

CURRENT OPINION ABOUT POST-CONCUSSION SYNDROME
AMONG HEALTH-CARE PROFESSIONALS AND PEOPLE
WITH A MILD HEAD INJURY
AND RESEARCH PORTFOLIO

PART ONE

(Part two bound separately)

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Doctorate in Clinical Psychology

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Chapter 1. Small Scale Service Related Project

An audit of an opt-in system in an adult mental health clinical psychology department.

Prepared in accordance with guidelines for submission to *Clinical Psychology Forum*
(Appendix 1.1)

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Introduction

Over the past years there has been an increasing number of referrals to clinical psychology departments without a corresponding increase in resources. This has resulted in departments operating long waiting lists. The amount of time a patient has to wait to be seen can cause dissatisfaction among referrers, patients and staff alike. A number of strategies have been used in an attempt to reduce waiting time including group work, referring on to other agents and brief therapy (DCP 1993). One factor that contributes to waiting time is patients not attending appointments, thus wasting clinicians' time. If the number of people who do not attend (DNA) their appointments can be reduced this will help reduce wait time. It has been suggested that providing new patients with an information leaflet about the service before they attend will improve attendance at first appointments (e.g. Webster, 1992). However, the evidence that this alone can increase attendance is mixed and Keen et al (1996) suggest that a leaflet may be better used in combination with some other strategy, such as an opt-in system. Depending on the system, this involves asking patients near the top of the wait list either to confirm that they still want an appointment or that they will attend a given appointment. Evidence for opt-in systems is also mixed. For example Waring et al (1999), Stallard and Sayers (1998) and Anderson and White (1994) found a decrease in first appointment DNA with the introduction of an opt-in system. Conaghan et al (2000) and Markham and Beeney (1990) found no such decrease.

In this clinical psychology department, in the West of Scotland, patients are routinely sent out information leaflets. However, about a quarter of patients still DNA their first appointment. In a further attempt to reduce the DNA rate for first appointments an opt-in system was introduced in April 1999. This system requires patients to confirm that they will attend their appointment, otherwise it is given to someone else.

This paper aims to evaluate this system for the first 6 months after its introduction, by addressing the following questions:

1. How many people say they will attend and how many appointments can be offered to other people?
2. How many appointments are actually offered to other people and how many of these are attended?
3. Has the DNA rate for first appointments reduced in those who said they would attend compared to when the opt-in system was not in place?
4. Has there been a reduction in wait time since the opt-in system was introduced?

Method

How the opt-in system works

The opt-in system is applied to all adult (age 16-64) referrals classified by the referrer as needing soon (within 8 weeks) or routine appointments. When referrals are received the patient is asked, via an acknowledgement letter, to return a slip confirming their details and stating whether they are willing to attend an appointment at short notice. When the patient is sent an appointment they are then asked to respond by a deadline (usually 3 weeks from when the appointment is sent out) to confirm either that they will attend, that the appointment is unsuitable or that they no longer require an appointment. If there is no response by the deadline, or if the appointment is unsuitable or not required, the appointment is offered to someone else who had said they would attend at short notice. The amount of notice can vary from about a week to a few days. These patients do not receive an opt-in letter, but are contacted by telephone followed by a letter confirming the time and enclosing a leaflet about the service. When reallocating these appointments, the appointment is given to the next person on the wait list who is available to attend. This can be a soon or a routine patient.

Procedure

Data was taken from the files of adult patients, classified as 'soon' or 'routine', whose referrals were received during the first 6 months after the opt-in system was introduced (99-00 cohort). Comparison data was taken from adult referrals received during the equivalent time period the previous year (98-99 cohort). Of the referrals

received in the department some were not accepted due to the department not providing the requested service, and some were removed from the waiting list at the request of the referrer or the patient because they no longer required an appointment. Data was not collected on these patients.

Data regarding attendance at the first appointment and length of time each patient had to wait until their first appointment was collected for all patients. For the 99-00 cohort, data was also collected regarding patients' response to the opt-in (no response, will attend, appointment unsuitable or appointment not needed) and the number of patients offered appointments as a result of others response to the opt-in letter.

Results

In the 99-00 cohort 198 referrals were received. 5 were not accepted and 1 was removed from the waiting list. This left 187 referrals (156 routine and 31 soon) who required appointments. In the 98-99 cohort 167 referrals were received. 8 were not accepted and 13 were removed from the waiting list. This left 146 referrals (115 routine and 31 soon). Of the 99-00 cohort, 129 routine and 27 soon referrals were sent appointments in an opt-in letter. The remaining patients did not receive opt-in letters because they had been offered appointments at short notice as a result of the others' response to the opt-in. Table 1 shows a breakdown of patients' response to the opt in letter.

INSERT TABLE 1 HERE

Combining the 'no response', 'appointment unsuitable' and 'appointment not needed' categories it can be seen that 44 routine and 10 soon appointments could be reallocated to someone else. In reality, 27 routine and 4 soon referrals were given appointments at short notice. Of these 33 all but 3 attended their appointments. (2 DNA'd and 1 cancelled)

85 routine and 17 soon patients in the 99-00 cohort said they would attend their appointments. Table 2 shows their actual attendance compared to the 98-99 cohort.

INSERT TABLE 2 HERE

Comparing the 98-99 soon with the 99-00 soon it can be seen that the attendance rate has improved by about 24% and the DNA rate has reduced about 22.6%. However, this should be interpreted with caution, given the small number of patients in the 99-00 soon cohort. Comparing the 98-99 routine cohort with the 99-00 routine cohort it can be seen that the attendance has improved by about 27% and the DNA rate reduced by about 11%.

The average waiting time was calculated for soon and routine referrals and is shown in Table 3.

INSERT TABLE 3 HERE

The introduction of the opt-in system has resulted in an increase in wait time for the soon referrals by about 3 weeks, but for the routine referrals there has been a reduction in wait time of about 10 weeks.

Discussion

Overall the data suggests that the opt-in system has been effective in reducing the DNA rate at first appointments. It seems to be able to filter out patients who will not keep appointments to leave a sample that can be expected to attend. This is reflected in the higher attendance rate and the lower DNA rate in the 99-00 cohort compared to the 98-99 cohort. The number of people cancelling appointments is also lower in the 99-00 routine cohort. This may reflect that in the 98-99 cohort some people spontaneously contacted the department to say that they would not be attending. Such people in the 99-00 cohort have already been filtered out. It should also be

noted that some people who cancel want further appointments whereas others do not. The latter can be discharged but the former still need to be seen and thus still use up resources. The data on attendance patterns does not distinguish between these groups. However, when a patient cancels with enough advance warning, the psychologist is able to use the time more effectively rather than waiting for patients who are not going to attend.

Not all appointments available for reallocation were actually given to others. It is only those who return a slip confirming their details who are offered such appointments. If the number of people who returned the slip was limited or the patient could not be contacted by telephone then this would explain why it was not possible to reallocate all appointments. The psychologist could however, give the appointment to one of their current patients so the time is not wasted. However, considering that 21 appointments were not reallocated, there remains potential for improvement.

The opt-in system has resulted in a decrease in waiting time for routine referrals of about 10 weeks. This in turn may have affected attendance rates. Evidence, although mixed, suggests that there is a positive relationship between waiting time and non-attendance (Jaffa and Griffin 1990; Hoare et al 1996). The opt-in system may therefore have also had an impact by improving the likelihood of attendance by decreasing the wait time.

The waiting time for soon referrals has increased. This may be partially due to difficulty reallocating appointments to soon patients, given that there are fewer of them. The soon patients may also not have had a chance to return the slip before they received an appointment. However this does not mean the system should be abandoned since it has reduced the DNA rate for first appointments. The patients are also still being seen within the required 8 weeks. One factor which may have increased the wait time is the fact a member of staff left during 98-99, leaving one

less clinician to see patients in an already small department. However, this does not explain why the wait time increased in the soon patients but not the routine.

One possible result of waiting times being reduced is that the number of referrals increase. Indeed there were more referrals in the 99-00 cohort. It remains to be seen if this system manages to keep the wait time relatively low with an increase in numbers. However, the system does seem to be efficient with more patients in the 99-00 cohort being offered appointments but having a shorter wait time than the 98-99 cohort. Markham and Beeney (1990) found with their opt-in system that an increase of referrals by 17% resulted in an increased wait of only one week. With this in mind and considering the potential for making the system even more efficient there is reason to be optimistic that, should referrals increase, the wait time should not increase too dramatically.

Although the opt-in system seems to be working, the process of reallocating appointments needs to be examined to see whether efficiency can be improved. Currently appointments are only reallocated to people who have returned the slip confirming their details and saying they will attend at short notice. Appointments could be offered to patients who have not responded to the slip. However, this could involve a time-consuming process of tracking down telephone numbers and secretaries having to deal with patients who object to being contacted by telephone. The alternative of sending a letter results in the appointment being received at even shorter notice. Another alternative is to ask referrers to emphasise to patients the importance of returning the slip. The importance of this can also be emphasised in the actual letter sent to patients. This would hopefully result in an increased pool of patients who can be contacted at short notice, although patients with literacy problems may not respond to this. It should be remembered that the process of reallocating appointments is time consuming and the secretaries need to balance this task with all their other work. It might thus be more efficient time-wise for the psychologist to give the appointment to a current patient if a new patient cannot be found to fill the appointment within a given period of time.

In conclusion the opt-in system has resulted in the reduction of non-attendance at first appointments and improved attendance rates. It has also reduced the wait time for routine referrals. However, the process by which unwanted appointments are reallocated could be explored to see whether the system can be made even more efficient.

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Table1: The number (percentage) of patients in each response category.

Response category	Group	
	Soon (n=27)	Routine (n=129)
No response	5 (18.5%)	26 (20.2 %)
Appointment unsuitable	5 (18.5%)	10 (7.8%)
Appointment not needed	0	8 (6.2%)
Will attend	17 (63%)	85 (65.9%)

Table 2: Attendance patterns of the 99-00 cohort who said they would attend compared to the attendance patterns of the 98-99 cohort.

Group	Attendance at first appointment		
	Attended	Did not attend	Cancelled appointment
98-99 soon (n=31)	20 (64.5%)	7 (22.6%)	4 (12.9%)
99-00 soon (n=17)	15 (88.2%)	0	2 (11.8%)
98-99 routine (n=115)	57(49.6%)	33 (28.7%)	25 (21.7%)
99-00 routine (n=85)	65 (76.5%)	15 (17.7%)	5 (5.9%)

Table 3: Average waiting time in weeks (with standard deviation) for the 99-00 cohort compared to the 98-99 cohort.

	Group			
	98-99 soon (n=31)	99-00 soon (n=31)	98-99 routine (n=115)	99-00 routine (n=160)
Mean wait time in weeks	4.7 sd=2	7.7 sd=3.3	24.74 sd=8.3	14.3 sd=4.9

Chapter 2. Major Research Project Literature Review

Knowledge about post-concussion syndrome and the consequences of mild head injury among health care professionals and the general public:
a systematic review.

Prepared in accordance with guidelines for submission to *Brain Injury*
(Appendix 2.1)

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Abstract

Primary objective. To systematically review the literature to determine opinion about post-concussion syndrome among health care professionals, lay people and people with a mild head injury (MHI). Papers were identified using a systematic search of electronic databases, with the addition of hand searches and a citation search. All included papers were assessed for methodological quality.

Main Results. Knowledge of symptoms among professionals was consistent with the published literature, although few professions have been studied. There were some differences in opinion about recovery and treatment among professionals. It is likely that some professionals are not well informed about useful treatments for post-concussion syndrome. Lay people and people with a MHI are likely to expect a general increase in symptoms following MHI but have less detailed knowledge about the specific symptoms expected.

Conclusions. The results suggest that people with MHI will rely on professionals to provide them with appropriate information and services but that professionals may not always be well informed about these issues. Methodological weaknesses in the studies and directions for future research are discussed.

Introduction

Mild head injury (MHI) is a significant problem in Britain. It has been reported that between 75% and 95% of head injuries presenting to hospitals are classified as MHI (Kraus and Nourjah, 1988; Thornhill Teasdale, Murray, McEwan, Roy and Penny, 2000). It is likely that this is an underestimate of the incidence of MHI as many people who experience a MHI will not seek medical attention.

MHI has been defined as a head injury which has a Glasgow Coma Scale (GCS) score of 13-15 and/or post traumatic amnesia (PTA) less than 24 hours and/or a loss of consciousness of less than 30 minutes. (Mild traumatic Brain Injury Committee, 1993). However, there has been some variation in the definition, with some researchers suggesting the use of PTA less than 1 hour or a loss of consciousness less than 20 minutes (e.g. De Kruik, Twijnstra, Meerhoff and Leffers, 2001; Bernstein, 1999).

A range of symptoms can occur after MHI. These include emotional problems such as anxiety and depression, somatic complaints such as headaches and dizziness, and cognitive difficulties such as poor memory and concentration. Some studies suggest that symptoms usually resolve within 3 months (e.g. Levin, Mattis and Ruff, 1987). However, other studies report that at three months post injury, between 26% and 79% of people with a MHI report persisting symptoms and between 12% and 34% have not returned to work (Englander, Hall, Stimpson and Chaffin, 1992; Rimel, Giordani, Barth, Boll and Jane, 1981). Furthermore between 28% and 51% continue to experience either moderate or severe disability at one year post injury (Thornhill et al, 2000; Deb, Lyons and Koutzoukis, 1998).

The symptoms following MHI have frequently been grouped together under the term post-concussion syndrome (PCS). However, there is currently no agreed definition of this syndrome. DSM-IV (American Psychiatric Association, 1994) states that further research is needed to include it as a diagnosis, although it suggests a preliminary definition for researchers to base studies on. ICD-10 (World Health Organization,

1992) also provides a description of common features of the disorder. However, in research studies the presence of a number of symptoms, as measured by various checklists, is often presumed to be evidence of PCS (Gouvier, Cubic, Jones, Brantley and Cutlip, 1992; King, Crawford, Wenden, Moss and Wade, 1995).

There is mixed opinion about whether MHI causes long term cognitive impairment. Early studies suggested that recovery was rapid with no permanent impairment (e.g. Levin, Mattis and Ruff, 1987; Dikmen, McLean and Temkin, 1986). However, a more recent meta-analysis of neuropsychological evidence (Binder, Rohling, and Larrabee, 1997) concluded there was some evidence for a persisting deficit in attention after MHI.

Malingering has been put forward as an explanation of persisting PCS (Miller, 1961). Although the disorder can exist in the absence of financial gain, a meta-analysis of available evidence (Binder and Rohling, 1996) concluded that compensation factors can influence recovery in a significant proportion of cases.

Psychological factors have also been noted to play a role in recovery. For example, measures of anxiety and mood have been found, in combination with length of PTA, to predict the presence of PCS at 3 months post injury (King, Crawford, Wenden, Caldwell and Wade, 1999).

Jacobson (1995) proposed a integrative model that acknowledges that although organic factors precipitate the initial report of PCS in most cases, the persistence of complaints is maintained by an interdependent set of organic, psychosocial and behavioural factors. According to this model, the patients' beliefs, appraisals and coping responses play an important role in either maintenance of or recovery from PCS. If a person is aware of what to expect as a result of their injury and is aware of how to cope with these sequelae, they may be less likely to experience disability.

There have been a small number of treatment studies of PCS. Treatments tend to involve the provision of information about the consequences of MHI. Early studies reported that patients who were given an explanation for their injury had less days off work as a result of their injury and fewer and less severe symptoms than patients who also received routine treatment (Relander, Troupp and Bjorkstein, 1972; Minderhound, Boelens, Huizenga and Saan 1980). However, in these studies information provision was also combined with other interventions including rest, early mobilisation and physiotherapy and graded return to activities.

Later randomised controlled studies provided interventions consisting of information, advice and support. They found that this resulted in patients experiencing a shorter average symptom duration, less severe symptoms and reduced social morbidity compared to controls (Alves, Macciocchi and Barth, 1993; Mittenberg, Tremont, Zielinski, Fichera and Rayls, 1996; Wade, Crawford, Wenden, King and Moss, 1997; Wade, King, Wenden, Crawford and Caldwell, 1998). Finally, when a one hour intervention providing information and advice, was compared to a more intensive intervention which included a 3-4 hour neuropsychological assessment and feedback, no differences were noted between groups (Paniak, Toller-lob, Reynolds, Melnyk and Nagy, 2000). It is therefore likely that a brief one hour session is sufficient input for patients and more comprehensive treatment is unlikely to be of further benefit.

In summary, several trials have found that interventions which provide information and advice to the patient can be beneficial in reducing disability and symptom duration following MHI. Less research has examined interventions for those with persisting difficulties. However, there is some suggestion that such patients might benefit from neuropsychological rehabilitation (Cicerone, Smith, Ellmo, Mangel, Nelson, Chase and Kalmar, 1996).

Given that MHI is a common problem that can cause significant disability, but one for which brief interventions appear to be of benefit, attention needs to be paid to ways in which it is managed. Two important influences on whether the patient

receives help are the opinions held by the patient and by the professional providing the care.

A variety of factors can influence a person's decision to seek help. These include beliefs about whether their problem is serious enough to warrant help from a professional and about whether something can be done to help them (Bayer and Peay, 1997). Thus the person's beliefs about their difficulties can influence not only how the symptoms progress, but also whether help is sought. It is therefore important to assess the extent of knowledge about MHI among the general public and people who have had a MHI.

A range of health-care professionals can be involved in the management of a patient with MHI. Different groups will have experienced different types of training and may work from different theoretical models. These factors, combined with the lack of clear consensus about PCS may mean that there are differences in opinion among groups. However, it is important that professionals have accurate knowledge about PCS and its treatment if they are to provide good care for patients. A number of national guidelines exist on which professionals can base their practice. (e.g. Scottish Intercollegiate Guidelines Network (SIGN), 2000; Royal College of Surgeons of England (RCSE), 1999; British Society of Rehabilitation medicine (BSR), 1998). Recommendations common to these reports are that patients should be advised of common sequelae of head injury and advised on returning to driving, work or sport. They also recommend that patients are followed up and where necessary, referred on to appropriate services (e.g. neuropsychology, rehabilitation specialist). Finally, the BSR (1998) also makes reference to the benefits of a neuropsychological assessment.

Studies of attitudes and knowledge about other health problems, e.g. pain and hypertension, have noted that practitioners do not always have accurate knowledge and may not always base their practice on national guidelines (Huse, Roht, Alpert and Hartz, 2001; Visentin, Trentin, DeMarco, and Zanolin, 2001). Furthermore, studies of the experiences of people with head injury suggest that people do not always

receive information following a MHI (Pioth, 1992) and that professionals sometimes show a lack of understanding about the long term consequences of brain injury (Swift and Wilson, 2001). It is therefore important to assess the extent of knowledge about MHI among health care professionals. If misconceptions do exist then these need to be identified and addressed. If they are not, it is possible that inaccurate or insufficient information is passed onto patients with MHI and hence may affect the course of PCS.

Aim

To systematically review the literature to determine

1. opinion about PCS among health care professionals
2. opinion about PCS among the general public and people with a head injury.

PART 1

Objective: To systematically review the literature to determine the opinion about symptoms, cause, recovery and treatment of PCS among health care professionals.

Previous reviews

No reviews of professional opinion about head injury were found.

Criteria for considering studies for this review

Types of studies

Any type of study that directly asks participants their opinion about MHI or PCS.

Types of participants

Health care professionals of any type.

Types of questions addressed

Any study that addresses one or more of the following areas.

1. The nature of symptoms expected after MHI.

2. Recovery from MHI.
3. The cause of symptoms following MHI.
4. Treatment of MHI/PCS.

Search strategy for identification of studies

A literature search using the following databases was carried out using the following search strategy:

Databases

Medline (1966 to March 2002), PsychInfo (1967 to March 2002), Embase (1980 to March 2002), Cinahl (1982 to March 2002), Amed (1985 to March 2002).

Strategy

1. All references to knowledge or opinion(s) or attitude(s) or perception(s) or expectation(s) or survey.
2. All references to head injury or brain injury or post(-)concussion or post(-)traumatic.
3. combine searches 1 and 2.
4. All references to professional or personnel.
5. combine searches 3 and 4.
6. All references to mild head injury or mild brain injury or minor head injury or minor brain injury or post(-)concussion.
7. combine searches 1 and 6.

Hand searches were performed using the following journals:

Brain Injury (1992 – 2002)

Journal of Neurosurgery, Neurology and Psychiatry (1992-2002)

Neuropsychological Rehabilitation (1998-2002)

The reference sections of all identified papers were examined to locate any additional studies. A citation search was carried out using all the papers identified.

Methods of the review

Each study that met the inclusion criteria was assessed for methodological quality. The SIGN criteria for the systematic review of intervention studies (SIGN, 2001) were used to assess the quality of the studies. However, since intervention studies are not appropriate for this review, the criteria were modified and are detailed below.

Evidence level I	Systematic review of good quality case control or cohort studies.
Evidence level IIa	High quality case control or cohort studies with a very low risk of bias
Evidence level IIb	Well conducted case control or cohort studies with a low risk of bias
Evidence level IIc	Case control or cohort studies with a very high risk of bias
Evidence level III	single case reports, case series

Description of studies

Seven studies met the inclusion criteria for the study and these are shown in table 1.

INSERT TABLE 1 HERE

Methodological quality of included studies

All studies were of a similar quality, although all had methodological weaknesses. These are detailed below.

Six studies were postal surveys and hence were subject to response bias. The response rate in the studies ranged from 14% to 51%. This means that the data collected may not reflect the opinion of the population as a whole. Furthermore, it is possible that many those who returned the questionnaire did so because they had a special interest in head injury. The responses therefore may reflect greater knowledge than exists in the population as a whole. However, the risk of this is reduced with higher response rates.

The questionnaire used by Auerbach (1967) was also used by two other studies (McMordie, 1988; Harrington et al, 1993). This allows comparison between different groups as well as providing information about changes in opinion over time. The Stranjalis (2000) study used a Greek translation of the Evans et al (1994) study. However, while this also allows comparison between groups, the questionnaire was not reported in full in the paper. This makes understanding some of the data more difficult and replication of the study harder.

Four studies surveyed more than one professional group (McMordie, 1988; Harrington et al, 1993; Stranjalis et al, 2000; Evans et al, 1994). This allows differences between groups to be explored in a more controlled way than comparing across studies. However, only two of these included statistical analyses to examine differences between groups. (Harrington et al, 1993; McMordie, 1988). One study included all groups in one analysis (Stranjalis et al, 2000) because the numbers were small. One study reported separate results for each group but did not conduct any statistical analyses (Evans et al, 1994). It would have been helpful to include this, particularly as it is possible that there may have been differences between groups.

The studies all ask questions about PCS or MHI. However, as noted earlier there is some variation in the definitions of both these terms. One study (MacKenzie, 2001) provided a case vignette for participants to base their answers on. It is possible that participants in the remaining studies might be basing their answers on different severities of head injury. Harrington et al (1993) asked whether participants would

have changed their answers if the term minor or mild head injury had been used rather than PCS. 15% of respondents reported they would have done so, although it is not noted how they would have changed their answers. This emphasises the importance of defining clearly the condition which is being discussed.

Results

Nature of Symptoms

Rehabilitation professionals (Harrington et al, 1993) rated cognitive symptoms as being the most common type of PCS symptom, followed by irritability, somatic symptoms, psychological symptoms and sensory impairment.

Neuropsychologists (Mittenberg and Burton, 1994) most frequently reported poor concentration as being characteristic of PCS, followed by poor memory, irritability, headache, fatigue, depression, anxiety, dizziness, blurry/double vision, light and sound sensitivity and 'other'.

When asked to identify symptoms that might occur following a MHI, GPs named a mean of 2.5 symptoms (MacKenzie, 2001). The most commonly reported symptoms were headache, memory problems, difficulty concentrating, anxiety, sleep problems and fatigue. When using a checklist 60% of GPs endorsed more than 6 symptoms.

Length of Recovery

The median length of recovery reported by family practitioners, neurologists, neurosurgeons and orthopaedists (Evans et al, 1994) was 3-6 months. 71% of physicians agreed that symptoms of PCS usually settle within 6 months (Stranjalis et al 2000). A similar proportion (76%) also agreed that a year after injury a small percentage of patients suffer post-concussion symptoms.

The majority of neurosurgeons in the Auerbach (1967) study endorsed recovery periods of less than 12 months, with responses being spread evenly across the

possible categories (less than 3 months, 3-6 months and 6-12 months). The majority of neurosurgeons in the McMordie (1988) study tended to endorse short (less than 6 months) recovery periods. The majority of rehabilitation professionals (Harrington et al 1993) and neuropsychologists (McMordie 1988) tended to endorse long (6 months or more) recovery periods. A proportion of each group noted that recovery varies with litigation (9-27% of neurosurgeons, 19% of neuropsychologists and 4% of rehabilitation professionals)

Cause of Symptoms

The majority of neurosurgeons, neuropsychologists, rehabilitation professionals, family practitioners, neurologists, and orthopaedists (Harrington et al, 1993; McMordie et al, 1988; Auerbach, 1967; Evans et al, 1994) considered organic factors to be the main contributing factor to PCS. The remaining respondents endorsed emotional factors and compensation factors as contributors to PCS. Physicians rated emotional factors as the main contributor to PCS, followed by organic factors and then compensation factors. (Stranjalis et al, 2000).

Mittenberg and Burton (1994) reported the frequency with which several factors were thought, by neuropsychologists, to contribute to PCS. The most common of these was cerebral dysfunction, followed by anxiety, depression, secondary gain, conversion, primary gain and 'other factors'.

A significantly higher percentage of neuropsychologists endorsed organic factors than neurosurgeons (McMordie 1988). Neuropsychologists were also significantly less likely than neurosurgeons to endorse compensation factors (McMordie 1988).

Treatment of PCS

Neuropsychologists reported a range of interventions as being useful in treating PCS (Mittenberg and Burton, 1994). The most frequently cited were education, support/reassurance, graded increase in activity, antidepressant medication, cognitive restructuring, progressive muscle relaxation and rest.

The treatments most commonly recommended by family practitioners, neurologists, neurosurgeons, orthopaedists and physicians (Evans et al, 1994; Stranjalis et al, 2000) were medication, cognitive rehabilitation and psychotherapy. Other services (psychologists, psychiatrists, pain clinic and head injury unit) were also commonly used.

The treatments most commonly recommended by rehabilitation professionals (Harrington et al, 1993) were patient/family education, cognitive rehabilitation, support groups, graded resumption of activities, vocational counselling and psychotherapy. The services most commonly used by rehabilitation professionals (Harrington et al, 1993) were neuropsychology, speech pathology, physiatry, occupational therapy, vocational rehabilitation, social service and clinical psychology.

The majority of neurosurgeons, neuropsychologists and rehabilitation professionals (Auerbach, 1967; McMordie, 1988; Harrington et al, 1993; Mittenberg and Burton, 1994) thought that both medication and psychotherapy could be helpful in treating PCS.

A significantly higher proportion of neuropsychologists and rehabilitation professionals than neurosurgeons thought that psychotherapy is helpful (Harrington et al, 1993; McMordie, 1988). Physicians and psychologists had more confidence in antidepressant medication than other rehabilitation professionals (Harrington et al, 1993). Psychologists and rehabilitation professionals had more confidence in vocational rehabilitation than physicians (Harrington et al, 1993). A significantly larger proportion of psychologists used stress management and psychotherapy than physicians or other rehabilitation providers (Harrington et al, 1993).

Cultural differences

Fewer Greek physicians than American physicians recommended cognitive testing for patients and believed litigation to be the main cause of PCS (Stranjalis et al 2000).

Discussion

The results provide information about different professionals groups' opinions about PCS. It is useful to compare these opinions to current research regarding PCS to determine whether there are any misconceptions or gaps in knowledge.

DSM-IV provides a preliminary definition of PCS, where the main symptoms are listed as fatigue, disordered sleep, headache, dizziness, irritability, anxiety, depression, apathy, changes in personality, attention problems and memory problems. The symptoms reported by both rehabilitation professionals (Harrington et al 1993), neuropsychologists (Mittenberg and Burton, 1994) and GPs (MacKenzie, 2001) are consistent with this. Studies that have followed up people with a MHI suggest that the most commonly reported symptoms are headaches, memory problems, sleep disturbance, fatigue, dizziness and irritability (Rimel et al, 1981; Alves et al, 1993; Youngjohn, Burrows and Erdal, 1995; Haboubi, Long, Koshy and Ward, 2000). It is noted that difficulty concentrating, which is the most common symptom expected by neuropsychologists, is reported with less frequency by patients than other symptoms. However, it is possible that patients themselves are less aware of this difficulty or may describe it as a memory problem. Data from neuropsychological assessments confirms that MHI can result in attention/concentration deficits (Binder and Rohling, 1996).

MacKenzie (2001) used two formats for assessing knowledge. This suggests that people do better with a checklist than using free recall. The knowledge of symptoms among neuropsychologists and rehabilitation professionals (McMordie, 1988; Harrington et al, 1993) was assessed using a multiple choice format. It is possible that these groups might appear less well informed if a free recall response was

required. Since checklists are unlikely to be used routinely in clinical practice, it would seem important to assess knowledge without providing such prompts. This may be more reflective of the knowledge professionals are likely to pass on to patients.

The remaining groups were not directly questioned about symptoms associated with PCS. Furthermore, although rehabilitation professionals were asked about symptoms, this group consisted of a number of different disciplines who may have had different awareness of symptoms. Therefore it remains unclear whether some health care professionals are aware of all the potential sequelae of a MHI. Given that GPs were able to name only a few symptoms using free recall, it is possible that other professionals may not be fully aware of all potential problems following MHI.

The reports from professionals regarding recovery time tended to be within the ranges reported in the literature (Englander et al, 1992; Rimel et al, 1981; Thornhill et al, 2000; Deb et al, 1998; Levin et al, 1987), although it is recognised that these published ranges are wide. It is also noted that some studies asked about the average time for recovery. (Auerbach et al, 1967; McMordie, 1988; Harrington et al, 1993). Thus although some participants endorsed short recovery periods, it is possible that they may also be aware that some cases take longer to recover.

It has been acknowledged that organic, emotional and compensation factors can all contribute to PCS (King, 1997). However, the relative contribution of each is uncertain. With the exception of the physicians in the Stranjalis et al (2000) study, there was consensus among the professionals that organic factors were the main contributor to PCS, followed by emotional factors then compensation factors.

Brief interventions consisting of information about common symptoms and how to cope with them have been shown to be of benefit for MHI (Wade et al, 1998; Mittenberg et al 1996; Paniak et al 2000). Such interventions were mentioned as useful by approximately 80% of neuropsychologists and rehabilitation professionals.

Family practitioners, neurologists, neurosurgeons, orthopaedists and physicians did not suggest this intervention. Therefore there is a possibility that a small proportion of neuropsychologists and rehabilitation professionals and the majority of other professionals are unaware that providing information and advice about MHI is important.

There is some evidence that neuropsychological rehabilitation can be of benefit for persistent PCS (Cicerone et al, 1996; BSR, 1998; RCSE, 1999). Such input was recommended by the majority of rehabilitation professionals and a proportion of family practitioners, neurologists, neurosurgeons, and orthopaedists. However, there remains a significant proportion of professionals who may be unaware of the benefit of neuropsychological input.

A range of other interventions and services were suggested as useful for PCS. It is possible that some of these are of benefit for PCS, e.g. relaxation, stress management, support groups, pain clinic, although there is currently little research to support their use with PCS specifically.

A variety of health care professionals are included in the studies reviewed. Where statistical analyses were carried out it was noted that some differences of opinion existed between professionals. Neurosurgeons tended to believe in shorter recovery periods whereas neuropsychologists and rehabilitation professionals tended to endorse longer recovery periods. Neuropsychologists and rehabilitation professionals also had greater confidence in the benefits of psychotherapy than neurosurgeons. The use of different questionnaires in different studies makes it hard to compare across all studies. However, it is also possible that family practitioners, neurologists, neurosurgeons, orthopaedists and physicians are less well informed about possible treatments than neuropsychologists and rehabilitation professionals.

These differences between professional groups might reflect the different training and awareness of the issues relating to head injury. The groups may also come into

contact with patients at different stages of recovery and be responsible for different types of care. For example, neurosurgeons and neurologists are more likely to be concerned with the immediate management of the injury, whereas neuropsychologists and rehabilitation professionals are likely to see those with persistent problems who require intervention. General physicians or family practitioners might be involved in referring patients to other services rather than providing treatment directly.

Although the studies survey a range of professionals there remain some groups whose opinion has not been sampled or who have been included only in a group analysis. For example, accident and emergency (A&E) doctors are frequently involved in the care of head injured people yet they are a group who have not been sampled. A postal survey of A&E Departments in the UK found that although written instructions regarding symptoms indicative of complications were routinely provided to patients, no departments provided written instructions about PCS symptoms or ways of coping with them (Hodgkinson, Berry and Yates, 1994). It is therefore possible that A&E doctors are either unaware of possible persisting symptoms and ways of coping, or do not see the value of providing this advice to patients. However, as noted in the SIGN (2000) guideline, this information should be provided to all patients.

McMordie (1988) noted that there had been some change of opinion over time. Most of the studies reviewed were conducted before or during the early 1990s. Since this time more research has become available, including treatment studies and professional guidelines regarding management of head injury. It is possible that opinion regarding PCS or MHI may change in response to these publications. Therefore it would be useful to survey current opinion to see whether these documents have led to more uniform and accurate opinions about PCS and MHI among professionals

PART 2

Objective: To systematically review the literature to determine the opinion about symptoms, recovery and treatment of PCS among lay people and those who have had a MHI.

Previous reviews

No previous reviews were identified.

Criteria for considering studies for this review

Types of studies

Any

Types of participants

Lay people/General public

People who have experienced a MHI

Types of questions addressed

Any study that addresses one or more of the following areas.

1. The nature of symptoms expected after MHI
2. Recovery from MHI
3. Treatments for MHI/PCS

Search strategy for identification of studies

A literature search using the following databases was carried out using the following search strategy:

Databases

Medline (1966 to March 2002), PsychInfo (1967 to March 2002), Embase (1980 to March 2002), Cinahl (1982 to March 2002), Amed (1985 to March 2002).

Strategy

1. All references to knowledge or opinion(s) or attitude(s) or perception(s) or expectation(s) or survey.
2. All references to head injury or brain injury or post(-)concussion.
3. Combine searches 1 and 2.
4. All references to lay or public or naïve.
5. combine searches 3 and 4.
6. All references to mild head injury or mild brain injury or minor head injury or minor brain injury or post(-)concussion
7. combine searches 1 and 6.

Hand searches were performed using the following journals:

Brain Injury (1992 to 2002)

Journal of Neurosurgery, Neurology and Psychiatry (1992-2002)

The reference sections of all identified papers were examined to locate any additional studies. A citation search was carried out using the papers identified.

Methods of the review

Each study that met the inclusion criteria was assess for methodological quality using the same criteria as in part 1.

Description of studies

13 studies met the inclusion criteria. These are described in table 2.

INSERT TABLE 2 HERE

Methodological quality of included studies

All studies were of a similar quality. However, there are some methodological weaknesses in each as detailed below.

Three studies (Mittenberg et al, 1992; Ferguson et al, 1999; Gunstad and Suhr, 2001) did not set out to specifically examine knowledge of MHI or PCS. These studies were concerned with comparing current symptoms with either expectations of what symptoms might occur following MHI (general public groups) or estimates of pre-morbid symptoms (MHI groups). However, since some of the groups completed checklists indicating their expectations of symptoms following MHI, these studies are included, with the relevant data being reported.

Nine studies used symptoms checklists to examine knowledge of the sequelae of MHI (Aubrey et al 1989; Mittenberg et al, 1992; Wong et al, 1994; Lees-Hayley and Dunn, 1994; Ferguson et al, 1999; MacKenzie, 2001; Gunstad and Suhr, 2001; Ferrari et al, 2001a; Ferrari et al, 2001b). The checklists contained between 10 and 97 items. Using more items in a checklist will increase the frequency with which symptoms are endorsed. Hence those studies that had a large number of items in the checklist might present an overestimate of knowledge of PCS. Six studies included distracter items (MacKenzie, 2001; Aubrey et al 1989; Wong et al, 1994; Ferrari et al, 2001a; Ferrari et al, 2001b; Gunstad and Suhr, 2001), but only three examined the results for true items vs. distracter items (MacKenzie, 2001; Aubrey et al 1989; Gunstad and Suhr, 2001).

Eight studies (Aubrey et al, 1989; Mittenberg et al, 1992; Wong et al, 1994; Ferguson et al, 1999; Ferrari et al 2001a; Ferrari et al, 2001b; Gunstad and Suhr, 2001; MacKenzie, 2001) provided a case scenario for participants to base their answers on, which provides some control for the severity of head injury being discussed. There was some variation within these definitions. Two mentioned a car accident with a loss of consciousness, four mentioned a car accident but with variations in loss of consciousness (few minutes to few hours) and time spent in hospital (overnight to 2 weeks), and one mentioned brief loss of consciousness resulting from a sporting accident. The remaining studies did not provide a definition of head injury. It is possible that participants may be referring head injuries of all severities. This is particularly likely in the Springer et al (1997) study where the participants were

friends or relatives of people receiving inpatient rehabilitation for moderate to severe head injury.

Three studies used agreement with statements to assess knowledge about head injury (Gouvier et al, 1988; Willer et al, 1993; Springer et al, 1997). These statements were rated as 'true', 'probably true', 'probably false' and 'false'. In the analysis, scores for 'probably true' were grouped with 'true', and scores for 'probably false' were grouped with 'false'. This method of analysis means that the percentage misconception might be underestimated. The scores in the 'probably' categories are likely to mean that the participant is uncertain and might even be guessing. Springer et al (1997) acknowledged this problem noted that a quarter of responses used the 'probably' categories. Hence the level of misconception may be higher than that reported.

Results

Symptoms

The nine studies that used checklists all suggested that people are able to identify symptoms consistent with PCS when using a checklist. One study (Aubrey et al, 1989) found that people are less aware of the cognitive symptoms than the physical and emotional ones, while a second study (MacKenzie, 2001) suggested emotional symptoms were better known than cognitive and physical ones. MacKenzie (2001) noted that the average number of symptoms people are able to identify when asked to self-generate them is less than one. This study also noted a correlation between the number of 'true' symptoms identified and the number of distracter symptoms endorsed. This suggests that people may be aware that symptoms increase following MHI but are unsure which symptom specifically to expect.

A small but substantial percentage of people (4% – 25%) hold misconceptions about 'brain damage' and brain injury sequelae, although it is unclear what severity of head injury this relates to (Gouvier et al, 1988; Willer et al, 1993; Springer et al, 1997).

Recovery

A cultural difference was noted regarding the expected duration of symptoms. A larger proportion of Canadians expect symptoms to persist 'for months or years', compared to Greeks and Lithuanians (Ferrari et al, 2001a; Ferrari et al, 2001b). No other studies examined recovery from MHI.

The percentage of misconceptions regarding recovery from head injury of undefined severity ranged from 30% to 50% (Gouvier et al, 1988; Willer et al, 1993; Springer et al, 1997).

Treatment

No studies directly assessed knowledge of treatments or interventions for MHI. However, Springer et al (1997) asked relatives three questions about rehabilitation and reported a mean misconception rate of 21%.

Discussion

It was found that people are able to identify common symptoms of MHI when using a checklist. However, when distracter items are added, many participants also endorse these. Furthermore people had difficulty naming more than one symptom when asked to generate symptoms themselves. This latter result is consistent with a study which examined lay persons' knowledge of posttraumatic stress disorder (PTSD; Burges and McMillan, 2001). This study also noted that although many people were able to name symptoms of PTSD with a checklist, few were able generate symptoms themselves. Overall it is therefore suggested that people lack specific knowledge about common sequelae of MHI. This lack of knowledge may contribute to the development or maintenance of PCS. This finding also emphasises that patients rely on professionals to provide them with information about common sequelae of MHI and how to cope with them.

The few studies that examined knowledge of treatment and recovery were not specific to MHI. However, if misconceptions exist about head injury in general then it is likely that there may be misconceptions about MHI specifically. If people are unaware that help could be offered to them they may be less likely to seek help, thus re-emphasising the need for professionals to be well informed so that they can offer appropriate interventions or services to people with a MHI.

The majority of studies were carried out in the USA or Canada. Since Ferrari et al (2001a,b) noted that there were cultural differences in expectations about length of recovery, it would seem important to examine opinion about recovery in other countries. Furthermore, Gouvier et al (1988) found that many people get their information from the media or from friends and family. Given that media coverage will be different in different countries, this is another reason for conducting studies in countries other than the USA and Canada.

Finally, it is worth noting that some studies used college/university students (Aubrey et al, 1989; Wong et al, 1994; Lees-Hayley and Dunn, 1994; Gunstad and Suhr, 2001). These samples are not representative of the typical MHI population. Males between the ages of 15 and 24 in social classes III–V comprise the highest risk group for MHI (Bernstein, 1999).

Conclusions

The aim of this review was to establish current knowledge/opinion about PCS/MHI among professionals, lay people and people who have experienced a MHI. It was thought that if misconceptions existed then this might influence the services that patients with MHI receive.

The main findings from part one suggest that there may be limited knowledge about some aspects of MHI among professionals and that there are some differences of

opinion between professional groups. While some professionals are aware of common symptoms of PCS, it is possible that prompts (e.g. checklists) are required to elicit this knowledge. Reports of recovery are consistent with published research, although it is acknowledged that these reports cover a large range of recovery. It is likely that many professionals are unaware of the best interventions for PCS, namely that providing information and advice about symptoms is important.

The main findings from part two suggest that lay people and people with a MHI have limited knowledge about MHI. They are aware that an increase in symptoms is expected but it is possible that they lack knowledge about which symptoms in particular to expect and may also be unaware of how to cope with them. Although there were few studies of knowledge about treatment and recovery, it is suggested that misconceptions exist in these areas.

Overall, these findings emphasise that patients are unlikely to be unaware of what to expect following a MHI and will rely on professionals to provide them with appropriate care. However, it is possible that some groups of professionals may be unaware of all the common symptoms following a MHI, and are also unaware that providing information about potential symptoms and how to cope with them is important.

There are some groups commonly involved with MHI (e.g. A&E doctors) who have not been studied. Some studies on professionals knowledge were carried out more than 8 years ago (Auerbach et al, 1967; McMordie, 1988; Harrington et al, 1993; Evans et al, 1994; Mittenberg and Burton, 1994) and may have changed over time in response to new publications. Finally, little is known about professional opinions about PCS in countries other than the USA. Future research might address some of these issues to ensure good care for patients is not being impeded by practitioners misconceptions or lack of knowledge.

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Table 1: Description of studies included in review

Study author	Year	Study type	Quality Rating	Population (n)	Main measure	Main Results	Comments
Auerbach, Schefflen and Scholtz	1967	Cohort postal survey (Response rate: 51%)	IIb	USA Neurosurgeons (253)	Questionnaire multiple choice response	<p><u>Length of recovery</u>: No trend in responses.</p> <p><u>Cause of symptoms</u>: Organic>emotional>litigation.</p> <p><u>Treatment</u>: Medication: helpful or occasionally helpful – 60%. Psychotherapy: Responses spread evenly from helpful to not helpful.</p>	
McMordie	1988	Cohort postal survey (Response rate: 38%)	IIb	USA Neurosurgeons (195) Neuropsychologist (185)	Questionnaire multiple choice response	<p><u>Length of recovery</u>: trend for neuropsychologists to endorse longer time periods for recovery. Trend for neurosurgeons to endorse shorter time periods for recovery.</p> <p><u>Cause of symptoms</u>: Organic>emotional>litigation.</p> <p><u>Treatment</u>: Medication helpful or occasionally helpful: 60% of neurosurgeons and 68% of neuropsychologists Psychotherapy helpful or occasionally helpful: 51% of neurosurgeons and 82% of neuropsychologists.</p>	Uses same questions as Auerbach (1967)
Harrington, Malec, Cicerone, and Katz	1993	Cohort postal survey (Response rate: 21%)	IIb	USA Rehabilitation professionals (213)	Questionnaire multiple choice response	<p><u>Symptoms</u>: cognitive symptoms most common, followed by irritability, somatic symptoms, psychological symptoms and sensory impairment.</p> <p><u>Length of recovery</u>: trend for participants to endorse longer time periods for recovery.</p> <p><u>Cause of symptoms</u>: Organic>emotional>litigation</p> <p><u>Treatment</u>: Medication helpful or occasionally helpful: 63%. Psychotherapy helpful or occasionally helpful: 80%.</p> <p>Interventions and services used by more than half the sample: Patient/family education, cognitive rehabilitation, support groups, graded resumption of activities, counselling, psychotherapy, neuropsychology, speech pathology, psychiatry, occupational therapy, vocational rehabilitation, social service and clinical psychology.</p>	Uses same questions as Auerbach (1967) plus additional questions

Table 1(continued): Description of studies included in review

Study author	Year	Study type	Quality Rating	Population (n)	Main measure	Main Results	Comments
Evans, Evans, and Sharp	1994	Cohort postal survey (Response rate: 18%)	IIC	USA Family practitioners (118) Neurologists (100) Neurosurgeons (97) Orthopaedists (82)	Questionnaire agreement with statements	Length of recovery: median length of recovery reported by all 4 groups was 3-6 months. Cause of symptoms: Organic. Similar proportions endorse emotional and litigation factors. Treatment: More than 50% of sample endorse medication, cognitive rehabilitation and referrals to psychologists.	Statements used in survey are not reported.
Mittenberg and Burton	1994	Cohort postal survey (Response rate: 35%)	IIb	USA Neuropsychologist (165)	Questionnaire multiple choice and free responses	responses reported by more than half the sample are given here Symptoms: poor concentration, poor memory, irritability, headache, fatigue, depression, anxiety and dizziness. Cause of symptoms: cerebral dysfunction and anxiety. Treatment: education, support/reassurance, graded increase in activity. Effectiveness of medication and psychotherapy.	
Stranjalis, Tsamandouraki Alamanos, Evans and Singounas	2000	Cohort postal survey (Response rate: 14%)	IIC	Greece General physicians (9) Neurologists (21) Neurosurgeons (11) Orthopaedists (12)	Questionnaire agreement with statements	Length of recovery: 71% endorsed the statement that symptoms usually settle within 6 months, 76% agreed that a year after injury a small percentage of patients suffer post-concussion symptoms. Cause of symptoms: Emotional>organic>litigation. Treatment: More than 50% of sample endorse use of medication.	Used same statements as Evans et al (1994) translated into Greek.
MacKenzie	2001	Cohort	IIb	UK General Practitioners (30)	Case vignette. free recall of symptoms and then checklist.	Symptoms: Using free recall a mean of 2.5 symptoms were reported. Using a checklist, 60% reported more than 6 symptoms.	Details of symptoms endorsed on checklist not reported.

Table 2: Description of studies included in review

Author	Year	Quality rating	Sample (n)	Main measures	Main outcome	Comments
Gouvier, Prestholdt and Warner	1988	IIb	USA General public (221)	Agreement with 25 statements. 4 areas covered: brain damage, unconsciousness, amnesia, recovery.	Overall percentage misconception: 25.21% brain damage: 44.83% unconsciousness: 55.43% amnesia: 49.65% recovery: 49.65%	Combined 'true' with 'probably true' and 'false' with 'probably false'. May be higher proportion of misconceptions if people are uncertain about items. No definition of severity of head injury given.
Aubrey, Dobbs and Rule	1989	IIb	Canada University students (43)	50 item symptom checklist following car accident (with LOC or without). Symptoms grouped into 5 categories: Physical (high frequency and low frequency) affective, cognitive and distracter.	Subjects aware of physical and affective symptoms but not cognitive symptoms following MHI. Rated symptoms more likely when LOC present than when no LOC.	Distracter items included and used in analysis.
Mittenberg, DiGiulio, Perrin and Bass	1992	IIb	USA General public (223)	30 item symptom checklist. Report current symptoms and symptoms predicted to occur 6 months after car accident.	General public predict symptoms consistent with PCS.	Distracter items not included.
Willer, Johnson, Rempel and Linn	1993	IIb	General Public USA: 245 Canada: 68	9 statements taken from Gouvier et al 1988 paper.	Overall percentage misconception: 4.5%, 4.4% brain damage: 18%, 16.2% unconsciousness: 59.3%, 62.2% amnesia: 45.83%, 49.25% recovery: 45.83%, 49.25%	Used same type of analysis as Gouvier et al, 1998. No definition of severity of head injury given.
Wong, Regennitter and Barrios	1994	IIb	USA University Students (141)	10 item symptom checklist. Report about symptoms expected after car accident.	Simulated group identified symptoms consistent with MHI.	Distracter items - reported by head injured people but not considered to be PCS.

Table 2 (continued): Description of studies included in review

Author	Year	Quality rating	Sample (n)	Main measures	Main outcome	Comments
Vaughn, Frank, Leach, O'Neal and Sylvester	1994	IIC	<u>USA</u> General public (1123)	Multiple response questions about cause, symptoms and rehabilitation cost associated with MHI.	85.8% thought head injury was serious or very serious problem. Those with lower education endorsed more symptoms.	No definition of severity of head injury given.
Lees-Hayley and Dunn	1994	IIb	<u>USA</u> University students (98)	10 item symptom checklist.	63.3% of subjects able to identify half or more of MHI symptoms	No distracter symptoms given in list.
Springer, Farmer and Bouman	1997	IIb	<u>USA</u> Friends and relatives of inpatients at rehabilitation centre (51)	Agreement with statements, some taken from Gouvier et al 1988. 6 areas covered.	Overall percentage misconception: 7.73% brain damage: 11.17% brain injury sequelae: 46.67% unconsciousness: 35.43% recovery: 29.75% rehabilitation: 20.67%	Used same type of analysis as Gouvier et al, 1998. No definition of severity of head injury given.
Ferguson, Mittenberg, Barone and Schneider.	1999	IIb	<u>USA</u> Athletes without MHI Normal: (159)	30 item symptom checklist. Normals rates current symptoms and symptoms predicted to occur 6 months after concussion in sporting competition.	Normals overestimate number of symptoms following MHI.	No distracter items included.
Ferrari, Obelieniene, Russell, Darlington, Gervais and Green.	2001	IIb	Employees Lithuania (171) Canada (179)	56 item symptom checklist Report expected symptoms following car accident with LOC. Indicated expected duration of symptoms checked.	Both groups had similar and accurate expectation of acute syndrome but Canadians expected symptoms to be more chronic.	Distracter items included but not used in analysis.

Table 2 (continued): Description of studies included in review

Author	Year	Quality rating	Sample (n)	Main measures	Main outcome	Comments
Ferrari, Constantoyannis and Papadakis	2001	IIb	Employees Greece: 200 Canada: 179	56 item symptom checklist. Report expected symptoms following car accident with LOC. Indicated expected duration of symptoms checked.	Both groups had similar and accurate expectation of acute syndrome but Canadians expected symptoms to be more chronic.	Included distracter but didn't analyse results.
MacKenzie	2001	IIb	<u>UK</u> MHI (30) Lay people (30)	Case vignette followed by free recall of expected symptoms then expected symptoms using 10 item checklist.	Free-recall – mean for both groups <1. Checklist – 40% of MHI and 20% of controls named more than 6 symptoms of PCS.	Included distracter. Correlation between number of correct symptoms and number of distracter items ticked.
Gunstad and Suhr	2001	IIb	<u>USA</u> Healthy controls (25) Healthy athletes (21) Depressed group (25)	97 item symptom checklist. Report current symptoms and expected symptoms following car accident with LOC.	All groups expected more symptoms than currently experiencing. Athletes expected less symptoms than other groups.	Included distracter items. Participants expected increase in distracter items as well as 'true' symptoms.

Abbreviations used: LOC-Loss of consciousness; MHI-Mild head injury

Chapter 3. Major Research Project Proposal

Current opinion about post-concussion syndrome among people with mild head injuries, their relatives and professionals.

Prepared in accordance with guidelines from D.Clin.Psy course handbook
(Appendix 3.1).

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Title

Current opinion about post-concussion syndrome among people with mild head injuries, their relatives and professionals.

Summary

The opinion of healthcare professionals, the patient and the patient's relatives may all be important in determining the services a person receives after experiencing a mild head injury (MHI). This study therefore aims to explore the current opinion about a common consequence of MHI, post-concussion syndrome (PCS), among neurosurgeons, clinical neuropsychologists, accident and emergency doctors, head-injured people and the relatives of head-injured people.

Neurosurgeons, clinical neuropsychologists and accident and emergency doctors throughout the UK will be surveyed by post to explore their opinions of different aspects of PCS, including symptom presentation, treatment, aetiology and disability. The head injured group and their relatives will be recruited from Glasgow Royal Infirmary and seen in person. They will be asked about symptoms of PCS using two different paradigms, and about other aspects of PCS.

The results of this study may highlight misconceptions among the groups, which can be addressed through training and education.

Background

A common consequence of minor head injury (MHI) is postconcussion syndrome (PCS), which consists of a wide range of physical, affective and cognitive symptoms, including headache, dizziness, poor concentration, memory difficulties, anxiety and depression. In many cases these symptoms resolve within three months (Levin, Mattis and Ruff, 1987) although in some cases symptoms can persist for up to at least one year post injury and can impact on the persons psychosocial functioning (Thornhill, Teasdale, Murray, McEwan, Roy and Penny, 2000).

Both psychological and pharmacological treatments exist for PCS, although there are few controlled studies. However, early psychological intervention may help reduce persistence and severity of PCS (Mittenberg Tremont, Zielinski, Fichera and Rayls, 1996; Wade, King, Wenden, Crawford and Caldwell, 1998).

Different people, including the patient, their family and healthcare professionals, may influence whether a person receives treatment for PCS. The patient's opinion about their symptoms may influence whether they seek help. The relative's opinion may influence whether they encourage the patient to seek help. However, some studies have found misconceptions about head injuries among the general public, including inaccurate beliefs about the range of symptoms that can result from a head injury and about expected recovery time. (Aubrey Dobbs and Rule, 1989; Willer, Johnson, Rempel and Linn, 1993; Swift and Wilson, 2001). Misconceptions such as these might prevent the patient from seeking help.

There has also been considerable debate surrounding PCS. It is not a formal diagnosis in DSM-IV and instead is classified as a category requiring more research. ICD-10 also emphasises the uncertainty regarding its aetiology. This uncertainty

about PCS, combined with different training for different professions may mean professionals groups have different opinions about PCS and this may influence the service they offer to the patient.

Several studies have explored professional opinion of PCS. Professional groups surveyed include neurosurgeons, neuropsychologists and rehabilitation professionals (Auerbach, Schefflen and Scholtz, 1967; McMordie, 1988; Harrington, Malec, Cicerone and Katz, 1993; Mittenberg and Burton, 1994). Differences in opinion were found between neurosurgeons and neuropsychologists regarding persistence of symptoms and usefulness of treatment. (McMordie, 1988). These surveys were all conducted in the USA some time ago. It is therefore possible that opinion is different in the UK or that opinion may have changed in light of more recent evidence and is now the same across professional groups.

Many people with head injuries will attend an accident and emergency department. Little is known about the opinion of accident and emergency doctors regarding PCS, yet their opinion may influence advice given to head-injured patients and hence influence whether the patient accesses further treatment if needed.

Knowledge of disorders has been examined using both a recognition paradigm, (Lees-Hayley and Dunn, 1994) a recall paradigm (Burges and McMillan, 2001). A recall paradigm may provide a more naturalistic method of exploring knowledge of PCS since knowledge is required to produce a response and it may also reflect the way a person reports symptoms in a clinical interview. However, checklists may reflect the leading nature of some questions in a clinical interview and may increase the number of symptoms reported. It may therefore be useful to examine a person's knowledge about PCS using both types of paradigm.

Aims

This study aims to examine different professional groups opinions' about PCS including symptom presentation, extent of disability, aetiology, and treatment. The

professional groups to be included are clinical neuropsychologists, neurosurgeons, and accident and emergency doctors.

This study also aims to examine the opinion of people who have experienced a recent MHI and their relatives about PCS, including symptom presentation and treatment.

Hypotheses

- 1) Professionals of different disciplines have the same concept of PCS regarding symptom presentation. They expect the same symptoms to be present and these symptoms meet DSM-IV research criteria for PCS.

- 2) Professionals of different disciplines may have the same opinion regarding other aspects of PCS in that:
 - They think the majority of PCS cases persist for 3 months or less.
 - For PCS lasting more than 3 months they have the same opinion regarding how disabling symptoms are.
 - They have the same opinions regarding the aetiology of PCS.
 - They consider the same treatment options and services for people with PCS.
 - They have the same opinion about treatment effectiveness.

- 3) People who have had a MHI and their relatives will have a limited concept of PCS in that:
 - They list insufficient symptoms to meet DSM-IV research criteria for PCS.
 - They expect symptoms to persist for less than three months.

- 4) Use of a recognition paradigm (checklist) will allow people with a MHI and their relatives to identify more symptoms of PCS than in a free recall paradigm (case vignette).

Plan of Investigation

Subjects

The subject groups to be included in this study are:

- 1) Neurosurgeons currently practicing in the UK.
- 2) Clinical neuropsychologists currently practicing in the UK.
- 3) Accident and emergency doctors currently practicing in the UK.
- 4) People who have had a MHI in the past 1-3 months.
- 5) Relatives of people who have experienced a MHI in the past 1-3 months.

Exclusion criteria

- 1) The MHI group will not include people who did not suffer a loss of consciousness or people whose loss of consciousness lasted more than thirty minutes.
- 2) The MHI group will not include anyone who has posttraumatic amnesia (PTA) of less than five minutes or more than one day.
- 3) The MHI group and the relatives group will not include people who have studied medicine or psychology to a degree level.
- 4) Any person who has previously experienced a severe head injury. (PTA greater than one day or Glasgow Coma Scale score less than 8.)
- 5) Any person under the age of 16 or over the age of 65.
- 6) Any person suffering from a diagnosed mental illness or dementia.
- 7) Any person with a learning disability.

Power analysis

This study uses a newly developed questionnaire as its main measure so there are no directly comparable studies. Therefore two studies, one asking professional opinion based on a case vignette, (Webb, Rose, Johnson and Attree, 1996) and one using a checklist with head-injured people (Ferguson Mittenberg, Barone and Schneider, 1999) were used. Power calculations based on these studies suggest that for an medium effect size of 0.8 with the probability of detecting a difference being 0.05, a

minimum of 14 subjects are needed in each of the head injured and relatives groups and a minimum of 25 subjects are needed in each of the professional groups. However for a more representative sample of professionals in the UK it is anticipated the numbers of professionals taking part will be higher.

Measures

A case vignette will be developed describing a person who has experienced a MHI. Subjects will be asked to read this and list all the symptoms they would expect the person to be experiencing at 1 month post injury.

Two questionnaires consisting of a series of questions about PCS will be developed. One will be given to professionals. The other will be given to the people with a MHI and their relatives.

The post-concussion syndrome checklist (PCSC) (Gouvier, Cubic, Jones, Brantley and Cutlip, 1992) and an extended version of the PCSC containing distracter items (MacKenzie, 2001) will be used. People with a MHI and their relatives will randomly be given one of the checklists and asked to indicate which symptoms they would expect the person in the vignette to be experiencing.

The Spot the Word Test (Baddeley, Emslie and Nimmo-Smith, 1993) will be given to people with a MHI and their relatives to estimate their pre-morbid IQ and IQ respectively. A retrospective measure of PTA (McMillan, Jongen and Greenwood, 1996) will be given to people with a MHI.

The Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983), the PCSC (Gouvier et al, 1992) and the Posttraumatic Stress Diagnostic Scale (PDS) (Foa 1995) will be given to people with a MHI to screen for anxiety, depression, PCS and PTSD.

Demographic data will be gathered for all subjects. A summary of which groups get which measures is detailed in Table 1.

INSERT TABLE 1 HERE

Procedure

Relevant professional bodies will be approached for a list of current practising clinical neuropsychologists and neurosurgeons in the UK. Individuals will then be sent a letter inviting them to participate, along with the relevant measures to complete and return. A list of practising accident and emergency doctors has been obtained.

Consent has been obtained to recruit head injured people from hospital discharge records at Glasgow Royal Infirmary.

When head injured patients are recruited they will be asked to bring a relative with them who is also willing to participate. These people will be seen in person to complete the relevant measures.

Design

This study uses mainly a between groups design to compare opinion between groups. However, a within subjects design is used to compare the number of symptoms produced in response to the vignette and checklist.

Settings and equipment

The head injured group and their relatives will be seen at Glasgow Royal Infirmary. The professionals will be surveyed by post.

The resources required consist of the measures described above plus envelopes and postage necessary to complete the postal survey.

Data analysis

All identifiers will be removed from the data. All information will be kept in a locked filing cabinet. SPSS will be used to store and analyse the data.

The symptoms produced by the groups will be used to determine whether they are describing PCS as defined by DSM-IV research criteria. Chi square analyses will be used to examine whether there are differences between groups regarding meeting DSM-IV research criteria for PCS and regarding the responses to multiple-choice questions.

ANOVAs will be used to determine whether there are differences between the professional groups regarding the proportion of people with PCS who are still disabled at three months and the extent of this disability.

Frequencies of the different treatments used by the professional groups will be calculated.

A three factorial ANOVA will be used to identify any differences between the head-injured and relatives groups, between the checklist and the vignette or between the two checklists in relation to the number of symptoms generated.

It is assumed that the data will be normally distributed. However, should this not be the case, equivalent non-parametric tests (i.e. Kruskal-Wallis and Friedman) will be used to replace the ANOVAs.

Practical applications

Awareness of gaps in knowledge or misconceptions among people with a MHI and their relatives can allow health care professionals to provide appropriate education and thus encourage people to seek treatment when required.

This study may also highlight whether professionals might require further training to ensure that their opinions are supported by current evidence and that appropriate interventions or services are considered for this patient group.

Timescales

Data collection will commence once ethical approval is received. It is estimated to begin by June 2001 and will take about 8 months.

Data entry and analysis is estimated to take 1 month.

Report writing is estimated to take 1 month.

Ethical Approval

Ethical approval will be sought from North Glasgow Hospitals University NHS Trust, then from the University of Glasgow.

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Table 1. A summary the measures used with each group.

Measure	(√) indicates who measure will be given to		
	Professionals	People with MHI	Relatives
Case vignette	√	√	√
Questionnaire for non-professionals		√	√
Questionnaire for professionals	√		
PCSC (for expected symptoms)		√	√
Demographics	√	√	√
Spot the Word Test		√	√
PTA		√	
HADS		√	
PCSC (for own symptoms)		√	
PDS		√	

Amendments to Proposal

Five months were spent trying to recruit people with a mild head injury and their relatives. Letters were sent to all people who had been admitted to the hospital over this period, inviting them to participate. No responses were received. The A&E ward was also telephoned three to five times a week to see whether anyone had been admitted with a head injury. Anyone who had been admitted was approached on the ward by the researcher and invited to participate. Although 10 people said they would be interested, only 2 agreed one month later. Neither had a relative who was willing to take part. The lack of response may have been due to the request for participants to attend an interview to complete the measures.

It was therefore decided to stop recruiting relatives and try to increase the number of head injured people by sending out questionnaires by post, rather than invite them to attend for interview. The number of measures was also reduced in an attempt to increase the response rate this group. The Spot the Word Test, PDS, HADS and PTA measures were not used.

Chapter 4. Major Research Project Paper

Current opinion about post-concussion syndrome among health-care professionals and people with a mild head injury.

Prepared in accordance with the guidelines for submission to *Journal of Neurology, Neurosurgery and Psychiatry* (Appendix 4.1)

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Objectives. To evaluate current opinion about post-concussion syndrome (PCS) among accident and emergency doctors, neurosurgeons, clinical neuropsychologists and people with a mild head injury. To determine whether these opinions are consistent with current knowledge about PCS and whether further training is required for professionals working with mild head injury.

Method. A questionnaire was designed to assess opinion about symptoms, recovery, treatment and cause of PCS. It was posted to all groups for completion and return. The overall response rate for professionals was 48%. The response from the mild head injury group was 10%.

Results. Many participants named headaches and poor concentration as common symptoms of PCS. A substantial proportion of all groups failed to name some PCS symptoms such as dizziness, sleep disturbance and fatigue. All groups' opinions about recovery were consistent with the current literature. Many A&E doctors and neurosurgeons lacked knowledge about treatment, particularly regarding the efficacy of information provision. Organic factors were most frequently cited to be the main cause of PCS, followed by emotional factors and compensation factors. Overall, clinical neuropsychologists tended to be better informed about PCS. Due to the low response rate for the mild head injury group, descriptive data only is provided.

Conclusions. All groups, but particularly those working in acute settings, might benefit from further training to ensure that all patients with a mild head injury receive an appropriate service. Methodological limitations and suggestions for further research are discussed.

Introduction

Post-concussion syndrome (PCS) refers to the range of symptoms that can occur following a mild head injury (MHI). These can be cognitive (e.g. poor memory and concentration) emotional (e.g. anxiety and depression) or somatic (e.g. headaches, fatigue) in nature. Studies suggest that between 26% and 79% of people with a MHI report persisting symptoms at three months (Rimel, Giordani, Barth, Boll and Jane, 1981; Englander, Hall, Stimpson and Chaffin, 1992) and between 28% and 51% continue to experience either moderate or severe disability at one year post injury (Thornhill, Teasdale, Murray, McEwan, Roy and Penny, 2000; Deb, Lyons and Koutzoukis, 1998).

Recent studies have found that brief interventions, consisting of providing information about expected symptoms and how to cope with them, can reduce symptom duration and severity, and social morbidity. (Wade, King, Wenden, Crawford and Caldwell, 1998; Mittenberg, Tremont, Zielinski, Fichera and Rayls, 1996; Paniak, Toller-lobe, Reynolds, Melnyk and Nagy, 2000). Therefore it is important that such interventions are available to all people with a MHI. Two factors are likely to influence whether such help is provided. Firstly, the patients' perceptions about their condition and potential treatments are likely to influence whether they seek help. Secondly, the opinion of health-care professionals about MHI will influence the help or advice they offer to a patient.

Lay people have misconceptions about the consequences of head injury. (Gouvier, Prestholdt and Warner, 1988; Springer, Farmer and Bouman, 1997; Willer, Johnson, Rempel, and Linn, 1993). While people are able to identify common symptoms of MHI using checklists, (e.g. Aubrey, Dobbs and Rule, 1989; Ferguson, Mittenberg, Barone and Schneider 1999) they have difficulty doing so without such prompts (MacKenzie, 2001). Little is known about lay persons' perceptions of recovery from MHI and its treatment. However, given that their knowledge of symptoms is limited, it is likely that people with a MHI will be unaware of what help can be offered and therefore will rely on professionals to provide them with appropriate care.

PCS is a controversial issue among health-care professionals. Different factors have been hypothesised to influence the course of recovery including organic, emotional and litigation factors. (Binder, Rohling and Larrabee, 1997; King, Crawford, Wenden, Caldwell and Wade, 1999; Binder and Rohling, 1996). Furthermore, there are various definitions of PCS. DSM-IV (American Psychiatric Association, 1994) provides a preliminary definition, although it is not a formal diagnosis. However, many researchers prefer to use symptom checklists to confirm the presence of PCS (e.g. Gouvier, Cubic, Jones, Brantley and Cutlip, 1992; King, Crawford, Wenden, Moss and Wade, 1995).

The lack of clear consensus about PCS in the literature might lead one to suspect that different opinions about PCS exist among health care professionals. Indeed, some studies have found this to be the case. For example, neurosurgeons tend to believe in a shorter recovery time than neuropsychologists (McMordie, 1988), few general practitioners (GPs) are able to name common sequelae of MHI (MacKenzie, 2001) and more neuropsychologists and rehabilitation professionals than neurosurgeons think that psychotherapy is helpful (Harrington Malec, Cicerone, and Katz, 1993). Cultural differences have also been noted. For example, Greek physicians are less likely than American physicians to consider litigation as a main causal factor in PCS (Stranjalis, Tsamandouraki, Alamanos, Evans, and Singounas, 2000).

Although these studies are useful in highlighting differences between professional groups, it should be noted that since they were conducted, further research has become available. This includes studies on treatment of MHI (Wade et al, 1998; Mittenberg et al, 1996; Paniak et al, 2000) and professional practise guidelines (Scottish Intercollegiate Guidelines Network (SIGN), 2000; Royal College of Surgeons of England (RCSE), 1999; British Society of Rehabilitation Medicine (BSR), 1998). It is therefore possible that there are no longer differences between groups and all have accurate knowledge about PCS. However, studies in other areas of health, e.g. pain and hypertension, have noted that practitioners do not always have

accurate knowledge and may not always base their practice on national guidelines (Huse, Roht, Alpert and Hartz, 2001; Visentin, Trentin, deMarco, and Zanolin, 2001). Furthermore, with one exception (MacKenzie, 2001), no studies have examined opinion about PCS in the UK. It is therefore important to examine current opinion of PCS among health care professionals. The opinions they hold are likely to influence whether they provide appropriate care to the patient.

A range of professionals can potentially be involved in the care of head injured patients at different stages. Differences in training and the main objective of care (e.g. acute or rehabilitation) might also contribute to differences in opinion about PCS among professionals. This study aims to examine current opinion about PCS among three professional groups involved in the care of people with MHI. Emphasis will be placed on whether these opinions are consistent with current knowledge of PCS and MHI. The opinions of a group of MHI patients will also be examined since little is known about what they know about treatment or recovery.

The three professional groups targeted in this study are accident and emergency (A&E) doctors, neurosurgeons and clinical neuropsychologists. As A&E doctors provide acute care to patients they are in a position to provide them with information about their injury at the time of discharge. This is likely to be a crucial stage for providing intervention particularly since many people do not attend follow up appointments (Bazarian, Hartman and Delahunta, 2000). No studies currently exist that examine this groups' perceptions of MHI. Like A&E doctors, neurosurgeons are involved in the early stages of care and they also have influence on service development (RCSE, 1999). They have a specialist knowledge of the brain and therefore they might have greater knowledge about the consequences of head injury. However, they tend to see fewer MHI than A&E doctors and may be less aware of the issues regarding MHI. Furthermore, neurosurgeons tend to believe in short recovery periods and have less confidence in interventions than other professionals (Harrington et al 1993). Clinical neuropsychologists tend to get involved in the later care of head injured patients and are perhaps more likely to see those suffering persistent

problems. They are in a position to provide treatment for patients so one would expect them to have a good knowledge of the consequences of MHI. A study in the USA showed that neuropsychologists have a broad knowledge of sequelae and interventions for MHI (Mittenberg and Burton, 1994).

Professional practice guidelines in the UK (SIGN, 2000; RCSE, 1999; BSR, 1998) recommend the provision of information about common sequelae of MHI at discharge from hospital. Therefore one would expect that all professional groups are equally well informed about possible consequences of MHI and will know that the provision of this information is important. However, the guidelines provide less detailed information about recovery and effectiveness of treatment. Therefore it remains possible that differences will exist between groups in these areas, as noted in other studies (e.g. McMordie, 1988; Harrington et al 1993).

Hypotheses.

1. All professional groups will be equally able to name common symptoms of PCS. The MHI group will be less able than the professional groups to name common symptoms of PCS.
2. Neurosurgeons and A&E doctors will endorse shorter recovery periods and less impairment than clinical neuropsychologists. The MHI group will tend to endorse short recovery periods.
3. All professional groups will be equally able to suggest information/education as a useful intervention for PCS. The MHI group will be unaware of what help could be offered to them.
4. Neurosurgeons and A&E doctors will think treatment is less effective than clinical neuropsychologists. The MHI group will expect treatment to be helpful.
5. All groups will have similar beliefs about the contribution of different organic, emotional and compensation factors to PCS.

Method

This study received ethical approval from the local research ethics committee and from Glasgow University (Appendix 4.2)

Participants

Professional groups

Clinical Neuropsychologists: Practitioner Full Members of the British Psychological Society Division of Neuropsychology resident in the UK were invited to participate. 181 of 305 (59%) responded, 130 of whom completed the questionnaire.

A&E Doctors: Full Members of the British Association for Accident and Emergency Medicine resident in the UK were invited to participate. 352 of 798 (44%) responded, 268 of whom completed the questionnaire.

Neurosurgeons: Full Members of the Society of British Neurological Surgeons resident in the UK were invited to participate. 73 of 173 (42%) responded, 65 of whom completed the questionnaire.

Of those who responded but did not complete the questionnaire, 36 returned questionnaires incomplete with no reason given. 26 questionnaires were returned because the person was no longer at the address. Others reasons for not participating included being retired (n=21), not working with head injured patients (n=30), having no time (n=15), being a member of a different professional discipline (n=8) working in paediatrics (n=5) and being unhappy with the term PCS (n=2).

Other postal studies of PCS report response rates of 51% (Auerbach, Schefflen and Scholtz, 1967), 38% (McMordie, 1988), 21% (Harrington et al 1993), 35% (Mittenberg and Burton, 1994) and 18% (Evans, Evans and Sharp, 1994). The overall response rate of 48% in this study therefore compares well with other published studies.

The mean number of years experience since qualifying was 16.6 (sd=8.11), 18.5 (sd=7.42) and 22.62 (sd=8.02) for clinical neuropsychologists, A&E doctors and neurosurgeons respectively. Neurosurgeons had significantly more experience than the other 2 groups. There was no significant difference between A&E doctors and clinical neuropsychologists in the number of years experience (Kruskal-Wallis $\chi^2=22.35$, df=2, $p<0.05$).

All A&E doctors and neurosurgeons worked in hospitals. 43% of clinical neuropsychologists worked in hospitals, 15% worked in a community setting, 28% worked in rehabilitation units and 6% worked in private practice.

56 (12.1%) participants noted they had a special interest in head injury. (18.5% of clinical neuropsychologists, 8.2% of A&E doctors and 15.6% of neurosurgeons) Clinical neuropsychologists were more likely than A&E doctors to note a special interest in head injury ($\chi^2=9.0$, df=1, $p<0.01$). There were no other significant differences between groups. Participants declared a wide range of special interests. For A&E doctors the most common were accident and emergency medicine (36.9%) and trauma (11.6%), for clinical neuropsychologist, the most common were neurorehabilitation (16.1%) and neuropsychology (20%) and for neurosurgeons the most common was spinal surgery (12.5%).

MHI group

106 patients who had been admitted overnight to hospital with a MHI were identified from hospital discharge records and by ward staff and were invited to participate. A MHI was defined as post traumatic amnesia (PTA) less than 24 hours, Glasgow Coma Scale (GCS) score between 13 and 15 or loss of consciousness (LOC) less than 30 minutes (Mild traumatic Brain Injury Committee, 1993). 11 (10.4%) responses were received. 3 questionnaires were 'returned to sender' and 8 (7.8%) agreed to take part. The poor response to recruitment meant the sample was small and unlikely to be representative of the MHI population. Half the sample were male and half were female. The mean age was 38.4 (sd=12.4, range 24-64). 6 had sustained their

injuries from a fall and 2 had been assaulted. The mean time since injury was 2.8 months (sd=0.53). 4 participants had a GCS of 15 and 1 had a GCS of 14. 3 participants had a PTA of less than 1 hour. No other details regarding severity of head injury were available.

Measures

Professional groups

PCS questionnaire (professionals)

A questionnaire, based on previous questionnaires (MacKenzie, 2001; Mittenberg and Burton, 1994; McMordie, 1988) was designed to assess knowledge of PCS (Appendix 4.3). It covered four areas as follows:

1. Symptoms: Participants were given a case vignette (MacKenzie, 2001)

A man crashes his car after skidding on some ice but no other cars are involved. He gets a bump on the head and loses consciousness for a few minutes. He is taken to hospital and cannot remember the accident. It is nearly an hour after the crash before the man is no longer confused and his memories of this hour are patchy. Apart from some cuts and bruises, he has no physical injuries. The hospital admits him overnight for observation and discharges him in the morning.

Participants were asked to name symptoms that could be present one month and three months after the accident.

2. Recovery: Participants were asked what proportion of people with a MHI might be experiencing disability following their head injury at different time intervals. Participants were asked to indicate how disabled they thought people would be in three different areas (work, relationships and daily activities) using a visual analogue scale.

3. Treatment: Participants were asked to name any intervention they thought would be useful in treating PCS. They were also asked to rate the effectiveness of psychological and medical treatments using visual analogue scales.

4. Mechanism: Participants were asked what they thought the main mechanism(s) for PCS was. Organic, emotional and compensation factors were offered as possible mechanisms since these categories had been used in previous studies (Auerbach et al, 1967; McMordie, 1988; Harrington et al, 1993)

MHI group

PCS questionnaire (MHI)

A questionnaire similar to that used for the professional groups was designed (Appendix 4.4). It covered 3 areas.

1. Symptoms: The same questions were asked about symptoms as for the professionals. Participants were also given the post-concussion symptom checklist (PCSC; Gouvier et al 1992; Appendix 4.5) and asked to complete this for symptoms expected at 1 month.

2. Recovery: Participants were given a multiple choice option regarding how long they thought it would take to recover from MHI.

3. Treatment: Participants were asked what help they had received following their injury and what help they thought would be useful. They were also asked to rate how helpful they thought psychological and medical treatments would be using visual analogue scales.

Post-Concussion Symptom Checklist (MHI)

Participants completed the PCSC for their own symptoms.

Procedure

Professional groups

Memberships lists for the relevant professional groups (described above) were obtained and letters were sent to all members on the list, inviting them to take part. A copy of the questionnaire, a consent form (Appendix 4.6), information sheet (Appendix 4.7) and a freepost envelope were enclosed. A reminder letter was sent to those who did not reply approximately two months after the initial letter had been sent.

MHI group

Letters were sent to people inviting them to participate. A copy of the measures, a consent form (Appendix 4.6), information sheet (Appendix 4.7) and a freepost envelope were enclosed. Where possible people were approached on the hospital ward to introduce the study and invite them to take part. They were then contacted a month later by post and asked to participate.

Results

Classification of answers to free response questions

DSM-IV research criteria for PCS (appendix 4.8) were used to classify symptoms identified by participants. Criteria were developed to classify those responses that did not directly correspond to symptoms listed in DSM-IV. These included alternative terms for DSM-IV symptoms (e.g. 'tiredness' was classified as 'fatigue') and responses that did not resemble any DSM-IV symptom (e.g. PTSD, whiplash/neckache).

Criteria were also developed to classify interventions identified by participants. These were based on classifications used by Mittenberg and Burton (1994) and any additional interventions that were noted from examining a sample of the data (n=60).

Statistical analysis

All data was tested for normal distribution using the Kolmogorov-Smirnov Test. Where data was not normally distributed, non-parametric statistics were used. When a Kruskal-Wallis Test was significant, a multiple comparisons procedure (Siegel and Castellan, 1988) was performed to detect which groups were significantly different. When the Friedman Test was significant, a multiple comparisons procedure (Siegel and Castellan, 1988) was performed to detect where the differences were. Due to the number of Chi-square comparisons being made in the analysis (three comparisons per question), the p-value was set at 0.01 for significant results to reduce the probability of spurious results. There were insufficient numbers in the MHI group to perform statistical analysis on (n=8). A brief summary of the MHI data is provided. All visual analogue scales were scored on a scale of 0-100.

Professional Groups

Symptoms

DSM-IV lists symptoms associated with PCS (Appendix 4.8). The most common symptoms reported by people with a MHI are headaches, memory loss, dizziness, sleep disturbance and fatigue (Rimel et al, 1981; Alves, Macciocchi and Barth, 1993; Haboubi, Long, Koshy and Ward, 2001). Table 1 shows the percentage of participants reporting each symptom at 1 and 3 months post injury.

INSERT TABLE 1 HERE

While a large proportion of all groups named headaches, less than half of all groups named dizziness and sleep disturbance, less than half A&E doctors and neurosurgeons named fatigue, and less than half A&E doctors named memory problems. Furthermore, all groups reported concentration difficulties as one of the most common symptoms, although the above studies suggest that this is reported less frequently by people with a MHI than other symptoms.

The mean number of DSM-IV PCS symptoms reported by clinical neuropsychologists, A&E doctors and neurosurgeons at one month were 4.47 (sd=1.77), 3.14 (sd=1.42) and 3.17 (sd=1.73) respectively. At 3 months the mean number of symptoms reported were 3.8 (sd=2.31), 2.17 (sd=1.76) and 2.33 (sd=2.02) respectively. There was a significant difference between groups in the number of symptoms reported at one month (Kruskal-Wallis test, $\chi^2=51.3$, $df=2$ $p<0.005$) and at 3 months (Kruskal-Wallis test, $\chi^2=44.74$, $df=2$ $p<0.005$). At both times clinical neuropsychologists reported significantly more symptoms than the other 2 groups. There was no difference between the number of symptoms reported by A&E doctors and neurosurgeons at either time.

To meet DSM-IV research criteria for PCS a person must report at least three physical or emotional symptoms and at least one cognitive symptom (appendix 4.8). Using these criteria, 57.5% of clinical neuropsychologists, 25.5% of A&E doctors and 33.3% of neurosurgeons reported sufficient symptoms to meet DSM-IV research criteria for PCS. A significantly higher proportion of clinical neuropsychologists than A&E doctors ($\chi^2=38.12$, $df=1$, $p<0.01$) and neurosurgeons ($\chi^2=9.82$, $df=1$, $p<0.01$) reported sufficient symptoms to meet DSM-IV criteria. There was no significant difference between A&E doctors and neurosurgeons ($\chi^2=3.22$, $df=1$, $p=0.07$).

There was no significant relationship between the number of years experience and the number of symptoms reported for any of the groups (Spearman's Rho correlation, clinical neuropsychologists: $r_s=-0.39$, $p=0.66$; A&E doctors: $r_s=-0.11$, $p=0.08$; neurosurgeons: $r_s=0.17$ $p=0.18$). There was no significant effect of having a special interest in head injury on the number of correct symptoms reported (Mann Whitney U Test, $U=9348$, $p=0.16$).

Recovery and Impairment

Between 26% and 79% of MHI patients still complain of symptoms at 3 months post injury and between 28% and 51% still continue to experience some disability at 1

year post injury (Rimel et al, 1981; Englander et al, 1992; Thornhill et al, 2000; Deb et al, 2001) Figure 1 shows the mean percentage of people with a head injury who are expected, by the professional groups, to be experiencing problems at different time intervals.

INSERT FIGURE 1 HERE

The published prospective studies report a range of recovery. The reports of recovery by all three groups in this study lie within these ranges. However, they are possibly towards the lower end of the range, suggesting that all professional groups tend to be more optimistic about recovery than published studies.

There were no significant differences between groups at one week (Kruskal-Wallis $\chi^2=3.365$, $df=2$, $p=0.19$). At 1 month and 3 months A&E doctors expected significantly less people to be impaired than neurosurgeons (Kruskal-Wallis $\chi^2=7.135$, $df=2$, $p<0.03$; Kruskal-Wallis $\chi^2=7.334$, $df=2$, $p<0.03$). There were significant differences between groups at 6 months and 1 year, (6 months: Kruskal-Wallis $\chi^2=6.85$, $df=2$, $p=0.03$; 1 year: Kruskal-Wallis $\chi^2=6.38$, $df=2$, $p=0.04$). When the multiple comparisons procedure was used, no comparisons were significant, although there was a trend at 6 months for A&E doctors to expect less people to be impaired than neurosurgeons, and a trend at 1 year for A&E doctors to expect less people to be impaired than clinical neuropsychologists.

The degree of disability for those still impaired at 3 months is shown in table 2. Neurosurgeons thought that people were significantly less likely to have returned to work than A&E doctors (Kruskal-Wallis $\chi^2=8.92$, $df=2$, $p<0.05$). There were no other significant differences between groups in opinions about social relationships (Kruskal-Wallis $\chi^2=2.39$, $df=2$, $p=0.30$) and daily activities (Kruskal-Wallis $\chi^2=0.15$, $df=2$, $p=0.93$).

INSERT TABLE 2 HERE

Treatment

The interventions reported to be useful by the professional groups are shown in table 3.

INSERT TABLE 3 HERE

There is evidence that the provision of information reduces symptom duration and severity and social morbidity. (Wade et al, 1998; Mittenberg et al, 1996; Paniak et al, 2000). Information provision was recommended by 69% of clinical neuropsychologists, 29% of A&E doctors and 16% of neurosurgeons. Clinical neuropsychologists were more likely to recommend the provision of information than either A&E doctors ($\chi^2=54.53$, $df=1$, $p<0.005$) or neurosurgeons ($\chi^2=43.82$, $df=1$, $p<0.005$). There was no significant difference between A&E doctors and neurosurgeons in their tendency to recommend information provision ($\chi^2=4.02$, $df=1$, $p=0.05$).

One recommendation in the RCSE (1999) report is that all patients should be followed up. However, few professionals recommended this. There is some evidence that neuropsychological input can be beneficial for persistent PCS (Cicerone, Smith, Ellmo, Mangel, Nelson, Chase and Kalmar, 1996). This notion is supported by professional guidelines (BSR, 1998; RCSE, 1999). 18.9% of clinical neuropsychologists, 27.2% of A&E doctors and 24.6% of neurosurgeons recommended a neuropsychological assessment or referral to a neuropsychologist/psychologist. There were no significant differences between groups recommendations for this ($\chi^2=3.08$, $df=2$, $p=0.21$).

Many other interventions for PCS were suggested. There is little evidence that some of these (e.g. CBT, anxiety management) are specifically useful for PCS. Other interventions (e.g. graded return to activities, memory aids) are coping strategies that may be beneficial and patients may be advised of these when given information/education (King, Crawford, Wenden, Moss and Wade, 1997)

Table 4 shows how helpful each group considered psychological treatment and medication to be. There were significant differences between groups for psychological treatment (Kruskal Wallis $\chi^2=15.71$, $df=2$ $p<0.05$) and medication (Kruskal Wallis $\chi^2=20.24$, $df=2$ $p<0.05$). Clinical neuropsychologists were significantly more likely than the other two groups to think that psychological interventions and medication are helpful. There was no difference between A&E doctors' and neurosurgeons' beliefs about how helpful either type of intervention is.

INSERT TABLE 4 HERE

The scores for effectiveness of treatment was divided into 4 categories and compared to data from other studies (Auerbach et al 1967; McMordie, 1988; Mittenberg and Burton, 1994) for neuropsychologists and neurosurgeons. This data is shown in table 5 and table 6. There was no comparable data for A&E doctors. It can be seen that a greater percentage of participants in the current study were uncertain about the efficacy of treatment than in previous studies.

INSERT TABLE 5 AND TABLE 6 HERE

The scores from all studies were divided into two groups to make statistical comparisons. Clinical neuropsychologists in the present study had similar beliefs about psychological treatment but had less confidence in medication compared to neuropsychologists in the McMordie (1988) study ($\chi^2=0.31$, $df=1$, $p>0.05$; $\chi^2=42.32$, $df=1$, $p<0.005$). They had more confidence in psychological treatment and medication than neuropsychologists in the Mittenberg and Burton (1994) study ($\chi^2=22.64$, $df=1$, $p<0.005$; $\chi^2=11.79$, $df=1$, $p<0.005$). Neurosurgeons in the present study had similar beliefs about psychological treatment but less confidence in medication compared to neurosurgeons in the Auerbach et al (1967) and McMordie (1988) studies (psychological treatment: $\chi^2=2.63$, $df=1$, $p>0.05$; $\chi^2=0.11$, $df=1$, $p>0.05$; medication: $\chi^2=58.58$, $df=1$, $p<0.005$; $\chi^2=61.39$, $df=1$, $p<0.005$)

Mechanism of PCS

There has been controversy over the mechanism of PCS, although it is now generally considered that organic, emotional and compensation factors can all play a role (King, 1999). Table 7 shows the percentage of each group endorsing a particular factor as contributing to PCS. Some subjects endorsed more than one factor. Organic factors were most frequently endorsed, followed by emotional factors then compensation factors.

INSERT TABLE 7 HERE

Clinical neuropsychologists were more likely than A&E doctors ($\chi^2=19.26$, $p<0.005$) and neurosurgeons ($\chi^2=21.025$, $p<0.005$) to endorse emotional factors. There were no significant differences between groups for organic and compensation factors.

MHI group

Symptoms and recovery

Symptoms reported by head injured people in response to the vignette were headache (50%), memory problems (37.5%), dizziness (37.5%) irritable (12.5%), anxiety (12.5%), sleep problems (12.5%), nose bleeds (12.5%) feeling dazed/confused (25%) and balance problems (12.5%). The mean number of symptoms using free recall was 1.75 (sd=1.48) and the mean number using the checklist was 5.5 (sd=1.3). The median time expected for recovery was 6-12 months. The mean number of symptoms reported on the PCSC for own symptoms was 5.14 (sd=1.58)

Treatment

6 (75%) participants reported they had received no help following their injury, 1 (12.5%) reported that they had received information about their injury and 1 (12.5%) reported that they had received help but did not specify what type. 6 (75%) reported that they would like to receive information about their injury and 2 (25%) did not

know what help might be offered. All participants expected both psychological help and medication would be very helpful.

Discussion

The response rate for the professional samples was good. The conclusions drawn from this study, although still subject to response bias, are therefore likely to be a good indication of the current views of these professions in the UK.

The results suggest that, although clinical neuropsychologists are better informed about symptoms than the A&E doctors and neurosurgeons, many professionals are unaware of all the potential sequelae of MHI. It is possible that the use of a free-recall paradigm rather than a recognition paradigm (e.g. checklist) resulted in fewer symptoms being named. This has been noted in other studies (Burges and McMillan, 2001; McKenzie, 2001). However, it is unlikely that checklists are used routinely in clinical practice. The method used here is therefore more realistic in that it reflects the knowledge that professionals are likely to pass on to patients.

It could be argued that asking about symptoms at specified time intervals led participants to name fewer symptoms than they were aware of, because they assumed the majority of patients would have recovered. However, over half the participants gave the same answers for both time intervals, although they expected less people to be disabled at three months than one month. This suggests that many participants named all symptoms that they were aware of.

The differences noted between A&E doctors and neurosurgeons in relation to recovery was unexpected. It may reflect that neurosurgeons see more severe cases of head injury and so are aware of the long term nature of sequelae. This result contrasts with the findings of McMordie (1988) who noted that neurosurgeons tended to endorse shorter recovery periods. However, although the differences here are

statistically significant it is questionable whether they are clinically significant as both groups report levels of recovery consistent with the literature.

Clinical neuropsychologists tended to have more confidence in interventions than the other two groups. This is perhaps related to the fact that they tend to be more involved in rehabilitation and hence may see clinically that some interventions appear to be of benefit, regardless of whether there is a strong research basis to support them. A substantial proportion of participants did not know how helpful interventions were. This highlights that a proportion of all groups may benefit from further training/education about MHI.

On the whole the clinical neuropsychologist group tended to be better informed about different aspects of PCS than the other groups. This perhaps reflects that they provide rehabilitative care rather than acute care. It is also acknowledged that MHI may not form a large proportion of each clinicians caseload. It may have been useful assess the degree of contact each participant had with MHI to determine whether this influenced their knowledge.

It is interesting to compare the results of this study to previous studies. Beliefs about psychological treatment in this study were generally similar to other studies. This is despite evidence about the importance of information provision being available to the present sample that was not available to previous samples. It is possible that professionals in the present study are either unaware of such publications or they do not classify such interventions as psychological.

The response to recruitment for the MHI group was disappointing. It was noted that those that did participate were able to name few symptoms using free recall and that they tended to expect recovery to take 6-12 months. Finally the majority had not received any help but wanted advice regarding what to expect and what could be done to help them. Although the sample is likely to be unrepresentative, this data

emphasises the need for professionals to be aware of possible sequelae of MHI and to be able to offer appropriate treatment.

It is unclear why the response rate for the MHI group was not better. It is possible that many who were contacted had recovered from their injury and had no incentive to participate. It is also possible that some of those approached may have had literacy problems. It is unclear how recruitment could be improved to gain a more representative sample. Head injury follow-up clinics, if available, could be targeted for recruitment. It is also possible that a monetary incentive would improve recruitment. People who did not respond initially could be sent reminder letters, although it is not certain that this would improve how representative the sample is.

This study highlights that many practising clinicians are unaware of many common sequelae of MHI and are also unaware that provision of information and advice to patients has the potential to reduce disability. It is possible that clinicians might require further training to broaden their knowledge of MHI to improve care for patients. It is also possible that departmental guidelines need to be reviewed to ensure the recommendations of national guidelines are met.

Finally, it is acknowledged that a range of professionals can be involved in the care of head injured patients. This study examines the opinion of three of these groups. It would also be useful to examine other groups' opinions (e.g. nurses, occupational therapists, neurologists, physiotherapists) to ensure all professionals who have the potential to be involved in MHI have sufficient awareness of the consequences of MHI to provide an appropriate service.

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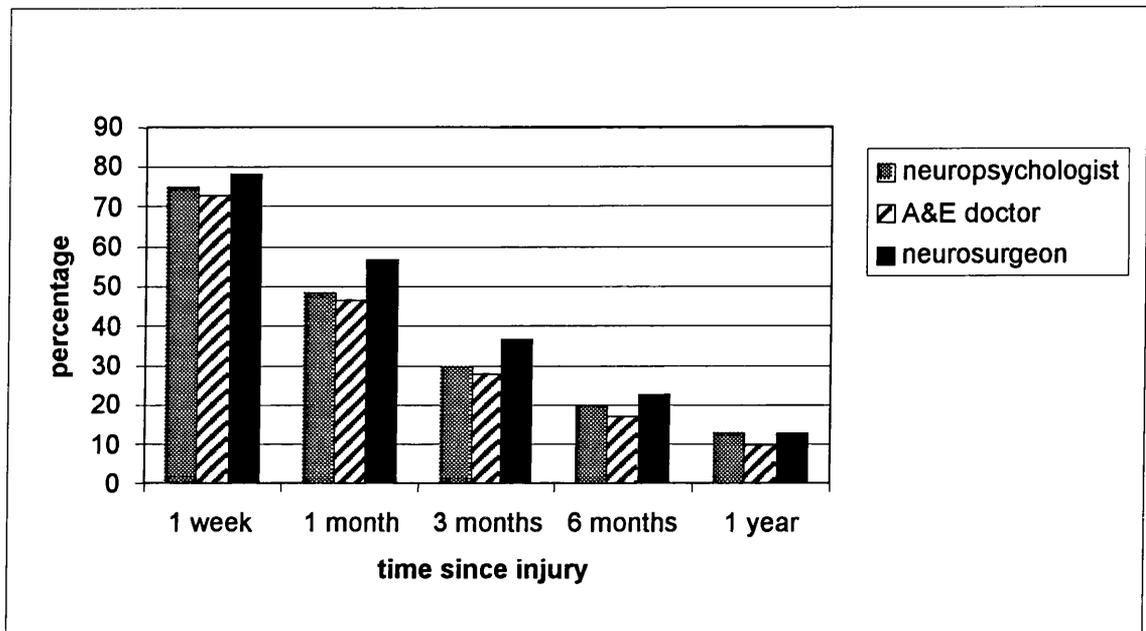
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Table 1. Number and percentage of each group naming symptoms of PCS at 1 month and 3 months post injury.

Symptoms listed in DSM-IV	Group					
	Neuropsychologists		A&E Doctors		Neurosurgeons	
	1 month	3 months	1 month	3 months	1 month	3 months
Attention/concentration difficulties	115(89.8%)	97 (76.4%)	194(73.5%)	134(51.5%)	33 (51.6%)	22(34.9%)
Headache	91 (71.1%)	69 (54.3%)	230(87.1%)	143(54.8%)	53 (82.8%)	41 (65%)
Memory difficulties	85 (66.4%)	74 (58.3%)	100 (38%)	75 (28.7%)	32 (50%)	27(42.9%)
Anxiety or depression	69 (53.9%)	69 (53.9%)	66 (25.1%)	55 (21.2%)	13 (20.3%)	16(25.4%)
Fatigue	66 (51.6%)	56 (44.1%)	72 (27.4%)	49 (18.8%)	16 (25%)	8 (12.7%)
Irritability or aggression	68 (51.3%)	60 (47.2%)	59 (22.4%)	43 (16.5%)	21 (32.8%)	15(23.8%)
Dizziness or vertigo	46 (35.9%)	30 (23.6%)	64 (24.3%)	36 (13.8%)	20 (31.3%)	9 (14.3%)
Difficulty sleeping	27 (21.2%)	22 (17.3%)	29 (11%)	21 (8.1%)	9 (14.1%)	6 (9.5%)
Apathy	3 (2.3%)	2 (1.6%)	7 (2.7%)	6 (2.3%)	0	0
Change in personality	0	3 (2.4%)	4 (1.5%)	5 (1.9%)	3 (4.7%)	3 (4.7%)
Symptoms not listed in DSM-IV						
Sensitivity to noise or light or visual disturbance	22 (17.2%)	14 (11%)	15 (5.7%)	8 (3.1%)	1 (1.6%)	0
PTSD type symptoms (nightmares, flashbacks, thinking about accident)	17 (13.3%)	16 (12.6%)	23 (8.7%)	17 (6.5%)	0	0
Neck Pain	2 (1.6%)	2 (1.6%)	15 (5.7%)	10 (3.8%)	4 (6.3%)	1 (1.6%)
Nausea	6 (4.7%)	3 (2.4%)	22 (8.4%)	11 (4.6%)	0	0

Figure 1. Mean percentage of people with a MHI still expected to be impaired at different time intervals post injury, as reported by each professional group.



**Table 2 Mean (standard deviation) scores for disability from MHI at 3 months post injury.
(0=impaired, 100=not impaired)**

	Neuropsychologist	A&E doctor	Neurosurgeon
Work	48.73 (22.77)	53.02 (24.28)	42.79 (24.72)
Social relationships	52.27 (20.81)	53.32 (22.38)	48.07 (25.11)
Daily activities	67.42 (20.33)	67.56 (21)	68.27 (24.72)

Table 3. Number and percentage of each group naming each intervention.

Intervention	Neuropsychologist	A&E doctor	Neurosurgeon
Education/information	83 (68.9%)	74 (28.7%)	9 (15.8%)
CBT	49 (40.2%)	12 (4.7%)	0
Graded return to activities	33 (27%)	10 (3.9%)	2 (3.5%)
Memory aids/techniques	29 (23.8%)	8 (3.1%)	2 (3.5%)
Neuropsychological assessment, referral to psychologist/neuropsychologist	23 (18.9%)	69 (27.2%)	14 (24.6%)
Involve relatives	22 (18%)	5 (2%)	3 (5.3%)
Anxiety management/relaxation	19 (14.6%)	1 (0.4%)	0
Reassurance	18 (13.8%)	42 (15.7%)	10 (15.6%)
Medication (of any type)	16 (13.1%)	48 (18.9%)	10 (17.2%)
Rest	6 (4.9%)	21 (8.3%)	4 (7%)
Counselling	6 (4.9%)	48 (18.9%)	10 (17.5%)
Rehabilitation/head injury team	3 (2.5%)	16 (6.3%)	2 (3.5%)
Occupational therapy	2 (1.5%)	13 (5.1%)	1 (1.8%)
Follow up	2 (1.5%)	15 (5.6%)	0
None	3 (2.5%)	47 (18.7%)	18 (30.5%)
Other*	9 (6.9%)	16 (6%)	2 (3.5%)

* litigation settlement, recognition of problem, liaison with employers, psychomotor therapy, anger management, reassurance of negative CT scan, physiotherapy, peer group support, hospital admission for observation, hypnotherapy, EMDR, exercise.

Table 4. Mean (standard deviation) scores for how helpful each type of treatment is thought to be (0=not effective, 100=very effective).

	Neuropsychologist	A&E doctor	Neurosurgeon
Psychological treatment	66.09 (14.89)	55.68 (21.34)	50.75 (26.16)
Medication	34.93 (21.6)	25.11 (18.88)	19.42 (17.75)

Table 5. Comparison of data to other studies regarding neuropsychologists beliefs about effectiveness of treatments.

	Psychological Treatments			Medication		
	McMordie (1988)	Mittenberg and Burton (1994)	Present study (2002)	McMordie (1988)	Mittenberg and Burton (1994)	Present study (2002)
Not effective (0-25)	7%	8.6%	1.6%	4%	17.8%	23.8%
Somewhat effective (26-50)	3%	36.8%	7.9%	10%	50.9%	16.7%
Moderately effective (51-75)	43%	36.8%	49.2%	59%	3.7%	14.3%
Very effective (76-100)	39%	12.9%	16.7%	9%	-	1.6%
Don't know	4%	4.9%	24.6%	18%	9.8%	43.7%

Table 6. Comparison of data to other studies regarding neurosurgeons beliefs about effectiveness of treatments.

	Psychological Treatments			Medication		
	Auerbach (1967)	McMordie (1988)	Present study (2002)	Auerbach (1967)	McMordie (1988)	Present study (2002)
Not effective (0-25)	34%	27%	18.6%	35%	17%	61.7%
Somewhat effective (26-50)	12%	17%	6.8%	4%	19%	16.7%
Moderately effective (51-75)	18%	44%	33.9%	7%	49%	5.0%
Very effective (76-100)	28%	7%	8.5%	53%	11%	0%
Don't know	3%	4%	32.2%	1%	4%	16.7%

Table 7. Number and percentage of each group endorsing a factor as contributing to PCS

Factor	Neuropsychologist	A&E doctor	Neurosurgeon
Organic	118 (90.8%)	223 (83.2%)	56 (87.5%)
Emotional	100 (76.9%)	145 (54.1%)	28 (43.8%)
Compensation	44 (33.8%)	86 (32.1%)	23 (35.9%)

Chapter 5. Abstract for Clinical Research Case Study

The effect of two types of exposure therapy on the strength of negative cognitions and preoccupation with appearance in a single case of body dysmorphic disorder.

Prepared in accordance with the guidelines for submission to *Behavioural and Cognitive Psychotherapy* (Appendix 5.1)

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Abstract

An ABC design was used to assess the impact of behaviour therapy on symptoms of body dysmorphic disorder in a 26 year old male who was preoccupied with the appearance of his jaw. Exposure of the body part to others and exposure of the body part to self were introduced sequentially. Exposure of the body part to others led to a significant increase in mood and a significant decrease in anxiety and social avoidance. Exposure of the body part to self led to a significant decrease in mood but the decreases in anxiety and social avoidance were maintained. Neither type of exposure had a significant impact on negative cognitions, preoccupation with appearance or avoidance of mirrors. Behaviour therapy can be useful in addressing some aspects of body dysmorphic disorder but it is possible that cognitive therapy may be required to address negative cognitions. Caution should be used when asking patients with body dysmorphic disorder to carry out exposure of the body part to self as this does not appear to follow a simple model of anxiety reduction. Limitations of the study are discussed.

Key Words: body dysmorphic disorder, behaviour therapy, single n.