

**Psychological Sequelae Of Head Injuries: Is Amnesia
For The Event A Protective Factor In Developing
Post-Traumatic Stress Disorder?**

& Research Portfolio

Sue Turnbull MA Psych (Hons)

Submitted in partial fulfilment towards the degree of Doctorate in Clinical
Psychology. Complete research case studies held separately within the
University of Glasgow to protect patient confidentiality.

Department of Psychological Medicine

Faculty of Medicine

University of Glasgow

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Chapter 1

Small Scale Research Project

An Evaluation Of Referrals To A Community Mental Health Team

And A Direct Access Psychology Service From Primary Care

Running Head: A Comparison of Referrals to a CMHT and Psychology

Prepared in accordance with the instructions for authors from “Journal of Mental Health” (appendix 1.1)

An Evaluation Of Referrals To A Community Mental Health Team And A Direct Access Psychology Service From Primary Care

Abstract

This study compared the referrals from GPs to a Community Mental Health Team (CMHT) and a Direct Access Psychology service (DAP). All referrals from GPs to the services were analysed (56 to the CMHT and 45 to the DAP) for a two month period. Referral rates were similar between services. More anxiety and depressive problems were referred to the DAP and more adjustment problems to the CMHT ($\chi^2 = 6.18$, $df = 1$, $p = 0.013$). Referrals were appropriate to the DAP and less appropriate to the CMHT ($\chi^2 = 6.6$, $df = 1$, Fisher's exact $p = 0.02$). Overall a higher rate of referrals was received from larger GP practices and from urban areas. Rural areas were more likely to refer to the DAP. The implications of these results in terms of access to the two services are discussed.

Introduction

The purpose of this study was to compare the referrals from GPs to the 'Direct Access Psychology' service (DAP) of the local psychology department and the Community Mental Health Team (CMHT) covering the same locality.

CMHTs are a relatively new development in the provision of mental health services and recent years have witnessed an increasing emphasis away from hospital-based psychiatric services to CMHTs (Mistral & Velleman, 1997). In the area under study the CMHT has evolved as a team that includes all community psychiatric nurses for this population. The team also includes two psychiatrists, a clinical psychologist, a social worker and occupational therapists. As well as attending to the needs of the seriously mentally ill in the community, according to the information sent to GPs, the CMHT targets its resources to "deliver comprehensive, local and accessible mental health services to people aged between 16-65 years" (appendix 1.2). In this locality the DAP has also undergone a large restructuring, it too has moved away from a hospital base to an independent centre. The DAP includes the services of clinical psychologists and a counselling psychologist. The DAP has informed GPs in its information leaflet that it aims to provide a service when a "flexible tailored response to a patient's psychological problem is required" (appendix 1.3) and includes various examples of appropriate problems such as anxiety, depression and eating disorders. It is possible that

following these recommendations could lead to some overlap between the clients of the CMHT and the DAP.

Of interest is whether the GPs make appropriate referrals to the services. A measure of this could be whether or not a client is taken on for treatment in that service. It should be noted that, although this will give an indication, it is a fairly crude assessment as it is possible that services take on clients that they do not believe are totally appropriate.

Rates of “did not attend” (DNA) for a first appointment to services could be a further indication of appropriateness of referral. Attendance, however, could also be connected to various other things, for example, studies have found that the longer a client has to wait for a first appointment, the less likely he or she is to attend that appointment (e.g. Anderson & White, 1996). The time waiting for an appointment could be different between services and this will be considered in the light of objectives that the services set themselves. The DAP aims to see all clients within nine weeks of referral and the CMHT aims to see clients as soon as possible.

There are many possible influences acting on a GP’s decision about whether to and where to refer a client for a particular problem. There is, however, some concern that referrals to community teams by GPs can often be biased and rather than being needs-led referral decisions can be affected by such

things as the size of the GP practice. For instance, Laugharne & Fleminger (1996) found that practices consisting of three or more GPs referred higher numbers of cases to CMHTs compared to practices of only one or two GPs. Another issue that might be of relevance in this locality is the area in which a client resides. This could possibly have an influence on the accessibility of the services as many of the people in this area live in a rural area with high unemployment, and hence poverty, combined with poor public transport provision. It has been suggested that clients are more likely to attend more accessible services, centred in their own neighbourhood (Whitehead, 1992). The DAP generally offers a service from the local GP surgery with the CMHT offering a service that aims to be as close to the client's home as possible which is either in a central base in the main town in the area or in a health centre and includes the possibility of home visits.

The main aims of this study are to report on the demands on the two services made from GPs by comparing the referral rates to the services directly from primary care surgeries. The accurateness of the GP's diagnosis of the referral will be assessed by comparing the presenting problem as defined by the referral letter to that defined by assessment letter from the referred to service. The profile of patients attending for assessment at the two services will be compared in terms of their presenting problem at assessment so as to look at the possible overlap of service provision. The appropriateness of referrals will be considered by comparing the proportion of clients referred

that are actually offered appointments by the two services. DNA rates and the time waiting for an appointment will be compared between the two services and the impact of the time waiting for an appointment on the DNA rate will be analysed. Finally, factors that might affect referral decisions will be compared between the services: the age of the client, the size of the GP practice and whether the client lives in a rural or an urban area.

Methodology

Sample

The locality under study consisted of a population of 77,336 of which approximately 22,123 lived in a rural area. A total of 12 GP surgeries serve this area. A total of 101 clients were identified as having been referred in this period: 45 to the DAP and 56 to the CMHT.

Procedure

Manual records kept at the CMHT base and at the DAP base as to the referrals received from primary care were used to identify all referrals from GPs for a two month period covering August and September 1996. This time period was chosen to coincide with a previous audit completed on a CMHT serving a neighbouring area. Information was gathered from the manual records and case-notes as follows: the referring GP; the presenting problem according to the referral letter and assessment letter; whether the client was offered treatment, referred on or offered no treatment; whether

the client attended for the assessment; the time between receipt of referral and the first appointment; the age of the client at referral; the size of the GP practice; whether the client resided in an urban or rural area.

Presenting Problem

The presenting problem was classified from both the GP's referral letter and the assessment letter by recording the presenting problem from each letter.

The presenting problems were coded as follows and, in the cases of co-morbidity, problems identified as more serious trumped others with 4>3>2>

1:

- 1) Bereavement, relationship problems or adjustment difficulties.
- 2) Anxiety or depressive related disorder.
- 3) Substance misuse.
- 4) Serious Mental Illness.

If none of the above were deemed relevant the problem was classified as "other".

Size of GP Practice

This was recorded as small if there were one or two partners in the surgery and large if there were three or more partners following the division identified by Laugharne & Fleminger (1996).

Urban versus Rural

The distinction between urban and rural was made by including all that lived in the main two towns (which are a continuation of each other) as urban and

all those living in the surrounding small towns, villages and isolated houses as rural.

Statistical Analysis

Confidence intervals for referral and assessment rates were calculated using Confidence Interval Analysis (CIA). Version 1.1” (Gardner, 1991).

Statistical Package for Social Scientists (SPSS) for Windows, Version 6.1 was used for all other data analysis. Categorical data was compared using chi-squares and continuous data compared using independent sample Mann-Whitney U-tests. A logistic regression was used to ascertain whether any of the proposed factors could predict referral decisions.

Results

Referral Rates

Referral rates from each of the twelve surgeries are presented in figure 1.

Figure 1 in here

It can be seen that there were differences in the patterns of referrals from GPs with some referring more to the CMHT and some to the DAP. Overall there was no significant difference in the rates of referral between the two services with the CMHT having received a referral rate of 7.2 per 10,000 population (95% CI 5.4 - 9.1) and the DAP having received a referral rate of

5.8 per 10,000 population (95% CI 4.1 - 7.5) from primary care in a period of two months.

Presenting Problems

There was a strong correlation between the presenting problem as defined by the referring agent and as that as defined by the assessing agent (Spearman's $r = 0.8$, $p < 0.0001$). Figures 2 & 3 illustrate the presenting problems assessed by the CMHT and the DAP respectively.

Figures 2 & 3 in here

A total of 44 clients attended for assessment at the CMHT and 36 at the DAP leading to similar rates for the two months with the CMHT having received a rate of 5.2 per 10,000 population (95% CI: 3.6 - 6.8) and the DAP having received 4.7 per 10,000 population (95% CI: 3.1 - 6.2) for assessment. The assessment rate for anxiety and depressive type disorders at the DAP was 3.5 per 10,000 population (95% CI: 2.2 - 4.8) compared to a lesser rate of 1.7 per 10,000 population (95% CI: 0.8 - 2.6) at the CMHT. The CMHT assessed a higher rate of adjustment disorders than the DAP. The DAP assessed 1.2 per 10,000 population (95% CI: 0.4 - 1.9) with the CMHT having assessed a slightly higher rate of 2.1 per 10,000 population (95% CI: 1.1 - 3.1). A chi-square test revealed that this indicated a significant difference in the proportions of clients seen for anxiety and

depression compared to adjustment difficulties between the two services ($\chi^2 = 6.18$, $df = 1$, $p = 0.013$). Only the CMHT saw those with serious mental illness (0.5 per 10,000 population; 95% CI: 0.01 - 1.0) or those with alcohol or drug problems as their main problem (0.6 per 10,000 population; 95% CI: 0.08 - 1.2).

Appropriateness of Referrals

The DAP accepted 97% of its referrals for treatment with only one case (3%) not offered appointments. The CMHT accepted 77% of referrals for treatment with four clients (9%) not offered appointments and a further 6 (14%) being re-referred elsewhere. If this is taken as a measure of appropriateness of referral, a chi-square analysis revealed that the referrals to the DAP were significantly more appropriate ($\chi^2 = 6.6$, $df = 1$, Fisher's exact $p = 0.02$). The re-referrals from the CMHT included 4 to addiction services, one to a different CMHT and one referral to child and family services.

DNA Rates & Waiting Time for Appointment

The proportion of clients not attending for their first assessment was similar for the two services: 9 out of 45 (20%) clients did not attend for their assessment with the DAP and 12/56 (21%) of those did not attend for their assessment with the CMHT.

Nonparametric tests were used to analyse the number of days waiting as the distribution of data was skewed. Comparing between services, there was a trend towards a difference with the median waiting time for an appointment with the DAP at 33 days (range: 6 - 97) and that for the CMHT 28 days (range: 2 - 57) (Mann-Whitney Z score = -1.81, $p < 0.07$).

The effect of the waiting time for an appointment on DNA rates was analysed and revealed an insignificant trend for those who did not attend having been given a longer waiting time for their first appointment (Mann-Whitney Z score = -1.95, $p < 0.06$). Those who did not attend were offered an appointment in a median of 35 days (range: 12 - 73) compared to those who attended being offered an appointment in a median of 29 days (range = 2 - 97).

Factors Affecting Referral Decisions

The factors considered as possibly affecting referral decisions are presented in table 1. There was a slightly higher rate of referral to services from urban areas (14.1 per 10,000; CI: 11.0-17.3) compared to rural areas (10.4 per 10,000; CI : 6.2-14.6). The amount of referrals from small practices was significantly lower at a rate of 4.2 per 10,000 (CI: 0-8.9) compared to the rate of referrals from larger practices (14.0 per 10,000; CI: 11.2-16.7).

Table 1 & 2 in here

A stepwise logistic regression revealed that only the area where a client lived proved to be a factor in whether they were referred to the DAP or the CMHT. This factor explained 19 % of the variance (adjusted $R^2 = 0.19$). Table 2 contains details of the regression. The direction was that there was a greater possibility of being referred to the DAP than the CMHT if the client lived in a rural area and more possibility of being referred to the CMHT than the DAP if the client lived in an urban area.

Discussion

Referral Rates

The demands made on the two services in terms of referral rates were overall not significantly different. However, there were striking differences in the pattern of referrals with some GP surgeries referring more to the DAP and others to the CMHT as illustrated in figure 1. This is explored further when looking at some of the possible factors influencing referral decisions.

Presenting Problems

The strong correlation found between the presenting problem as diagnosed by the GP and that diagnosed by the assessing agent indicates that GPs were making accurate diagnoses of those clients they refer on to mental health services. They also appeared to be differentiating between services with the DAP being referred more clients with anxiety or depressive type problems

than the CMHTs. There was however still a large overlap and this reflected the similarities in some of the services offered. Both CPNs and counselling psychology are suitably qualified to address adjustment difficulties, bereavement and relationship problems (Parker et al., 1997). CPNs are also qualified in anxiety management techniques and this was reflected in a proportion of anxiety and depressive related problems being referred to the CMHT. As requested, the DAP was not being referred clients with substance misuse or serious mental illness as their main problem.

Appropriateness of Referral

The GPs appeared to be making appropriate referrals to the DAP with the majority of clients being taken on for treatment. This supports an earlier study which found that GPs have a clear idea of the skills of clinical psychologists (Hughes *et al.*, 1996). The referrals to the CMHT, however, were significantly less appropriate although it must be stressed that the majority of referrals were taken on by the team. Inappropriate referrals included those with substance misuse who were usually referred on to addiction services. It is possible that this is due, in part, to the information leaflet sent to GPs not specifying or excluding the types of mental health problems the CMHT is capable of treating. The referral system might be more efficient if the GPs referred directly to the correct service. This perhaps indicates the GPs need for more information about the specific services available for alcohol and drug related difficulties.

DNA Rates & Waiting Times

The DNA rates were similar for both services and not significantly related to the amount of time waiting for an appointment although there was a trend for those not attending having had to wait slightly longer. The amount of time waiting for an appointment was also not significantly different between the two services. Although there was a trend evident for the CMHTs seeing clients after a shorter wait, the median waiting times for seeing clients only actually differed by five days between services. It should further be noted that waiting times for appointments were uniformly fairly low and largely within service objectives. The DAP met its objective to see the majority of clients within 9 weeks of referral with only 3 clients not being seen within this time period. The average time waiting was also well below this at 33 days (under 5 weeks). The CMHT saw clients within an average of 28 days (4 weeks).

Factors Affecting Referral Decisions

There was a much higher referral rate from large surgeries compared to smaller surgeries. This supports earlier findings that larger surgeries are more likely to refer to CMHTs (Laugharne & Fleminger, 1996) and this could reflect inequalities in accessing both outpatient psychiatric and psychological services. There were also slightly fewer referrals from rural

areas to services, however, this could reflect higher levels of need from clients living in an urban environment.

When looking at whether any of these factors influenced where a GP chose to refer to, it was found that if the client lived in a rural area it was more likely for the referral to be to the DAP. It is possible that this could be explained by the referral practices of two GP surgeries that served the majority of rural clients (surgeries 9 & 12 in figure 1) as these surgeries referred solely to the DAP. Reasons for this can only be speculative, it is possible that the GPs believed that the DAP was more accessible than the CMHT or it could be partly due to one of the psychologists serving these surgeries also being the head of the psychology department of this area and hence the GPs might have believed that they were getting an especially good quality service from the DAP in this area.

Conclusions

Overall the GPs appeared to be making appropriate referrals to the services and their referral practices did reflect some differentiation between the two services. However, there was still a large overlap and this possibly reflects the real overlap that exists in the services provided by the Direct Access Psychology and the Community Mental Health Team. The psychology service did include a counselling service and there are real similarities in the services offered by CPNs, counselling psychologists, psychologists and to

some extent psychiatrists albeit there are differing approaches evident between the disciplines. The CMHT was found to be receiving some inappropriate referrals and it is possible that providing more information to GPs especially with regards to the alcohol and drug services available in the area would decrease these and improve efficiency. The low rates of referral from smaller practices could highlight an inequality at the point of access to services that needs to be addressed. A further study looking more directly at how GPs make their referral decisions could clarify this and address the preference displayed by GPs to refer rural clients to the DAP and urban clients to the CMHT.

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Figure 1: Referral Rates to DAP and the CMHT by Surgery

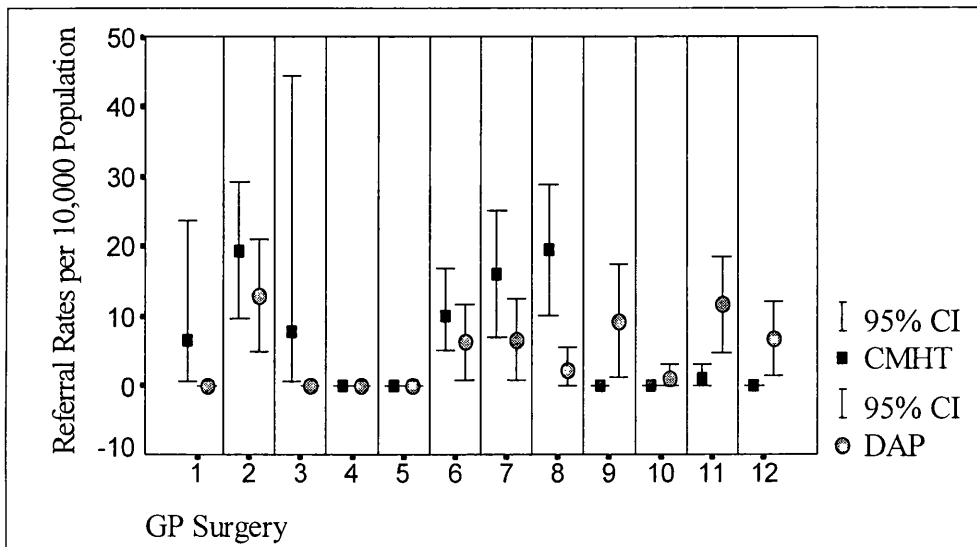


Figure 2: Pattern of Presenting Problems as Assessed by the CMHT

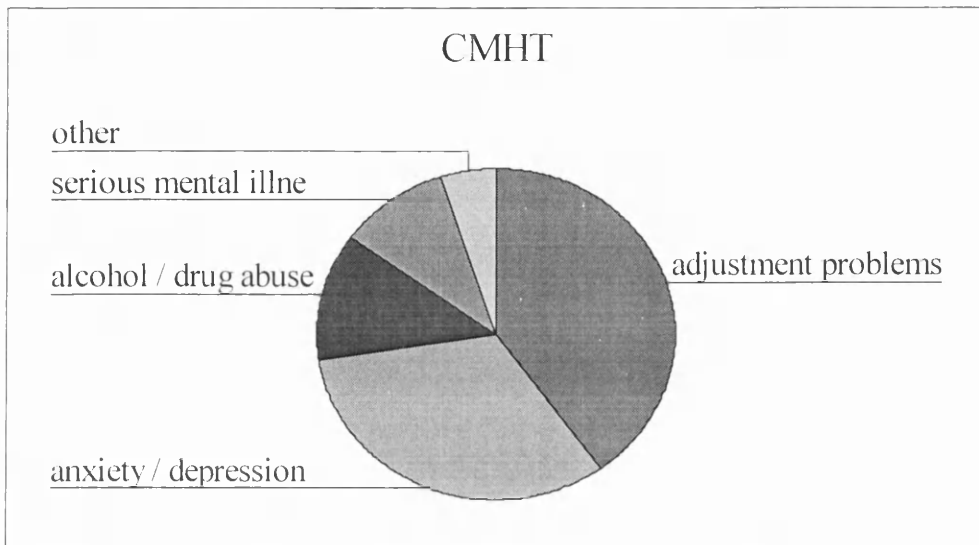


Figure 3: Pattern of Presenting Problems as Assessed by the DAP

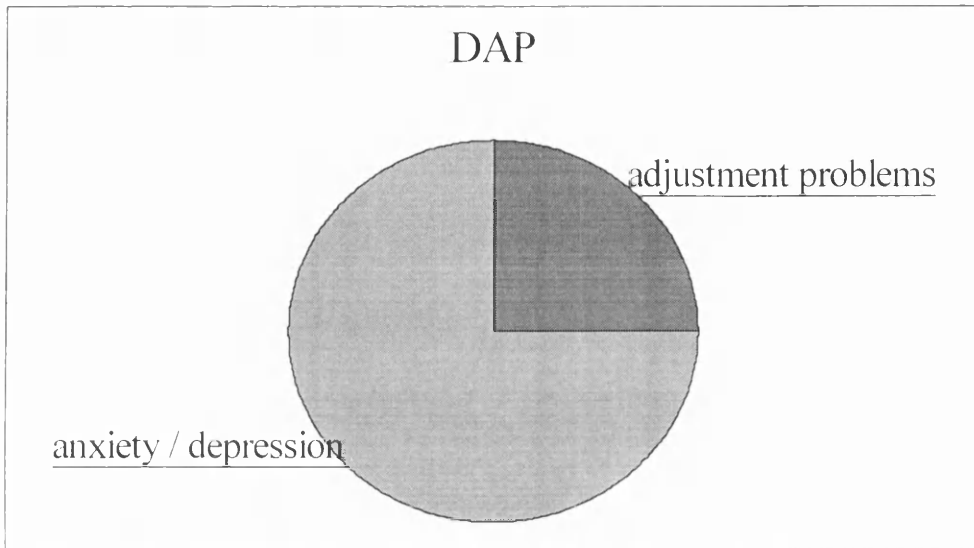


Table 1: Possible Factors Affecting Referral Decisions

	Age mean (sd)	Area (% referred to service)		Size of Practice (% referred to service)	
		Urban (n=78)	Rural (n=23)	small (n=3)	large (n=98)
DAP (n=45)	37 (12)	37.2 %	69.6 %	0 %	45.9 %
CMHT (n=56)	36 (10)	62.8 %	30.4 %	100 %	54.1 %

Table 2: Predictors of Referral Decision from Logistic Regression

Variable	Coefficient <i>B</i>	Standard Error <i>SE (B)</i>	P
Area	0.675	0.255	0.008
(Constant)	-0.151	0.255	

Chapter 2

Literature Review

The Development Of Post Traumatic Stress Disorder Following A Head

Injury: A Review Of The Literature

Running Title: PTSD After a Head Injury

Prepared in accordance with the instructions for authors from “The Journal of Nervous and Mental Disease” (see appendix 2.1)

The Development Of Post Traumatic Stress Disorder Following A Head Injury: A Review Of The Literature

Abstract

The concept of the development of post traumatic stress disorder (PTSD) after a head injury, accompanied by amnesia for the actual event, is a controversial one. An interest in the influence of post traumatic amnesia (PTA) on the development of PTSD has recently emerged in the literature. Several studies and case reports have now started to highlight the issues and incorporate their findings into models of the development of PTSD. This paper reviews the studies to date and summarises the various mechanisms by which post traumatic stress disorder may develop in the context of an amnesia as well as suggesting areas that need further investigation.

Introduction

There have been two main approaches to looking at the development of post traumatic stress disorder (PTSD) in the context of a traumatic brain injury (TBI). Some studies have recruited from series of patients admitted to hospital following road traffic accidents (RTAs). Since not all of those involved in RTAs will have a head injury, direct comparisons can be made between those with and those without head injuries who have experienced similar traumatic events. The other main type of study has been that in which consecutive attendees at hospital with a brain injury are examined for PTSD. The difficulty with the latter design is ensuring that each individual has been exposed to a trauma (criteria A for PTSD), although the majority of admissions (excluding cerebral vascular accidents) fulfil this as head injuries are often in the context of traumatic events. Table 1 summarises both of these types of study that have addressed the development of PTSD in the context of a head injury with amnesia for the event.

Table 1 in here

Prevalence of PTSD Following a Head Injury

There is conflicting evidence as to the prevalence of post-traumatic stress reactions in populations who have suffered a head injury with amnesia for the traumatic event. It has been argued that there is no evidence of PTSD in this population and that it is not possible to develop such symptoms due to

the lack of memories for the actual event. If there is no traumatic memory, it is argued that, criteria A (a traumatic event) cannot be met (Sbordone and Liter, 1995; Mayou et al, 1993). However, other studies have identified significant levels of PTSD symptoms in populations who have experienced traumatic brain injuries with accompanied amnesia for the event (e.g. McMillan, 1996; Bryant & Harvey, 1995).

Mayou et al, (1993) screened 188 road traffic accident victims for psychiatric symptoms. Although they found PTSD in the sample as a whole (11%) they found that PTSD did not occur in subjects who had been briefly unconscious and who were amnesic for the accident. Post-traumatic symptoms in their sample were strongly associated with having a horrific memory of the accident. Sbordone and Liter (1995) also did not find any PTSD in their head injured sample, all of whom were amnesic for the event and had a period of unconsciousness. The majority of these cases had been involved in RTAs. They examined 70 subjects who had previously been diagnosed with either PTSD or mild traumatic brain injury. They attempted to identify cases who would fit a dual diagnosis of PTSD and post concussional syndrome (PCS). They found that none of their PCS sample reported symptoms that would suggest that they were suffering from PTSD and concluded that mild traumatic head injury and PTSD were two mutually exclusive disorders. However their results should be interpreted with caution. Their head injured sample contained only 28 patients, therefore their study had very little power to identify possible cases. They also failed

to use any objective measures of post traumatic symptoms relying purely on unstructured clinical interviews by the first author to make their assessments during which patients were simply asked to describe their symptoms since their accident. Considering there are various standardised questionnaires and diagnostic interviews for PTSD (e.g. the Clinician Assessed PTSD Scale: Blake et al, 1990) this was an unsatisfactory method for assessing symptoms for the purpose of research. Warden et al (1997) found that none of their 47 moderately head-injured sample, all of whom had a post traumatic amnesia of at least one hour, met full criteria for PTSD although 13% met all criteria except intrusive symptoms.

Those studies that have found evidence of PTSD vary considerably in their estimates of the amount of those suffering such symptoms. This is perhaps because the numbers studied are often fairly small. Middleboe et al (1992) reported on consecutive admissions to a hospital for a mild head injury, the majority, but not all, of whom had experienced a loss of consciousness or amnesia. They identified only 1 case (2% of their sample) who fulfilled DSM-III-R criteria for PTSD. However, from the presentation of their results, it appears that they identified 3 or 4 others who had medium scores on the Impact of Events Scale (IES: Horowitz et al, 1979) and therefore had some post traumatic symptoms. They did not examine directly if the presence of amnesia mediated the post traumatic stress symptoms. Ohry et al (1996) interviewed 24 outpatients who had incurred head injuries and

were attending for rehabilitation and found high levels of PTSD in their sample: 33% met DSM-III-R criteria for PTSD using the PTSD Inventory (Soloman et al, 1993). It was not clear from their results whether all their participants had an amnesia for the traumatic event or not. Bryant and Harvey (1995) screened 38 non-head injured and 38 head injured road traffic accident victims for post traumatic symptoms using the IES and a semi-structured interview, the PTSD-I (Watson et al, 1991). All of the head-injured sample had amnesia for the impact of the accident. Their non-head injured sample contained a significantly greater number who fulfilled criteria for acute stress disorder (42%) compared to those who sustained a head injury of whom 27% met criteria. Hickling et al (1998) screened 107 road traffic accident victims for PTSD using the Clinician Assessed PTSD Scale (CAPS: Blake et al, 1990), 16 of whom had a mild traumatic brain injury (MTBI) involving a loss of consciousness with little or no recall of the event. From their results table 56% (n=9) of the MTBI group and 32% (n=29) of the non-MTBI group received a diagnosis of PTSD, although they did not report if this was a significant difference. Bryant and Harvey (1998a) assessed consecutive head injured road traffic accident victims, all of whom had amnesia for the event, for acute stress disorder one month after injury and for PTSD 6 months after injury. They found that 14% of their sample met criteria for acute stress disorder and 24% for PTSD at six months. Ehlers et al (1998) found that 29% of their mild head injured group, all of whom had experienced a loss of consciousness, met criteria for PTSD three

months post-trauma compared to 21% of the non-head injured group. PTSD was reported to be significantly related to a mild head injury at this point, however, at one year follow-up this relationship had ceased to be significant. Bryant and Harvey (1999) reported 20% (n=9) of their head injured group, all of whom had a loss of consciousness and a post traumatic amnesia, as meeting criteria for PTSD using a diagnostic interview, this compared to 25% (n=15) of their non-head injured group.

The majority of studies found some evidence of PTSD in their head-injured samples which indicates that it does appear to be possible to develop PTSD in the context of a brain injury with accompanied amnesia. Estimates of the prevalence of PTSD following a head injury varied considerably from 0% to 56%. It is of note that the studies that failed to identify PTSD sufferers in their head injured samples are the studies that did not use any assessment tools designed specifically for the identification of PTSD symptoms. In comparison those studies that used diagnostic interviews designed for PTSD found rates of 20-56% following exposure to a traumatic event which involved a head injury.

Five studies compared non-head injured samples to head injured samples who had experienced similar traumatic events. The outcome from these studies was mixed: two studies found lower amounts of PTSD in their head injured groups (Mayou et al, 1993; Bryant and Harvey, 1995); one study

found significantly more PTSD in their head injured group (Ehlers et al, 1998) with another appearing to from the presentation of their results (Hickling et al, 1998); one study found no difference between those with and without head injuries (Bryant and Harvey, 1999). In conclusion it appears from the few studies that exist that a head injury with amnesia for the traumatic event does not protect against the development of PTSD. However, the mechanisms of how the symptoms develop and manifest needs closer attention. More details of the extent of the amnesia also need to be examined in relation to the development of symptoms.

Symptom Profile

Much attention has been focused on criteria B for PTSD: intrusive symptoms - recurrent recollections, dreams, and flashbacks of the event accompanied by distress and physiological activity (APA, 1994). It has been hypothesised that those who have amnesia for the event cannot have intrusive PTSD symptoms because the injury prevented the brain from processing and recording the events at the time of the accident (Sbordone and Liter, 1995) and therefore there would be nothing to draw on in terms of memories in the production of symptoms.

Bryant and Harvey (1995) found high levels of symptoms in both head injured and non-head injured groups following a road traffic accident but found that the non-head injured had significantly higher scores on the

PTSD-I, the IES, and the IES-Intrusion scale, whereas there were no significant differences in IES-avoidance scores. Bryant and Harvey (1996) discussing what appears to be the same sample of head injured road traffic accident victims found that the experience of a head injury with amnesia for the event was negatively correlated with intrusion scores on the IES. Intrusive symptoms were largely explained by the absence of amnesia of the road traffic accident in a stepwise multiple regression leading them to conclude that recall of the actual traumatic event was critical in the development of intrusive symptoms. Ohry et al (1996) found that although many of their head injured population were suffering from PTSD intrusion scores were generally lower than avoidance scores on the IES. Intrusive symptoms such as reliving the event and having recurrent dreams about it were the least reported symptoms. The lack of intrusive symptoms following a moderate traumatic brain injury was noted by Warden et al (1997) who screened 47 patients using the PTSD items of the Present State Examination (PSE) modified for use with a head-injured population. All patients had a PTA of more than 24 hours but had recovered to be fully orientated within 3 months. No patients reported having criteria B symptoms: re-experiencing. However, 6 patients (13%) fulfilled all the other criteria which includes avoidance and arousal symptoms. The authors suggested that the post traumatic amnesia protected specifically against recurring memories and that their sample had developed a form of PTSD without the re-experiencing symptoms.

However, there are studies that have found a evidence of intrusion symptoms following a head injury. For example in Bryant and Harvey's (1995) study although there was less evidence of intrusive symptoms in the head injured group there was a proportion of head injured patients who despite being amnesic for their trauma did report intrusive as well as avoidance symptoms. The case identified with PTSD in Mayou et al (1993) had high levels of both intrusions and avoidance symptoms. Harvey and Bryant (1998) reported that 20% of their head injured population suffered from intrusions one month post-injury and intrusions at this stage were strongly predictive of developing PTSD at six month follow-up where 24% of the sample met criteria including intrusive symptoms (Bryant & Harvey, 1998a). Bryant and Harvey (1999) also found evidence of both intrusive and avoidance symptoms in their head injured group.

It appears then that intrusive symptoms can develop after a head injury, but that there is some evidence to suggest that re-experiencing symptoms are less likely to occur when compared to a non-head injured group (Bryant and Harvey, 1995; 1996) and when compared to the level of avoidance symptoms (Warden et al, 1997; Ohry et al, 1996). However, the mechanisms behind this and discussion of how this fits with existing models of the development of PTSD are not clear from these studies. None of the studies profiled the symptoms in enough detail to be able to assess the specific content of the intrusive symptoms. Case studies have been more illustrative

and have highlighted possible mechanisms by which intrusive symptoms and traumatic memories can arise despite amnesia for the actual event.

Case Studies

Perhaps the earliest report in the literature of the development of PTSD in the context of a loss of consciousness and amnesia for the event is that presented by McMillan (1991). This describes a client who had been involved as a passenger in a car accident in which her friend, who was driving, was killed. Despite having no verbal memory of the event she developed symptoms that met criteria for DSM-III-R PTSD, including intrusive thoughts about the accident and her friend that had died and avoidance of thoughts and situations connected to the accident and its sequelae.

Table 2 summarises the case studies that have been reported in the literature to date and indicates what memories if any are present and whether the presence of intrusive symptoms and/or avoidance symptoms of PTSD were reported. All cases were involved in road traffic accidents except for one aeroplane crash and one industrial accident in the McMillan (1996) series. The case reported by Horton (1993) does not give enough details of the degree of amnesia other than a mild concussion and therefore it is quite possible that some memories of the accident were present and that these were responsible for the intrusive symptoms. Layton and Wardi-Zonna

(1995) reported on two cases of head injured patients developing PTSD. The first had a questionable loss of consciousness but reported as having no memories of the accident and it is of interest that no intrusive symptoms of PTSD were reported. The other case could only remember getting on to her motorcycle about five minute before the accident and her intrusions consisted of imaginary of motorcycles colliding but with no specific memories or pseudomemories of the accident represented in her symptoms.

Table 2 in here

McMillan's (1996) case series is the most comprehensive case consideration of the development of post traumatic symptoms after a head injury. He reported on 10 single cases which represented all those who had been referred for neuropsychological assessment or rehabilitation (n=312) who also fulfilled criteria for PTSD. All of the cases suffered from intrusive recollections related to the incident. The majority of these recollections were of distress just after the accident or of waking in hospital with no understanding of how they had got injured. This series is particularly interesting as it identifies 'islands' of memory and the development of pseudomemories as implicated in the development of post traumatic symptoms.

'Islands' of memory are purported to result from drifting in and out of consciousness and are a possible mechanism whereby explicit memories can be laid down during a period of apparent unconsciousness. McMillan (1996) reported this experience in only one patient who had a PTA of four days and not at all in the severe head injured categories where it might be assumed that their period of unconsciousness was perhaps more complete and certainly longer. King (1997) also reported on a case who had an 'island' of memory just after being hit by a car. This patient had no other memories of the accident and for the 2 ½ days after his accident. His intrusive symptoms including automatic thoughts and nightmares which consisted of re-experiencing this 'island' of memory. He remembered trying to pull himself to the edge of the road, seeing the car which had hit him stop, and mistakenly believing that the car had turned round to "finish him off" (King, 1997, p83).

Pseudomemories are imaginary recollections of the impact and immediate sequelae that have either been self-generated or based on information about the incident provided by police or relatives. These were mostly evident in cases with severe head injury in McMillan's (1996) series. Bryant (1996) reported on a further two cases both of whom demonstrated delayed onset post traumatic symptoms with intrusive images generated from pseudomemories. Both of these cases had long periods of PTA.

It appears then that intrusive symptoms can be reported after a head injury even in cases where no traumatic memories of the actual accident or events surrounding it are reported. Several mechanisms have been identified by which intrusive symptoms manifest. Intrusive symptoms can arise from thoughts related to the accident or its consequences which are not memories, for example, thoughts about a friend who had died in the accident (McMillan, 1991), or images of motor-cycles colliding (Layton and Wardi-Zonna, 1995). Though there may be no memory of the actual impact there may be distressing memories of events prior to the incident (McMillan, 1996). 'Islands' of memory might have survived whereby isolated bits of the incident are remembered and manifest in intrusive symptoms (McMillan, 1996; King, 1997). Intrusive symptoms have been reported to relate to the traumatic memory of regaining consciousness with multiple injuries either at the scene, in an ambulance, or in hospital (McMillan, 1996). Finally there is some evidence of pseudomemories developing from being told what had happened and intrusive symptoms consisting of these distressing pseudomemories (McMillan, 1996; Bryant, 1996). There is a need to systematically profile the relationship between memories of the event and the nature of intrusive symptoms so as to inform models of the development of PTSD.

Cognitive Models of PTSD

Cognitive models place great emphasis on the need for the representation of the traumatic event in memory (Power and Dalglish, 1997, p244; Foa et al, 1989). The Schematic Propositional Associative Analogical Representation Systems (SPAARS) model (Power and Dalglish, 1997) proposes that there is a need for an encoding of the event along with a threat-related appraisal for PTSD to develop. This is in common with other cognitive theories which suggest that encoding the traumatic event is crucial. For example, Foa et al (1989) have proposed an information-processing theory of PTSD which consists of the formation of a “fear-network” in long-term memory at the time of the event which associates stimulus information about the event and the cognitive, behavioural and physiological reactions to the trauma. However, it is not clear if this model is correct for a head injured population when there is a lack of the memory of the actual trauma. It is difficult for this model to account for PTSD symptoms such as intrusive imagery arising from what is believed to have happened in the incident. Yet intrusive recollections in head injured patients can be experienced as just as real as similar symptoms in those without head injuries (Bryant and Harvey 1998b) despite apparently not having managed to encode the event and fear reactions into long-term memory at the time of the accident.

Brewin et al’s (1996) ‘dual-representation theory’ could account for the development of symptoms without the need for a conscious verbal memory

for the event. This theory has been applied to PTSD and suggests that at the time of the trauma ‘verbally accessible memories’ (VAMs) that are available for conscious recall and ‘situationally accessible memories’ (SAMs) that cannot be deliberately accessed are laid down in parallel. VAMs are hypothesised to be available for deliberate retrieval and progressive editing by the traumatised individual whereas SAMs are thought to be unavailable for deliberate, conscious accessing and therefore unavailable for progressive editing. This theory makes predictions for the development of specific symptoms of PTSD (see figure I) with intrusive memories accounted for by the VAMs and flashbacks, dreams and situational arousal accounted for by SAMs.

Figure 1 in here

In the context of an amnesia for the traumatic event it could be that it is only the VAMs that have not been encoded and that the SAMs have been successfully encoded. This would account for less intrusive symptoms (specifically intrusive recall of the actual event) and predict a specific profile of symptoms. It could also be predicted that the onset of PTSD might be delayed as the lack of VAMs make it impossible for emotional processing to occur and memories of the event could only reach conscious awareness via the SAMs being triggered by specific situations. This could account for the higher prevalence of PTSD at six months compared to the

prevalence of acute distress disorder at one month post-trauma found by Bryant and Harvey (1998a). Studies that carefully profile how traumatic events are represented in memory in parallel with a systematic charting of specific post traumatic symptoms are needed to test this model further.

Conclusions

There is some evidence to suggest that PTSD does develop in the context of head injury with an amnesia for the traumatic event. A few studies have concluded that a loss of consciousness or amnesia precludes the development of PTSD (Sbordone and Liter, 1995). Reports in the literature like this have led some law professionals to take the extreme view that clients with head injuries presenting with such symptoms are likely to be malingering (Price, 1994). However, careful case studies have identified individuals with the dual diagnosis of PTSD and a head injury (e.g. McMillan, 1991, 1996; Bryant, 1995) as have larger studies using appropriate screening methods (e.g. Ohry et al, 1995; Bryant and Harvey 1998a; Ehlers et al, 1998). It should be emphasised, however, that the number of studies into this population are small and that the majority are by the same few researchers which leads to the possibility of the same few subjects being incorporated into different studies.

Some studies have failed to identify intrusive symptoms in head injured populations (Warden et al, 1997) or found less intrusive symptoms in head

injured populations compared to non-head injured populations (Bryant and Harvey, 1995, 1996). However, both case studies and larger studies have managed to identify intrusive symptoms in head injured populations. Theories are emerging to account for the development of these symptoms. For example, the presence of a dual memory system (Brewin et al, 1996) whereby explicit memory and implicit memory for events are hypothesised to be created separately and in parallel. This could account for the presence of PTSD symptoms without any conscious memory of the experience and would predict less intrusive recollections. Other routes to developing post traumatic symptoms could include the preservation of memories surrounding the incident, the presence of “islands of memory” (McMillan, 1996) or the presence of “pseudomemories” (Bryant, 1996; McMillan, 1996). Research is needed to clarify the links between specific memories and the presentation of PTSD following a head injury so as to develop a greater understanding of the mechanisms underlying the complex psychological reactions to traumatic events.

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Table 1: Rates of PTSD following a Head Injury

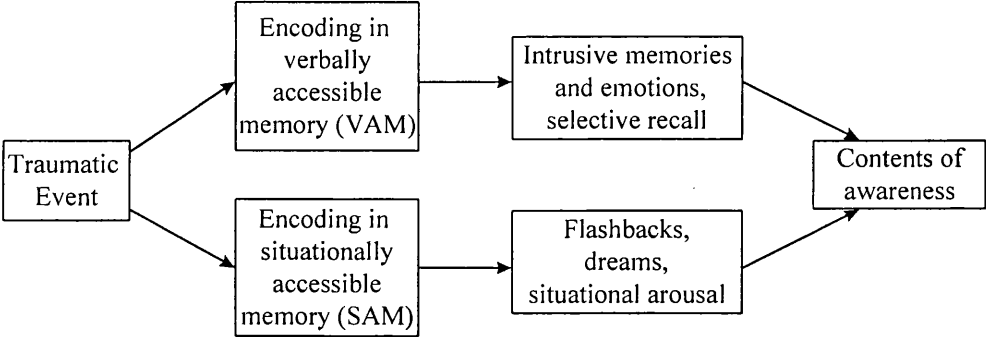
Study	Population	Severity of Head Injury	Assessment of PTSD	Prevalence of PTSD		Symptom Profile
				HI ⁹	no HI ⁹	
Middleboe et al. (1992)	51 head injured (various trauma)	mild	IES ² clinical interview	2%	n/a	High intrusions and avoidance symptoms in IES
Mayou et al. (1993)	44 head injured (from 188 RTAs)	mild	semi-structured interview	0%	14%*	Not available
Sbordonne et al. (1995)	28 post-concussion syndrome (various)	mild	clinical interview	0%	n/a	Not available
Ohry et al. (1996)	24 head injured (various trauma)	unclear	PTSD Inventory IES ²	33%	n/a	More avoidance than intrusive symptoms reported
Bryant & Harvey (1995)	38 head injured RTA ¹ (38 non-head injured)	mild	PTSD-I IES ²	27% (ASD ⁸)	42% (ASD ⁸)	Intrusive symptoms less prevalent in HI ⁹ group compared to non-HI ⁹
Warden et al. (1997)	47 head injured active-duty soldiers	moderate	PTSD items from PSE ³	0%	n/a	No intrusive symptoms although 13% had avoidance & arousal symptoms
Hickling et al. (1998)	16 head injured (from 107 RTA ¹ 's)	mild	CAPS ⁴	56%	32%	Not available
Bryant & Harvey (1998)	79 head injured (RTA ¹ 's)	mild	ASDI ⁵ (1 month) CIDI ⁶ (6 months)	14% 24%	n/a n/a	Evidence of intrusive and avoidance symptoms
Ehlers et al. (1998)	106 head injured (from 967 RTA ¹ 's)	mild	PSSS ⁷	29%	21%	Not available
Bryant & Harvey (1999)	46 head injured (from 105 RTA ¹ 's)	mild	CIDI ⁶ (6 months)	20%	25%	Intrusive and avoidance symptoms in both groups

¹ road traffic accident; ² Impact of Events Scale; ³ Present State Examination; ⁴ Clinician Assessed PTSD Scale; ⁵ Acute Stress Disorder Inventory; ⁶ Composite International Diagnostic Interview; ⁷ Posttraumatic Stress Symptom Scale; ⁸ Acute Stress Disorder; ⁹ head injured
*estimated from results table

Table 2: Case Studies

	Length of PTA	Traumatic Memories				PTSD symptoms	
		before	after	islands	pseudo	Intrusive	Avoidance
McMillan (1991)	6 weeks	no	no	no	no	yes	yes
Horton (1993)	mild	-	-	-	-	yes	yes
Layton & Wardi-Zonna (1995)	6 hours 2 weeks	no	no	no	no	no yes	yes yes
McMillan (1996)	<1 day	yes	yes	no	yes	yes	yes
	<1 day	no	yes	no	no	yes	yes
	<1 day	no	yes	no	no	yes	yes
	2 days	yes	no	no	no	yes	yes
	3 days	yes	yes	on	no	yes	yes
	4 days	no	no	yes	no	yes	yes
	5 days	no	yes	no	no	yes	yes
	21 days	no	yes	no	yes	yes	yes
	42 days	no	yes	no	yes	yes	yes
60 days	no	no	no	yes	yes	yes	
Bryant (1996)	5 weeks	no	no	no	yes	yes	yes
	3 weeks	no	no	no	yes	yes	yes
King (1997)	2 ½ days	no	no	yes	no	yes	yes

Figure I: Dual Representation Theory (from Brewin et al., 1996)



Chapter 3

Proposal For Major Research Project

Psychological Sequelae Of Head Injuries: Is Amnesia For The Event A Protective Factor In Developing Post-Traumatic Stress Disorder?

Prepared in accordance with guidelines in the Doctorate in Clinical Psychology Handbook (appendix 3.1). Guide lines based on the application for a mini-grant in health services research. Submitted to the ethics committee of the Glasgow Royal Infirmary University NHS Trust (ethical approval: appendix 3.2)

Title

Psychological Sequelae Of Head Injuries: Is Amnesia For The Event A Protective Factor In Developing Post-Traumatic Stress Disorder?

Summary

This study aims to examine the prevalence of post-traumatic stress disorder (PTSD) following head injuries and to examine specifically the effect of an amnesia for the traumatic event. The symptom profile and content will be reported on to see if symptoms can be accounted for by specific traumatic memories or if other mechanisms can be identified in the development of PTSD.

Potential participants will be recruited from consecutive attendees of the Accident and Emergency department of the Glasgow Royal Infirmary who have presented with a head injury and amnesia for the traumatic event in the past year. They will be asked to complete questionnaires as to their memories of the event and symptoms of post traumatic stress disorder. Groups will be compared with no memories of the event, unfearful memories of the event and fearful memories of the event to examine the relationship between fearful memories of the event and intrusive symptoms of PTSD. A subset who appear to be suffering from PTSD from the questionnaires will be interviewed for more details of the memories and content of their post traumatic symptoms so as to make a diagnosis and to

examine in more detail the relationship between the recall of the event and specific symptoms.

Introduction

There is conflicting evidence as to the nature of post-traumatic stress reactions in populations who have suffered head injury with amnesia for the traumatic event. It has been argued that there is no evidence of PTSD in this population and that it is not possible to develop such symptoms due to the lack of memories for the actual event and therefore no criteria A (a traumatic event) in memory (Sbordone & Liter, 1995; Mayou *et al.*, 1993). However, other studies have identified PTSD in populations who have experienced traumatic brain injuries with an amnesia for the event (e.g. McMillan, 1996; Bryant & Harvey, 1995; Ehlers et al, 1998).

Much attention has been focused on criteria B for PTSD: intrusive symptoms - recurrent recollections, dreams, and flashbacks of the event accompanied by distress and physiological activity (APA, 1994). It has been hypothesised that those who have amnesia for the event cannot have intrusive PTSD symptoms because the injury prevented the brain from processing and recording the events at the time of the accident (Sbordone & Liter, 1995) and therefore there would be nothing to draw on in terms of memories in the production of symptoms. Some studies profiling PTSD symptoms in this population have found less evidence of intrusive

phenomena compared to non-head injured groups (Bryant & Harvey, 1995) with one study finding no intrusive symptoms in a brain injured sample (Warden et al., 1997). However, other studies have found evidence of intrusive symptoms in their head injured populations (Bryant & Harvey, 1998; Bryant & Harvey, 1999). Case studies, in particular, have identified intrusive symptoms and highlighted possible mechanisms by which traumatic memories can arise despite amnesia for the actual event. McMillan (1996) describes cases that meet the symptom profile for PTSD yet are amnesic for the event. There has also been a report of two cases in which distressing pseudomemories developed in the months following the incident after hearing or seeing reports of the accident which manifested as delayed PTSD (Bryant, 1996). However, no studies have systematically examined such memories and how they relate to specific symptoms in this population.

Cognitive models place great emphasis on the need for the representation of the traumatic event in memory (Power & Dalgleish, 1997; Foa *et al.*, 1989). Brewin *et al.* (1996) have hypothesised a model of memory representation that separates 'verbally accessible memories' (VAMs) from 'situational accessible memories' (SAMs). This model makes predictions for the development of specific symptoms of PTSD with VAMs said to be necessary for the development of the symptoms of intrusive memories and emotions. However, it is not clear if these models are correct for a head

injured population and further research is needed to highlight the mechanisms involved in the development of post-traumatic symptoms in this population.

Aims and Hypotheses

This study will aim to screen a population of those who have suffered head injuries in the context of a traumatic event and record the prevalence and profile of post-traumatic symptoms in this population. Any memories of the accident will be recorded. If the cognitive models for PTSD hold true for this population it would be expected that those with no fearful memories of the incident should have no intrusive symptoms of PTSD. From studies in the literature it would be expected that intrusive symptoms are likely to occur despite an amnesia for the actual event itself and that the content could relate to traumatic memories surrounding the incident (e.g. regaining consciousness and discovering injuries, the presence of 'islands' of preserved memories or the presence of pseudomemories).

Plan Of Investigation

Participants

400 potential participants will be contacted to include 150 participants aged 16-65 who have suffered a closed head injury in the context of a traumatic incident (either a road traffic accident or assault) resulting in an attendance to accident and emergency in the past year.

Measures

Questionnaires to be sent out include a questionnaire aiming to collect demographic details of age, sex, and the type of incident and the degree of ongoing injury consequences as measured by impact on work, leisure and social life (appendix 3.3). There will also be a questionnaire pertaining to the presence of memories of and surrounding the incident that led to the head injury (appendix 3.4). Standard questionnaires include the Impact of Events Scale (Horowitz, 1979; appendix 3.5), and the Hospital Anxiety and Depression Scale (Snaith & Zigmund, 1983; appendix 3.6).

Interview-based measures include the Clinician-Administered PTSD Scale for DSM-IV (CAPS-DX: Blake et al., 1996) for clarifying diagnosis and repetition of the memory questionnaire as an interview to gain more detailed information as to the content of memories.

Design and Procedure

Pilot

The questionnaires that have been developed to gather information as to injuries and memories, will be piloted on a sample of 10 patients admitted to a ward after attendance at Accident and Emergency (A&E) for a head injury to ensure ease of comprehension and validity.

Phase 1

Computer records for A&E attendance and discharge summaries for the A&E ward will be searched to identify consecutive admissions recorded as having a head injury over a year period (n=1000).

Case records to be scanned to identify a cohort who meet inclusion criteria of having been involved in a potentially traumatic event (e.g. road traffic accident or assault) and who do not meet exclusion criteria of a chronic morbidity due to an ongoing alcohol problem. Information to be gathered from the case records of potential participants (n=400) include age, sex, type of incident, estimated length of PTA, length of unconsciousness, physical injuries, length of hospital admission (if any) and whether alcohol or other intoxicants were involved.

Phase 2

Potential participants from the above procedure (n=400) will be sent a pack which includes a letter (appendix 3.7), an information sheet (appendix 3.8) and a consent form (appendix 3.9) as well as the above questionnaires. If consenting they will be asked to complete the questionnaires and asked if they would be willing to be contacted by phone for further details of their symptoms and experiences.

Phase 3

All those who appear to meet criteria for PTSD according to their scores on the IES (estimate: 30 potential for 10-15 definite diagnosis) will be contacted by telephone and the nature of their post-traumatic symptoms examined using a semi-structured diagnostic interview (CAPS-DX: Blake et al., 1996) to gain further details as to whether they meet caseness for PTSD. The profile and content of their symptoms will be recorded. The memory questionnaire will be repeated as a semi-structured interview and more details recorded to determine whether the intrusive symptoms can be accounted for by actual distressing memories of traumatic experiences or whether there is a cohort of people who have developed post-traumatic symptoms by other mechanisms.

Data Analysis

Main analysis will be comparing groups identified as having either no memories, untraumatic memories or traumatic memories of the incident during which a head injury was sustained. A between group comparison will be completed for the presence of intrusive and avoidance post-traumatic symptoms as indicated in the Impact of Events Scale. The presence of other psychological symptoms and the effects of injuries will be controlled for by entering such factors as co-variates. Estimated power for this analysis, using GPOWER (Faul & Erdfelder, 1992), assuming $n=150$ and a medium effect size is 0.78, $\lambda = 9.37$.

To answer in more detail the question as to the mechanisms of the development of post-traumatic stress disorder in this population, the profile and content of symptoms will be examined to answer whether the content of intrusive symptoms is directly related to a conscious memory of the incident or if other mechanisms can be identified to account for the development of the symptoms.

Practical applications

Further knowledge of the nature and mechanisms involved in the development of post-traumatic reactions in this population can aid in their psychological management.

Timescales

Data collection: 3-4 months: *Data analysis:* 1 month

Ethical Approval

Ethical approval has been given by Glasgow Royal Infirmary University NHS Trust (appendix 3.2).

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Chapter 4

Major Research Project

Psychological Sequelae Of Head Injuries: Is Amnesia For The Event A Protective Factor In Developing Post-Traumatic Stress Disorder?

Prepared in accordance with the instructions for authors from “British
Journal of Psychiatry” (see appendix 4.1)

Psychological Sequelae Of Head Injuries: Is Amnesia For The Event A Protective Factor In Developing Post-Traumatic Stress Disorder?

ABSTRACT

Background: There is controversy as to whether PTSD can develop following a brain injury with a loss of consciousness. However, few studies have taken into account the extent of the actual amnesia for the event. **Aims:** To consider how amnesia for the traumatic event effects the development and profile of traumatic stress symptoms. **Method:** 1500 case records from an accident and emergency department were screened to identify 371 individuals with traumatic brain injury to be invited to complete questionnaires. 53 responses were included in the study. Groups were compared with no memory (n=14), untraumatic memories (n=13) and traumatic memories (n=26) for traumatic stress symptoms as measured by the IES-R. A structured interview (CAPS-DX) was used to determine caseness and provide details of symptom profile. **Results:** Groups with no memories or traumatic memories of the index event reported higher levels psychological distress than the group with untraumatic memories. Prevalence of PTSD in the entire cohort was 17-27%. Ratings of PTSD symptoms were less severe in the no memory group compared to those with traumatic memories. **Conclusions:** Psychological distress was associated with having traumatic or no memories of an index event. Amnesia for the event did not protect against PTSD, however, it does appear to protect against the severity and presence of specific intrusive symptoms.

INTRODUCTION

Recent attention has been paid to the development of post traumatic stress disorder (PTSD) following traumatic brain injury (TBI) with accompanying amnesia for the index traumatic event. Some have argued that such a head injury is protective in that a lack of memories for the event precludes the development of PTSD as there is no traumatic event in memory (Sbordone & Liter, 1995; Mayou *et al*, 1993). However, others have identified PTSD rates of 20% to 33% in populations with TBI (Ohry *et al*, 1996; Bryant & Harvey, 1995, 1999; Ehlers *et al*, 1998). None of these studies have specifically looked at the amount or type of memory individuals have of their traumatic experiences. It has often been assumed that due to a loss of consciousness or some post traumatic amnesia (PTA), there is a complete lack of memory for the event. Such an assumption may be a confounding factor in these studies. The present study aims to look at a population with TBI to establish prevalence of PTSD and to specifically consider how amnesia for traumatic events is related to the development and profile of traumatic stress symptoms.

METHOD

Participants

A search of the computerised records of the accident and emergency department of a city centre hospital was performed for all people aged 16-65 who had attended with a head injury in the six months previously ($n \approx 1000$).

Once identified the paper admission records were then scanned for those who appeared to meet inclusion criteria of a traumatic event having occurred (such as an assault or road traffic accident) and evidence of a traumatic brain injury. Traumatic brain injury was suggested if a loss of consciousness or a period of post-traumatic amnesia was documented or queried in case records. In addition discharge summaries (n≈500) for the main admission ward for the accident and emergency department were also scanned for one year to identify any further cases who appeared to meet the criteria and had not already been identified via the computer search. Exclusion criteria included evidence of chronic alcohol abuse resulting in repeated admissions to accident and emergency as this population were likely to have had previous head injuries and were also more likely to confabulate as to the memories of the index event.

A total of 371 individuals were identified all of whom had a loss of consciousness and a PTA documented or queried in case records. A letter and information sheet was sent to all potential participants asking them if they wished to be involved in the study. Those who wished to take part were invited to complete the enclosed consent form and questionnaires. They were also asked to indicate whether they would be willing to be contacted for a telephone interview. After three weeks, if there had been no response, a reminder letter was sent out. A total of 55 responses (15%) were received of

which two were excluded due to the participants reporting no loss of consciousness and a complete recall of all events.

Measures

Revised Impact of Events Scale (IES-R: Horowitz et al, 1979)

This is a 15-item self report scale developed to measure stress reactions after a traumatic event. It consists of two subscales reflecting “intrusions” and “avoidance” of memories, thoughts and feelings associated with the traumatic event. A cut-off point of ≥ 20 on either subscale was used to denote a high score indicating the possibility of PTSD being present (Middleboe et al, 1992; Bryant & Harvey, 1995).

Clinician-Administered PTSD Scale for DSM-IV (CAPS-DX: Blake et al, 1996)

This was used to establish a definite diagnosis and obtain details of symptom profile. The CAPS-DX is a structured clinical interview which generates frequency (0-4) and intensity scores (0-4) for the 17 possible PTSD symptoms from the DSM-IV criteria (APA, 1994). Criteria 8 (difficulty in remembering parts of the event) was excluded for the purposes of this study due to the presence of some organic amnesia due to the head injury. Various scoring rules have been devised with different sensitivity and specificity levels (Weathers et al, 1999). For the purpose of this study the most lenient and most stringent rules were followed to give a lower and

upper estimate of the prevalence of PTSD in this population. The least stringent rule was defined by “Frequency ≥ 1 / Intensity ≥ 2 ” (F1/I2), (Blake *et al*, 1990). PTSD was diagnosed if enough symptoms from each criteria for PTSD were present to meet DSM-IV criteria (1 re-experiencing, 3 avoidance and numbing, 2 hyperarousal). This has a sensitivity kappa co-efficient of 0.76 and a specificity kappa co-efficient of 0.54 for clinical diagnosis. The most stringent rule was defined by “Frequency ≥ 1 / Intensity ≥ 2 / Total Severity ≥ 65 ” (F1/I2/TSEV65). This diagnoses PTSD if enough symptoms from each criteria of PTSD are present and if the frequency and intensity scores from all the 17 symptoms total at least 65. This has a sensitivity kappa co-efficient of 0.66 and a specificity kappa co-efficient of 0.85 for clinical diagnosis (Weathers *et al*, 1999).

Hospital Anxiety and Depression Scale (HADS: Zigmond & Snaith, 1983)
This was used to measure levels of anxiety and depression. The HADS is a 14-item self report questionnaire which has separate scales for symptoms of anxiety (7 items) and depression (7 items) and was developed for populations with physical illness. This questionnaire depends on psychological rather than somatic symptoms of anxiety and depression and therefore is less likely to be affected by the presence of physical illness. Scores of greater than or equal to 10 on either subscale are suggestive of clinical levels of symptoms.

Memory of the Event

A questionnaire was devised (appendix 3.4) to establish whether any memories of the incident or events immediately surrounding it were present and whether these memories were traumatic. This was for the purposes of classifying participants as having traumatic memories, untraumatic memories, or no memories of the event during which the head injury was incurred. Traumatic memories surrounding the actual event could include memories of someone behaving in a threatening manner or regaining consciousness and feeling afraid. The period of unconsciousness and length of PTA were also queried as hospital records did not always provide sufficient details.

Impact of Physical Injuries

A questionnaire was devised in order to gain a subjective index of the extent that the individual was affected by any physical injuries as a result of the incident as this could be a confounding factor in the development of psychological distress (appendix 3.3). This provided a composite rating from 0-12 by summing the ratings of the effect of physical injuries in disrupting the ability to work, take part in leisure activities, socialise and the effect on general abilities.

Compensation

The participant was asked to state whether they were involved in a compensation claim as this could be a factor influencing over-reporting of psychological distress.

Procedure

Participants initially completed the above questionnaires by post. Clinical interviews were then conducted over the telephone to determine caseness for those who appeared to be displaying symptoms of PTSD from their questionnaires. Those scoring above 20 on either scale of the IES-R were followed up by telephone by a postgraduate psychologist using the structured clinical interview (CAPS-DX: Blake *et al*, 1996) to establish a definite diagnosis and obtain details of symptom profile. A sample of those scoring under 20 on each subscale were also followed up to check for false negatives in the sample.

Statistical Analysis

SPSS for Windows version 7.5.1 (SPSS Inc., 1996) was used to analyse the data. Analysis of descriptive data was completed using chi-squares for categorical data, t-tests for interval data, and Mann-Whitney tests for ordinal data. The main analysis consisted of a multiple analysis of variance (MANOVA) with groups defined by the memory of the incident: whether

there was no memory, untraumatic memories, or any traumatic memories of the incident or events immediately surrounding it.

RESULTS

Responders versus Non-responders

Non-responders (i.e. those who did not complete the questionnaires) were characterised by being more likely to have been involved in an assault and less likely to have been involved in a road traffic accident than responders ($\chi^2 = 12.73$, $df = 1$, $p < 0.001$). Non-responders were also identified as having a less severe head injury in that they were less likely to have a severe (PTA of one day to one week) or very severe (PTA > one week) head injury compared to responders ($\chi^2 = 24.17$, $df = 1$, $p < 0.001$). However, the majority of responders had been involved in an assault and had a mild (PTA < one hour) or moderate (PTA one hour to one day) head injury. No other differences were found between responders and non-responders. Table 1 profiles the sample.

Table 1 here

Memory of the Incident

Groups were defined by the memory of the event (no memory, untraumatic memory or traumatic memory) to test the hypothesis that a head injury could be protective in the development of traumatic stress symptoms due to the

lack of representation of the event in memory. The characteristics of the groups are displayed in table 2. The group with no memories of the event were more likely to have a severe or very severe head injury and less likely to have a mild or moderate head injury than groups with memories of the event ($\chi^2 = 9.98$, $df = 1$, $p < 0.005$). The effect of physical injuries on abilities consisted of a composite rating from 0-12 with no significant differences found between memory groups. No significant differences were found between groups in the type of traumatic event.

Table 2 here

Self-Report Measures of Psychological Distress

Groups were compared for levels of traumatic stress symptoms as measured by the IES-R and anxiety and depression as measured by the HADS. Due to multiple comparisons, a multiple analysis of variance (MANOVA) with Bonferroni corrections was completed to consider the effect of memory group on the development of traumatic intrusive symptoms, avoidance symptoms, anxiety and depression. Mean scores for intrusive symptoms ($f = 12.12$, $df = 2$, $p < 0.001$) and avoidance symptoms ($f = 10.15$, $df = 2$, $p < 0.001$) differed according to whether an individual had no memory, an untraumatic memory or a traumatic memory of the event (figure 1). Symptoms of anxiety ($f = 8.05$, $df = 2$, $p < 0.001$) and depression ($f = 11.3$, $df = 2$, $p < 0.001$) also differed according to memory group. Table 3 displays

the mean scores and standard deviations for each group. Those with no memory or traumatic memories of events scored significantly higher on both scales of the IES-R and both scales of the HADS. There were no differences between those with no memories and traumatic memories.

Table 3 here

Figure 1 displays the main relationship of interest: the relationship of memory with indicators of traumatic stress symptoms. For the total sample (n = 58) the mean score (SD) for the avoidance subscale (18.1 (10.5)) was higher than for the intrusion subscale (15.6 (10.5)) using a paired sample t-test ($t = 2.933$, $df = 52$, $p < 0.006$).

Figure 1 here

Relationships Between Measures of Psychological Distress, Impact of Physical Injuries and Time Since Incident

To consider whether psychological distress was related to time since the injury or impact of physical injuries as a result of the incident, these variables were entered as co-variates into the MANOVA. Levels of psychological distress ($f = 3.01$, $df = 8$, $p < 0.005$) remained to differ between memory groups after controlling for time since injury and impact of injuries. Impact of physical injuries on functioning was also found to be

related to levels of psychological distress ($f = 4.49$, $df = 4$, $p < 0.001$). Time since incident was not found to be related to the reporting of psychological distress. Table 4 displays the results of this analysis.

Table 4 here

Each measure of psychological distress differed between memory groups and also differed according to the rating of effect of physical injuries on present functioning.

The interactions between the measures of psychological distress and the ratings of impact of physical injuries was explored further to establish the nature of the relationship. Scores on the IES-R subscales were found to be positively correlated with scores on the HADS subscales and ratings of the impact of physical injuries on functioning. Table 5 displays these results.

Table 5 here

These results indicate that either increased psychological distress leads to an increased perception of the effect of injuries on abilities or that increased physical disability as a result of the incident leads to increased psychological distress.

Compensation

The possible effect of claiming compensation was also examined to see if this was related to the reporting of ongoing psychological and physical distress. Only reporting of ongoing difficulties with physical injuries was related to a compensation claim with those claiming compensation scoring higher on the rating of the ongoing effects of physical injuries on functioning ($f = 6.276$, $df = 1$, $p < 0.02$). Level of psychological distress was not related to a compensation claim indicating that claims were not likely to be made based on psychological distress in this population.

Prevalence of PTSD

Of the 55 people who returned the questionnaire, 53 met the inclusion criteria of a loss of consciousness plus a period of post traumatic amnesia at the time of the incident. Twenty-six of these had scores which were below 20 on both subscales of the IES-R. The four participants scoring highest below this cut-off point were interviewed and none met criteria for PTSD. It was therefore assumed that those with scores below 20 on each subscale were not likely to be suffering from PTSD. Of the 27 who scored at or above the cut-off point, 18 agreed to be interviewed. Of these 18, 7 met criteria for PTSD using the stringent rule (F1/I2/SEV65), a further 4 met criteria using the lenient rule (F1/I2), 5 did not meet criteria, and 2 could not be contacted despite many attempts. Table 6 shows the number diagnosed with PTSD by memory group. If it is accepted that those scoring under 20 for each subscale

of the IES-R were not suffering from PTSD, then the IES-R used in this way has a sensitivity of 100% and a specificity of 44-69%. This makes it an appropriate tool for screening purposes but indicates that it should not be recommended as a reliable indicator of caseness for PTSD.

Table 6 in here

Prevalence rate for PTSD in this head-injured population was estimated as between 17% using the stringent criteria and 27% using the lenient criteria assuming that all those with low scores on the IES-R did not have PTSD and discounting those who refused to be interviewed. Despite having no memory for the incident or events surrounding it, at least two individuals met criteria for PTSD. There were no significant differences between the no memory and traumatic memory group on the numbers diagnosed with PTSD using either scoring rule. However, it must be emphasised that the numbers in each group were small.

Symptom Profile

Figure 2 displays the symptom profiles for those who met criteria for PTSD using the lenient scoring rule in the traumatic memories group (n = 6) and the no memory group (n = 5). None of those interviewed with untraumatic memories of the incident met criteria for PTSD. It was of note that none of those with no memory for events were troubled by intrusive recollections.

Distressing dreams, flashbacks, avoidance of places or people that reminded them of the event and hypervigilance were the least reported symptoms in the no memory group.

Figure 2 here

Severity scores on the CAPS-DX differed between memory groups. Those with no memories scored lower than those with traumatic memories (Mann-Whitney = 4.00, $p < 0.05$). This indicates that although levels of PTSD were similar between groups, those with no memories of the traumatic event had less severe symptoms than those with traumatic memories. Table 7 gives medians of summed symptom scores by memory group adjusted to account for using only 16 symptoms of PTSD.

Table 7 here

Intrusive Symptoms

Intrusive memories related to actual memories. However, dreams and flashback experiences could be related to experiences of which there was no conscious memory. The most frequently reported intrusive symptoms in the no memory group were psychological and physiological distress on exposure to cues about the event. Table 8 gives examples of intrusive symptoms.

Table 8 here

All intrusive symptoms in this sample were related to the actual incident or what was believed to have happened during the incident. There were no reports of distressing events such as regaining consciousness in hospital being represented in intrusive or avoidance symptoms.

DISCUSSION

Responders versus Non-Responders

Those that responded to the questionnaire were less likely to have been involved in an assault and more likely to have been involved in a road traffic accident than non-responders. However, the majority of responders had been involved in an assault (60%). There was also a higher representation of individuals with severe or very severe head injuries in those who completed the questionnaires. Those with more severe head injuries were perhaps more likely to have still been in contact with the hospital's head injury services and hence possibly more amenable to completing research questionnaires.

The response rate (15%) was similar to studies conducted in this manner with populations who had been victims of violent crime (e.g. 11%: Brewin *et al*, 1999). The proposal for the study had originally anticipated a higher response rate of 25% due to the severity of the injuries and the continued contact with the hospital for many of the sample. However, it transpired that this was an over ambitious estimate.

Memory of the Incident

There were more individuals with severe or very severe head injuries in the no memory group than in groups with memories of the event. There were no other differences between the memory groups in terms of time since injury, impact of physical injuries, involvement in a compensation claim or whether the individual was intoxicated at the time of the event.

Self-Reported Psychological Distress

Increased psychological distress was associated with having traumatic or no memories of the event. This was true for traumatic stress symptoms as well as measures of anxiety and depression. All measures of psychological distress were correlated which is to be expected in a population with traumatic stress symptoms. Co-morbidity of traumatic stress symptoms with both anxiety and depression has been found by numerous studies (e.g. Davidson *et al*, 1991; Helzer *et al*, 1987; Shore *et al*, 1989). Scores on the IES-R and self-report measures of anxiety and depression symptoms have also been found to be correlated immediately following (Bryant & Harvey, 1995) and one-year post injury in a head injured sample (Middleboe *et al*, 1992).

The present study demonstrated positive correlations between measures of psychological distress and impact of physical injuries on functioning. This

could indicate that either increased psychological distress can lead to an increased perception of the effect of injuries on abilities or that increased physical disability as a result of the incident can lead to increased psychological distress.

IES-R scores for the no memory and traumatic memory groups were similar to scores reported for individuals with clinical levels of stress responses (Horowitz *et al*, 1979) and scores previously reported for TBI populations (McMillan, 1996; Ohry *et al*, 1996). In keeping with previous findings in head injured populations, scores for the avoidance symptoms were found to be higher than intrusive symptoms in the total sample (Ohry *et al*, 1996; McMillan, 1996). A study comparing a head injured to a non-head-injured group found lower scores on the IES-intrusion subscale in the head injured group with no differences between groups on the avoidance subscale (Bryant and Harvey, 1995).

Compensation claims were not related to self-report of psychological distress in this sample. This could indicate that compensation claims were not generally based on psychological symptoms. It has been suggested in the legal literature that high levels of traumatic stress symptoms in an individual with TBI is indicative of malingering due to the supposed incompatibility of the two diagnoses (Price, 1994). Viewpoints such as this in the legal literature could discourage the pursuit of claims based on psychological

distress following such an injury. In this sample, however, it was also possible that the event during which the head injury was sustained did not provide a basis for a compensation claim.

Prevalence of PTSD by Interview

PTSD was diagnosed in 17% of the total sample using stringent criteria and 27% of the total sample using lenient criteria. Those diagnosed included those with traumatic memories and those with no memories of the event. No PTSD was diagnosed in any individual with untraumatic memories of the event. These levels of PTSD are comparable to studies looking at non-head injured victims of assault where PTSD has been diagnosed in 20% of the sample (Brewin *et al*, 1999). Other comparable non-head injured populations for the present study would include young urban adults (23%: Breslau *et al*, 1991) and traffic accident victims (18%: Ursano *et al*, 1999; 23%: Ehlers *et al*, 1998; 39%: Blanchard *et al*, 1996). One year post-incident about 10-32% have been found to suffer from PTSD symptoms (Blanchard *et al*, 1996; Koren *et al*, 1999). All of these studies used DSM-III-R criteria with the exception of Ehlers *et al* (1998) who implemented the DSM-IV criteria in their study. The present study's findings, in line with the bulk of evidence in the literature for this population (Turnbull, 1999) suggests that having a head injury with some amnesia for the event present is not protective in the development of PTSD *per se*. However, a closer look at the symptom profile does suggest some areas that

need closer investigation in terms of the presentation of PTSD in this population.

Symptom Profile

No differences were found between the traumatic memory group and the no memory group in the prevalence of PTSD and traumatic stress symptoms as measured by the IES-R. However, a difference was found between the two groups in terms of severity scores for PTSD symptoms using the CAPS-DX. Median severity scores were 59 for the no memory group and 88 for the traumatic memory group. This suggests that having no memory of events might be protective in terms of the severity of PTSD symptoms. It must be stressed, however, that the numbers in each group were small by this stage and, therefore, these findings are tentative. The total CAPS-DX scores for the PTSD groups were comparable to populations with and without head injuries with PTSD (52-65: Hickling *et al*, 1998; 59: Blanchard *et al*, 1996).

Intrusive memories were not reported by any of the 5 people interviewed with no memories of the event but in all those who had a traumatic memory. The most commonly reported intrusive symptoms were psychological and/or physiological distress in response to reminders of the event. From the results of the present study there are indications that specific symptoms could be affected by the disruption of the memory of the event. Previous studies have not considered how the degree of amnesia within a traumatically brain

injured population can specifically affect the development of symptoms. For example, rates of re-experiencing symptoms or intrusive symptoms in traumatically brain injured populations have been found to be generally lower than non-brain injured populations (e.g. Harvey & Bryant, 1998, Ohry *et al*, 1996). However, it is not clear from previous studies how the actual presence or not of any memories of the event is related to individual intrusive symptoms.

It is important to point out that the DSM-IV criteria (APA: 1994) for PTSD differs slightly from that of the DSM-III-R criteria (APA: 1987) in that “physiological reactivity to reminders of the traumatic event” has been moved from the hyperarousal group of symptoms (D) to the intrusion group of symptoms (B). A previous study using DSM-III-R classifications reported no intrusive symptoms in their head injured sample and suggested that those with head injuries developed a form of PTSD without intrusive symptoms (Warden *et al*, 1997). However, from examination of their results not only was physiological reactivity not included as an intrusive symptom but they also did not enquire about psychological distress triggered by reminders of the event. These were two of the most frequently reported symptoms in the present sample of head injured subjects.

In terms of specific mechanisms identified in this sample, the presence of a ‘pseudomemory’ developing in symptoms was identified in one individual

who developed dreams and flashbacks of being trapped in his car and looking up onto the hard shoulder. These did not appear to correspond with what had actually happened in the accident. The individual had been in a coma for two weeks after the accident and had amnesia for the week previous to the accident making it unlikely that the symptoms came from actual memories. One individual with traumatic memories reported dreams about the incident in which more people had been added to his attackers. These extra people also became present in his intrusive memories and flashbacks.

Cognitive Models of PTSD

Cognitive theories of PTSD place emphasis on the need for representation of the traumatic event in memory. Brewin et al's (1996) 'dual-representation theory' could account for the development of some intrusive symptoms without the need for a conscious verbal memory for the event. This theory has been applied to PTSD and suggests that at the time of the trauma 'verbally accessible memories' (VAMs) that are available for conscious recall and 'situationally accessible memories' (SAMs) that cannot be deliberately accessed are laid down in parallel. VAMs are hypothesised to be available for deliberate retrieval and progressive editing by the traumatised individual whereas SAMs are thought to be unavailable for deliberate, conscious accessing and therefore unavailable for progressive editing. This model makes predictions as to the development of specific symptoms of

PTSD (see figure 3). Intrusive memories are thought to be generated by the VAMs and flashbacks, dreams and situational arousal generated by SAMs.

Figure 3 in here

In the context of an organic amnesia for the traumatic event, it could be that it is only the VAMs that have not been encoded and that the SAMs have been successfully encoded. Looking in more detail at the presentation of symptoms in the present study it was not possible to identify any individual who was troubled by intrusive memories of the event of which there were no verbally accessible memories. However, there were reports of nightmares and flashback experiences of events for which there was not conscious memory. Furthermore, all suffered from situationally triggered psychological or physiological distress. Although the numbers in the sample were too small on which to base any definite conclusions, the pattern of symptoms could be explained by this model. More research on the cognitive mechanisms behind memory storage and retrieval of traumatic events are necessary to explore this further.

Limitations

- The diagnosis of PTSD was made by main investigator who was not blind to the memory group of the individual or the IES score.
- The sample for the symptom profile was quite small and hence only tentative conclusions can be drawn from this part of the study.
- When considering the hyperarousal group of symptoms in this population there are overlaps with many symptoms that could equally be attributed to the presence of a head injury such as difficulty concentrating, irritability, startle reaction and insomnia (Evans, 1992).

Clinical Implications

- Traumatic brain injury with or without amnesia for the event does not appear to be protective in the development of post traumatic stress disorder.
- Psychological distress following a traumatic brain injury is associated with having traumatic memories or no memories of an index event.
- Intrusive symptoms are less prevalent than avoidance symptoms in this population and intrusive memories are associated with having verbally accessible traumatic memories of the event.

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Table 1: Characteristics of responders and non-responders. Except where stated otherwise figures are numbers (percentages) of subjects

	Responders (n=55)	Non- responders (n=316)
Mean age (years (SD))	35 (11)	33(12)
Male	48 (87)	266 (84)
Female	7 (13)	50 (16)
Time since incident (months (SD))	5 (3)	6 (3)
Admitted to ward	44 (80)	256 (81)
Under the influence of alcohol or drugs:		
yes	34 (62)	179 (71)
no	21 (38)	73 (29)
unknown	0	64
Event:		
assault	33 (60)	237 (75)
road traffic accident (driver or passenger)	6 (11)	14 (4)
road traffic accident (pedestrian or cyclist)	10 (18)	20 (6)
accident at work	0	2 (1)
fall	6 (11)	36 (11)
unknown	0	7 (2)
Severity of Head Injury:		
none	2 (4)	0
mild (PTA < 1 hour)	31 (56)	180 (78)
moderate (PTA 1 hour - 24 hours)	12 (22)	47 (20)
severe (PTA 1 day - 1 week)	8 (14)	3 (1)
very severe (PTA > 1 week)	2 (4)	2 (1)
unknown	0	84

Table 2: Characteristics of responders by memory group. Except where stated otherwise figures are numbers of subjects

	no memory (n=14)	untraumatic memory (n=13)	traumatic memory (n=26)
Mean age (years (SD))	38 (13)	35 (11)	33 (10)
Male	12	11	23
Female	2	2	3
Time since incident (months (SD))	7 (3)	5 (3)	5 (3)
Admitted to ward	13	12	19
Alcohol or drugs involved	9	10	14
Impact of injuries on functioning (median (quartiles))	6.5 (2.25, 10)	0 (0, 5.5)	5 (1.75, 8)
Claiming compensation	2	4	9
Event:			
assault	6	6	19
RTA (driver or passenger)	3	1	2
RTA (pedestrian or cyclist)	3	2	5
fall	2	4	0
Severity of head injury:			
mild (PTA < 1 hour)	3	12	16
moderate (PTA 1hour - 1 day)	4	1	6
severe (PTA 1 day - 1 week)	5	0	4
very severe (PTA > 1 week)	2	0	0

Table 3: Psychological Distress by Memory Group

	no memory (n = 13) mean (SD)	untraumatic memory (n = 14) mean (SD)	traumatic memory (n = 26) mean (SD)
Avoidance	19.29* (9.53)	8.54 (6.25)	22.31* (9.91)
Intrusions	16.07 * (8.94)	5.54 (6.16)	20.35* (9.87)
Anxiety	6.93* (3.89)	2.54 (1.81)	8.65* (4.43)
Depression	10.21* (5.91)	5.54 (3.60)	12.12* (4.72)

* mean difference compared to untraumatic memory group is significant at the $p < 0.05$ level after Bonferroni corrections.

Table 4: Factors Related to Symptoms of Psychological Distress

	Effect of Physical Injuries			Memory Group		
	F	df	significance	F	df	significance
Avoidance	11.63	1	p < 0.005	7.22	2	p < 0.005
Intrusions	17.83	1	p < 0.001	9.60	2	p < 0.001
Anxiety	24.59	1	p < 0.001	6.55	2	p < 0.005
Depression	25.91	1	p < 0.001	9.23	2	p < 0.001

Table 5: Correlations of Measures of Ongoing Distress

	Avoidance	Intrusions	Anxiety	Depression	Impact of Injuries
Avoidance	1.000	0.821*	0.635*	0.662*	0.513*
Intrusions		1.000	0.626*	0.669*	0.553*
Anxiety			1.000	0.772*	0.576*
Depression				1.000	0.616*
Impact of Injuries					1.000

* correlation is significant at the $p < 0.01$ level

Table 6: PTSD Diagnosis Using CAPS-DX

	untraumatic memory (n=13)	no memory (n=14)	traumatic memory (n=26)
no PTSD	12	7	11
possible PTSD (not able to interview)	1	2	9
PTSD (lenient)	-	5	6
PTSD (stringent)	-	2	5

Table 7: CAPS-DX Severity Scores

	N	Median Score	(range)
No Memory	5	59.5	(35.1 - 71.2)
Traumatic Memory	6	87.7	(37.2 - 93.5)

Table 8: Examples of Intrusive Symptoms

Memory	Actual Event	Intrusive Symptoms
Traumatic Memory		
“windows” of memory of trying to protect self from being kicked	attacked in city centre at night	Intrusive memories of protecting self but more people added Dreams of trying to protect self Flashbacks of event Becomes upset and anxious when in city centre after dark
friend arguing with taxi driver, scared, thinking “he is not looking where he is going”	passenger in black taxi cab involved in a road traffic accident	Intrusive memories of argument with taxi driver Dream of car crashing No flashbacks Becomes upset and very anxious if a passenger in a car or taxi
No Memory		
No memories of week before and two weeks after event	Driver of car involved in road traffic accident	No intrusive memories Dream of car embedded in barrier, looking up onto hard shoulder, cars stopping Flashbacks of dream Becomes upset and anxious if any crash reported on news
Memory of being out with friends and then no memories until regaining consciousness in hospital	Witnesses told that assaulted with a bottle	No intrusive memories No dreams No flashbacks Becomes upset and very anxious if reminded about event

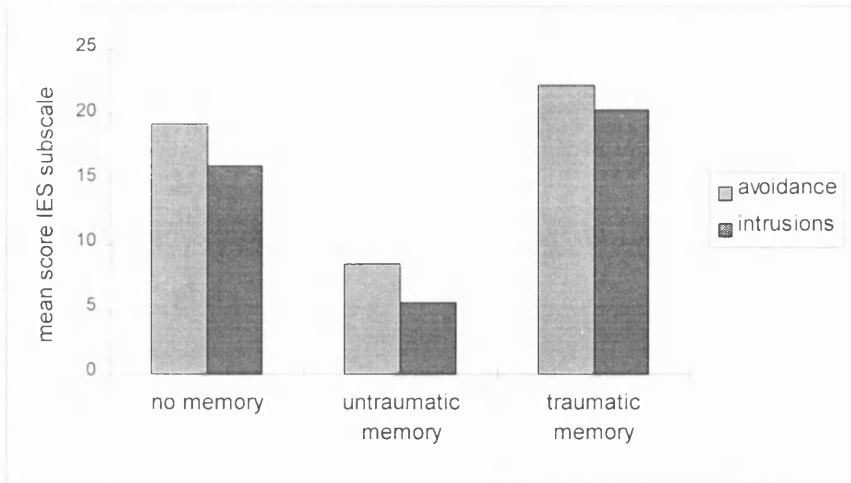
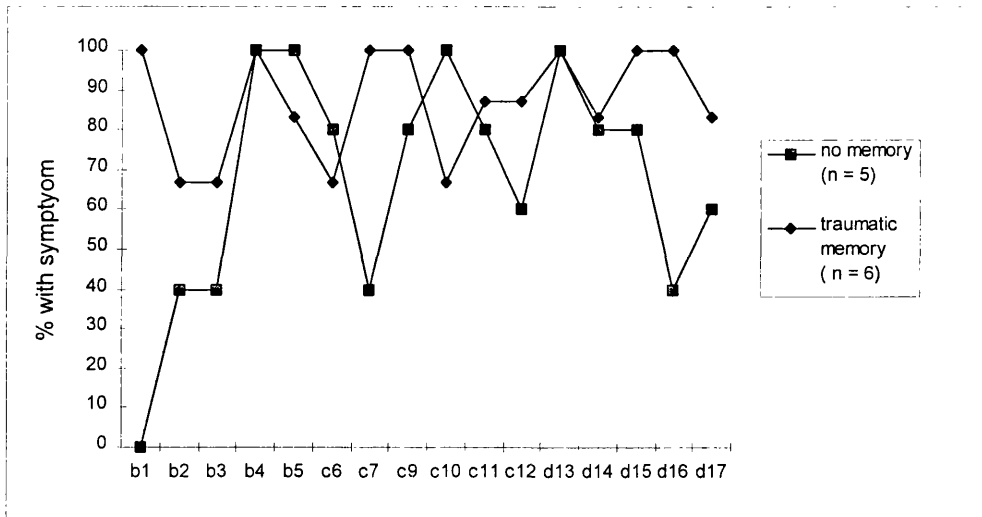


Figure 1: Impact of Event Scores by Memory Group



Details of Symptoms

Re-experiencing Symptoms	Avoidance and numbing symptoms	Hyperarousal symptoms
b1 - Intrusive recollections	c6 - Avoidance of thoughts, feelings, or conversations	d13 - difficulty falling or staying asleep
b2 - Distressing dreams	c7 - Avoidance of activities, places or people	d14 - irritability or outbursts of anger
b3 - Flashbacks	c9 - Diminished interest or participation in activities	d15 - difficulty concentrating
b4 - Psychological distress on exposure to cues	c10 - Detachment or estrangement	d16 - hypervigilance
b5 - Physiological distress on exposure to cues	c11 - Restricted range of affect	d17 - exaggerated startle response
	c12 - Sense of a foreshortened future	

Figure 2: Symptom Profile of PTSD in Traumatic Brain Injury

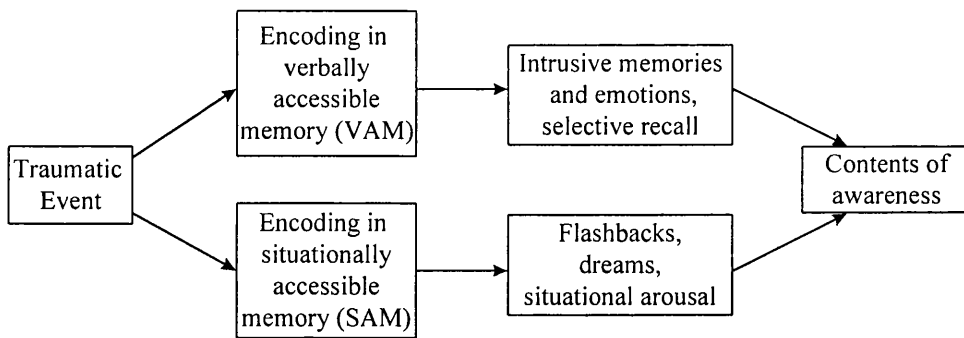


Figure 3: Dual Representation Theory (from Brewin *et al*, 1996)

Chapter 5

Abstracts For Research Case Studies

Research Case Study I

Auditory Hallucinations As Intrusive Thoughts: Conceptualisation And Treatment Using A Cognitive Behavioural Approach

Abstract

This single case study reports on the treatment of a woman presenting with drug resistant auditory hallucinations. The hallucinations were hypothesised as being misinterpretations of internally generated intrusive thoughts. Treatment was based on a cognitive intervention for obsessional thoughts and concentrated on the reinterpretation of the voices as real concerns or worries. The aim of this was to normalise the experience to some extent and hence decrease the distress related to the voices. Distress generated by the voices was monitored daily and a time-series analysis demonstrated a decrease in distress by end of treatment. This was accompanied by a decrease in frequency of voices. Progress was maintained at three-month follow-up.

Key words: case-study; auditory hallucinations; intrusive thoughts; time-series analysis

Research Case Study II

Non-Food Related Factors In The Treatment Of Binge Eating Disorder:

An Illustrative Case Study

Abstract

A single case study of the treatment of a woman with Binge Eating Disorder and a history of abuse is presented. Treatment took place over 8 sessions of a cognitive-behavioural approach. Therapy was focused both on the eating behaviour and on the recognition of emotional needs. Binge frequency and a rating of needs met was kept throughout treatment. The direct relationship between negating needs and bingeing behaviour was demonstrated midway through treatment due to events outside sessions. This case illustrates the necessity of not only focusing on the symptoms of disordered eating behaviour and the cognitions connected to weight and shape issues but to also pay attention to non-food related psychological processes in the development and maintenance of an eating disorder when treating this population.

Key words: Binge Eating Disorder; cognitive-behaviour therapy; emotional needs

Research Case Study III

Auditory Comprehension In A Bilingual Aphasic: The Influence Of Spatial Aspects Of Language

Abstract

A single case study is presented in which it is investigated whether the deficits in auditory comprehension follow a similar pattern in the dominant and non-dominant language. General testing of cognitive functioning and language was completed in the dominant language. Specific testing of auditory comprehension in English and German was completed for various word categories. It was found that there was a specific deficit in body-part identification in both English and German. This was in the context of global language difficulties as well as deficits in spatial tasks. It is concluded that failure in the body-part identification task for this client was perhaps influenced by non-language specific difficulties. Emphasis is put on the common spatial feature of the failed task.

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Appendix 1.1: Instructions for authors from 'Journal of Mental Health'

Notes for Contributors

Journal of Mental Health welcomes original communications and articles which have relevance to the field of mental health. Papers are accepted on the understanding that they are subject to editorial revision and that their contents have not been published elsewhere.

Manuscripts should be sent to the Executive Editor, Professor Ray J Hodgson, Centre for Applied Public Health Medicine, Lansdowne Hospital, University of Wales College of Medicine, Cardiff CF1 8UL, United Kingdom.

To expedite assessment, 3 complete copies of each manuscript should be submitted. All submissions should be in the style of the American Psychological Association (*Publication Manual*, Fourth edition, 1994). Papers should be typed on one side of the paper, double spaced (including the references), with margins of at least 2.5 cm (1 inch). The first sheet should include the full title of the paper, a short title not exceeding 45 characters (for a running title at the head of each page), names of authors and the address where the work was carried out. All pages must be numbered. Significant delays may occur to manuscripts that do not conform to journal style. Each article should be accompanied by an abstract of not more than 150 words. Manuscripts should not exceed 6000 words in total, unless previously agreed by the Editor. The full postal address of the author who will check proofs and receive correspondence and offprints should also be included. Footnotes should be avoided where possible.

In order to improve accuracy and expedite publication, authors are requested to submit the *final and revised* version of their manuscript on disk. The disk should contain the paper saved in its original application software (e.g. WordPerfect or Microsoft Word), and as either Word for Macintosh, rich text format (RTF) if available, or as a text or ASCII (plain) text file. The disk should be clearly labeled with the author(s) name, paper title, file names and the software used. A good quality copy of the manuscript is *always* required.

References should follow the style of the American Psychological Association. All publications cited in the text should be listed following the text; similarly, all references listed must be mentioned in the text. Within the text references should be indicated by the author's name and year of publication in parentheses, e.g. (Folkman, 1992) or (Sartory & Stern, 1979), or if there are more than two authors (Gallico *et al.*, 1985). Where several references are quoted consecutively, or within a single year, within the text the order should be alphabetical, e.g. (Mawson, 1992; Parry & Watts, 1989) and (Grey, 1992; Kelly, 1992; Smith, 1992). If more than one paper from the same author(s) and year are listed, the date should be followed by (a), (b), etc., e.g. (Cobb, 1992a).

References should be listed alphabetically by author on a separate sheet(s) (double spaced) in the following standard form, capitalisation and punctuation:

a) For periodical articles (titles of journals should *not* be abbreviated):

Rachman, S., Cobb, J., Grey, S.J., McDonald, B., Mawson, D., Sartory, G. & Stern, R. (1979). The behavioural treatment of obsessive-compulsive disorders, with and without clomipramine. *Behaviour Research and Therapy*, 17, 467-478.

b) For books:

Powell, T.J. & Enright, S.J. (1990). *Anxiety and stress management*. London: Routledge.

c) For chapters within multi-authored books:

Hodgson, R.J. & Rollnick, S. (1989). More fun, less stress: How to survive in research. In G. Parry & F. Watts (Eds.), *A Handbook of Skills and Methods in Mental Health Research* (pp. 75-89). London: Lawrence Erlbaum.

Journal titles should not be abbreviated and unnecessary references should be avoided.

Clear, grammatical and tabular presentation is strongly encouraged.

Illustrations should not be inserted in the text. Each should be provided separately, and numbered on the back with the figure number, title of the paper, and names of the author(s). Three copies of all figures must be submitted. All photographs, graphs and diagrams should be referred to as 'Figures' and should be numbered consecutively in the text in Arabic numerals (e.g. Fig 3). The appropriate position of each illustration should be indicated in the text. A list of captions for the figures should be submitted on a separate sheet and should make interpretation possible without reference to the text. Captions should include keys to symbols. Where possible it would help to ensure greater accuracy in the reproduction of figures if the values used to generate them were supplied.

Tables should be typed on separate sheets and their approximate position in the text should be indicated. Units should appear in parentheses in the column heading but not in the body of the table. Words and numerals should be repeated on successive lines; 'ditto' or 'do' should *not* be used.

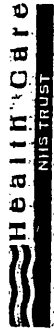
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Appendix 1.2: Information leaflet from Community Mental Health

Team



COMMUNITY MENTAL HEALTH TEAMS

(Adult Services)

A Guide for General Practitioners and other referrers on how to use the service for maximum effect

THE AIMS OF COMMUNITY MENTAL HEALTH TEAMS

- INTERFACE WITH OTHER MENTAL HEALTH SERVICES
- MEMBERSHIP AND ADDRESS OF COMMUNITY MENTAL HEALTH TEAMS
- HOW TO MAKE REFERRALS
- HOW COMMUNITY MENTAL HEALTH TEAMS RESPOND TO REFERRAL
- OTHER SERVICES OFFERED BY COMMUNITY MENTAL HEALTH TEAMS



OTHER WAYS IN WHICH THE COMMUNITY MENTAL HEALTH TEAMS CAN ASSIST

Meet with community groups to discuss mental health issues.

Support carers of people with mental health problems.

Offer support and advice to primary care workers regarding mental health problems, resources and facilities that are available.

Offer support and advice to Social Work and other Community agencies.

Provide written information on mental health issues.

COMMUNITY MENTAL HEALTH TEAMS

(Adult Services)

AIM TO:

- 1 Deliver comprehensive, local and accessible mental health services to people aged between 16 and 65 years.
- 2 Provide a multidisciplinary approach to needs assessment and care management.
- 3 In association with other local services, provide assessment, treatment, continuing care and support in the community to people with diverse and wide ranging mental health problems.
- 4 Through early intervention, promote and maintain the mental health of individuals and their families and carers.

TEAMS WILL OPERATE PRINCIPALLY TO ENSURE THAT PEOPLE ARE OFFERED THE MOST APPROPRIATE AVAILABLE EXPERTISE TO MEET THEIR CURRENT MENTAL HEALTH NEEDS AS SOON AS POSSIBLE AND AS CLOSE TO HOME AS POSSIBLE

YOUR ACCESS TO OTHER MENTAL HEALTH SERVICES will continue to exist, including in-patient and Day Hospital facilities.

Additionally, other specialist teams will continue to provide mental health services, ie, Addictions, Child and Family Psychiatry and Elderly Mental Health Services.

While GPs may refer suitable patients direct to any of the mental health services, where there may be doubts, referrals to the CMHT will help ensure people are matched to the most appropriate available resources.

CMHTs will have strong links to all mental health services, including inpatient services, and will re-direct cases as considered appropriate following consultation with GP and patient.

ADDRESS AND TEAM MEMBERSHIP

Six Adult Community Mental Health Teams will be established throughout Ayrshire. Each will include the same Core Membership and cover defined geographic areas.

YOUR LOCAL CMHT

Team Leader:

ADDRESS:

TELEPHONE:

**Hours of Duty: In the first instance Monday - Friday
9.00 am - 5.00 pm**

Outwith these hours a telephone answering machine will be available to accept messages.

MEMBERS OF YOUR LOCAL COMMUNITY MENTAL HEALTH TEAM (Adult Services), WILL INCLUDE

Psychiatrist and medical support staff,
Community Psychiatric Nurses,
Psychologists, Occupational Therapy and Social Work staff all specialising in Mental Health. (Most will have a full time commitment to the Team).

Although not Core Members, the Community Mental Health Team will have access to physiotherapists, dietitians and chiropractors who are all experienced and specialise in working with mental health related problems.

PLANNED FUTURE DEVELOPMENTS will include

- an extension of hours into evenings and weekends
- a crisis response service.

REFERRAL PROCEDURE TO YOUR COMMUNITY MENTAL HEALTH TEAM

Referral forms should be completed and sent direct to your local Community Mental Health Team base office, addressed to the CMHT Team Leader. (Urgent telephone referrals will be accepted, but should be backed up with an appropriate written referral as soon as possible).

GPs retain the right to refer to a specific discipline or named individual within the Team, which will as far as possible be accommodated.

ALLOCATION OF CASES

The information contained within the standard CMHT Referral Form will allow the Team to make an informed decision about allocating the case for an initial assessment, and the degree of urgency attached.

Following assessment by a Team member, if required a full Team discussion of the case will take place. At this stage cases will be classified as either complex or non-complex.

NON-COMPLEX CASES

It is anticipated that a number of referrals will fall into the non-complex category, and will require the involvement of one Team member only. The person appointed to the case will undertake the necessary liaison with the patient's GP.

COMPLEX CASES

It is anticipated there will be more than one Team member involved in these cases. A key worker will be appointed to oversee case management. These patients will have a regular, formal review to which GPs will be invited to attend and notified of outcome.

The participation of patients will be sought throughout the assessment and care management process.

Local Standards - will be established to inform service users of what they can expect from their Community Mental Health Teams.

Appendix 1.3: Information leaflet from Direct Access Psychology

CONSULTING & CLINICAL PSYCHOLOGY SERVICES

DIRECT GP ACCESS SERVICE : ADULTS

ABOUT THE SERVICE:

- Psychologists in this part of the service are closely affiliated with the Primary Care Team
- The service is wherever possible based in surgeries and Health Centres throughout and all patients are offered appointments near to their homes
- We aim to see referred patients within 9 weeks of referral, and are also prepared to see cases more urgently
- There is a named Clinical Psychologist associated with each General Practice in although in special cases, referral to another Psychologist can be arranged (for example, when a female or male therapist is specifically requested)

WHEN TO REFER TO A CLINICAL PSYCHOLOGIST:

- When a flexible tailored response to a patient's psychological problems is required, i.e. a response based on the application of a wide range of psychological theories, models and interventions to health care
- When it is unlikely that an "off the shelf" treatment package will meet the patient's needs: for example, when there are multiple psychological problems, and when there may be a need to change treatment approach during the course of therapy
- When there is some uncertainty as to which psychological specialty or type of intervention is most applicable and there may need to be access to other specialisms within CCPS (for example, Neuropsychology, Care of the Elderly or Health Psychology)

WHAT DOES CLINICAL PSYCHOLOGY PROVIDE IN THIS CONTEXT ?

Those disorders and problems which respond well to this kind of intervention include:

- anxiety related disorders (for example, phobic anxiety, generalised anxiety, obsessive compulsive disorder, panic disorder/ hypochondriasis)
- depression (with low self-esteem and low self-worth, a loss of interest in previously enjoyed activities and persistent and pervasive negative thinking)
- post traumatic stress disorder (including problems related to sexual/ emotional/ physical abuse, trauma or accident)
- eating disorders (including bulimic and anorexic problems, as well as over-eating): these are often treated in conjunction with the Dietitians
- psychosexual dysfunction and marital discord
- habit disorders (including a range of undesired behaviours which interfere with the quality of life of the patient and their family)

- difficulties in adjustment to physical illness
- difficulties in coping with pain; sleep problems
- problems in adjustment to major life events/transitions (for example, bereavement, stress, unemployment, bad employment and illness).

WHAT THIS SERVICE DOES NOT GENERALLY PROVIDE:

The disorders described respond, in most cases, to brief, focused interventions, with the need for "one-stop referral" whether treated individually or in groups.

In the main, this service will not deal particularly effectively with the range of psychotic illnesses, chronic alcohol/drug misuse, learning disability or organic mental infirmity. There are psychologists in other parts of the service whose expertise is more appropriately applied to these kinds of problems.

COUNSELLING PSYCHOLOGY:

This approach is part of the range of "treatments" provided, and is often within this service only one aspect of an individual patient's therapy, where the therapist provides a supportive non-judgmental relationship for the patient to feel "safe" in exploring problems, experiences and possible (re)solutions.

The counselling approach is mainly appropriate in our view, for example, for people who are experiencing/remembering difficult/traumatic life events, such as bereavement, marital discord or illness.

OUR RELATIONSHIP TO THE COMMUNITY MENTAL HEALTH TEAMS:

We are gradually successfully recruiting Clinical Psychologists who will be members of the Community Mental Health Teams.

These CMHT Psychologists will have specialist expertise in working with people who have long term psychological distress and those who are mentally ill, i.e. those who require multi-disciplinary input and longer term therapeutic relationships with several members of the team, including the psychologist.

The psychologists both in the Primary Care service and the CMHT service, will ensure that, when psychological intervention is required, the patients will be directed to the most appropriate source of treatment.

The Primary Care Psychologists will also ensure that patients referred to them, who might be better served by the CMHT, will be referred on as soon as possible.

REFERRAL:

Attached, is a list of the names of psychologists associated with each General Practice, who will respond to and deal with requests for assessment and intervention. To a great extent, we rely on General Practitioners to assist us in the first instance in prioritising referrals, particularly those of urgent cases, and the outcome will be improved if dialogue between psychologist and GP is encouraged and developed.

Appendix 2.1: Instructions for authors from 'The Journal of Nervous and Mental Disease'

The Journal of Nervous and Mental Disease Instructions to Contributors

Editorial Policies

The Journal publishes articles containing new data or ways of reorganizing established knowledge relevant to understanding and modifying human behavior, especially that called "sick" or "deviant." Our policy is summarized by the slogan, "Behavioral science for clinical practice. Articles should include at least one behavioral variable, clear definition of study populations, and replicable research designs. Authors should use the active voice and first person whenever possible. Preference is given to research reports of no more than 15-18 double-spaced typewritten pages; authors wishing to submit longer evaluative review papers should query the Editor in advance. Brief reports (10 typewritten pages) are considered if they have heuristic value. Book reviews are solicited.

Neither a submitted article nor the data it contains may have been published previously or be currently under review for publication elsewhere. Reprint permission for all materials printed in or adapted from other publications must be submitted immediately after formal acceptance. Lists of authors should include only primary researchers and writers; other contributors should be acknowledged in a footnote.

Reports of studies involving human subjects must indicate a) the social context from which subjects were drawn and their relationship to the investigator, and b) that informed consent was obtained. Patient anonymity must be protected in all instances.

Manuscripts are usually subjected to blind review by at least two referees for significance, originality, and verifiability. Every effort is made to inform authors of publication decisions within 3 months. All authors must assign copyright in writing to Lippincott Williams & Wilkins when an article is accepted. All accepted manuscripts are edited for adherence to scientific and Journal format and style, internal consistency, succinctness, nonsexist language, grammar, syntax, and punctuation. Rejected manuscripts will be returned to authors only if the original submission is accompanied by a postage-paid, self-addressed envelope. Manuscripts should be submitted in the final, revised format. Extensive re-written and editorial changes made by the corresponding author after the article is typeset will be charged to the respective author.

Manuscript Submission

Three clear copies of the manuscript, accompanied by a cover letter stating the complete title of the paper and the name, mailing address and telephone number of the corresponding author, should be addressed to Eugene B. Brody, M.D., Editor-in-Chief, *The Journal of Nervous and Mental Disease*, The Sheppard and Enoch Pratt Hospital, 6501 N. Charles Street, Baltimore, Maryland 21285-6815. The manuscript must be typed, double-spaced, with 1-inch margins on all sides, paginated, and organized in accordance with the Journal guidelines. Do not indicate authors' names on manuscript pages. Do not submit glossy photos of figures or computer diskettes. If the manuscript is accepted for publication, the corresponding author will be notified of additional requirements, which may include camera-ready prints or laser printout of figures. Authors are encouraged to submit the *accepted version* of the manuscript, references, and figure legends on diskette. Identify the diskette with the name of the senior author, article title, hardware, software, and version. IBM-compatible disks are preferred in WordPerfect; but other programs will be accepted. For additional information, call the Editorial Office at (410) 938-3182.

Notify the Editorial Offices promptly of any address change for the corresponding author. The Journal is not responsible for loss.

Organization of Manuscripts

In most cases, manuscripts should contain the following sections and materials, in the order listed:

1) *Running title page*: An abbreviated title (not more than 45 characters, including spaces and punctuation) and the name and address of the person to whom proofs should be sent.

2) *Complete title page*: A full, informative title (no more than two lines) and the names and highest degrees of all authors.

3) *Abstract*: Full title and a one page description (150 words or less) of the general purpose, methodology, results, and conclusions of the research.

4) *Introduction*: A clear statement of the purpose of the study, a brief survey of salient literature, a description of the research setting if relevant, and the rationale for the general methodology chosen.

5) *Methods*: A precise description of subjects, procedures, apparatus, and methods of data analysis, all sufficiently detailed to allow other competent researchers to evaluate or replicate the study.

6) *Results*: A succinct presentation of *significant* data obtained, including tables or figures *only* to supplement — not repeat — the text.

7) *Discussion*: An extension (*not* reiteration) of the *Results*, emphasizing significant principles, relationships, generalizations and implications relevant to previous studies, limitations, and suggestions for further research.

8) *Conclusions*: a clear statement of all conclusions, briefly summarizing evidence for each.

9) *References*: An unnumbered list of cited sources arranged in alphabetical order, using the style shown in the examples below. Note that all authors' names are listed: "et al." is used only in the text. Accuracy of the references is the authors' responsibility. If a manuscript has been accepted for publication, list it as "in press" and give the journal name. Unpublished or privately published materials and personal communications are not references but should be cited as footnotes.

Within the text, citations should show the authors' last names and year of publication (*e.g.*, Mills and Smith, 1956); multiple sources should be cited alphabetically by author. If there are more than two authors, give only the name of the first author, followed by "et al." (*e.g.*, Mills et al., 1956). If more than one publication by the same author in the same year is cited, suffixes (a, b, c, etc.) should be added to the year in both the text and list citations (*e.g.*, Mills, 1956a). In the text, show page numbers from the original source for any quoted material (*e.g.*, Mills, 1956 p. 12). Except in extraordinary circumstances, no more than four references should be cited in support of any given point.

Examples of reference style:

Lewis SW, Reveley A, Reveley M, Chitkara B, Murray RM (1987) The familial/sporadic distinction as a strategy in schizophrenia research *Br J Psychiatry* 151:306-313.

Gottlieb BH (Ed) (1981) *Social networks and social support*. Beverly Hills, CA: Sage.

Weissman MM, Boyd JH (1985) Affective disorders: Epidemiology. In HI Kaplan, BJ Sadock (Eds), *Comprehensive textbook of psychiatry*, IV (4th ed, Vol 1, pp 764-769). Baltimore: Williams & Wilkins.

10) *Footnotes*: A listing of all footnotes in the order in which they appear in the text. Footnote 1 should identify the primary institutional affiliation of the first author (and others who share that setting); it should also give the name and address of the author to whom reprint requests should be sent. Subsequent footnotes identify the affiliations of authors at other institutions, followed by an unnumbered footnote describing grant support and other essential acknowledgments. Final numbered notes provide information on citations in the text which do not qualify as references.

11) *Figure Legends*: A consecutively numbered (arabic) listing of all figure legends, each sufficiently explanatory to make reference to the text unnecessary.

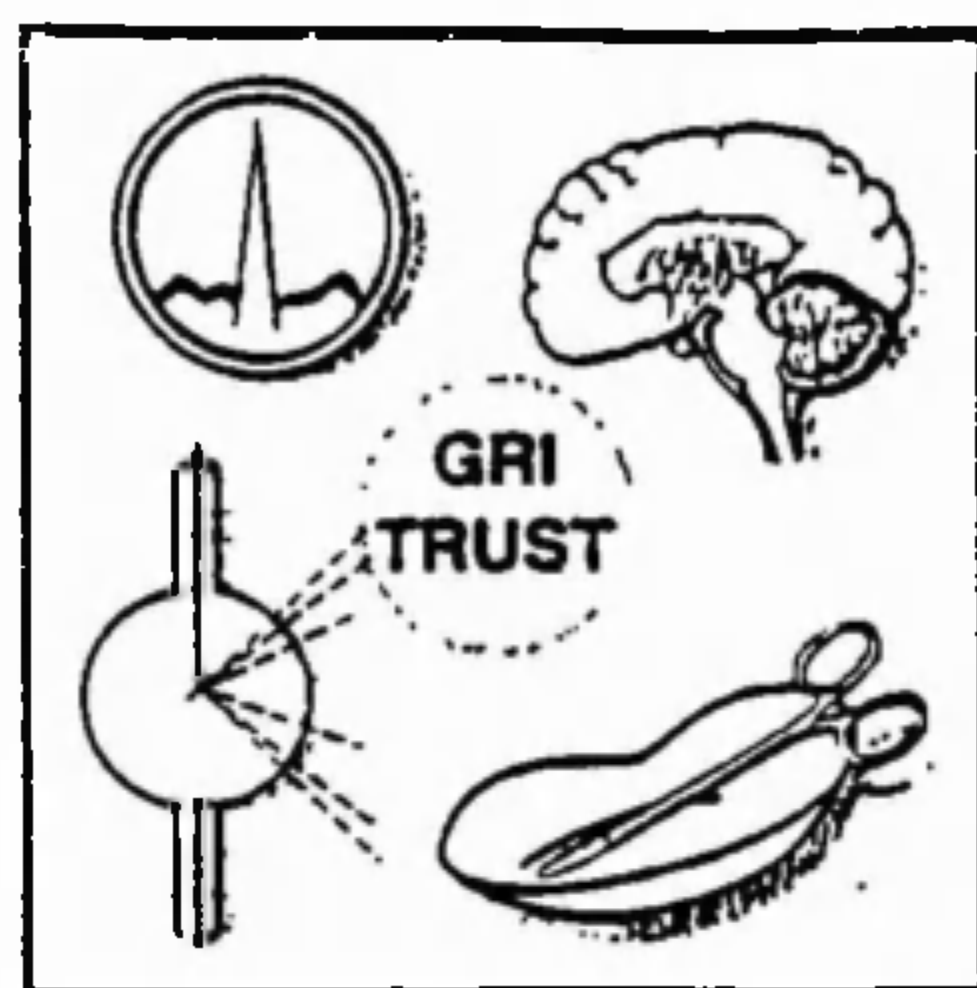
12) *Figures*: Photocopies of professionally prepared figures. Camera-ready glossy or laser prints to be sent only upon acceptance of the paper a typed label on the back of each should include figure number, name of lead author, and title of manuscript.

13) *Tables*: A consecutively numbered presentation of all tables, each typed double spaced on a separate page, and headed by a brief but descriptive title.

Appendix 3.1: Guidelines for completion of a proposal for a mini-grant

- 1.1 Applicants - names and addresses including the names of co-workers and supervisor(s) if known.**
- 1.2 Title - no more than 15 words.**
- 1.3 Summary - No more than 300 words, including a reference to where the study will be carried out.**
- 1.4 Introduction - of less than 600 words summarising previous work in the field, drawing attention to gaps in present knowledge and stating how the project will add to knowledge and understanding.**
- 1.5 Aims and hypothesis to be tested - these should wherever possible be stated as a list of questions to which answers will be sought.**
- 1.6 Plan of investigation - consisting of a statement of the practical details of how it is proposed to obtain answers to the questions posed. The proposal should contain information on Research Methods and Design i.e.**
 - 1.6.1 Subjects - a brief statement of inclusion and exclusion criteria and anticipated number of participants.**
 - 1.6.2 Measures - a brief explanation of interviews/observations/ rating scales etc. to be employed, including references where appropriate.**
 - 1.6.3 Design and Procedure - a brief explanation of the overall experimental design with reference to comparisons to be made, control populations, timing of measurements, etc. A summary chart may be helpful to explain the research process.**
 - 1.6.4 Settings and equipment - a statement on the location(s) to be used and resources or equipment which will be employed (if any).**
 - 1.6.5 Data analysis - a brief explanation of how data will be collated, stored and analysed.**
- 1.7 Practical applications - the applicants should state the practical use to which the research findings could be put.**
- 1.8 Timescales - the proposed starting date and duration of the project.**
- 1.9 Ethical approval - stating whether this is necessary and, if so, whether it has been obtained.**

Appendix 3.2: Ethical approval for research



DEVELOPMENT.

Please Reply To -
Mrs Karen Sykes, R&D Administrator

Dr Elizabeth Campbell
Dept of Psychological Medicine
Academic Centre
Gartnaval Royal Hospital
Glasgow
G12 0XH

08 June 1999

Dear Dr Campbell

PROJECT APPROVAL

99AC002

Psychological symptoms after head injuries: Is amnesia for the event a protective factor in developing post-traumatic stress disorder?

I am pleased to inform you that the above project has received both ethical and financial approval and may now proceed. The letter from the Ethics Committee is enclosed.

I have recorded the start date for this project as 01 August 1999 .

I would be grateful if you could let me know when the project will, in fact, commence.

Approval is subject to the submission of progress reports throughout the lifetime of the project and this date will be used to time appropriately requests for such reports.

With kind regards

Yours sincerely

Mrs Karen Sykes
Research Development Administrator

Cc. Mr I Swann, Consultant in Admin Charge, Accident and Emergency, Glasgow Royal Infirmary.

Trust Research Office, 4th floor QEB, 10 Alexandra Parade, Glasgow G31 2ER.
0141-211 4587 or 0475 0141-211 0474 research@gri.org.uk

GLASGOW ROYAL INFIRMARY UNIVERSITY NHS TRUST

Appendix 3.3: Demographics questionnaire

IMPACT OF INJURY

Age: _____ Sex: Male / Female Date: _____

When did you get your head injury? (please give the exact date) _____

How did you get your head injury?

(if you cannot remember yourself - what have people told you happened?)

Please tick a box:

road traffic accident (vehicle driver/passenger/motorcycle)	
road traffic accident (pedestrian/cyclist)	
assault	
fall	
other	

Please give details:

Please tick a box to say how you know this is what happened

I remember this is what happened	
I was told that this is what happened	
Not sure	

How bad were your physical injuries after the incident? (please tick a box)

none	slight	moderate	bad	very bad

In the past month how much have your physical injuries affected your ability to go to work or look after your family? (please tick a box)

not at all	a little	somewhat	a lot

In the past month how much have your physical injuries affected your ability to take part in sport and leisure activities? (please tick a box)

not at all	a little	somewhat	a lot

In the past month how much have your physical injuries affected your ability to take part in social activities? (please tick a box)

not at all	a little	somewhat	a lot

Overall, in the past month how have your physical injuries affected your ability to do things? (please tick a box)

not at all	a little	somewhat	a lot

Are you in the process of, or planning any compensation claim?

Yes
 No
 Don't know

Appendix 3.4: Memory questionnaire

MEMORY QUESTIONNAIRE

The following questions are about how much you remember about what happened before, during and after the time when your head was injured.

PART ONE

1) Did you get knocked out when your head was injured? (please tick a box)

yes	no	not sure

If yes or not sure: How long were you knocked out for? (please tick a box)

under 5 mins	5 - 15 mins	15 - 30 mins	30 mins - 1 hour	over 1 hour

2) Have you lost your memory for any part of the incident in which you received your head injury?

yes	no	not sure

If yes or not sure: How long in total is the time that you cannot remember after the incident?

under 10 mins	10 mins - 1 hour	1 hour - 24 hours	24 hours - 1 week	over 1 week

PART TWO (please complete this even if you remember very little)

1a) Do you have memories of what happened *just before* the incident?

yes	no	not sure

b) Can you remember being scared or afraid of what was going on *just before* the incident?

yes	no	not sure

Please give details of what you remember happening

2a) Do you have *any* memories of the *immediate time* of the incident?

yes	no	not sure

b) Can you remember being scared or afraid at the *immediate time* of the incident?

yes	no	not sure

Please give details of what you remember happening

3a) Do you have memories of things that happened *after* the incident? (this can be things like waking up afterwards or being told about what had happened)

yes	no	not sure

b) Can you remember being scared or afraid *after* the incident?

yes	no	not sure

Please give details of what you remember happening

Appendix 3.5: Impact of Events Scale

IES

Below is a list of comments made by people after stressful life events. Please answer each item, indicating how frequently these comments were true for you **IN THE PAST WEEK** in relation to the incident when you got your head injury.

<p>1. I thought about it when I didn't mean to</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>	<p>9. I felt as if it hadn't happened or wasn't real</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>
<p>2. I avoided letting myself get upset when I thought about it or was reminded of it</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>	<p>10. Pictures about it popped into my mind</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>
<p>3. I tried to remove it from memory</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>	<p>11. Other things kept me thinking about it</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>
<p>4. I had trouble falling asleep or staying asleep because thoughts about it came into my mind</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>	<p>12. I was aware that I still had a lot of feelings about it, but didn't deal with them</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>
<p>5. I had string waves of feeling about it</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>	<p>13. I tried not to think about it</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>
<p>6. I had dreams about it</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>	<p>14. Any reminder brought back feelings about it</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>
<p>7. I stayed away from reminders of it</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>	<p>15. My feelings about it were rather numb</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>
<p>8. I tried not to talk about it</p> <p>Not at all..... <input type="checkbox"/></p> <p>Rarely..... <input type="checkbox"/></p> <p>Sometimes..... <input type="checkbox"/></p> <p>Often..... <input type="checkbox"/></p>	

Appendix 3.6: Hospital Anxiety and Depression Scale

Hospital Anxiety and Depression Scale (HADS)



Name: _____ Date: _____

Clinicians are aware that emotions play an important part in most illnesses. If your clinician knows about these feelings he or she will be able to help you more.

This questionnaire is designed to help your clinician to know how you feel. Read each item below and **underline the reply** which comes closest to how you have been feeling in the past week. Ignore the numbers printed at the edge of the questionnaire.

Don't take too long over your replies, your immediate reaction to each item will probably be more accurate than a long, thought-out response.

FOLD HERE

FOLD HERE

	A	D			A	D
	3		I feel tense or 'wound up'	I feel as if I am slowed down		
	2		Most of the time	Nearly all the time		3
	1		A lot of the time	Very often		2
	0		From time to time, occasionally	Sometimes		1
	0		Not at all	Not at all		0
	0		I still enjoy the things I used to enjoy	I get a sort of frightened feeling like		
	1		Definitely as much	'butterflies' in the stomach		0
	2		Not quite so much	Not at all		1
	3		Only a little	Occasionally		2
	3		Hardly at all	Quite often		3
	3		I get a sort of frightened feeling as if	I have lost interest in my appearance		
	2		something awful is about to happen	Definitely		3
	1		Very definitely and quite badly	I don't take as much care as I should		2
	0		Yes, but not too badly	I may not take quite as much care		1
	0		A little, but it doesn't worry me	I take just as much care as ever		0
	0		Not at all			
	0		I can laugh and see the funny side of things	I feel restless as if I have to be on		
	1		As much as I always could	the move		3
	2		Not quite so much now	Very much indeed		2
	3		Definitely not so much now	Quite a lot		1
	3		Not at all	Not very much		0
	3		Worrying thoughts go through my mind	Not at all		
	2		A great deal of the time	I look forward with enjoyment to things		
	1		A lot of the time	As much as I ever did		0
	0		Not too often	Rather less than I used to		1
	0		Very little	Definitely less than I used to		2
	3		I feel cheerful	Hardly at all		3
	2		Never	I get sudden feelings of panic		
	1		Not often	Very often indeed		3
	0		Sometimes	Quite often		2
	0		Most of the time	Not very often		1
	0		I can sit at ease and feel relaxed	Not at all		0
	1		Definitely	I can enjoy a good book or radio or		
	2		Usually	television programme		
	3		Not often	Often		0
	3		Not at all	Sometimes		1
				Not often		2
				Very seldom		3

Now check that you have answered all the questions

TOTAL

A	D
---	---

This form is printed in green. Any other colour is an unauthorized photocopy.

HADS copyright ©R.P. Snaith and A.S. Zigmond, 1983, 1992, 1994.

Record form items originally published in *Acta Psychiatrica Scandinavica* 67, 361-70, copyright ©Munksgaard International Publishers Ltd, Copenhagen, 1983.

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Windsor, Berkshire SL4 1DF, UK. All rights reserved.

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Appendix 3.7: Letter to participants

Division of Clinical Psychology

Direct line: 0141-211

Fax: 0141-357 4899

E-mail:



UNIVERSITY
of
GLASGOW

Dear

Following your attendance at Accident and Emergency at Glasgow Royal Infirmary in [*insert month of attendance*], I would like to invite you to take part in a study that I am conducting as part of my post-graduate training. This study will look at psychological symptoms that people might have after a head injury.

The study involves completing some questionnaires. These will ask you about details of your head injury and any memories that you have about getting your head injury. There are also some questionnaires about whether you have had certain psychological symptoms since getting your head injury. If you are willing to talk further to me on the telephone about the incident, please indicate that on the consent form. You can choose to answer just the questionnaires if you do not wish to be contacted personally. If you do not have a phone I can arrange to interview you. The questionnaires should not take longer than half-an-hour to complete. The interview will also take no longer than half an hour.

Please read the information sheet about the study and if you are willing to take part in this study can you please sign the consent form, complete the enclosed questionnaires and return them to me in the enclosed envelope. If you have any questions about the study please contact me, Sue Turnbull, by phoning Mrs Sheila Neilson (secretary) on 0141 211 3920.

All information will be kept confidential and your name will not be connected with the computerised data-set that will be used for the study. You can refuse to take part in this study or leave the study at any time without giving a reason and your present or future treatment will not be affected in any way.

I look forward to hearing from you soon,

Yours sincerely

Sue Turnbull MA (Hons)
Trainee Clinical Psychologist

DEPARTMENT OF PSYCHOLOGICAL MEDICINE
Academic Centre, Gartnavel Royal Hospital, 1055 Great Western Road, Glasgow G12 0XH

Head of Department: Professor C A Espie

Appendix 3.8: Information sheet

INFORMATION SHEET

Study Title:

Psychological Symptoms After Head Injuries

What is the purpose of the study?

To look at the psychological symptoms that people might have after a head injury and their memories of how they got their head injury.

Why have I been chosen?

You have been asked to participate as you have recently attended Accident and Emergency for treatment after a head injury and I am contacting all those who have recently attended.

Who is organising the study?

The study is being organised by the University of Glasgow in conjunction with the Accident and Emergency Department of Glasgow Royal Infirmary.

What will happen to me if I take part?

You will be asked to fill out the enclosed questionnaires about your memories of getting your injury and what happened before and after as well as some questionnaires about some symptoms that you may have had since getting your injury. If you have stated that you are willing to be contacted by telephone I may phone you to ask you for some more details about your symptoms and your memories of the incident.

What are the possible risks?

Some people may find filling in the questionnaire or talking about the incident upsetting.

What are the possible benefits?

There are no direct benefits to you but the information gathered from the study may be useful in developing ways to identify and treat psychological symptoms after head injuries.

Is my doctor being paid for including me in the study?

No

Confidentiality - who will know I am taking part in the study?

Only the main investigator, Sue Turnbull, will know that you are taking part. All information will be kept confidential and your name will not be connected with the computerised data-set that will be used for the study.

GP Notification

Your GP will not be notified about your participation in this study.

Local Research Ethics Committee Approval

Ethical approval for this study has been given by Glasgow Royal Infirmary University NHS Trust.

Research Results

The results from this study will be available on request by April 2000 from Sue Turnbull.

Contact For Further Information

Please contact Sue Turnbull or Dr Elizabeth Campbell at Dept. Psychological Medicine, Academic Centre, Gartnavel Royal Hospital, Great Western Road, Glasgow G12; Tel 0141 211 3920; e-mail: sueturnbull@hotmail.com

Appendix 3.9: Consent form

Division of Clinical Psychology

Direct line: 0141-211

Fax: 0141-357 4899

E-mail:



UNIVERSITY
of
GLASGOW

CONSENT FORM

Participation in the study "Psychological Symptoms After Head Injuries"

Researcher: Sue Turnbull, MA(Hons)

- I confirm that I have read and understood the information sheet for the above study.
- I have asked the researcher any questions that I have about the study and at present have no further questions unanswered.
- I understand that my participation is voluntary and that I can leave the study at any time without giving a reason and that my present or future treatment will not be affected in any way.
- I understand that all information will be kept confidential and that my name will not be connected with the computerised data-set.
- Please tick one of the following boxes:
 - I can be contacted for further information, my telephone number is: _____
 - I do not want to be contacted for further information.

I _____ agree to take part in the above study.
[NAME IN BLOCK CAPITALS]

Signature: _____

Date: _____

DEPARTMENT OF PSYCHOLOGICAL MEDICINE
Academic Centre, Gartnavel Royal Hospital, 1055 Great Western Road, Glasgow G12 0XH

Head of Department: Professor C A Espie

Appendix 4.1: Instructions for authors from 'British Journal of Psychiatry'

Instructions to authors

The *British Journal of Psychiatry* is published monthly by the Royal College of Psychiatrists. The *BJP* publishes original work in all fields of psychiatry. Manuscripts for publication should be sent to The Editor, The British Journal of Psychiatry, 17 Belgrave Square, London SW1X 8PG.

All published articles are peer reviewed. A decision will be made on a paper within three months of its receipt.

Contributions are accepted for publication on the condition that their substance has not been published or submitted for publication elsewhere. Authors submitting papers to the *BJP* (serially or otherwise) with a common theme or using data derived from the same sample (or a subset thereof) must send details of all relevant previous publications, simultaneous submissions, and papers in preparation.

The *BJP* does not hold itself responsible for statements made by contributors. Unless so stated, material in the *BJP* does not necessarily reflect the views of the Editor or the Royal College of Psychiatrists.

Published articles become the property of the *BJP* and can be published elsewhere, in full or in part, only with the Editor's written permission.

Manuscripts accepted for publication are copy-edited to improve readability and to ensure conformity with house style.

We regret that manuscripts and figures unsuitable for publication will not normally be returned.

MANUSCRIPTS

Three high-quality manuscript copies together with an electronic copy on floppy disk (IBM formatted) should be submitted, and authors should keep one copy for reference. Articles should be 3000–5000 words long, must be typed on one side of the paper only, double-spaced throughout (including tables and references) and with wide margins (at least 4 cm); all the pages, including the title page, must be numbered.

TITLE AND AUTHORS

The title should be brief and relevant. If necessary, a subtitle may be used to amplify the main title.

All authors must sign the covering letter; one of the authors should be designated to receive correspondence and proofs, and the appropriate address indicated. This author must take responsibility for keeping all other named authors informed of the paper's progress.

All authors should clearly state their involvement in the work presented, and any conflict of interest arising, in the accompanying letter.

If authors wish to have their work peer reviewed anonymously, they must submit their work without personal identification; names and addresses of all authors should be given in the covering letter. Otherwise, the names of the authors should appear on the title page in the form that is wished for publication, and the names, degrees, affiliations and full addresses at the time the work described in the paper was carried out given at the end of the paper.

STRUCTURE OF MANUSCRIPTS

A structured summary should be given at the beginning of the article, incorporating the following headings: Background; Aims; Method; Results; Conclusions; Declaration of interest. The latter should list fees and grants from, employment by, consultancy for, shared ownership in, or any close relationship with, an organisation whose interests, financial or otherwise, may be affected by the publication of your paper. This pertains to all the authors of the study. The summary should be no more than 150 words. Editorials do not require summaries.

Introductions should be only one paragraph (up to 150 words). Use of sub-headings is encouraged, particularly in the Discussion. Three clinical implications and three limitations of the study should be provided. A separate Conclusions section is not required.

REFERENCES

References should be listed alphabetically at the end of the paper, the titles of journals being given in full. Reference lists not in *BJP* style will be returned to the author for correction.

Authors should check that the text references and list are in agreement as regards dates and spelling of names. The text reference should be in the form '(Smith, 1971)' or 'Smith (1971) showed that . . .'. The reference list should follow the style example below (note that *et al* is used after three authors have been listed for a work by four or more).

Alderson, M. R. (1974) Self poisoning: what is the future? *Lancet*, *i*, 104–113.

American Psychiatric Association (1980) *Diagnostic and Statistical Manual of Mental Disorders* (3rd edn) (DSM-III). Washington, DC: APA.

Aylard, P. R., Gooding, J. H., McKenna, P. S., et al (1987) A validation study of three anxiety and depression self assessment scales. *Psychosomatic Research*, *1*, 261–268.

De Rougemont, D. (1950) *Passion and Society* (trans. M. Belgion). London: Faber and Faber.

Fisher, M. (1990) *Personal Love*. London: Duckworth.

Flynn, C. H. (1987) Defoe's idea of conduct: ideological fictions and fictional reality. In *Ideology of Conduct* (eds N. Armstrong & L. Tenenhouse), pp. 73–95. London: Methuen.

Jones, E. (1937) Jealousy. In *Papers on Psychoanalysis*, pp. 469–485. London: Baillière, Tindall.

Mullen, P. E. (1990a) Morbid jealousy and the delusion of infidelity. In *Principles and Practice of Forensic Psychiatry* (eds R. Buglass & P. Bowden), pp. 823–834. London: Churchill Livingstone.

— (1990b) A phenomenology of jealousy. *Australian and New Zealand Journal of Psychiatry*, *24*, 17–28.

Personal communications need written authorisation; they should not be included in the reference list. No other citation of unpublished work, including unpublished conference presentations, is permissible.

TABLES

Each table should be submitted on a separate sheet. They should be numbered and have an appropriate heading. The tables should be mentioned in the text but must not duplicate information in the text. The heading of the table, together with any footnotes or comments, should be self-explanatory. The desired position of the table in the manuscript should be indicated. Do not tabulate lists, which should be incorporated into the text, where, if necessary, they may be displayed.

Authors must obtain permission if they intend to use tables from other sources, and due acknowledgement should be made in a footnote to the table.

FIGURES

Figures should be individual glossy photographs, or other camera-ready prints, or good-quality output from a computer, not photocopies, clearly numbered and captioned below. Avoid cluttering figures with explanatory text, which is better incorporated succinctly in the legend. Lettering should be parallel to the axes. Units must be clearly indicated and should be presented in the form quantity:unit (note: 'litre' should be spelled out in full unless modified to ml, dl, etc.).

Authors must obtain permission if they intend to use figures from other sources, and due acknowledgement should be made in the legend.

Colour figures may be reproduced if authors are able to cover the costs.

STATISTICS

Not all papers require statistical analysis. Case histories and studies with very small numbers are examples. In larger studies where statistical analyses are included it is necessary to describe these in language that is comprehensible to the numerate psychiatrist as well as the medical statistician. Particular attention should be paid to clear description of study designs and objectives, and evidence that the statistical procedures used were both appropriate for the hypotheses tested and correctly interpreted. The statistical analyses should be planned before data are collected and full explanations given for any *post-hoc* analyses carried out. The value of test statistics used (e.g. χ^2 , *t*, *F*-ratio) should be given as well as their significance levels

so that their derivation can be understood. Standard deviations and errors should not be reported as \pm , but should be specified and referred to in parentheses.

Trends should not be reported unless they have been supported by appropriate statistical analyses for trends.

The use of percentages to report results from small samples is discouraged, other than where this facilitates comparisons. The number of decimal places to which numbers are given should reflect the accuracy of the determination, and estimates of error should be given for statistics.

A brief and useful introduction to the place of confidence intervals is given by Gardner & Altman (1990, *British Journal of Psychiatry*, 156, 472-474). Use of these is encouraged but not mandatory.

Authors are encouraged to include estimates of statistical power where appropriate. To report a difference as being statistically significant is generally insufficient, and comment should be made about the magnitude and direction of change.

GENERAL

All abbreviations must be spelt out on first usage.

The generic names of drugs should be used, and the source of any compounds not yet available on general prescription should be indicated.

Generally, SI units should be used; where they are not, the SI equivalent should be included in parentheses. Units should not use indices: i.e. report g/ml, not g ml^{-1} .

The use of notes separate to the text should generally be avoided, whether they

be footnotes or a separate section at the end of a paper. A footnote to the first page may, however, be included to give some general information concerning the paper.

If an individual patient is described, his or her consent should be obtained and submitted with the manuscript. The patient should read the report before submission. Where the patient is not able to give informed consent, it should be obtained from an authorised person. Where the patient refuses to give consent, the case study can only be written up if personal details and dates and other information which identifies the patient is omitted to ensure that there is no breach of confidentiality. Contributors should be aware of the risk of complaint by patients in respect of defamation and breach of confidentiality, and where concerned should seek advice.

PROOFS

A proof will be sent to the corresponding author of an article. Offprints, which are prepared at the same time as the *BJP*, should be ordered when the proof is returned to the Editor. Offprints are despatched up to six weeks after publication. The form assigning copyright to the College must be returned with the proof.

LETTERS TO THE EDITOR

Letters must be double spaced and should not exceed 350 words. They will be edited for clarity and conformity with *BJP* style and may be shortened. There should be no more than five references. Proofs will not be sent to authors.

