

Australian drivers with disabilities using vehicle modifications: user demographics, human factors and road safety issues

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Abstract

Drivers with disabilities (DWDs) often rely on safe systems applications: safer vehicle-driver interfaces through vehicle modifications (VMs). VMs include alternative primary/secondary vehicle controls and access/egress enhancements. Little is known about Australian DWDs' or their use of VMs. This cohort study investigated DWDs using VMs via a survey which collected demographics, human factors and prescription practice data. Respondent DWDs (n= 97) were mostly older, experienced drivers using low technology VMs who relied on vehicle transportation for community access. Whilst most reported satisfaction with their VMs, breakdown, maintenance and safety concerns identified highlight potential impacts on road safety and the need for in-depth research.

Introduction and Aims

Drivers with disabilities (DWDs) may be considered vulnerable road users. Their driving independence often relies on application of the safe systems approach: optimising and creating safer vehicle-driver interfaces through vehicle modifications (VMs). VMs include alternative primary and secondary vehicle controls and access/egress enhancements. Little is known about DWDs' use of VMs, safety and human factors issues or impacts of independent vehicle transportation. Such information is required to improve risk management and expand the evidence base supporting rehabilitation and licensing/registration policy. Using an action research framework, a cohort study investigated, and captured the views of, DWDs using VMs including demographics, devices used, and opinions regarding independence benefits, safety concerns and VMs prescription practices.

Methods

A literature review, ergonomic and safe systems driving task analysis and project advisory group (including prescribers/suppliers, funding bodies, advocacy groups and DWDs) informed the descriptive cross sectional study design including the development and implementation of a self-completion anonymous survey. Disability, driving recency and exposure, plus VMs requirements formed key study eligibility criteria. Convenience sampling was augmented by survey promotion through several large DWD support groups. Descriptive statistics only are reported here.

Results

The study sample comprised 97 DWDs who were predominantly male (66%), aged 61+ years (64%), cohabitating (68%), metropolitan residents (72%) and rated physical health as good/very good (67%). Commonly, DWDs reported spinal (n=55) or polio (n=18) conditions resulting in leg paralysis (52%) or functional restrictions (27%). Almost all relied on wheelchair mobility (97%), reported driving as their preferred transport method (90%) and very difficult/impossible access to key destinations (employment, health and shopping services, etc.,) without independent vehicle transportation (59% – 81% for different destinations).

Just over half (n=49) reported having professional assessment/input into VMs choice. Some DWDs indicated they designed and built their own VMs. Respondents indicated that a wide range of mostly low technology VMs were used: hand controls to replace foot operated acceleration/brake pedals (n=64), aids to support one-handed steering wheel control (n=48), ramps/hoists enabling wheelchair accommodation/storage (n=26) and modified foot controls (n=23). Those DWDs using

primary control VMs had on average used them for 20+years. DWDs required different numbers of VMs: one (n=39), two (n=28) or three+ (n=26). The majority of DWDs were mostly/very satisfied with modifications used, however DWDs reported breakdown concerns (n=37), persistent safety (n=11) and maintenance (n=13) issues potentially impacting on road safety. Prescription practice issues raised included: seeking professional advice, opportunity to trial VMs and talking with DWDs already using similar devices.

Discussion and implications

An increase in the ageing driver population, improvements in health and demands for personal driving independence despite physical disability will lead to more DWDs in the future. Older, experienced DWDs who were the subject of our study rely heavily on independent vehicle transportation to provide access to key services. Whilst many drivers were happy with and received professional help regarding VMs prescription, not all accessed such services. Road safety concerns identified highlight the need for further in-depth investigation related to the nature of initial and ongoing driver assessment and VMs maintenance and viability. This is required to optimise human-control-interface “fit” in the context of changing disability needs and innovations in both vehicle and VMs technology. This first study of Australian DWDs using VMs will impact on the evidence base required to support safety related initiatives for this road user group.

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