Full length article

Quality of life following road traffic injury: A systematic literature review

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ARTICLE INFO

ABSTRACT

Purpose: To assess and provide a systematic overview of current knowledge about the relationship between quality of life (QoL) and road traffic injury, and to appraise how QoL is affected by road traffic injury.
Methods: A systematic review of the literature published since 1990 on QoL after a road traffic injury, including adult and paediatric populations, from three databases (Pubmed, PsychInfo and SafetyLit) was undertaken. The methodological quality was assessed according to the Newcastle-Ottawa Quality Assessment Scale.
Results: Thirty articles were included and assessed for quality. The QoL scores of those injured were similar to population norms at the first assessment, followed by a drop at the second assessment. An increase of QoL from the second to third assessment was reported, but participants never reached the population norms at the last follow-up (range six weeks to two years), with an exception of those claiming compensation and those with lower extremity fractures. Age, gender, socioeconomic status, injury severity, injury type and post-traumatic stress disorder were associated with reduced QoL.
Conclusions: Available literature regarding QoL among injured in road traffic crashes is heterogeneous with regard to aims and tools used for assessment. Our review confirmed that independent of measure, the overall QoL was significantly reduced after a road traffic injury compared to the general population norms. Persons who are older, of female gender, lower socioeconomic status, diagnosed with post-traumatic stress disorder, with more severe injuries or injuries to the lower limbs are more vulnerable to loss of QoL following road traffic injury compared to other patient groups injured in road traffic crashes.

Every year, 1.3 million people are killed and up to 50 million are injured in road traffic crashes (RTC) worldwide. RTCs are predicted to be the third leading cause of reduced health globally in 2020 (Murray and Lopez, 1997). In many high-income countries, the burden of road traffic injuries (RTI) has shifted from premature death to injury and disability with long-term consequences. This is the result of major reductions in road fatalities in concurrence with the increased likelihood of surviving serious crashes. The momentum gained by road safety efforts is in danger of being lost due to lack of knowledge regarding the long-term health of crash survivors. The consequences of injuries are often considered only in terms of the physical injury and the psychological aspects are neglected both in research and in health care. Therefore, quality of life (QoL) should be acknowledged as an important patient-reported outcome for crash survivors, as it has been for other patient groups (Higgins and Green, 2011; Perry et al., 2007; Sprangers, 2010). QoL is a multidimensional construct that considers the 'individual's perception of their position in life in the context of the culture value system in which they live and in relation to their goals, expectations, standards and concerns' (The WHOQOL Group, 1993).

With this in mind, the loss of QoL can, on an individual level, mean that the individual has lost their ability to live a fulfilled life, including the opportunity to return to work and a meaningful existence following an injury. In the European Union, the direct cost of injuries are estimated to 80 billion Euros each year, a sum that does not include the indirect costs of injuries, such as loss of productivity and rehabilitation (EuroSafe, 2013). To understand the burden of injuries it is therefore important to use a measure that captures the multidimensional aspect of long-term consequences following injury. QoL is particularly relevant in areas in which the impact of the injury is not directly measurable using traditional measures such as morbidity or mortality.

Even though several studies (Holbrook et al., 2001, 1999; Holbrook and Hoyt, 2004; Kiely et al., 2006; Rainer et al., 2014; Sluys et al., 2005; Ulvik et al., 2008) have reported a significant reduction in QoL following a traumatic injury, few studies have accounted for the cause of injury (e.g. road traffic injury, fire related injury, fall) in their analysis. According to psychological theories such as cognitive processing theory (Horowitz, 2011), the mechanism might have an impact on the QoL following injury. Therefore, there is need for more knowledge on

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QoL in relation to injuries following specific mechanism of injury, e.g. QoL following RTI. Thus, the aim of this review was to assess and provide a systematic overview of current knowledge about the relationship between QoL and RTI, and to appraise how QoL is affected by RTI.

1. Methods

1.1. Literature search

The PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) guidelines for systematic reviews were followed (Moher et al., 2009). The PRISMA guidelines consist of a checklist containing 27 items and a four-phase flow diagram, which ensures transparency and complete reporting of systematic reviews.

The literature search, completed in December 2016, comprised the electronic databases of PubMed, PsychInfo and SafetyLit using combinations of Quality of Life, Health related Quality of Life (HRQoL), road traffic crash, road traffic accident, motor vehicle accident, motor vehicle crash, collision, road traffic injury, minor injury, severe injury, long-term impairment and recovery of function as keywords. These keywords were combined with AND in all searches; and all nouns were searched both in singular and plural in all search combinations; e.g. quality of life AND road traffic accident AND severe injuries. Studies (both qualitative and quantitative) selected for review were limited to full text articles published in peer reviewed scientific journals no earlier than 1990; written in English; including QoL or HRQoL as an outcome post-RTI without restrictions of age; gender or type of road traffic crash. Case reports; dissertations and reviews were excluded. Moreover; we excluded original articles that reported QoL or HRQoL as an outcome of injury but did not differentiate on the cause of the injury. Two researchers read abstracts of each retrieved article to determine eligibility. Articles that were determined eligible were retrieved and read in full. An additional researcher was asked to read all the articles assessed as eligible in the first step to insure that only relevant articles were included in the final results of the review. Lists of references from each paper were searched for additional eligible articles; and appropriate articles abstracts were retrieved. Abstracts of these articles were read and if eligible full-text articles were retrieved and screened. Three reviewers with expertise in road traffic injury epidemiology and prevention as well as QoL studies made the assessments.

1.2. Data extraction

A data extraction form was developed and modified accordingly during the data extraction process. Data were extracted by one reviewer, followed by independent evaluation by two reviewers. Researchers reviewing the articles were not blinded to the names of the journals, names of the authors, the institution or results in the data extraction process. Data were extracted relating to the number and description of the study participants, study method, outcome and main findings of the study from all included articles.

1.3. Methodological quality

Two reviewers independently assessed the methodological quality with the Newcastle-Ottawa Quality Assessment Scale (NOS) (Wells et al., 2011). The quality assessment was made based on three major categories of the NOS: "Selection", "Comparability" and "Outcome". These categories were divided into further subcategories according to the NOS protocol (Wells et al., 2011). Subcategories included in the Selection category were: representativeness of cohort, selection of non-exposed cohort, ascertainment of exposure and demonstration that outcome was not present at the start of the study. The comparability category included only comparability of cohorts on the basis of the design or analysis, which included if the study controls for any

important factors. The outcome variable included assessment of outcome, duration of follow-up and adequacy of follow-up of the cohort. Each study was awarded a maximum of one star for each subcategory, except for comparability, which was awarded a maximum of two stars. For the outcome subcategory of duration of outcome, one star was awarded if the follow-up occurred with a minimum duration of three months after the crash. The subcategory of adequacy of follow-up was set to 50 per cent.

Qualitative studies were appraised according to five items from the BMJ qualitative appraisal guidelines (The BMJ, 2009). This guideline aids in the assessment of qualitative studies and consists of a total of 12 statements which should be considered in the assessment. We chose five of the twelve items which assessed the quality of the study in regards to the outcome of interest for this review, i.e. QoL following RTI. The five items assessed for this review included if the researcher explained the theoretical framework and methods used, had clearly described and justified the sampling strategy, if the analysis was repeated by more than one researcher and whether the researcher gave evidence of seeking out observations that might have contradicted or modified the analysis.

2. Results

This review reports on results limited to QoL following RTI, and the results will be presented in terms of type of studies included, methodological quality assessment, QoL measures used and QoL following RTI.

2.1. Type of studies included

A total of 2718 articles were identified through the database search, leaving 1212 unique citations after the removal of duplicates. Of these, a total of 25 articles were identified as eligible. A further twelve articles, mostly on paediatric populations, were identified through references from the eligible articles. Five of these twelve articles were included in the review, giving a total of 30 articles, see Fig. 1 for details. All articles were published between 1999 and 2016 (Table 1), giving an average of 1.2 publications per year. All of the included studies were performed in high- and upper middle-income countries (World Bank, n.d.).

2.2. Methodological quality assessment

The quality assessment is summarised in Table 2. The assessment revealed that the strength of the studies included confirmation of exposure, duration of follow-up and adequacy of follow-up of cohorts. All, but two, of the studies confirmed the exposure of road traffic crash via medical records. Thirteen of the studies (Alghnam et al., 2014; Batailler et al., 2014; Fitzharris et al., 2010; Hours et al., 2014; Kenardy et al., 2015; Khati et al., 2013; Landolt et al., 2009; Littleton et al., 2014, 2011; Nhac-Vu et al., 2014; Sturms et al., 2005, 2003, 2002) had attrition rate of ≤50% or provided a description of those lost to follow-up.

Limitations of the studies included the selection of a non-exposed cohort, demonstration that the outcome was not present at the start of study, comparability and assessment of outcome. When a comparison group was included, it most often included a group that had been exposed to road traffic injuries (Batailler et al., 2014; Hours et al., 2014; Nhac-Vu et al., 2011; Tournier et al., 2016) but were excluded from the specific cohort in the study. Only two studies included a self-reported measure of QoL which was in fact measured prior to the crash (Alghnam et al., 2014; Pons-Villanueva et al., 2011), all of the other studies included a baseline assessment of QoL, which most often referred to the past four weeks, i.e. a self-reported retrospective assessment of the weeks prior to the crash. Nine studies (Alghnam et al., 2014; Barnes and Thomas, 2006; Gabbe et al., 2015; Jagnoor et al., 2015; Pons-Villanueva et al., 2011; Sturms et al., 2005, 2003, 2002; Tournier et al., 2016) controlled for important factors (e.g. age, gender) relating to the comparability of the cohorts or analysis, and all of the