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## Longitudinal Assessment of Quality of Life and Its Change in Relation to Motor Vehicle Crashes: The SUN (Seguimiento Universidad de Navarra) Cohort

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**Background:** Despite the prevailing notion that injury victims are healthy subjects, there is scarce evidence on their preinjury health status, particularly for motor vehicle crash (MVC) victims, where changes between their preinjury health status (or age- and sex-adjusted standards) have seldom been compared with their postinjury status.

**Methods:** This longitudinal study recorded pre-event self-reported health status (as measured by Short Form-36 scores) of cohort participants who were followed up for 4 years. Differences at the beginning and the end of follow-up as well as differences in Short Form-36 scores changes over time were compared according to the occurrence of a MVC during that time.

**Results:** From 3,361 participants included for analysis, 64 had an incident MVC. At baseline, those participants who would not have subsequently a MVC had better health than those who would have it. In addition, those who reported being in a crash lost more health after the crash than their noncrash counterparts, although these differences were only seen in adjusted analyses. Adjusted analyses showed a significantly greater worsening of health in MVC victims, particularly in regards to role physical (adjusted difference in 4 years change,  $-7.7$ ; 95% CI,  $-13.6$  to  $-1.9$ ), bodily pain ( $-5.9$ ; 95% CI,  $-11.4$  to  $-0.3$ ), and role emotional ( $-6.2$ ; 95% CI,  $-12.5$  to  $-0.02$ ).

**Conclusions:** In this cohort, participants who eventually suffered a crash had a worse health status before their MVC than those who did not suffer a MVC. They lost even further health after the injurious event. These findings bear particular relevance when assessing the burden of disease, or when conducting effectiveness evaluation studies at the individual and population level.

**Key Words:** Injury, Motor vehicle crash, Quality of life, SF-36.

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The effect of motor vehicle crash (MVC) injuries on the health status of patients and populations has been previously described mostly in terms of the impact on mortality

and health services use, as in for example, hospitalization events.<sup>1</sup> Impact on health-related quality of life (HRQL) among nonfatal victims has also been investigated, and a number of studies have reported that injured patients exhibit worse health than their noninjured counterparts. We have conducted a longitudinal study to assess health status before and after a MVC to compare values before and after the event within subjects who had a MVC and between subjects who had and those who did not have a MVC. Previous publications have reported on the impact of MVCs on general health. For example, McCarthy et al. used a retrospective study to compare Short Form (36) Health Survey (SF-36) scores of 233 women between the ages of 16 years to 44 years with pelvic fracture, lower extremity fracture, or both (excluding those with Glasgow Coma Scale score  $<13$ ) with age-specific population norms. Mean time from injury at the time of the interview in the population was 6½ years. In 90% of these women, the mechanism of injury was a motor vehicle or motor cycle crash. The injured group significantly scored lower (meaning worse quality of life) on all SF-36 dimensions except for mental health. Average differences were greater for physical function, role limitations because of physical health, bodily pain, and general health.<sup>2</sup> MacKenzie et al. compared disabilities in exclusively MVC-injured patients with noninjured patients. Patients included were 18 years to 59 years of age. They found significantly worse scores in all SF-36 dimensions in the injured group except in vitality and mental health.<sup>3</sup> Sluys et al. compared SF-36 scores between trauma patients series aged 15 years or older with Injury Severity Score  $\geq 9$  at 5 years after injury with a sex- and age-matched reference group. They found significantly lower scores in the trauma group in all eight SF-36 dimensions.<sup>4</sup>

Ameratunga et al. conducted a case-control study. Cases were 218 car drivers sustaining nonfatal crashes. Outcomes at 5 months and 18 months were compared between these and a representative sample of 254 car drivers. Among the drivers reporting worsened health, SF-36 scores revealed greater reductions in physical health in those admitted after the crash, but these scores improved from 5 months to 18 months.<sup>5</sup> Fitzharris et al. followed up 62 patients at 2 months and 8 months after a MVC-related hospital admission. The results from the SF-36 indicated significant reductions in health status at 2 months and 8 months postcrash relative to

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in a MVC thereafter and that when those crashes occur their health status deteriorates even faster.

We did not assess injury severity in this cohort beyond the fact that, at least, the participant was on a work leave because of the MVC. However, our results show a global impact of MVCs in health.

In sum, the clinical relevance of this study is to know that (i) MVC-injured people are less healthy before the event than those who will not have a MVC, mainly in bodily pain, role emotional, and mental health, and (ii) after the MVC, they worsen more in role physical, bodily pain, and role emotional. This is particularly relevant in clinical settings because the current expectations for full recovery among young-injured individuals may be overestimating the health state that injured patients had before the event. The implications of our findings reach beyond the clinical world into the policy arena because the societal burden of injuries has been traditionally estimated considering the full-health state of injured individuals, and thus, some of the current burden estimates may indeed be overestimations.

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