Factors associated with non-return to work in the severely injured victims 3 years after a road accident: A prospective study

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ABSTRACT

Road accidents may impact victims' physical and/or mental health and socio-occupational life, particularly the capacity to return to work. The purpose of our study is to assess modifiable medical and socio-occupational factors of non-return to work in the severely injured 3 years after a road accident. Among 1,168 road accident casualties in the Rhône administrative Département of France followed for five years, 141 of the 222 severely injured (Maximal Abbreviated Injury Scale \( \geq 3 \)) aged more than 16 years who were in work at the time of the accident, reported whether they had returned to work in the 3 years following the accident. The subgroups of those who had (n = 113) and had not returned to work (n = 28) were compared for socio-occupational (gender, age, educational level, marital status, socio-occupational group) accident-related medical factors (type of road user, type of journey, responsibility in the accident, initial care) and post-accident medical factors (pain intensity, post-traumatic stress disorder, physical sequelae, quality of life) by using standardized tools. Severity of initial head, face and lower-limb injury, intense persistent pain, post-traumatic stress disorder, poor self-assessed quality of life and health status at 3 years were associated with non-return to work by univariate analysis. On multivariate analysis, severity of initial head and lower-limb injury, intense persistent pain at 3 years and post-traumatic stress disorder were significantly associated with non-return to work 3 years following severe road-accident injury. Post-traumatic stress disorder and chronic pain were essential modifiable medical determinants of non-return to work in the severely injured after a road accident: early adapted management could promote return to work in the severely injured. Improve early adapted treatment of pain and PTSD in the rehabilitation team should help the severely injured return to work following a road accident.

1. Introduction

Road injury designates an accident with at least 1 casualty, on a public thoroughfare, involving at least 1 vehicle. In 2015, there were 56,603 road accidents with injury in France, with 3,461 deaths and 70,802 injured, including 35,000 severely injured. Road accident depend on a range of road and traffic factors that interact with speed and also on the characteristics and behaviour of the drivers using the road, such as age, gender, drink-driving and seatbelt wearing (Fildes, 2013). Clear physical relationships lead to higher severity of injury outcomes as speed increases. Apart from the human cost for the individual victims, road accidents have an financial cost including medical and social expenditure for casualties and fatalities (Naumann et al., 2010; Wesson et al., 2011). Prolonged sick leave may have harmful consequences in the form of chronicity and socio-occupational exclusion (Fort et al., 2011). Road traffic accidents may cause psychological diseases. A prospective study of 1534 road-accident casualties aged 17–69 years with most minor injuries (61%), shows one-third of the respondents had at least one of the four psychosocial conditions (post-traumatic stress disorder, phobic travel anxiety, general anxiety, depression) at 3 months (36%) and 15% of subjects suffered PTSD at 1 year and 11% of subjects at 3 years (Mayou and Bryant, 2001, 2002).

Road accidents may also impact victims' physical socio-occupational life, particularly the capacity to return to work (Buitenhuis et al., 2009; Fitzharris et al., 2010). Accident-related traumatic injuries often require the form of chronicity and socio-occupational exclusion (Mayou and al. most road-accident casualties were working at 3 months (69%), at 1 year (73%) and at 3 years (75%) after the accident (Mayou et al., 2014).
and Bryant, 2001, 2002).

It has been shown that injury related factors (localization, severity, number of injuries) are major determinants of functional outcome (Holbrook et al., 1999; Vles et al., 2005). A substantial number of major traumas suffer from long term impairments, disabilities and handicaps particularly in severe lesions from head, spine and lower limbs (Currens, 2000). Furthermore, the relationship between the severe injuries and the difficult return to work has been established (Currens, 2000). Several studies investigated determinants of return to work after major trauma, and identified socio-occupational factors and medical factors (Gross et al., 2010; Clay et al., 2010). Physical impairment and pain were significantly associated with non-work disability after multiple trauma (Anke et al., 1997). Demographic and injury related factors and social functioning were significant predictors of return to work status after multiple severe injuries (Sobert et al., 2007). Few studies, focused on road-accident casualties (Fort et al., 2011; Hours et al., 2010). Improving the chances of return to work of the severely injured road-accident victims requires knowledge about determinants of non-return to work. The objective of the present study was to identify modifiable medical and socio-occupational risk factors for non-return to work in severely injured road-accident victims 3 years after the road accident.

2. Materials and methods

2.1. Selection of participants in the ESPARR cohort

The ESPARR study (Etude de Suivi d’une Population d’Accidentés de la Route dans le Rhône) monitors a prospective cohort of road accident casualties in order to study the short and medium term consequences of the accident. This cohort is a subpopulation of the Rhone Registry of road accident victims, which has been collecting almost exhaustive data on road accidents involving injury in the area since 1995 (Laumon et al., 1997) The inclusion period for the cohort was from October 1, 2004 to July 2006 (Hours et al., 2010). All road-accident casualties who sought medical care in public or private hospitals in the Rhône administrative area were eligible for inclusion (Hours et al., 2008). Inclusion criteria comprised:

- having had a road accident involving at least one mechanical means of transport;
- living and having had the accident in the Rhône administrative area (pop. 1.6 m);
- having survived the crash;
- and having been a patient in one of the area’s hospitals.

Only patients (or their family) who gave consent for follow-up were included in the cohort. Injured people (or a member of their family) were contacted by an interviewer during their stay for care at the hospital. In all, 1168 subjects aged 16 years over at the time of accident, agreed to participate in the project, forming the ESPARR cohort. Because of the large disproportion between casualties with mild-to-moderate injuries (90% of cases) and those with severe injuries, inclusion was stratified by maximum injury severity on the Abbreviated Injury Scale (AIS) (“Association for the Advancement of Automotive Medicine (AAAM). The Abbreviated Injury Scale” 1990; Hours et al., 2008). This classification standardizes injury data, scoring each lesion from one (minor) to six (fatal). The MAIS is the maximal AIS score sustained by a casualty. The objective was to recruit all accident victims with serious-to-critical injury (M-AIS ≥ 3), and to have half of the series with moderate injury (M-AIS 2) and one in six with minor injury (M-AIS 1). The NIHSS (New Injury Severity Score) is calculated as the sum of the squares of AIS scores for the casualty’s three most severe injuries, regardless of body region.

2.2. Study population

A total of 773 of the 1168 working subjects in the ESPARR cohort (age range 16–64 years) were in work at the time of their accident. Amongst the 773 subjects, 224 who had severe injury (M-AIS 3+), constituted the target population. Half of the participants had an educational level below school-leaving certificate (baccalauréat). At the time of the accident, three-quarters were working in the private sector, with permanent contracts.

2.3. Variables and measurement tools

To collect data on the accident and the previous familial, occupational and health situations, interviewers were present in the emergency units and ran face-to-face interviews with the victim (or family members) after patients have given informed consent (Hours et al., 2008, 2010). Participants were asked to fill out a 6-month follow-up self-administered questionnaire, sent by post, investigating their opinion of their overall state of health. In case of non-response, a telephone call was made to fill out the questionnaire with the patient. At 1 year and 3 years’ post-accident, a neuro-psycho-social check-up and medical consultation were offered to victims rated M-AIS ≥ 3 or with head lesions rated M-AIS ≥ 2 (moderate cranial trauma). A questionnaire was filled out with the patient during this consultation; other cohort members were sent the questionnaire by mail for self-administration. In case of postal non-response or refusal of consultation, telephone contact was made (Michaels et al., 2000).

The variables studied at inclusion and during the post-accident phase were of several types (Hours et al., 2010) Briefly, for this analysis, the following variables were used:

- sociodemographic at the time of accident: gender, age, educational level, marital status, socio-occupational group assessed by International Standard Classification of Occupations (ISCO-68);
- accident-related: type of road user, type of journey, responsibility in the accident self-assessed by the casualties (Hours et al., 2008);
- pre-accident diseases;
- initial care: M-AIS by body region (head, face, spine, thorax, abdomen, upper limbs, lower limbs) and New Injury Severity Score (NISS);
- physical sequelae self-assessed by the subjects, three years post-accident
- work-related: physically or psychologically tiring work self-assessed by the casualties, sick leave, and date of return;
- post-traumatic stress disorder (PTSD), assessed at 1 year post accident by a validated French translation of the Post-traumatic Stress Disorder Check-List scale (PSCL) (Ventureyra et al., 2002); scores equal to or greater than 44 indicate PTSD;
- Pain was evaluated at 3 years on a visual analogue scale from no pain (0 mm) to the maximal conceivable pain (100 mm).
- The perceived quality of life was assessed at 3 years on the World Health Organization Quality of Life Questionnaire-Brief Version (WHOQOL-Bref). This questionnaire has good psychometric properties and good validity (Skevington et al., 2004). It is composed of 26 questions: 2 independent items assessing quality of life and satisfaction with health, and 24 items exploring 4 dimensions (physical, psychological, social and environmental). Responses to each question are on a 5-point Likert scale, quantifying intensity (“not at all” to “extremely”), capacity (“not at all” to “completely”), frequency (“never” to “always”) or an assessment (“very dissatisfied” to “very satisfied” or “very poor” to “very good”). Responses are weighted by an algorithm to calculate “profile” scores. We used the transformed scale from 0 to 100. The highest is the score, the best is the quality of life.
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