Dialysis and Transplantation 2010 – Physician's Guide to Assessing and Counseling Older Drivers. American Medical Association/National Highway Traffic Safety Administration/U.S. Department of Transportation. June 2003)

Questionnaire 2: Am I A Safe Driver?

This is the second of two questionnaires to be answered by participants in this study. It is designed to study how you feel about your driving. You only need to complete this if you are currently driving.

Instructions: Check the box if the statement applies to you
☐ I get lost while driving
☐ My friends and family members say they are worried about my driving
☐ Other cars seem to appear out of nowhere
☐ I have trouble seeing signs in time to respond to them
☐ Other drivers drive too fast
☐ Other drivers often honk me
☐ Driving stresses me out
☐ After driving, I feel tired
☐ I have had more "near misses" lately
☐ Busy intersections bother me
☐ Right-hand turns make me nervous
☐ The glare from oncoming headlights bothers me
☐ My medication makes me dizzy or drowsy
☐ I have trouble turning the steering wheel
☐ I have trouble looking over my shoulder when I reverse
☐ I have been stopped by the police for my driving recently
☐ People will no longer accept rides from me
☐ I don't like to drive at night
☐ I have more trouble parking lately
☐ I am not allowed to drive my grandchildren
If you have checked any of the boxes, your safety may be at risk when you drive. Talk to your doctor about ways to improve your safety when you drive.

(Adapted from Vats et al Dialysis and Transplantation 2010 – Physician's Guide to Assessing and Counseling Older Drivers. American Medical Association/National Highway Traffic Safety Administration/U.S. Department of Transportation. June 2003)

ABSTRACT

Background

Driving is a complex task requiring multiple cognitive domains and the musculoskeletal system. Cognitive dysfunction is associated with driving impairment. Dialysis patients are known to have a high prevalence of cognitive impairment and other comorbidities, and may be at risk of driving impairment. No Australian guidelines address driving safety in dialysis patients.

Aims

To estimate the proportion of dialysis patients who were driving and those at risk of driving impairment, and to investigate the agreement between objective and subjective markers of risk.

Methods

This single centre study involved dialysis patients voluntarily completing two questionnaires relating to risk of driving impairment; the first questionnaire focused on objective markers, and the second questionnaire focused on subjective markers. Risk of driving impairment was established using pre-determined criteria, and the agreement between objective and subjective markers was estimated using Cohen's kappa.

Results

44.8% (99/221) of patients participated; 76.8% (76/99) of participants were driving, and 76.3% (58/76) of drivers were at risk of driving impairment. Factors associated with at-risk driving included post dialysis dizziness, leg weakness or numbness, falling asleep whilst driving, and hypoglycaemia. Sixteen patients reported collisions since commencing dialysis. The questionnaires displayed slight agreement (Cohen's kappa = 0.20) between objective and subjective markers.

Conclusions

Dialysis patients are at risk of driving impairment based on self-reported questionnaire responses. Discrepancies between patients' perceptions and objective markers were apparent. Further research into appropriate risk assessments, as well as development of guidelines to aid in determining driving safety in dialysis patients, is needed.

KEY WORDS

Automobile Driving

Renal Dialysis

Patient Safety

Accidents, Traffic

Surveys and Questionnaires

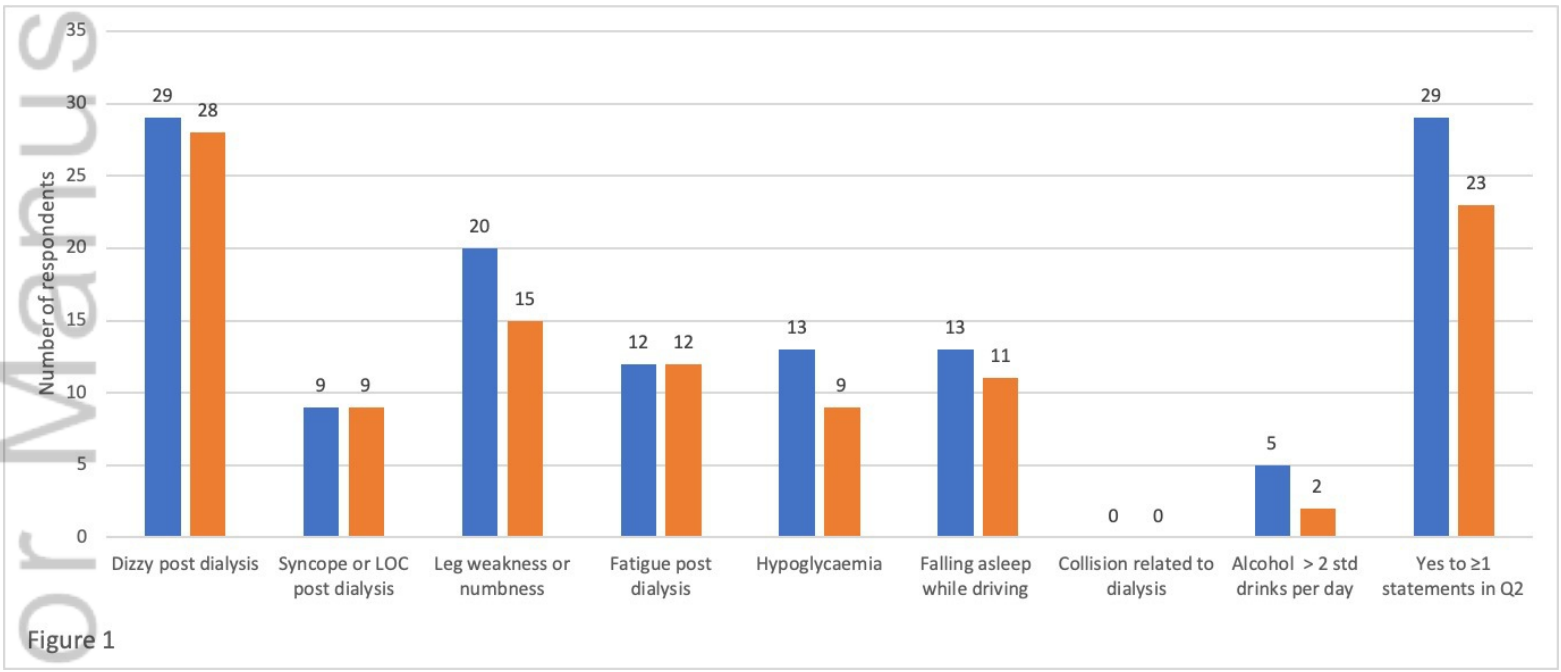

Figure 1

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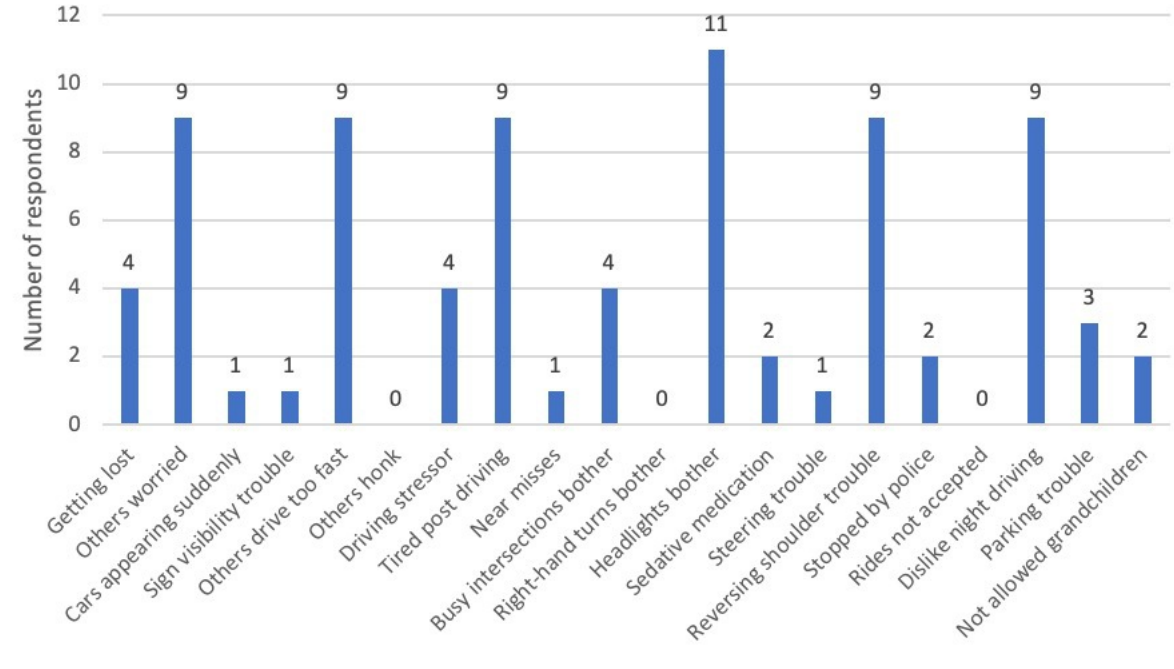

Figure 2

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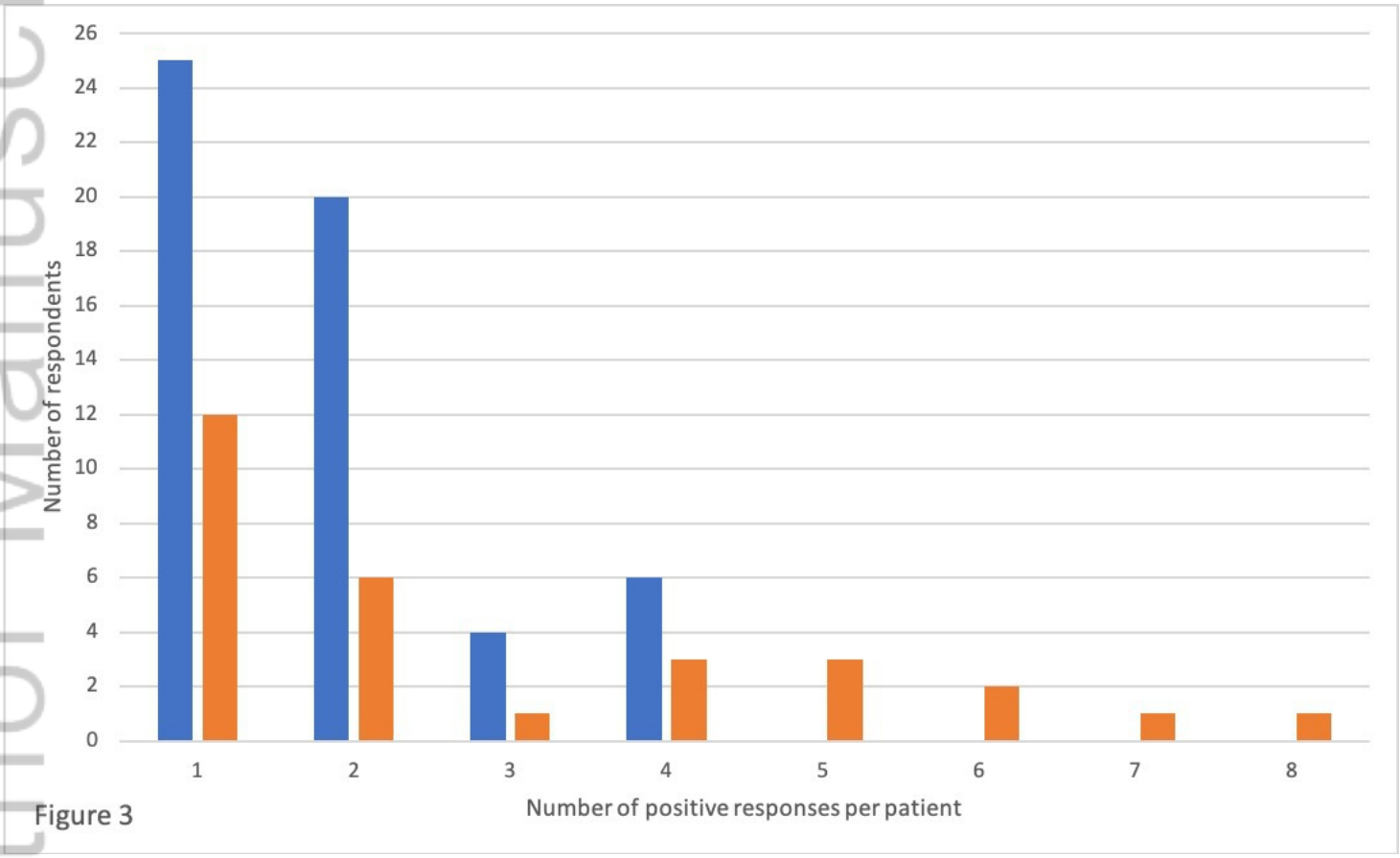

Figure 3

IMJ_15198_Driving Paper IMJ_Figure3.jpg

TITLE

DIALYSIS AND DRIVING: AN ANONYMOUS SURVEY OF PATIENTS RECEIVING DIALYSIS FOR END STAGE KIDNEY DISEASE

AUTHORS

Alison Graver
Positions at time of submission: Nephrologist, Austin Health; PhD student, Department of Medicine (Austin Health), Melbourne Medical School, University of Melbourne
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health
Contribution to the paper: data collection and analysis, drafting and revision of the manuscript

Natasha Cook
Positions at time of submission: Nephrologist and General Physician, Austin Health
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health
Contribution to the paper: principal investigator, study design and development, data collection and analysis, drafting and revision of the manuscript

Morris Odell
Positions at time of submission: Retired. Formerly Head of Clinical Forensic Medicine, Victorian Institute of Forensic Medicine; Adjunct Associate Professor of Forensic Medicine, Monash University
Institutional affiliations at which the work was carried out: Victorian Institute of Forensic Medicine
Contribution to the paper: study development, manuscript revision

Leonid Churilov
Positions at time of submission: Professor of Biostatistics, University of Melbourne
Institutional affiliations at which the work was carried out: Department of Medicine (Austin Health), Melbourne Medical School, University of Melbourne
Contribution to the paper: data analysis, manuscript revision

David Anthony Power
Positions at time of submission: Director of Nephrology, Austin Health; Professor of Nephrology, University of Melbourne
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health; Department of Medicine (Austin Health), Melbourne Medical School, University of Melbourne; Kidney Laboratory, Institute for Breathing and Sleep, Austin Health
Contribution to the paper: study development, manuscript revision

Peter Francis Mount
Positions at time of submission: Deputy Director of Nephrology, Austin Health; Clinical Associate Professor, University of Melbourne
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health; Department of Medicine (Austin Health), Melbourne Medical School, University of Melbourne; Kidney Laboratory, Institute for Breathing and Sleep, Austin Health
Contribution to the paper: study development, manuscript revision

Matthew RP Davies
Positions at time of submission: Nephrologist and General Physician, Austin Health
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health
Contribution to the paper: data collection, manuscript revision

Suet-Wan Choy
Positions at time of submission: Nephrologist and General Physician, Austin Health
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health
Contribution to the paper: manuscript revision

Kathy Paizis
Positions at time of submission: Nephrologist, Austin Health
Institutional affiliations at which the work was carried out: Department of Nephrology, Austin Health
Contribution to the paper: manuscript revision

CORRESPONDING AUTHOR
Alison Graver

Post: Department of Nephrology, Austin Health
145 Studley Road
Heidelberg
Victoria
Australia 3079

Email: ali.graver@austin.org.au

Telephone: +61 438 564 581

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