

Determining driving safety for palliative care patients: a literature review based on systematic principles

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Introduction

Driving a motor vehicle is a complex activity that requires different skills, such as physical abilities, proper judgment, perception and response time.[1]. In the UK for the year ending June 2013, there were 185,540 reported road injuries, with 23,530 people being killed or seriously injured (Department of Transport 2013).

When advising on driving safety, it is the duty of the healthcare professional to consider the patient's illness itself, the symptoms burden and the medication that may influence their neuropsychological state.

In palliative care there is understandable concern about patients when it comes to driving. Not only can they have debilitating incurable illness and other comorbidities but their symptoms may be managed with opioid, neuroleptic and sedative medications.

There is already much published driving literature on patients with dementia, Parkinson's, stroke, hepatic encephalopathy and traumatic brain injury.

In practice, the consensus among occupational therapists is that a combination of neurocognitive and behind the wheel testing is the preferred method of assessing driving ability in patients with medical conditions. To date however, it is not known what kind of studies could be used to inform driving advice for patients who would be known to specialist palliative services.

Aim

To provide an overview of the quality of literature available that would apply to the palliative care patient group, specifically in relation to behind-the-wheel or simulated driving performance.

Method

A literature search was undertaken based on systematic principles.

This included

- Database searches
- Citation searching
- Grey literature
- Hand Searching
- Personal contact

Patients with cancer, cardiorespiratory disorders and neurological disorders were included.

Patients with dementia, Parkinson's, stroke, hepatic encephalopathy and traumatic brain injury were excluded because these populations do not represent the majority cared for by specialist palliative care.

Method contd...

Databases searched

- Ovid Medline 1950 to 22/5/17
- PsycINFO 1806 to 22/5/17
- Embase 1980 to 22/5/17
- CINAHL 1980 to 22/5/17

Grey Literature

- OpenGrey database
- Rapid Response BMJ
- Caresearch.com.au
- Web of Science Database

Hand Searching

- Palliative Medicine (1987-2000)
- European Journal of Palliative Care (1994 - 2000)
- International Journal of Palliative Nursing (1995-1999)
- Journal of Palliative Care (1985-1994)

Citation searching of relevant articles using SCOPUS

Results

The search captured 22,673 articles. An additional 92 articles were obtained from citation and reference list searching.

Following removal of 5,750 duplicates, 17,015 articles were screened against the inclusion and exclusion criteria. 111 full text articles was examined after screening.

Nine articles met the inclusion criteria and were included in the review.

| Patient diagnosis | Number of studies |
|--------------------|-------------------|
| Multiple Sclerosis | 6 |
| Heart Failure | 1 |
| COPD | 1 |
| Cancer | 1 |

Table 1 – breakdown of included articles based on diagnosis

Three studies employed human driving instructor assessments while the remaining six used driving simulators.

All studies apart from Orth et al¹ employed some form of neurocognitive assessment. All nine of the studies were observational.

Overall the results for MS, heart failure, COPD and cancer patients demonstrated poorer behind the wheel or simulated assessment scores compared to norms. It was not possible to determine the diagnostic validity of the various neurocognitive tools for driving ability across the nine studies because of the differences in the assessment methods used.

Results contd...

Cancer patients

The cancer study by Yuen et al³ reported longer mean brake reaction times and steering variability however collision difference was not significant. Statistically significant correlations between neurocognitive tests and driving could not be determined due to the small heterogeneous sample size (n=10)

Cardiorespiratory disorders

Alosco et al's² study of heart failure patients showed significantly more simulated driving errors such as collisions, centerline crossings and missed stop signs compared to controls. It also demonstrated that poorer performance on some neurocognitive tests correlated with behind the wheel performance such as executive function and attention.

The study by Orth et al¹ demonstrated significantly more accidents than controls, but did not involve neurocognitive testing.

Neurodegenerative disorders

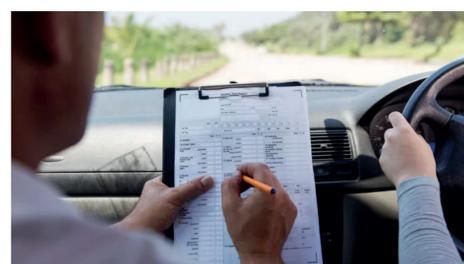


Fig 1 – behind the wheel testing with a driving instructor is considered part of the gold standard of driving assessment for many patient groups

All of the six multiple sclerosis studies were observational. Three of them^{4,7,8} used a behind the wheel assessment while the others employed a driving simulator^{5,6,9}. Three studies^{4,7,8} had a control group, the rest were compared to normative scores from the driving simulator software.

On the behind the wheel assessments, in Schultheis' study⁴ 12 of 64 MS (19%) patients failed the behind the wheel assessment, Akinwuntan⁷ found 10 of 44 (22%) to fail while 7 of 21 (33%) patients failed in Lincoln's study⁸.

In the simulated assessments, Kotterba⁵ found an increase in accident rates and concentration faults. Devos⁹ found no significant differences between MS patients and controls whereas Marcotte⁶ found greater deviation in lane position and poorer responsiveness on a simulated assessment in MS patients.

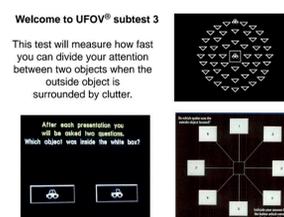


Fig 2 – The Useful Field of View Test. This is a test of visual attention and information processing and correlates strongly with driving performance in many patient groups.

Conclusion

This literature review based on systematic principles sought to find observational studies on behind the wheel or simulated driving performance for patients who would typically be known to palliative care services. Only nine articles were found after broadening the patient inclusion criteria to include non-malignant diagnoses. This reflects the paucity of studies which use this particular assessment method in these patient groups. There is a big need for more behind the wheel or simulated driving studies for patients with incurable life limiting illnesses to inform practice and policy.



Fig 3 – the STISIM driving simulator

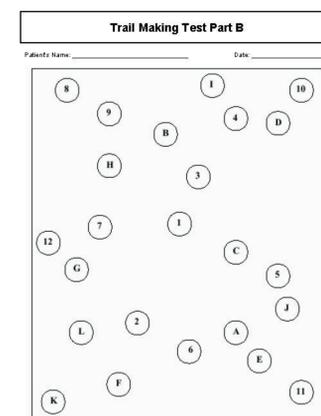


Fig 4 – The Trail Making test Part B. This is a neurocognitive test of cognitive flexibility and divided attention

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