

The Road to Recovery for Vulnerable Road Users Hospitalised for Orthopaedic Injury

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Abstract

Vulnerable road users are susceptible to sustaining series injury that can lead to life-long consequences. This study aimed to compare three vulnerable road user groups for health-related quality of life, return to work status and level of function at 6- and 12-months post-injury. The Victorian Orthopaedic Trauma Outcomes Registry comprised 6,186 patients who sustained orthopaedic trauma as a pedestrian, cyclist or motorcycle rider in Victoria from 2009 to 2016. Distinct differences in demographics and recovery outcomes between the groups were found. This research has implications for targeting treatment towards individuals at risk of a poor recovery after orthopaedic transport injury.

Background

Pedestrians, cyclists and motorcycle riders are vulnerable road users who comprise more than half of all global road transport fatalities (World Health Organisation, 2018) and are more susceptible to serious injury. Little is known about the mental and physical health outcomes of vulnerable road user groups after transport injury as road users included in outcome studies to date are rarely considered separately, with pedestrians often combined with cyclists (Gabbe et al., 2017; Heron-Delaney, Warren & Kenardy., 2017; Kenardy et al., 2017). Consequently, the rate of recovery and improvements in health-related quality of life for different vulnerable road user groups after orthopaedic injury remains unclear.

Aims

The aim of the present study was to characterise and compare patient reported outcomes at 6- and 12-months post-injury for patients involved in an on-road collision as a pedestrian, pedal cyclist or motorcycle rider.

Method

A registry-based cohort study was conducted using data from the Victorian Orthopaedic Trauma Registry of patients admitted to four major hospitals in Victoria, Australia for orthopaedic injury following an on-road collision that occurred between January 2009 and December 2016. Patient demographics, major trauma status, injury type, pre-existing conditions, pre-injury work status, highest level of education completed, funding source and patient reported outcomes were extracted from the registry. The three outcome measures collected at six- and 12-months post-injury comprised health-related quality of life (3-level EuroQol 5 dimensions questionnaire (EQ-5D-3L)), functional recovery (Glasgow Outcome Scale-Extended (GOS-E)) (Dolan, 1997) and return to work status.

Results

There were 8,528 patients admitted to participating hospitals during the eight-year period. Of these patients, 6,186 sustained their orthopaedic injury on a road, street or highway. Most patients were motorcycle riders (42.8%) followed by pedal cyclists (32.6%) and pedestrians (24.6%). Difficulties with usual activities were the most prevalent item reported at 6-months post-injury reported by 73% of pedestrians, 67% of motorcycle riders and 44% of pedal cyclists. A higher proportion of motorcycle riders (63%) and pedestrians (66%) reported problems with pain at 12 months compared to pedal cyclists (33%). The prevalence of reported problems with anxiety/depression remained unchanged from 6 and 12-months for pedestrians, motorcycle riders, and pedal cyclists with 50% of pedestrians reporting problems compared to 38% of motorcycle riders and 20% of pedal cyclists. Multivariable linear and logistic regression models revealed that an average pedal cyclist had a reduced odds of reporting problems across all EQ-5D-3L quality of life domains compared to an average pedestrian and motorcycle rider. Compared to the average pedestrian, the average motorcycle rider had a lower adjusted odds of problems with anxiety/depression at 6 and 12 months post-injury (AOR = 0.75; 95% CI: 0.65 to 0.86).

Conclusion

Our analyses showed that firstly pedal cyclists consistently demonstrated reduced odds of reporting problems across all domains compared to pedestrians. Second, of particular concern is that the prevalence of individuals who reported problems with depression/anxiety remained stable from 6- to 12-months post-injury for both motorcycle riders and pedestrians. Given that 50% of pedestrians reported problems with mental health at 12-months post-injury further research is required to understand the barriers to recovery and to target rehabilitation and trauma care towards individuals who need it the most.

References

- Dolan, P. (1997). Modeling valuations for EuroQol health states. *Medical Care*, 1095-1108.
- Gabbe, B. J., Simpson, P. M., Cameron, P. A., Ponsford, J., Lyons, R. A., Collie, A., . . . Braaf, S. (2017). Long-term health status and trajectories of seriously injured patients: A population-based longitudinal study. *PLoS medicine*, 14(7), e1002322.
- Heron-Delaney, M., Warren, J., & Kenardy, J. A. (2017). Predictors of non-return to work 2 years post-injury in road traffic crash survivors: Results from the UQ SuPPORT study. *Injury*, 48(6), 1120-1128. doi:10.1016/j.injury.2017.03.012
- Kenardy, J., Heron-Delaney, M., Hendrikz, J., Warren, J., Edmed, S. L., & Brown, E. (2017). Recovery trajectories for long-term health-related quality of life following a road traffic crash injury: Results from the UQ SuPPORT study. *Journal of Affective Disorders*, 214, 8-14. doi:https://doi.org/10.1016/j.jad.2017.02.031
- World Health Organization. (2018). Global status report on road safety 2018. World Health Organization.