Title: RETURN TO DRIVING AFTER HEAD INJURY

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Abstract

Objectives:
To determine whether patients who return to driving after head injury can be considered safe to do so and to compare the patient characteristics of those who return to driving with those who do not.

Methods:
In a multicentre qualitative study ten rehabilitation units collectively registered 563 adults with traumatic brain injury during a 2.5 year period. Recruitment to the study varied from immediately after hospital admission to several years post injury. Patients and their families were interviewed around three to six months following recruitment. 383 (67.5%) subjects were interviewed within one year of injury, of whom 270 (47.6%) were interviewed within 6 months of injury. Main outcome measures were the presence or absence of driving related problems reported by drivers and ex-drivers, and scores on driving related items of the Functional Independence/Functional Assessment Measure (FIM+FAM).

Results:
Of the 563 patients 381 were drivers before the injury and 139 had returned to driving at interview. Many current drivers reported problems with behaviour (anger, aggression, irritability) (67 (48.2%)), memory (89 (64%)), concentration and attention (39 (28.1%)), and vision (39 (28.1%)). Drivers reported most driving-related problems as frequently as ex-drivers, main exceptions were epilepsy and community mobility. Current drivers scored significantly higher on the FIM+FAM (i.e. more independent), than ex-drivers. The driving group had sustained less severe head injuries than ex-drivers, nevertheless 78 (56.2%) of current drivers had received a severe head injury. Few (61, 16%) previous drivers reported receiving formal advice about driving following injury.

Conclusions:
The existence of problems which could significantly affect driving do not prevent patients returning to driving after TBI. Patients should be assessed for both mental and physical status before returning to driving after a head injury, and systems put in place to enable clear and consistent advice to be given to patients regarding driving.

Introduction

The overall annual incidence of traumatic brain injury (TBI) in the United Kingdom is approximately 300 per 100,000.[1] As the majority of TBI victims are young and life expectancy is rarely reduced,[2][3] it has been estimated that as many as 500,000 people in the UK may be currently living with the consequences of their TBI.[4]

TBI may be 'a hidden disability' [5] since a person may appear physically normal, yet have considerable cognitive, psychological, social, emotional and behavioural problems. Psychosocial problems are reported long after discharge from acute services, and include impaired judgement, short temper, aggression and intolerance of others.[6][7][8][9] These problems are likely to affect the ability of the head injured person to return to driving. Although people with brain injury have not been identified as at particularly high risk of road accidents, poor judgement and impulsivity must be major sources of risk, with physical problems playing only a minor role.[10]

Many people see the ability to drive again as a crucial index of recovery.[10] Stopping driving is associated with lost social activities and depression, even when other forms of transport are easily accessible.[11]

In the United Kingdom (UK) drivers are required to inform the Driver and Vehicle Licensing Agency (DVLA) if they have any disability which is likely to last for more than three months and which may affect their fitness to drive. The Medical Commission on Accident Prevention (MCAP) produces a guide for medical practitioners [12] which advises that following a serious head injury patients should abstain from driving for 6 to 12 months unless 'clinical recovery is full and complete'. The responsibility for informing the DVLA lies with the patient, however the guide strongly recommends that doctors advise the patient to do so, particularly when there is concern for the safety of the patient and/or other road users.[13] However, this is not the case in all countries. In a review of the literature van Zomeren reported that in many countries brain injured patients are required to have a medical examination before a driver's licence can be renewed.[10]

A large multicentre study investigating outcomes following post-acute rehabilitation for adults with TBI was carried out by a research team from the Centre for Health Services Studies (CHESS) at the University of Warwick.[14][15] The aims of the study were to examine rehabilitative care given to patients and identify those elements of a rehabilitation service which lead to good patient outcomes. The main source of data was in-depth interviews with patients and their families. Part of the interview covered community mobility and return to driving, and it was clear that this was an important issue for many respondents. This paper examines return to driving, and compares the characteristics of those patients who had returned to driving with those who had not.

Method

Ten English pilot sites received funding for five years to improve rehabilitation services for adults with TBI, and to participate in a CHESS-directed evaluation study from 1992 to 1997.

Participants

Five hundred and sixty three adults with TBI aged between 16 and 65 were referred for rehabilitation to the ten collaborating sites. Mean age was 32.5 years (median: 30 years, SD: 13.13); 77.1% were male. Injury severity was determined using Glasgow Coma Scale (GCS) [16] scores and/or length of post traumatic amnesia (PTA), where recorded. GCS scores were available for 402 (70.8%) patients and PTA for 196 (34.8%). Injury severity was classified according to the criteria proposed by the Medical Disability Society [17]: *Mild* brain injury: an injury causing unconsciousness for 15 minutes or less, and/or a GCS of 13 to 15. *Moderate* brain injury: an injury causing unconsciousness for more than 15 minutes but less than 6 hours, or a PTA of less than 24 hours, and/or GCS of 9 to 12. *Severe* brain injury: an injury causing unconsciousness for 6 hours or more, or a PTA of 24 hours or more, and/or GCS of 6 to 8. *Very Severe* brain injury: an injury causing unconsciousness for 48 hours or more or a PTA of 7 days or more, and/or GCS of 3 to 5. Using these criteria 230 (40.8%) of the study group had very severe head injuries, 153 (27%) severe, 120 (21.4%) moderate, and 60 (10.8%) mild.

Time Since Injury

Patients entered the study at different times post injury. Some units recruited directly from acute wards, others from community services, sometimes years post injury. Wherever possible interviews were carried out 3–6 months post recruitment. In practice 270 (47.5%) were interviewed within 6 months of injury, 383 (67.5%) within one year, 461 (81.9%) within two years, and a further 102 (18.1%) were interviewed more than two years post injury.

Measures

Face-to-face semi-structured interviews were carried out with 563 patients and their families. Interview schedules were of a funnel design, beginning with unprompted comments describing the problems and concerns of both the patient and his family, followed by more structured questions on, for example, community mobility, driving, employment, social integration, information received from health service professionals, and satisfaction with services. Five trained researchers carried out the interviews using standardised interview questionnaires, all were members of the research team. Interviews were carried out with the patient and a significant family member, most frequently spouse or parent, and took place in the patient's home in approximately 90% of cases. Because of this, the patient and family member were usually interviewed at the same time. Problems reported by patient and problems reported by family member were recorded separately. A measure of functional independence, the Functional Assessment Measure FIM+FAM,[18] was carried out by clinicians to coincide with the timing of the interviews.

Patients who were drivers prior to the injury were divided into two groups, those who had returned to driving by the time of the interview, and those who had not. A sub-group of the ex-drivers had been formally instructed not to drive and were looked at separately.

Results

Drivers before injury and at Interview
Most people (381, 67.7%) were drivers before injury. One hundred and thirty people (23.1%) were not drivers before injury, and no relevant information was available for 52 (9.2%).

Of the 381 previous drivers, 139 (36.5%) were driving at interview and 242 (63.5%) were not. Of the previous drivers only 41 (10.8%) reported receiving a formal driving ban from the DVLA due to their injury. Twenty-seven (66%) of these because of risk of seizures. A further 20 previous drivers (5.3%) reported being advised not to drive by a clinician, giving a total of 61 patients who had been specifically advised not to drive.

Problems reported at interview related to driving
The problems reported by patients and family members which were likely to be associated with driving performance, (such as wakefulness, behavioural problems, attentional problems, sensory deficits and memory problems), were examined for those currently driving, previous drivers not currently driving, and banned and non-banned drivers (Table 1).

Table 1 about here please

Current Drivers
Almost half (67, (48.2%)) of those driving reported behaviour problems such as irritability, anger management, and aggression. Eighty-nine (64%) reported memory problems. Problems which may impair wakefulness and alertness during driving were also frequently reported; i.e. tiredness (50, (36%)) and sleep disturbances (42, (30.2%)). Problems with concentration and attention were reported by 28.1% (39), giddy spells or dizziness by 29.5% (41), and problems with balance and co-ordination by 12.9% (18). Emotional problems were also reported, 31 patients (22.3%) reported depression, and carers reported that the patient displayed personality changes (20, (14.4%)) and lack of insight (13, (9.4%)).

Ex-Drivers
Table 1 also shows the number of previous drivers who had not returned to driving reporting these problems. Most problem items were reported as frequently by ex-drivers as by current drivers. The Chi-Squared test of Association was used to compare the two groups of drivers for each problem item. There were significant differences between the two groups for Epilepsy ($p = 0001$), Driving ($p = 004$), Community Mobility ($p = 0.038$) and Vision ($p = 0.048$) with ex-drivers reporting these problems more frequently than current drivers. 'Other Behavioural problems' which included temper and abusive behaviour were also reported significantly more frequently by ex-drivers ($p = 0.002$). Aural problems were reported more frequently by ex-drivers than current drivers but did not reach significance at the 5% level ($p = 0.085$). Diminished alcohol tolerance was reported by more current drivers than ex-drivers, but the difference was not significant at the 5% level ($p = 0.08$).

Banned Drivers
Only 61 out of 381 previous drivers reported that they had been formally advised not to drive. Two of these drivers admitted driving despite their licence being revoked, and three said that they continued to drive although formally advised not to by clinicians. The 'banned drivers' reported most problem items as frequently as current drivers. Exceptions were a higher incidence of epilepsy (27, (44.3%)), mood swings (16, (26.2%)), problems with driving (48, 78.7%)), and lack of insight reported by their carers (10, (16.4%)). The Chi-Squared test of association was used to compare banned drivers ($n = 61$) with non-banned drivers ($n = 320$) for each problem item. The frequency of reported problems was only significantly different between the two groups for four items: Epilepsy ($p = 0001$), Driving ($p = 0001$), Mood Swings ($p = 0.05$), and Sleep problems ($p = 0.05$).

FIM+FAM Scores on Driving Related Items
Scores on the FIM+FAM were used as a more objective measure of driving related problems in order to corroborate the problems reported by patients and their families. The four items: Attention, Orientation, Emotional Status and Safety Judgement were chosen to assess those skills required by drivers. These items were defined using the FIM+FAM scoring decision tree [19] and shown in Table 2.

Table 2 about here please
Table 3 about here please

Table 3 shows the scores on the four FIM+FAM items for the whole study group ($n = 538$), current drivers ($n = 132$), ex-drivers ($n = 231$), banned drivers ($n = 58$), and all non-banned drivers ($n = 305$). The FIM+FAM is scored from 1 to 7 where 1 is fully dependent on others and 7 is fully independent. A score of 6 indicates some problems, and ≤ 5 indicates that a patient requires help or is unable to perform the task.

For all four FIM+FAM items a score of 7 was achieved by a higher proportion of current drivers than both ex-drivers and the interview group as a whole. The means and standard deviations on the four items were a) for current drivers: Attention 6.3 (SD 1.01), Orientation 6.8 (SD 0.75), Emotion 5.6 (SD 1.57), Safety 6.6 (SD 0.85); b) for ex-drivers all mean scores were approximately one level lower: Attention 5.3 (SD 1.86), Orientation 5.9 (SD 1.91), Emotion 4.7 (SD 1.93), Safety 5.3 (SD 2.0). For banned versus non-banned drivers the means and standard deviations were a) for banned ex-drivers: Attention 5.7 (SD 1.5), Orientation 6.5

(SD 1.16), Emotion 4.95 (SD 1.76), Safety 5.9 (SD 1.51), only slightly lower than those of the current drivers, and b) for all non-banned drivers mean scores were: Attention 5.7 (SD 1.71), Orientation 6.2 (SD 1.71), Emotion 5.0 (SD 1.87), Safety 5.8 (SD1.82).

A recent study analysing the properties of the FIM+FAM concluded that raw ratings may be justifiably treated as good approximations to points on interval scales of measurement.[20] Consequently the Chi-Squared test of Association was used to compare the FIM+FAM scores of a) the group of previous drivers who had returned to driving with b) the group of previous drivers who had *not* returned to driving. There was a significant difference between the two groups: $p = 0.0001$ for Attention, Orientation and Safety Judgement, and $p = 0.002$ for Emotion.

The Chi-Squared test of association was also used to compare banned drivers with non-banned drivers for each FIM+FAM item. Somewhat surprisingly there was no significant difference between banned and non-banned drivers on any of the four items.

Severity of Injury and Return to Driving

The severity of TBI was classified as Mild, Moderate, Severe and Very Severe.[17] Cross-tabulations using the Chi Squared test of Association were calculated to compare a) the injury severity of the drivers with the ex-drivers, and b) the banned drivers with the non-banned drivers. There was a significant difference in injury severity between the drivers and the ex-drivers ($p = 0.001$). Overall, the driving group had suffered less severe head injuries than the ex-driving group, in particular, 31 (22.3%) of current drivers had received a mild head injury, compared to only 19 (8.0%) of ex-drivers (Table 4). There was no significant difference between the injury severity of the banned drivers and the non-banned drivers ($p = 0.68$). Although the majority of the banned drivers (40, (65.6%)) had suffered a severe or very severe head injury, 4 (6.6%) had sustained a mild head injury.

Table 4 about here please

Discussion

Many of those patients who had returned to driving after TBI reported problems which could significantly affect their ability to drive. Importantly, the proportion of patients reporting these problems was very similar for both the driving and ex-driving groups. Visual problems and problems with concentration and attention were reported by over one quarter of those who were driving. Half the drivers reported behavioural problems such as a ‘short fuse’, uncontrolled aggression, and irritability. Other emotional problems such as depression and mood swings were not reported any less frequently by the drivers than the ex-drivers. For the sub-group of formally banned drivers there was a higher incidence of epilepsy and mood swings than was observed amongst non-banned drivers.

Family members of the driving group reported personality change and lack of insight in the patient as frequently as did family members of the ex-driving group. These two factors have been identified [10] as being particularly important in increasing risk and reducing driving skills because psychological deficits are less likely than physical deficits to be identified and compensated for. Whilst most of those people who had returned to driving were physically competent to drive a vehicle, it may be argued that some were putting themselves and others at risk due to their psychological, emotional and cognitive problems.

As a group, the patients who had returned to driving had received a less severe TBI than those who had not yet returned to driving. This finding is likely to be influenced by the short follow-up period, when those who suffered mild injuries were most likely to have returned to driving. Nevertheless, over half (56.2%) of the current drivers had received a severe, or very severe head injury.

On the FIM+FAM drivers achieved significantly higher scores than ex-drivers, indicating that clinicians believed them to be more independent. This finding is consistent with that observed by others.[21] However, there were no significant differences between banned and non-banned drivers. This may be because risk of epilepsy was the main reason for a driving ban rather than other deficits.

The four items chosen to be particularly relevant to driving performance are all FAM items, which have been found to demonstrate lower inter-rater reliability than FIM items.[18] However, recent research suggests that both FIM and FAM items have a highly acceptable level of internal consistency and reliability.[20] The FIM+FAM has, however, been shown to have ceiling effects when used with patients following TBI, which causes the measure to be relatively insensitive to changes, and may mask the incidence of higher level cognitive and emotional deficits.[22]

Medical Fitness to Drive : Advice to Patients

Holders of a British driving licence are advised to inform the Driver and Vehicle Licensing Agency (DVLA) *"at once if you have any disability (includes any physical or mental condition) which affects (or may future affect) your fitness as a driver if you expect it to last more than three months"*. The freely available MCAP guides advise medical practitioners that responsibility for determining the fitness to drive of an individual rests with the DVLA, however doctors should advise the patient to inform the DVLA of any condition which may affect the patient's fitness to drive.[12][23] Only in exceptional circumstances should a doctor breach patient confidentiality and inform the DVLA himself. Responsibility for informing the licensing authorities is also problematic in other countries. In a survey carried out in the USA the different States have different requirements regarding impaired drivers; with fifteen states authorising physicians to report impaired drivers, of which seven states require physicians to report them, and thirty-five states where drivers are required to report themselves.[24]

Visual deficits were reported by approximately one third of previous drivers (current drivers: 28.1% and ex-drivers: 37.6%) of whom few reported that they had received specific visual examinations or advice about driving. Special considerations are required when assessing whether a brain injured person is visually fit to drive, and close liaison should be maintained between the optometrist and other head injury professionals involved in the patient's care.[25] Many of our interviewees reported that they were unable to judge distances, were dazzled by on-coming cars, and found it difficult to see well enough to drive at night, factors also noted by others.[26][27]

From our interviews it appears that few patients were told that the DVLA should be informed, or were given any formal advice, particularly if they had made a good physical recovery and there was a delay before referral to the rehabilitation team. Rehabilitation professionals were often concerned to find that a patient had returned to driving despite problems with vision, co-

ordination, anger and uncontrolled aggression. Attempts to stop him driving were thwarted by the fact that 'the doctor told me I could'.

For those patients who have epilepsy diagnosed, the regulations are fairly straightforward,[28] but are much less so for other conditions associated with head injury. We were told that GPs had given patients a green light to drive without the benefit of any formal assessment, but sometimes with advice to keep initial journeys short. One patient reported that his GP had advised him against informing the DVLA suggesting that it would be very difficult to get his licence back.

An example of conflicting advice was G, who suffered a moderate head injury at age 43. He was a self-employed long-distance lorry driver. At the interview he reported double vision, memory problems, severe headaches and fatigue. At his outpatient appointment the neurosurgeon informed him that he could return to work, apparently without realising that the patient worked as a driver of a heavy goods vehicle. His Case Manager, concerned for the patient's safety managed to get this decision reversed. This action left the patient confused, and he reported to us that whilst his treatment had been good, it had 'worked against me'. He had received "a letter from the doctor saying it is absolutely fine to go back to work" then had the decision overturned. His subsequent inability to work caused the family severe financial hardship. He reported that he wished he had not gone to rehabilitation and withdrew from therapy shortly afterwards, leaving the area without a forwarding address.

At the time of the interviews none of the study sites appeared to have a formal policy about giving advice and information on return to driving, however during the course of the five-year study this issue came to be addressed more systematically by five of the sites. The National Head Injuries Association (Headway) produce a leaflet advising patients on return to driving,[29] yet few of the patients we interviewed were aware of this information. In practice, the decision to resume driving was often made by the patient himself, a finding consistent with that made by Priddy et al [30] who also observed that patients were willing to restrict their driving activities to suit their altered abilities. From our interviews we found that patients, and particularly their families, showed good common sense in delaying a return to driving and then resuming gradually, starting with short and familiar journeys, often accompanied. Some patients took refresher driving lessons of their own volition.

Driving Assessments

Four of the study sites had close access to specialist Disabled Driving Centres which were able to provide a formal assessment of the head injured person's suitability to return to driving. Study patients who appeared to have few problems were often offered a 'fast-track' assessment which ensured that the patient was competent to drive on the road. However, such assessments do not generally assess the higher cognitive levels required in driving as noted by van Zomeren.[31] Study patients who had a formal driving assessment and were passed as fit to drive reported that this increased their confidence and improved their quality of life. Being able to drive again often meant that they could resume previous activities. Those unable to resume driving often reported frustration with their situation, and felt trapped in their homes.

Possible Limitations of the Research

This research project was not an epidemiologically based study. However, the project presented an opportunity to study a large group of patients selected to receive rehabilitation by centres of good practice whose resources were enhanced by DoH grants specifically for

head injury rehabilitation, and thus expected to receive a better service than could be offered by units without the benefit of a dedicated head injury team. Despite this, it appeared that driving advice was often not routinely given to previous drivers, or if it was, then the patients themselves did not recall it, which is of equal concern.

Unanswered Questions and Future Research

This paper reports interview responses mostly made during the early months post injury when patients had not long returned to driving. A long term follow up of these patients is crucial to ascertain whether a head injury predisposes drivers to further accidents.

Conclusions

Few patients reported that doctors had advised them not to drive following their TBI. Risk of epilepsy was the most likely reason for a formal driving ban. Patients who had returned to driving report a similar pattern of deficits to those who had not returned to driving, the main difference between the two groups being a higher level of functional independence amongst the current drivers. Patients were not given clear nor consistent advice regarding return to driving and often had to rely on informal advice from therapists, on their common sense or that of their family. It is recommended that patients are informed of their entitlement to drive after a head injury by the rehabilitation team and their GP. However, such advice can be unpopular with patients, and not necessarily followed. For patients who do meet the current medical standards of fitness to drive careful assessment and monitoring can lead to a safe return to driving and a consequent improvement of their quality of life.

Key Messages

- The existence of problems which could significantly affect driving do not prevent patients returning to driving after TBI. It appears that advice on return to driving is not routinely given following TBI. The decision to return to driving was often made by the patient himself.

- Clinicians should familiarise themselves with the MCAP publications and the current regulations and advice offered by the DVLA regarding driving after TBI.

- Previous drivers who have suffered TBI should be routinely assessed for behavioural, emotional and sensory problems, in addition to physical driving performance, and advised accordingly before they return to driving

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Table 1 Frequency of Problems Reported by Respondents at Interview: Drivers, Ex-Drivers, Banned Drivers, All Previous Drivers Not Banned, and All Patients

Problem	Number of Patients Returned to Driving (n = 139)	Total Number of Previous Drivers not returned (n = 242)	Number of Previous Drivers with Medical Ban# (n = 61)	Number of All Previous Drivers Not Banned (n = 320)	Number of All Patients Reporting (n = 563)
Memory	89 (64.0%)	157 (64.9%)	41 (67.2%)	206 (64.4%)	356 (63.2%)
Headaches	60 (43.2%)	89 (36.8%)	26 (42.6%)	123 (38.4%)	211 (37.5%)
Fatigability	50 (36.0%)	93 (38.4%)	27 (44.3%)	116 (36.3%)	191 (33.9%)
Sleep problems	42 (30.2%)	57 (23.6%)	**22 (36.1%)**	**77 (24.1%)**	128 (22.7%)
Giddy Spells/Dizziness	41 (29.5%)	62 (25.6%)	19 (31.1%)	84 (26.3%)	142 (25.2%)
Concentration/Attention	39 (28.1%)	72 (29.8%)	21 (34.4%)	90 (28.1%)	154 (27.4%)
Visual problems	*39 (28.1%)*	*91 (37.6%)*	24 (39.3%)	106 (33.2%)	190 (33.7%)
Depression	31 (22.3%)	44 (18.2%)	9 (14.8%)	66 (20.6%)	104 (18.5%)
Aural problems	30 (21.6%)	35 (14.6%)	9 (14.8%)	56 (17.5%)	86 (15.3%)
Problems concerning Driving	*26 (18.7%)*	*81 (33.5%)*	**48 (78.7%)**	**59 (18.4%)**	113 (20.1%)
Balance and Co-ordination	18 (12.9%)	39 (16.1%)	9 (14.8%)	48 (15.0%)	92 (16.3%)
Personality Change	20 (14.4%)	29 (12.0%)	4 (6.6%)	45 (14.1%)	68 (12.1%)
Alcohol/Alcohol Tolerance	18 (12.9%)	18 (7.4%)	9 (14.8%)	27 (8.4%)	59 (10.7%)
Insight	13 (9.4%)	25 (10.3%)	10 (16.4%)	28 (8.8%)	56 (10.0%)
Mood Swings	24 (17.3%)	41 (16.9%)	**16 (26.2%)**	**49 (15.3%)**	27 (4.8%)
Epilepsy	*5 (3.6%)*	*38 (15.7%)*	**27 (44.3%)**	**16 (5.0%)**	69 (12.3%)
Epilepsy like (absences, blank spells)	4 (2.9%)	6 (2.5%)	1 (1.6%)	9 (2.8%)	12 (2.1%)
Community Mobility	*14 (10.1%)*	*43 (17.8%)*	13 (21.3%)	44 (13.8%)	96 (17.1%)
Irritability*	35 (25.2%)	45 (18.6%)	14 (23%)	66 (20.6%)	105 (18.7%)
Anger Management*	32 (23.0%)	47 (19.4%)	14 (23%)	65 (20.3%)	118 (21.0%)
Aggression*	8 (5.7%)	17 (7.0%)	2 (3.3%)	22 (6.9)	39 (6.9%)
Other Behavioural*	*3 (2.2%)*	*27 (11.2%)*	3 (4.9%)	27 (8.4%)	40 (7.1%)
Frustration*	6 (4.3%)	13 (5.4%)	3 (4.9%)	16 (5.0%)	27 (4.8%)
All Behavioural**	67 (48.2%)	121 (50%)	28 (45.9%)	160 (50.0%)	272 (48.3%)

* categorised as behavioural problems ** number of patients with at least one behavioural problem
# Banned drivers are also included in the figures for previous drivers not returned
Figures in italics depict items with statistically significant differences between current and ex-driver groups
Figures in **bold** depict items with statistically significant differences between banned and non-banned drivers

Table 2 Definitions of the Four Driving Related FIM+FAM Items

FIM+FAM Item	Definition
Attention	Includes the length of time able to concentrate on tasks taking into consideration distractibility, level of responsiveness, and the difficulty/length of task. A score of less than 6 indicates the presence of some attentional deficits.
Orientation	Includes orientation to person, place, time and situation. A person scoring less than 6 needs help to be oriented to person, place, time and situation.
Emotional Status	Includes frequency and severity of depression, anxiety, frustration, unresponsiveness, agitation, interference with general life functioning, ability to cope with and take responsibility for emotional behaviour. A score of less than 6 indicates the presence of 'behaviour problems interfering with general life functioning'.
Safety Judgement	Includes orientation to one's situation, awareness of one's deficits and their implications, ability to plan ahead, ability to understand the nature of situations involving potential danger and to identify risks involved, freedom from impulsivity, ability to remember safety related information, and ability to respond appropriately if danger arises. A person scoring less than 6 needs some help to operate safely in the community.

Table 3 Driving Related FAM Scores at Interview

FIM+FAM Item	**FIM+ FAM Score**	**Number of current drivers N = 132*** No. of drivers = 139	**Total Number of ex-drivers N = 231*** No. of ex-drivers = 242	**Number of previous drivers with medical ban# N = 58** No. of banned drivers = 61	**Number of previous drivers not banned N = 305** No. of non-banned drivers = 320	**Total Number of all patients N = 538*** No. of all interviewees = 563
Attention	7	74 (56.1%)	75 (32.5%)	23 (39.7%)	126 (41.3%)	192 (35.7%)
Attention	6	37 (28.0%)	57 (24.7%)	15 (25.9%)	79 (25.9%)	130 (24.2%)
Attention	≤ 5	21 (15.9%)	99 (42.9%)	20 (34.5%)	100 (32.8%)	216 (40.1%)
Orientation	7	114 (86.4%)	148 (64.1%)	45 (77.6%)	217 (71.1%)	346 (64.3%)
Orientation	6	9 (6.8%)	27 (11.7%)	6 (10.3%)	30 (9.8%)	67 (12.5%)
Orientation	≤ 5	9 (6.8%)	56 (24.2%)	7 (12.1%)	58 (19.0%)	125 (23.2%)
Emotional Status	7	47 (35.6%)	41 (17.8%)	12 (20.7%)	76 (24.9%)	130 (24.2%)
Emotional Status	6	40 (30.3%)	63 (27.4%)	16 (27.6%)	87 (28.5%)	144 (26.8%)
Emotional Status	≤ 5	45 (34.1%)	127 (55.0%)	29 (51.7%)	142 (46.6%)	264 (49.1%)
Safety Judgement	7	99 (75.0%)	90 (39.0%)	25 (43.1%)	164 (53.8%)	241 (44.8%)
Safety Judgement	6	21 (15.9%)	57 (24.7%)	20 (34.5%)	58 (19.0%)	108 (20.1%)
Safety Judgement	≤ 5	12 (9.1%)	84 (36.4%)	13 (22.4%)	83 (27.2%)	189 (35.1%)

* Not all of the interviewees had complete FIM+FAM scores, hence the discrepancy between the number of FIM+FAMs and interviewees.
# Banned drivers are also included in the figures for ex-drivers

Table 4: Severity of Injury for Current Drivers, Ex-Drivers, Banned Drivers, and Non-banned Drivers

Injury Severity	**Current Drivers N = 139** (No. of drivers = 139)	**Ex-Drivers N = 240*** (No. of ex-drivers = 242)	**Banned Drivers# N = 61** (No. of banned drivers = 61)	**Non-banned Drivers N = 318*** (No. of non-banned drivers = 320)
MILD	31 (22.3%)	19 (7.9%)	4 (6.6%)	45 (14.2%)
MODERATE	30 (21.6%)	51 (21.3%)	17 (27.9%)	64 (20.1%)
SEVERE	39 (28.1%)	78 (32.5%)	23 (37.7%)	92 (28.9%)
VERY SEVERE	39 (28.1%)	92 (38.3%)	17 (27.9%)	117 (36.8%)

* Less than whole group due to missing data
# Banned drivers are also included in the figures for ex-drivers