Staff Ratings of Challenging Behaviour in an Acquired Brain Injury Population: Evaluating the Usefulness of Screening Measures

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Declaration

This thesis has been compiled by myself and the work contained herein is my own

Signed

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Acknowledgement

I would like to thank all the staff and patients of the Robert Ferguson Unit, Edinburgh, without whom this research would not have been possible.

ABSTRACT

Current literature on sequelae of acquired brain injury reveals that behavioural disturbances such as physical and verbal aggression and disinhibited behaviour present a substantial barrier to community re-integration following severe brain injury. This study applies the concept of 'challenging behaviour', originally applied to people with learning disabilities, to behavioural disturbance following acquired brain injury. Definition of challenging behaviour, assessment, intervention, and impact on carers are discussed. Standardised measures of challenging behaviour are reviewed.

The study has two aims. Firstly, to investigate the degree of shared understanding of the concept of challenging behaviour within a group of staff working in a specialist unit for people with behavioural disturbances following acquired brain injury. Twenty-eight members of staff (21 nurses and 7 other professional staff) completed questionnaires, consisting of four brief case vignettes. Each vignette was rated on five-point scales for important defining aspects of challenging behaviour: overall management difficulty, threat to the physical safety of the patient and others, and impact on the patients' access to community facilities. Results were analysed for agreement between raters, taking consideration of demographic variables.

Secondly, the usefulness of screening measures in application to challenging behaviour was evaluated within the same unit. The measures chosen were the Agitated Behaviour Scale (Corrigan 1989) and the Checklist of Challenging Behaviour (Harris et. al. 1994). Three members of staff (2 trained nurses and one other member of therapeutic staff) rated each patient's behaviour during the preceding week. A total of 22 patients were assessed, some on more than one occasion, and results examined for inter-rater reliability and concordance with clinical records. In addition, the behavioural profile of this clinical population is delineated. The application of standardised screening measures in general to challenging behaviour, methodological issues and future research implications are discussed.

Contents

INTRODUCTION

1. Sequelae of Brain Injury

The sequelae of neurological insult in acquired brain injury include symptoms such as sensory and motor disturbance which can limit mobility and impair competence in activities of daily living (e.g. Olver, Ponsford and Curran 1996, Jennet and Teasdale 1981), cognitive impairments such as deficits of memory, attention and executive functioning, and communication deficits (Richardson 1990 for reviews). Among the most important variables in long term outcome are emotional and behavioural disturbance (e.g Gainotti 1993), often described as personality change (e.g. Prigatano 1992). Combined with physical and cognitive impairments, behavioural and emotional disturbances may prevent people with acquired brain injury from resuming economic and social activities (Morton and Wehman 1995, Brooks, McKinlay, Symington, Beattie and Campsie 1987). In particular, behavioural, affective and personality disturbance are associated with burden on close relationships and carers (Brooks, Campsie, Symingtom, Beattie and McKinlay 1986, Thomson 1984), and may ultimately result in the failure of attempts to support the individual within their community (Manchester, Hodgkinson and Casey 1997). The current study is concerned with people for whom severe behavioural disturbance following brain injury is a major barrier to community reintegration such that they require specialist inpatient treatment at the national unit in Scotland for the rehabilitation of people with challenging behaviour following acquired brain injury.

1.1 Epidemiology of brain injury, disability and behavioural problems

The epidemiology of head injury in Scotland has been reviewed by Bryden (1989). Each year, for every million of population, 20 000 attend an accident and emergency department as a result of head injury; 3 000 of these are admitted to a local hospital and 200 transferred for neurosurgical investigation or treatment. Surveys of the Strathclyde region using relative's reports estimated incidence of 2 patients per 100 000 of the population per year physically or mentally disabled by head injury. Prevalence was between 51 and 123 people disabled by head injury per 100 000 of population depending on area, though no clear reason for this difference in prevalence was identified. Severity of brain injury as a result of head injury is not discussed by Bryden, and specific factors associated with disability are not elaborated.

More recently, Johnson and Balleny (1996) estimated the incidence of severe traumatic brain injury for the Cambridge area as 5.6 per 100 000 population per year. This was based on a total of 46 patients aged 65 and younger surviving severe head injury over a period of three years. Relatives reported behaviour change in 79 per cent of patients available to follow up. Of these, 58 per cent were described as showing behaviour change sufficient to cause significant problems at home. Based on these findings, the estimated incidence of behavioural change following severe brain injury is 4.4 individuals per 100 000 population per year, and of these 2.5 per 100 000 per year have significant problems at home as a result of behavioural change.

1.2 Acute behavioural disturbance following brain injury

Acute behavioural disturbance following brain injury has been described as a form of agitation (e.g. Levin, Benton and Grossman 1982). The use of the term 'agitation' in relation to brain injury differs from its use in the psychiatric literature (Sandel and Mysiw 1996). Behavioural characteristics associated with agitation in brain injury include physical aggression, explosive anger and increased psychomotor activity (Fugate, Spacek, Kresty, Levy, Johnson and Mysiw 1997), threatening demands, verbal abusiveness and sexually inappropriate behaviour (Mysiw, Jackson and Corrigan 1988). Agitation, described as constant uninhibited movement, is distinguished from restlessness in which the patient is constantly active but capable of brief inhibition of movement (Reyes, Bhattacharyya and Heller 1981). In the early stages post injury, agitation appears to be an indicator of poorer prognosis compared with restlessness and appropriate activity level. Patients who were agitated early in rehabilitation were less likely to return to work and more likely to experience psychiatric problems (Reyes et al. 1981).

Agitation has been conceptualised as a stage of recovery in brain injury and has been typically associated with the acute stage after brain injury. Levin and Grossman (1978), for example, found that approximately 30 per cent of their head injured patients went through a period of disinhibited movement, restlessness, wandering, irritability and aggressiveness. Sandel and Mysiw (1996) note that definitions of agitation following brain injury are inconsistent and propose a syndrome of 'post traumatic agitation' defined as excesses of behaviour (aggression, disinhibition, emotional lability, motor restlessness) during a state of post traumatic amnesia (PTA), the period of clouded

consciousness preceding the attainment of full orientation and continuous awareness of one's surroundings (Mandelberg 1975). (More precisely, PTA is defined as the period from the time of trauma until the first three consecutive days on which the patient demonstrates an ability to form continuous memory traces (see Forrester and Geffen 1995).)

However, a survey of 129 clinicians (Fugate et al. 1997) found that although 45 per cent favoured a definition restricting 'agitation' to the acute recovery period prior to resolution of post traumatic amnesia, 52 per cent thought that agitation could occur at any time after injury, even after post traumatic amnesia has resolved. Furthermore, respondents indicated that presentations of behavioural excesses differed temporally. Descriptions of early presentations of agitation emphasise disturbances of orientation and memory while later manifestations are conceptualised as relating to disinhibition. Cognitive impairments such as disorientation, memory impairment and disinhibition have all been found to be important aetiological factors in agitated behaviour (Corrigan, Mysiw, Gribble and Chocks 1992). In addition, it should be noted that there are many potential causes of agitation. Sandel and Mysiw (1996) conceptualise agitation as a subtype of delirium, potential causes of which could include metabolic and physiological as well as neurological problems.

Although agitation often remits with time or medication, it may persist for an extended period in some patients and these patients can be prone to anger or violent behaviour (Prigatano, Fordyce, Zeiner, Roueche, Pepping and Wood 1986).

1.3 Long term behavioural and emotional sequelae of brain injury

The following sections of this discussion deal with longer term sequelae of acquired brain injury. The mechanisms which underlie these long term changes are discussed in section *1.6.*

Serious behaviour change is a major long term difficulty amongst those with severe brain injury, causing considerable family distress (e.g. Brooks et al. 1986, Thomson 1984). Behaviour change has been identified by relatives in 79 per cent of severe brain injury patients, causing significant practical problems at home in about half of these cases (Johnson and Balleny 1996). The same study also found that more behaviour problems were reported in community settings after discharge than in hospital during the acute stages of recovery. In acute inpatient care, irritability and disruptive behaviour were most frequently reported by staff, followed by apathy and restlessness. Family reports of the patients at home identified apathy and irritability as the most common problems with disinhibition and reduced social skills more evident at home than in hospital. Behavioural symptoms tended to worsen over time and, in particular, aggression and irritability were more prevalent 18 months or more after injury.

Thomson (1984), in her long term follow up of traumatic brain injury patients, reported that affective disturbances such as emotional lability and cognitive problems such as memory impairments are found both at 2.5 years post injury and 10-15 years post injury and are relatively stable over time. Behaviour problems, however, substantially worsened over time.

Similarly, Brooks et al. (1986) found that relatives' reports of physical aggression in patients increase over time. At one year after injury 15 per cent of relatives of severely brain injured patients reported threats of violence from the patient and 10 per cent reported that the patient had physically assaulted them. These figures rose to 54 per cent and 20 per cent respectively five years after injury. Other authors have also reported an association between brain injury and an increased tendency to violence. Elliot (1982) postulated the Episodic Dyscontrol Syndrome, finding that 35.6% of the patients in his study had a history of recurring physical attacks of uncontrollable rage and had developed this behavioural pattern after a specific brain trauma. Rosenbaum and Hoge (1989) report a history of severe head injury in 61.3 per cent of their cases referred for marital violence.

Behavioural disturbance following brain injury occurs within the context of a wide range of behavioural and emotional changes and other symptoms. The most common long term problems in patients with severe brain injury, according to relatives' reports are: personality change, slowness, poor memory, irritability, bad temper, tiredness, depression, rapid mood change, tension and anxiety, and threats of violence (Brooks et al. 1986).

'Personality change' has sometimes been reported as families' main concern following severe traumatic brain injury (Lezak 1978, Levin et al. 1982). It is beyond the scope of this discussion to deal in detail with constructs such as personality. However, within the context of brain injury some clarification is useful regarding the definitions of

different types of sequelae. Prigatano (1992) suggests that the term 'personality' is broadly used to describe enduring emotional and motivational characteristics of a person which have developed over a lifetime. He notes that emotion and motivation are difficult constructs to define precisely in behavioural terms; however, he proposes that emotion can be broadly defined as complex feeling states associated with interruption of goal seeking behaviour and motivation can be described as complex feeling states that parallel hierarchical goal seeking behaviour. Emotional and behavioural changes after brain injury may be conceptualised as potential components of personality change, though whether they are interpreted as such by relatives may depend on the nature of the changes and how they relate to premorbid characteristics. Although behavioural and emotional sequelae are described separately here, it is acknowledged that they are often closely related.

The most commonly reported emotional/behavioural changes after brain injury are summarised by Prigatano (1992) and classified into active or passive disturbances. Among the most common active disturbances are: irritability, agitation, aggression, impulsiveness, restlessness, inappropriate social responses, emotional lability, sensitivity to noise or distress, anxiety, suspiciousness, delusions, and paranoia. The most commonly reported passive disturbances include: aspontaneity, loss of interest in the environment, loss of drive or initiative, fatigue, depressed mood, childishness, helplessness and lack of insight.

A review of the emotional and psychosocial impact of severe brain injury (Morton and Wehman 1995) concluded that patients are at high risk of social isolation and prolonged

periods of anxiety and depression, these difficulties creating a major barrier to community adjustment.

1.4 Return to work, independence in daily living, and social activities

The sequelae of brain injury include effects not only on the individual themselves but also on their relationships with others and ability to re-integrate into society. Return to employment after brain injury is a commonly reported outcome measure of psychosocial adjustment. Brooks et al. (1987) found that the employment rate within a severely brain injured group dropped from 86 per cent before injury to 29 per cent seven years after injury. Olver et al (1996) followed up a sample of successive brain injury admissions, the majority of whom had severe brain injury, at two and five years after injury. Of those who were employed before injury, only 40 per cent were employed five years after injury. Although there were improvements in independence in domestic and community activites between two and five years after injury, employment status had worsened: 32 per cent of those employed at two years after injury were unemployed at five years and many who were students at two years became unemployed at five years.

Although severity of injury, age and cognitive functioning are significantly related to employment status within twelve months of injury, this is less so in the longer term when psychosocial problems may interfere with employment (Ruff, Marshall, Crouch, Klauber, Levin, Barth, Kreutzer, Blunt, Foulkes, Eisenberg, Jane and Maramou 1993). Post traumatic cognitive, behavioural and emotional deficits were found to be much better predictors of return to work than physical deficits in patients followed up seven

years after injury (Brooks et al. 1987). In particular, deficits in personal hygiene and in taking responsibility for self care, and problems with mood and control of anger accounted for high levels of variance.

Dikmen Machamer and Temkin (1993) report a 46 per cent rate of return to work amongst people who had been working prior to a moderate to severe brain injury. However, the majority did not return at the same level as before their injury and only 18 per cent were financially independent two years after injury. Enduring dependence in daily living was also reported.

Even amongst people who have suffered extremely severe brain injury, however, improvements in independent living are seen over very long term follow up (Thomson 1984). Whilst at 2.5 years after injury 24 out of 40 patients were dependent, only 12 remained dependent at 10-15 years, cared for in nursing homes or psychiatric hospital. However, functional gains in independent living skills do not necessarily correspond to gains in employment status (Olver et al. 1996).

Social isolation is a major problem in the years following severe brain injury (Oddy and Humphrey 1980), and does not improve several years later (Oddy, Coughlan, Tyerman and Jenkins 1985, Morton and Wehman 1995). Morton and Wehman (1995) suggest this may be a particular problem for people who are injured in early adulthood because they tend to be at an early stage in establishing independence in areas such as friendship, leisure activities, intimate relationships, residence and employment. Thomson (1989) found that people injured when they are young adults are at higher risk

of developing late behavioural and emotional sequelae. She suggests this may be due to the vulnerability of the developing personality.

1.5 Impact on carers of behavioural disturbance following brain injury

The emergence of more serious behaviour problems over time is related to a high incidence of divorce and high subjective burden on relatives (Brooks 1991). Severity of injury in itself is not predictive of subjective burden reported by relatives at five years post injury. Greater magnitude of behavioural and emotional changes in the patient is associated with relatives' report of higher subjective burden, whereas greater memory problems are not (Brooks et al. 1986).

Levels of emotional distress are elevated in the long term amongst relatives caring for a person with brain injury. Oddy et al. (1985) found clinically significant levels of emotional distress in 17 per cent of relatives seven years after severe brain injury, compared to the general population prevalence of 8 per cent suffering clinically significant emotional distress. Brooks (1991) reported that at two to seven years after injury, 25 to 30 per cent of family members experience anxiety and depression sufficiently severe to warrant clinical intervention. Hall and colleagues (Hall, Karzmark, Stevens, Englander, O'Hare and Wright 1994) found that relatives' self reports of stress did not tend to increase between six months and two years after the injury. However, caregivers did report notable increases in medication and substance use and decreases in employment and financial status.

Pre-injury characteristics of families play an important part in the impact of brain injury

on relatives. At two years post injury, self reported stress was significantly higher for those with insufficient funds and those with pre-existing risk factors for psychosocial distress such as substance abuse, psychiatric or forensic history (Hall et. al. 1994). No difference was found in levels of self reported stress between carers who were spouses of the patient and those who were parents, although spouses reported more behavioural problems in the patient with increased severity over time. Hall et al. (1994) suggest that behavioural sequelae might be less problematic for parents than spouses due to less discontinuity of role, and likelihood of greater support available to parents (such as their own spouse).

It has already been noted that social isolation is a major problem for patients but the patient's whole family may become socially isolated, demonstrated by decreased size and increased intensity of the patient's social network (Kozloff 1987).

1.6 Mechanisms underlying behavioural and emotional changes after severe brain injury

Three main types of influence on behavioural change after brain injury are suggested by Gainotti (1993): neurological factors; psychological factors (personal attitudes/ reactions to the disability); and psychosocial factors (consequences of functional impairments for the network of social relationships).

Long term cognitive and some affective impairments following severe brain injury remain relatively static over time while behavioural, emotional and psychosocial problems tend to worsen (Thomson 1984, 1989, Brooks et al. 1986, 1991, Dikmen et al.

1993, Johnson and Balleny 1996, Morton and Wehman 1995). Therefore, many behavioural, emotional and psychosocial changes have been conceptualised as interactions between neurological impairments, reactions by the patient and others to these, and changes to the patient's situation (e.g. Prigatano 1992).

The association between behavioural/emotional changes and severity of brain injury can be poor; for example, irritability is a common symptom of brain injury which does not appear to be related to the overall severity of the injury (Dikmen, Temkin and Armsden 1989) and it is therefore supposed that irritability is secondary to neural disturbance (Prigatano 1992). Problems with control of anger can be conceptualised as an exaggerated form of irritability, often triggered by frustration. Aggressive behaviour may have direct neurological correlates (e.g. Elliot 1982) or may be related to cognitive impairments such as poor impulse control which can be the result of brain injury. However, there is little evidence to suggest that brain injury causes aggression *per se.* A complex interaction of biological, psychological and social factors is likely. For example, a reduced repertoire of adaptive behaviours for dealing with conflict in the social environment and increased sensitivity to noise may lead to more aggressive or angry responses (Prigatano 1992).

The development of behavioural problems after brain injury may also be understood in the context of learning theory. This will be discussed in more detail in Section 2. Impairments of adaptive cognitive and communication skills are common after brain injury and aggressive or violent behaviours may emerge as alternative ways of communicating needs. Behaviours are maintained and reinforced if they fulfill an

important communicative function for the individual (Willis and LaVigna 1996, Emerson 1995).

1.7 Methodological issues in measuring outcome of brain injury

The study of outcome in brain injury is subject to a number of methodological difficulties. The group of people studied is heterogeneous in age, social background, mechanism and severity of injury and support systems available after injury. Furthermore, in defining the psychosocial outcome of injury, there are overlaps between psychological, emotional, behavioural and social outcome measures. Different groups of patients differ in the types of interventions available to them, and it is difficult to find appropriate control groups. In addition, much of the data on these patients comes from self-report which has its own methodological difficulties. Results may differ depending on whether the respondents are relatives, staff or the patients themselves (McKinlay and Brooks 1984, Dikmen et al. 1993) and therefore studies which used different respondents are not directly comparable with each other.

In order to accurately interpret the various findings reported it is important to have an awareness of the various factors which can affect brain injury outcome and how they are measured. Measurement of outcome itself varies widely depending on the focus of the study in question. Level of independence in daily living and employment status are commonly used outcome variables, as is the Glasgow Outcome Scale which classifies outcome into four broad categories and has relatively good predictive and concurrent validity at 6 months post injury (Satz, Zaucha, Forney, McCleary, Asarnow, Light, Levin, Kelly, Bergsneider, Hovda, Martin, Caron, Namerow and Becker 1998).

However, these types of measures tend to be of limited use in distinguishing longer term behavioural and emotional changes in the patients, many of which can have considerable effects on patients and their relatives' everyday lives.

One of the most important predictors of outcome is the severity of initial neurological insult. The most widely used measures of severity of brain injury are the Glasgow Coma Scale and duration of post traumatic amnesia. The Glasgow Coma Scale (GCS; Teasdale and Jennet 1976) measures level of consciousness by combining scores obtained from separate assessments of motor responses, verbal responses and eye opening. There is debate over timing of assessment after injury and there may be difficulty measuring the level of consciousness for patients for whom facial or other fractures prevent certain types of responses (e.g. eye opening). However, the GCS is a very widely used measure, recognised to relate strongly to severity of injury and to outcome measures (eg. Hellawell 1999).

Duration of 'post traumatic amnesia' (PTA) is the period of disorientation following injury during which the patient is unable to recall a continuous flow of new experiences (Forrester and Geffen 1995, Russel and Smith 1961). It includes the period of unconsciousness, or 'coma', following injury (Levin et al. 1982). Duration of PTA has been classified into bands which are thought to correspond to severity of closed head injury (Jennet and Teasdale 1981). As with the Glasgow Coma Scale, the prognostic value of duration of PTA is compromised by medical complications other than neurological insult which interfere with level of consciousness either directly or because of pharmacological treatment.

Mechanism of injury also affects sequelae. Particular mechanisms of injury are associated with particular types and locations of lesions. For example, closed head injury of the acceleration-deceleration type which typically occurs in motor vehicle accidents causes damage to axial brain structures and mesobasal parts of the frontal and temporal lobes. These are the most important parts of the limbic system structures which are involved in the regulation of social and emotional behaviour. The prevalence of emotional and psychosocial disturbance in the long term sequelae of closed head injury can be hypothesised as related to preferential damage to the limbic structures in this type of injury (Gainotti 1993). Patients injured as a result of assault have poorer outcome at 6 months post injury, measured by self rating of symptoms and impact on everyday life (Wenden, Crawford, Wade, King and Moss 1998). Dunlop, Udvarhelyi, Stedem, O'Connor, Isaacs, Puig and Mather (1991) found that patients who had been injured as a result of assaults were more likely to show deterioration of emotional and behavioural problems (measured using an observational rating scale) at six months after injury than patients who had been involved in motor vehicle accidents. The group of patients who showed deterioration were also more likely to have a history of pre-injury alcohol abuse and have sustained a skull fracture with left parietal lobe injury.

Traumatic brain injuries which necessitate cranial surgery for the removal of mass lesions have been associated with poorer outcome. Zafonte and colleagues (Zafonte, Ricker, Lombard, Mann and Black 1999) found an interaction between need for cranial surgery and initial GCS score. Those whose GCS was either at the severe or mild end of the scale and who required cranial surgery had poorer outcome, measured using a

disability rating scale. Zafonte et al. (1999) suggest that the need for cranial surgery may be indicative of potential for neurological damage of the presenting condition but acknowledge that the outcome scale used may not be sensitive enough and that additional factors such as volume of tissue removed during surgery and intracranial pressure may be important variables in outcome.

Age at time of injury is an important predictor of outcome (Asikainen, Kaste and Sarna 1998). For severe brain injuries, patients with the best chance of reasonable functional recovery were aged between 8 and 40 years. There was a high percentage of severe disability among patients under the age of 8 and over the age of 40 years. Despite age effects, variations in cause and severity explained many of the differences in broad functional outcome, measured on the Glasgow Outcome Scale. Furthermore, there have been few long term outcome studies of brain injury. The sequalae of brain injury in childhood may not fully emerge until years later due to disruption of normal development. Some studies have found that people who sustain a brain injury in early adulthood are particularly vulnerable to long term behavioural, emotional and psychosocial sequalae (Thomsen 1989, Morton and Wehman 1995) and Thomsen (1989) notes that younger adult patients are at higher risk of late (10-15years) behavioural and emotional sequelae. This may be linked to disruption in psychosocial development (Morton and Wehman 1995) and dependency on family of origin.

1.8 Premorbid characteristics

Premorbid characteristics interact with injury variables in influencing outcome. A great many traumatic brain injuries are associated with alcohol use (discussed in detail by

Kreutzer, Harris-Marwitz and Witol 1995). Positive blood alcohol levels have been found in 72 per cent of patients presenting with moderate brain injury (Rimel, Giordani, Barth and Jane 1982) - 53 per cent of their sample were described as intoxicated, compared to 17 per cent of those presenting with mild head injury. Pre-injury history of alcohol abuse was found in 34 per cent of moderately brain injured individuals (Rimel et al. 1982). Kreutzer, Wehman, Harris, Burns and Young (1991) reported a study on 74 unemployed traumatic brain injury patients referred for vocational rehabilitation and of this group, 66 per cent reported being moderate to heavy drinkers prior to their injury and 36 per cent reported history of illicit drug use.

Criminal proceedings histories amongst traumatic brain injury samples are higher than those for the general population, both pre-injury and post-injury. Kreutzer et al. (1991) reported 20 per cent had been arrested pre-injury and 10 per cent after. These figures are higher than those for the reference population (whole US population) of which only 2 per cent were arrested annually. The most frequent charges amongst Kreutzer's sample were drunk driving, drunk in public, disorderly conduct and drugs offences. There were also some charges of battery, assault, and breaking and entering.

Hall et al. (1994) found from self report that 16 per cent of brain injury patients had been arrested prior to their injury for non-traffic offences and 8 per cent had been imprisoned. After injury, 24 per cent had been arrested and 18 per cent jailed. Lewis, Pincus, Feldman, Jackson and Bard (1986) surveyed 15 death row inmates and found that they all had histories of severe head injuries.

Kreutzer et al. (1995) reported on the criminal, psychiatric and substance abuse histories of 327 outpatients with history of traumatic brain injury and found a higher rate of criminality, both before and after traumatic brain injury, than the general population. There was an association between criminality and psychiatric problems, a greater proportion of those arrested pre-injury having received psychiatric treatment at some time than those who were not arrested prior to injury. There were a high proportion of heavy and moderate drinkers among those arrested pre-injury compared with those not arrested pre-injury. More aggressive behaviour was seen in the group of patients who had been arrested than in those who had never been arrested.

Brooks et al. (1986) found from relatives' reports that 31 per cent of a 43 patient sample all with severe head injury had been in trouble with the law since their accident, including charges of breach of the peace, drunk and disorderly, motoring offences and one attempted murder charge. Of these 13 individuals, 8 had a pre-injury history of trouble with the law, making it difficult to conclusively attribute this to the effects of the head injury.

Premorbid personality may also have an effect on outcome. Oddy and Humphrey (1980) report that premorbid personality affects return to work after brain injury. Relatives' retrospective descriptions of patients' pre-morbid personality were related to speed of return to work within the first two years after injury. Patients described as nervous and suspicious were more likely to experience delay in return to work, whilst those described as verbally expansive ("brash") returned to work more rapidly.

2. Definition of Challenging Behaviour, Methods of Assessment and Intervention

There is not a great deal of literature available which specifically addresses challenging behaviour in people with acquired brain injury. Therefore, much of the following discussion is drawn from work relating to people with learning disabilities and challenging behaviour, the context in which the concept of challenging behaviour was developed. Some literature relating to the care of people with dementia has also been used as a resource.

2.1 Definitions of challenging behaviour

The term 'challenging behaviour' was introduced into the debate on provision of community services for people with learning disabilities in a document edited by Blunden and Allen (1987). The term was used to replace terms such as 'abnormal', 'aberrant', 'disordered', 'disturbed', 'dysfunctional', 'maladaptive', and 'problem behaviour' and was chosen to 'emphasise that such behaviours represent challenges to services rather than problems which individuals ... carry around with them' (Blunden and Allen 1987, p.14).

Challenging behaviour has been defined as:

> culturally abnormal behaviour of such intensity, frequency or duration that the physical safety of the person or others is likely to be placed in serious jeopardy, or behaviour which is likely to seriously limit use of, or result in the person

being denied access to, ordinary community facilities.

Emerson 1995, pp.4-5

Key aspects of this definition are that challenging behaviour is defined by its consequences and within a social context. A wide range of types of behaviour of varying frequency and duration may come under the definition and challenging behaviour has wide-ranging personal and social consequences. (It can impact on health, quality of life, and others' responses and may lead to abuse, exclusion, or deprivation.) The difficulties these consequences pose for services define the behaviour as challenging. The behaviour takes place in a context which includes environment, antecedents, and other people's involvement. Social rules are involved in interpretation of challenging behaviour, so some subjective judgements are involved. It is important also to consider for whom the behaviour presents a challenge.

Qureshi and Alborz (1992), define severe challenging behaviour as behaviour that has:

a) at some time caused more than minor injuries to the person or others; at some time resulted in the destruction of the immediate environment;
b) occurs at least weekly and places the person in danger, requires intervention by more than one member of staff, causes damage which cannot be rectified by immediate care staff or causes at least an hours' disruption;
c) or has caused disruption lasting more than a few minutres at least daily.

This definition includes severity of consequences, management difficulty, frequency, duration and disruptiveness as factors involved in determining the severity of challenging behaviour.

2.2 Definition of challenging behaviour in practice

In practice, because of the complexity of the definition of challenging behaviour and the importance of social context in defining the behaviour as challenging, it can be difficult to establish validity in measuring challenging behaviour (Kiernan and Moss 1990).

However, Lowe and Felce (1995a, 1995b) have reported consistency over time in ratings of challenging behaviour made by primary carers of people with learning disabilities. An association between the frequency of a behaviour and the severity of management problem it presents was found, with more frequent rather than occasional behaviours being rated as severe. Only one type of behaviour, 'wanders away', was considered severe regardless of frequency. 'Aggression', 'disturbing noises' and 'temper tantrums' were among the behaviours considered severe if occuring frequently. Other behaviours were considered a lesser management problem when they occured frequently: 'destructiveness'; 'self-injury'; 'objectionable personal habits'; 'anti-social behaviour'. The authors interpret these findings as indicative that carers' assessment of severity of challenging behaviour may be based mainly on the difficulty it poses for carers in their daily activities, rather than the effect it may have on the progress and development of the individual. Furthermore, there were differences in severity ratings between different contexts. More behaviours were generally rated as severe in family homes and in community houses than in hospital. This could be for a number of reasons such as different severity of actual behaviour occurring, different standards adopted in the judgement of behaviour, different abilities to cope or different environmental constraints (Lowe and Felce 1995).

Clear differences in carers' perceptions of severity of challenging behaviour are associated with staffing levels, understaffing being associated with ratings of behaviours as more severe management problems (MacDonald and Barton 1986). These findings illustrate that interpretations of challenging behaviour are influenced by type and frequency of behaviours as well as contextual factors, including social norms and ability of the setting to cope with the behaviour.

Causal attributions made by staff about challenging behaviour are discussed by Hastings (1997). In the learning disability literature, this has been studied for the purpose of evaluating the efficacy of staff training, with the assumption that beliefs about what causes challenging behaviour will influence staff responses to it. Factors which interact with causal attributions to determine behaviour may include emotional responses to the behaviour, beliefs about effective intervention strategies and formal and informal aspects of service cultures (Hastings and Remington 1994, Hastings, Remington, and Hatton 1995).

2.3 Service implications

Blunden and Allen (1987) describe the service provision for people with learning disabilities as follows:

> They are often people who are to be found in locked ...wards in mental handicap hospitals. They may have come to the attention of the courts and may be in special hospitals or detained in mental handicap hospitals (or in prison). Within community services they may be in special provision or may even be excluded from schools or day provision for adults. Their families may request 'respite

> care' or crisis intervention and early alternative residential provision. They may be prescribed high levels of medication to 'control' their behaviour. In general, they are people around whom family members and service personnel may reach 'breaking point'
>
> Blunden and Allen 1987, pp.14-15

The person with challenging behaviour following acquired brain injury may experience similar shortfalls in service provision. Patients who exhibit severe challenging behaviour cannot be adequately cared for in standard neurological rehabilitation units. The risk they present to themselves, staff and other patients often leads to them being excluded from active rehabilitation (Wood 1987, Gloag 1985). These patients end up in psychiatric and learning disability wards because there are no other settings equipped to contain their behaviour. However, in these settings patients are unlikely to receive any structured rehabilitation and may be managed instead with medication, seclusion and physical restraint (Manchester 1993). In these circumstances, challenging behaviour is at best contained and may be exacerbated. There is clearly a need for specialised units or intensive support systems for people with challenging behaviour (Manchester et al. 1997, Bullard and Bond 1988).

2.4 Effects of challenging behaviour on carers

Challenging behaviour increases staff stress. Amongst staff carers of dementia sufferers, there is a highly significant correlation between self report of emotional stress and total number of assaults by residents (Macpherson, Eastley, Richards and Mian 1994).

Characteristics of staff and working patterns are related to levels of stress reported. Less experienced nurses with greater patient contact are more likely to exhibit symptoms of stress (Livingston and Livingston 1984). Number of hours worked and staff training and role affect job satisfaction (Willcocks, Peace and Kellaher 1987).

Challenging behaviour is a major cause of stress experienced by carers of people with learning disabilities (Quine and Pahl 1985, Qureshi 1992). Staff working with people with learning disability and challenging behaviour in small community houses were found to be significantly more anxious, feel less supported, and have lower job satisfaction than staff in houses where the residents did not have challenging behaviour (Jenkins, Rose and Lovell 1997). A range of, mostly negative, emotional reactions to episodes of challenging behaviour are reported among staff caring for people with learning disabilities and challenging behaviour (Bromley and Emerson 1995). These include sadness, despair, anger, annoyance, fear and disgust. The most significant sources of stress were identified by staff as behaviour which is wearing over time, absence of any effective way of dealing with the behaviour and difficulty understanding the person's behaviour.

Some of the emotional effects of behavioural disruption on family carers of people with acquired brain injury have already been discussed. Available research on staff stress in brain injury rehabilitation did not find any difference in measures of stress between nurses in a brain injury rehabilitation ward and nurses on a general rehabilitation ward (Van den Broek and Lye 1996). The two groups were matched carefully for demographics and the only variable other than type of patient group on which they were

found to differ was that the brain injury ward had a higher staff to patient ratio. The authors suggest that organisational factors may be protective against stress for the brain injury rehabilitation nurses.

Challenging behaviour is one of the main predictors that parents caring for a son or daughter with learning disabilities will seek a residential placement for them (Tausig 1985). The presence of aversive behaviour in dementia sufferers is particularly stressful for carers and behaviours which are aversive to carers may contribute to the breakdown of care within the family (Gilhooley, Sweeting, Whittick and McKee 1994). The number of problems identified in the sufferer predicts institutionalisation within 6 months (Gilleard 1984). In the preceding discussion, considerable strain on carers of brain injured people who have behavioural disturbance has been noted, and parallels can be drawn with the literature on caring for people with learning disabilities and people with dementia to suggest that the presence of challenging behaviour and the effects this has on carers are important factors in failure of community placements. The effects of challenging behaviour on carers influence quality of care. They may also influence carers' definitions of severity of challenging behaviour because of fluctuations in perceived ability to manage the behaviour (Emerson 1995).

Staff behaviour towards people with learning disabilities and challenging behaviour may be related to how they experience the challenging behaviour (Hastings and Remington 1994) consistent with the function of the challenging behaviour. For example, self-injurious behaviour may have the function of gaining positive reinforcement for the person displaying the behaviour. If staff experience the

behaviour as aversive they quickly intervene to give the person attention and so stop the self-injurious behaviour and terminate their own aversive reaction. Both the self injurious behaviour and the staff intervention are reinforced.

Dagnan, Trower and Smith (1998) investigated emotional reactions to challenging behaviour amongst care staff working with people with learning disabilities. Care staff who worked with people with challenging behaviour evaluated the person with challenging behaviour more positively and reported that they would be more likely to offer help to the person than carers who did not work with people with challenging behaviour. Helping behaviour was best predicted by optimism, which was best predicted by negative emotion which was best predicted by an attribution of controllability.

2.4 Models of challenging behaviour

Various models of challenging behaviour have been proposed. Some of the biological models are briefly reviewed by Holt (1995): the endorphin model hypothesises that self-injurious behaviour is perpetuated by the stimulation of endorphin receptors it produces, the serotonin model links low levels of serotonin to impulsive and aggressive behaviour, the dopamine model relies on abnormalities of the dopaminergic system occuring in certain genetic disorders which are associated with self-injurious behaviour. Emerson (1995) gives a thorough discussion of both neurobiological and behavioural approaches to understanding challenging behaviour.

Applied behaviour analysis has been very influential in the understanding of

challenging behaviour displayed by people with learning disabiities (Baer, Wolf and Risley 1968, LaVigna and Donnellan 1986, Willis and LaVigna 1996). This approach has focused on enhancing competence to become participating members of society as well as remediation of challenging behaviour. The dominant model of challenging behaviour in applied behavioural analysis is to view challenging behaviour as an example of operant behaviour, behaviour which is maintained by environmental consequences and is functionally adaptive. Both internal biological consequences and external environmental consequences may maintain behaviour, and contextual factors provide the basis for motivational states underlying behaviour. Cues in the physical and social environment act as discriminative stimuli, signalling the likelihood of reinforcement. These factors may interact with the person's individual learning history to produce an episode of challenging behaviour.

The contextualist view of behaviour analysis (described by Emerson 1995) emphasises that challenging behaviour is defined by a process of social construction. Whether behaviour is defined as challenging depends on: norms and expectations about appropriate behaviour in particular settings and for particular social roles, the ability of the person to give a plausible account for their behaviour, cultural beliefs held by participants involved in the setting in which the behaviour takes place, and the capacity of the setting to manage any disruption caused (Emerson 1995).

2.5 Assessment of challenging behaviour

It is clear from the various models of challenging behaviour that assessment must include a wide range of factors including assessment of the function or functions served

by the behaviour, based on detailed descriptions of the behaviour, its antecedents and consequences. However, functional analysis is only part of the necessary behavioural analysis (Willis and LaVigna 1996). A full assessment needs to include assessment of the person's skills and functional abilities generally, background history, description of the environment, history of the challenging behaviour and internal as well as external antecedents (LaVigna and Donnellan 1993). Biobehavioural factors may be considered in the form of internal antecedents, consequences and functions of behaviour. It is also necessary to gather information on how the environment interacts with the person's intellectual impairments, in other words an ecological understanding of the person's fit with their environment. If there is a mismatch, the person may resort to challenging behaviour to try to cope with perceived excessive environmental demands.

Each instance of challenging behaviour can only be thoroughly understood by in-depth analysis of the individual and their circumstances (Donnellan, LaVigna, Negri-Shoultz and Fassbender 1988, Willis et al. 1993). The assessment methods discussed above were developed for use with people with learning disabilities. Stokes (1996), discussing challenging behaviour in dementia, argues for the use of a phenomenological approach to understanding challenging behaviour, based on understanding of the person's biography and unique personal characteristics with thorough individualised assessments used to guide appropriate person-centred therapeutic interventions.

2.6 Interventions for behavioural disturbance following brain injury

Behavioural rehabilitation in acquired brain injury has typically been based on a neurobehavioural approach, analysing behaviour in terms of neuropsychological

impairment (Wood 1987). This type of intervention is based around inpatient programmes of behavioural reinforcement, including regular rewards for appropriate behaviour along with aversive consequences such as seclusion for inappropriate behaviours. The use of a neurobehavioural approach with people with challenging behaviour following brain injury has consistently demonstrated reductions in aggressive, disinhibited and socially inappropriate behaviours while strengthening adaptive behaviours (Wood 1984). In the many cases where gains were achieved with patients previously considered 'hopeless' cases, there is evidence of long term maintenance of gains and that severely brain injured people can benefit from this approach several years after their initial injury (Burgess 1990, Lloyd and Cuvo 1994).

There are serious ethical difficultes with the use of aversive procedures (Alderman, Fry and Youngston 1995, Donnellan et al. 1988), including concerns about how these relate to the human rights of clients, potential harm such as negative effects on clients' self esteem, justifiability of using aversive procedures when there may be non-aversive alternatives, and the potential for abuse of clients (LaVigna and Donnellan, 1986, pp.1-8). In response to these concerns, integrated behavioural approaches which employ positive theraupetic strategies and avoid punishment have been developed (LaVigna, Willis and Donnellan 1997). These approaches were originally developed with people with learning disabilities, but have been applied to work with people with severe challenging behaviour as a result of acquired brain injury (Rothwell, LaVigna and Willis 1999).

This integrated behavioural approach within a positive (non-aversive) framework

(Rothwell et al. 1999) is based on comprehensive behavioural assessment which includes functional analysis of the behaviour, a general assessment of the individual's skills and history, and an ecological understanding of how the person interacts with their environment. Based on this assessment, the core of the active rehabilitation process, termed 'positive programming', involves general skills development, teaching appropriate skills functionally equivalent to the challenging behaviour and functionally related to it, and developing emotional self-management skills. In addition, there is focused treatment for the challenging behaviour itself, using well established contingent reinforcement which rewards appropriate behaviour or the absence of challenging behaviour. A reinforcement programme which rewards any response other than the target behaviour is termed 'differential reinforcement of other behaviour' (DRO, first defined by Reynolds 1961). Alternatively, an effective way of reducing rates of very high frequency behaviours is to reward lower rates of the behaviour - 'differential reinforcement of low rates of behaviour' (DRL) which has been used successfully with brain injured clients (Turner, Green and Braunling-McMorrow 1990). Antecedent control can provide one of the fastest methods of gaining control over target behaviours. In addition to pro-active strategies designed to produce enduring reductions in challenging behaviour combined with increases in general functioning, it is necessary to have reactive strategies designed to produce quick but temporary reductions in challenging behaviour when it does occur. Reactive procedures can include active listening, direct instruction, stimulus change and distraction. Control and restraint and as-required medication can be used if these fail (Rothwell et al. 1999).

Interventions for challenging behaviour must not only be person-centred but should

demonstrate social validity: addressing socially significant problems, undertaken in a way acceptable to the main parties involved, resulting in socially important outcomes (Emerson 1995). Emerson argues for a multifaceted approach to measuring outcomes and their significance to the different people involved (Emerson et al.1991). This might include: measurement of the actual behaviour shown by the person; replacement skills and behaviours; procedures required for managing periods of challenging behaviour; health-related consequences of behaviour such as tissue damage; restrictiveness of residential or vocational placements; broader aspects of the person's life such as integration into general society, personal life satisfaction, range of choices; and how the person's challenging behaviour is perceived by others including family, staff and the public (Emerson 1995).

As part of this process of evaluation, it would be useful to develop standardised measures of behaviour in order to investigate efficacy of interventions on a group scale as well as on an individual basis (Rothwell 1999).

3. Standardised Screening Measures of Challenging Behaviour

3.1 Rationale for use of standardised measures

While individualised assessment is required to fully understand each individual's needs and to assist management of challenging behaviour, standardised screening measures would allow comparison between groups of patients, measurement of change over time and treatment efficacy and could help quantify risks to which staff and patients are exposed.

The requirements of a good screening measure include acceptable levels of reliability and validity. The scale must have reasonably good reliability between different raters and at different time periods. It must have construct validity, which is often assumed through concordance with other measures (Carmines and Zeller 1979). From the discussion hitherto, it is clear that ecological and social validity must be considered and that the measure must be relevant to the client group and be practical enough to be easily administered.

There are at present very few standardised measures of challenging behaviour for use with patients with acquired brain injury. Most of the existing scales have been developed for use with people with learning disabilities and many of the scales available from this literature base are unsuitable for use with brain injury clients because they contain items which are not relevant to the group, or terminology which would not be appropriate to this group either because of differences in clinical presentation or unnecessarily stigmatising language.

3.2 Measures of challenging behaviour in acquired brain injury

There are very few quantitative measures of behavioural sequelae in brain injury. In response to this, Alderman, Knight and Morgan (1997) developed the Overt Aggression Scale Modified for Neurorehabilitation (OAS-MNR) specifically for the measurement of aggression post brain injury. The OAS-MNR is an observational rating scale based on the Overt Aggression Scale (Yudofsky, Silver, Jackson, Endicott and Williams 1986), which allows recording of both frequency and severity of aggressive behaviours

in four categories: verbal aggression; aggression against objects; aggression against self; aggression against others. Each instance of aggression is rated for type of aggression and on a four-point scale of severity, for which operational definitions are given. In addition, codes are given for recording antecedents to aggression, environmental factors, and type of intervention used to manage each episode of aggression.

The OAS-MNR provides quantitative and qualitative information which can be used to supplement functional analysis of behaviour and provide quantitative measure of change over time. It also attempts to overcome problems of poor classification of severity of aggression in previous literature by providing detailed operational definitions (Alderman et al. 1997, Alderman, Davies, Jones and McDonnel 1999). The OAS-MNR was developed using continuous observation and recording in a setting with a staff-to-patient ratio of one-to-one or higher (Alderman et al. 1999). It requires a great deal of staff time to complete and a major difficulty of continuous recording of behaviours such as aggression is that staff must prioritise managing the behaviour over recording it.

Within the current research, the OAS-MNR was not considered practical because of the staff resources needed to complete the measure. The unit surveyed typically has a staff to patient ratio of two-to-five- considerably less than that of the unit where the OAS-MNR was developed. The OAS-MNR measures only aggressive behaviours and does not include inappropiate social and sexual behaviour which are commonly part of the presentation of patients within the unit where the current research is based.

The Neurobehavioural Rating Scale (NRS) was developed for use with people with

brain injury (Levin, High, Goethe, Sisson, Overall, Rhoades, Eisenberg, Kalisky and Gary 1987). The NRS draws items from the Brief Psychiatric Rating Scale (Overall and Gorham, 1962) and includes additional items specific to the behavioural changes following brain injury. The NRS was standardised using a group of closed head injury patients with no prior history of alcohol abuse, psychiatric disorder or previous head injury. Good inter-rater reliability was demonstrated and ratings on the NRS were found to relate to severity of injury and time since injury (Levin et al. 1987). However, as a measure for behavioural outcome in brain injury, the NRS contains a range of items not directly relevant to the measurement of challenging behaviour. The scale is based on brief structured interviews with direct care staff and training of interviewers was necessary to establish inter-rater reliability. The NRS was not used in the current research because it could not be easily used by direct care staff and does not address challenging behaviour in detail. The NRS was also not considered suitable for the current study because the population to be studied differs considerably from the standardisation population in their high prevalence of psychiatric disorders and substance abuse histories.

The Agitated Behaviour Scale (Corrigan 1989) is a 14 item observational rating scale, standardised on acutely admitted acquired brain injury patients in the United States and is designed to measure agitation post brain injury. Factor analysis of this scale reveals one general construct (Agitation) with three underlying factors: Aggression, Disinhibition and Lability (Corrigan and Bogner 1994). Other research indicates that cognition and agitation co-vary, with most of the co-variance due to the effect of attention (Corrigan et al. 1992). Although the Agitated Behaviour Scale was not

specifically designed to measure challenging behaviour, the clinical presentation of the patients in the current research overlaps considerably with the presentation of agitation post brain injury. These patients display aggression and disinhibition in the context of moderate to severe cognitive impairment. The Agitated Behaviour Scale has well-demonstrated psychometric properties, is quick to complete, easily understood, incorporates ratings of frequency and severity of target behaviours, and has face validity for the clinical presentation of the group of patients to be studied. The Agitated Behaviour Scale was therefore utilised in the current study.

A final measure which was considered for inclusion in the study initially was Haffey and Johnston's (1989) Comprehensive Assessment Inventory for Rehabilitation (CAIR), which includes a section on Impairment of Behaviour Pattern. This measure was designed to evaluate head injury rehabilitation programs in the United States. The section on impairment of behaviour pattern covers verbal behaviours and physical aggression rated for frequency and disruptiveness. Standardisation data are not available; but the scale appears clinically relevant to the population to be studied and was initially considered for inclusion in the current study.

3.3 Measures of Challenging Behaviour in Learning Disabilities

The learning disability literature was consulted for screening measures of challenging behaviour. Although several scales were available, most were inappropriate for the brain injury population, or were too long to be practically completed by direct care staff.

The Adaptive Behaviour Scale Part II (Nihira, Foster, Shellhaas and Leland 1974;

Nihira, Leland and Lambert 1993) has been widely used to assess challenging behaviour in people with learning disabilities. It consists of 44 behaviour categories in 13 domains - a total of 452 examples of behaviour to be coded. This measure has been criticised for giving equal weight to diverse behaviours and for rating only frequency, not severity (Lowe and Felce 1995b) and there have been various attempts to improve it: Clements, Boft, DuBois and Turpin (1980) obtained ratings of severity of each type of behaviour in order to weight items and McDonald and Barton (1986) and McDonald (1988) developed the Maladaptive Behaviour Scale from revisions to the Adaptive Behaviour Scale Part II. The latter constructed a revised scoring system to incorporate severity and produced operationalised rating points for frequency and severity of behaviour reducing the number of categories of behaviour from 44 to 39 each defined by two examples of the behaviour rather than several as in the original measure. Although scoring difficulties with the ABS Part II were addressed by these improvements, many items are still inappropriately labelled and unsuitable for the acquired brain injury population: for example, 'bosses and manipulates', 'disrupts activities', 'inconsiderate', 'disrespectful', 'ignores regulations', 'impudent attitude'. The language used in these items is stigmatising, and therefore unacceptable within the positive approach used at the unit where the current research was carried out.

Lowe and Felce (1995a, 1995b) modified the Disability Assessment Schedule (Holmes, Shah and Wing 1982) to assess challenging behaviour. Adaptions were made to incorporate anchored and operationalised frequency and severity rating. The scale is brief enough to be easily administered (it includes 13 behaviour types). However, the behaviour categories included are not clearly defined, are not appropriate for the brain

injury population, and the language used is pejorative, for example: 'temper tantrums', 'anti-social behaviour such as deliberate stealing, lying or bullying others', 'attention-seeking', 'sexual delinquency'.

The Challenging Behaviour Scales (Wilkinson 1989) were designed to assess the impact of ward-based interventions on challenging behaviour in men with learning disabilites. The scales were empirically derived, using semi-structured interviews with staff to develop the set of 43 items. These items are rated on a five-point scale for frequency and 30 of the items are additionally rated on a three-point intensity scale, based on extent of damage caused. Once again, however, many of the items in the Challenging Behaviour Scales were not relevant to the acquired brain injury population. For example, 'aloof, indifferent to others, a loner', 'obsessed with content and arrangement of the environment', 'behaviour is unpredictable', 'throws objects around aimlessly', 'is sexually delinquent with awareness', 'takes no notice of what others do'. Some items which would have relevance to the acquired brain injury group are not included, such as disinhibited social and sexual behaviour and verbal aggression. As with other scales developed for people with learning disabilities, much of the terminology is unacceptable within a positive approach to working with people with challenging behaviour. Wilkinson (1989) acknowledges the unhelpfulness of some of the language her repondents used. She notes a recurring theme of distinction between aggression towards other residents and aggression towards staff, which reflects the power imbalance between staff and residents.

The Aberrant Behaviour Checklist (Aman, Singh, Stewart and Field 1985a, 1985b) is a

very widely used and well standardised measure designed to quantify and assess change in challenging behaviours associated with learning disability. It consists of 58 items rated on a four-point scale by structured interview with direct care staff. Factor analysis yields five factors: irritability and aggression; lethargy and social withdrawal; stereoptypic behaviour; hyperactivity and non-compliance; inappropriate speech (Aman, Richmond, Stewart, Bell and Kissel 1987). This measure has been standardised with populations of people with learning disabilities and challenging behaviour in different countries and a variety of residential settings (Aman, Singh and Turbott 1987, Newton and Sturmey 1988).

The Aberrant Behaviour Checklist is rather time consuming, and contains many items which are not of direct relevance to the brain injury population. A brief survey instrument called the Maladaptive Behaviour Inventory and based on the Aberrant Behaviour Checklist was developed by Dagnan, McEvoy and Sturmey (1995). This 15-item rating scale was found to have adequate inter-rater reliability and the authors suggested it would be useful for large scale surveys. However, like many of the scales developed with people with learning disabilities, the Maladaptive Behaviour Inventory does not have face validity for the clinical presentation of challenging behaviour in acquired brain injury.

The Checklist of Challenging Behaviour (Harris, Humphreys and Thomson 1994) provides a much better representation of challenging behaviour in acquired brain injury patients, although it was developed in the UK as a survey instrument for use with people with learning disabilities. It is also suitably quick to complete for the current

research purposes. The items on this checklist refer to specific forms of behaviour, and consist of 14 items on aggressive behaviour rated for frequency, severity and management difficulty using operationalised five-point scales and 18 items concerning other challenging behaviours rated for frequency and management difficulty. Preliminary data suggest that inter-rater reliability is acceptable, although the Checklist of Challenging Behaviour is not sensitive to change at the individual level (Harris et al. 1994). The Checklist of Challenging Behaviour was included in the current study because the items included appeared to be relevant to the acquired brain injury population and addressed specific aggressive and other challenging behaviours, because the measure is fairly quick to complete, and because the ratings used address the difference between frequency of challenging behaviour and severity of consequences.

3.4 Measurement methods in the current study

As discussed above, measures were chosen for relevance to the clinical population in terms of face validity, practicality of administration, appropriate use of language (i.e. less likely to be stigmatising), and recognition of the severity of consequences as important to challenging beahviour. The Agitated Behaviour Scale (Corrigan 1989); Comprehensive Assessment Inventory for Rehabilitation, Section on Impairment of Behaviour Pattern (Haffey and Johnson 1989); and Checklist of Challenging Behaviour (Harris et al. 1994) were included in the current study.

A number of factors already discussed may have important influences on ratings of behaviour: staff training and seniority, number of hours worked, perceived capacity to manage the behaviour (which may be influenced by number of hours worked, level of

stress experienced, and staffing levels), and cultural norms and expectations. Therefore, a method for assessing the validity of the construct of challenging behaviour was sought, with a view to demonstrating reasonable agreement between different members of staff regarding the definition of challenging behaviour.

Hastings (1997) describes the development of a rating scale used to investigate staff attributions of behaviour which use several short vignette descriptions of challenging behaviour as a basis for ratings of likely causal influences. Ratings of vignette material were also used by Oliver, Hall, Hales and Head (1996) to assess staff attributions about self injurious behaviour. Miller, Velleman, Rigby, Orford, Tod, Copello and Bennett (1997) discuss the use of vignette-based methods to investigate how clinicians would deal with or assess important situations as well as for more general research such as inter-rater reliability of psychiatric diagnoses.

Vignette-based methods have been used to investigate respondents' understanding of complex clinical material and have the advantage of being able to represent this material in condensed form while retaining a great deal of important information. This type of measure is particularly suitable for the current study because it allows for many of the influences on the definition of challenging behaviour to be reasonably well represented in a short format. A vignette-based measure was designed specifically to explore whether there is shared understanding of the concept of challenging behaviour amongst staff working with people who have challenging behaviour and acquired brain injury. Vignettes were devised using fictional case material similar to presentations seen in this patient group. To investigate how repondents' understanding of the behaviour and

situations described in the vignettes relate to the concept of challenging behaviour, they were asked to rate each vignette for aspects of challenging behaviour taken from Emerson's (1995) definition. Responses were written and anonymous. The use of fictional case material and anonymous responding was chosen to help minimise social biases in responding.

4: Research Aims and Hypotheses

4.1 Aims of the study

The aims of the study are: firstly, to investigate the degree to which there is shared understanding of the concept of challenging behaviour among staff at Scotland's national unit for rehabilitation of people with acquired brain injury and challenging behaviour; secondly, the study aims to evaluate the usefulness of screening measures of challenging behaviour within this setting.

4.2 Hypotheses Part One

There will be a shared understanding of the concept of challenging behaviour amongst staff working at the unit, in keeping with Emerson's (1995) definition of challenging behaviour.

The unit works within a positive framework and is guided by psychological theory. Its work is informed by the Institute of Applied Behaviour Analysis model (LaVigna and Donnellan 1993), and draws on functional analysis, learning theory, behaviour modification, and systemic approaches. Day to day work for all clinical staff involves

implementing assessment and intervention methods using these approaches. Because of this shared approach to challenging behaviour it is hypothesised that the staff group will share a common understanding of challenging behaviour.

Although the background literature suggests that level of staff training, work role and number of hours in direct contact with patients may affect staff experiences of challenging behaviour in other settings, staff characteristics are not expected to significantly influence interpretations of challenging behaviour in the current setting because of the shared approach to working with people with challenging behaviour.

Hypothesis 1 will be evaluated using staff ratings of four specially developed case vignettes, for which ratings will be obtained for four elements of the definition of challenging behaviour (derived from Emerson's 1995 definition): overall management difficulty (an item intended to address challenge to service provision); threat to physical safety of the patient; threat to physical safety of others; impact on access to community facilities. The following hypotheses relate to these.

Hypothesis 1A Interpretations of different types and severity of behaviours described in the vignettes will differ meaningfully from each other. Based on the author's interpretations while developing the vignette material, staff interpretations of elements of challenging behaviour are expected to differ between the vignettes as follows:
(*i.*) Overall management difficulty will be rated highest for vignette1, followed by vignette4, then vignette2, and vignette3 lowest.

(*ii.*) Threat to physical safety of the patient will be rated higher for vignette1 than for the remaining three vignettes.

(*iii.*) Threat to physical safety of others will be rated highest for vignette1, followed by vignette2, then vignette4, and vignette3 lowest.

(*iv.*) Impact on access to community facilities will be rated as higher for vignette1 and vignette4 than for the remaining two vignettes.

In addition, within each vignette, the different elements of the definition of challenging behaviour are expected to be highly correlated with each other, indicating coherence in the concept of challenging behaviour. Specifically, for each of the four vignettes, there will be substantial associations between:

(v.) Overall management difficulty and threat to physical safety of the patient.

(*vi.*) Overall management difficulty and threat to physical safety of others.

(*vii.*) Overall management difficulty and impact on access to community facilities.

(viii.) Threat to physical safety of self and threat to physical safety of others.

(ix.) Threat to physical safety of self and impact on access to community facilities.

(x.) Threat to physical safety of others and impact on access to community facilities.

Hypothesis 1B Staff interpretations of vignette case material will not differ significantly due to the staff characteristics of: (*i.*) professional group and training; (*ii.*) length of work experience at the unit; (*iv.*) length of work experience with people with challenging behaviour; (*v.*) age.

4.3 Hypotheses Part Two

A shared concept of challenging behaviour amongst staff is an important prerequisite for measurement of challenging behaviour in context. This will be investigated using the Agitated Behaviour Scale (Corrigan 1989) and the Checklist of Challenging Behaviour (Harris et al. 1994).

Hypothesis 2A There will be shared understanding between staff regarding actual instances of challenging behaviour in the Unit, demonstrated by good inter-rater reliability for screening measures such as the Agitated Behaviour Scale and Checklist of Challenging Behaviour.

Hypothesis 2B It is further expected that the screening scales used in this part of the study will be useful as measures of challenging behaviour for this patient group: specifically, the Agitated Behaviour Scale and Checklist of Challenging Behaviour will have good concordant validity with each other and with routinely gathered clinical data.

METHOD

1. Part One

Part One of the study addresses Hypothesis 1, that there will be a shared understanding of the concept of challenging behaviour amongst the staff in keeping with Emerson's (1995) definition of challenging behaviour.

Design

This part of the study used a survey method to sample interpretations of challenging behaviour. Between-subjects and within-subjects analyses were carried out.

Participants

Participants were 28 members of staff at a national unit for rehabilitation of people with challenging behaviour following acquired brain injury, the Robert Ferguson Unit in Edinburgh. The unit has accommodation for a total of 17 patients comprising individual rooms on two secure wards with space for 12 and 5 patients respectively. The clinical staff comprises a total of 50 nursing staff (22 trained nurses including a senior charge nurse and 28 nursing assistants); two qualified occupational therapists and an occupational therapy assistant; two qualified clinical psychologists and an assistant psychologist; two social workers; a doctor; a speech and language therapist; a physiotherapist; and an art therapist. The response rate for this part of the study was 45 per cent of the clinical staff.

Measures

A questionnaire measure of staff interpretations of challenging behaviour was devised (see Appendix 1). The measure comprises four case vignettes which describe behavioural presentations similar to those seen within the unit. Each vignette is rated by staff on five-point scales (none, mild, moderate, severe, very severe) for each of four aspects of challenging behaviour: overall management difficulty (intended as a measure of level of challenge presented to service provision); threat to physical safety of the patient; threat to physical safety of others; impact on access to community facilities. Qualitative data was sought by inviting comments on any additional aspects of the behaviour which staff thought made it easier or harder to manage.

Each of the four case vignettes describes a different patient, with different types of behaviours and circumstances, though all had developed challenging behaviour subsequent to acquired brain injury. The case vignettes were designed to sample a fairly wide range of the types of behaviours and circumstances which may be defined as challenging to service provision. The material for each vignette was compiled from clinical experience of working within the unit and in consultation with the two clinical psychologists based there. The case descriptions were varied according to mechanism of injury, level of independence in self care skills, form, frequency and severity of challenging behaviour. In vignette1 Darren displays infrequent yet severe physically aggressive behaviour. In vignette2 Sophie displays frequent verbal and physical aggression resulting in frequent minor injuries. Vignette3 describes Paul, who has frequent irritating verbal behaviour, not sufficiently disruptive to warrant the label of

challenging behaviour. Vignette4 describes Colin who shows some potential for inappropriate sexual behaviour.

Procedure

As a means of piloting the new measure, verbal feedback was sought from two nurses regarding the experience of completing the questionnaire in terms of length of time needed to complete it, clarity of written instructions, and how representative of the patient group the case material was. These aspects of the questionnaire being acceptable, the measure was distributed to all clinical staff with a covering letter (see Appendix 2) explaining the nature of the research and a demographics sheet which asked for details of each participant's age, gender, profession and grade, length of experience with challenging behaviour, length of experience at Unit, location of work within the unit, and work hours (see Appendix 3). Questionnaires were completed and returned anonymously.

Analysis of Results

The results were analysed using non-parametric procedures. Friedman tests were used to test differences between ratings of different elements of challenging behaviour between vignettes. Spearman correlations were used to test associations between different elements of challenging behaviour within vignettes. Kruskal-Wallis and Mann-Whitney tests were used to test differences between ratings of different groups of staff divided by demographic characteristics.

Qualitative data from written comments was categorised by the author into several types depending on the main themes expressed. Having identified these themes, each response was coded by two raters (the author and a psychologist at the unit) for the main theme expressed. Coding of the material was done collaboratively, the raters discussing their interpretations as part of the process. Frequently occurring themes in influences on management difficulty of behaviour were identified.

2. Part Two

Part Two of the study deals with Hypothesis 2, that here will be a shared interpretation of actual occurrences of challenging behaviour in the clinical setting as measured by the Agitated Behaviour Scale and Checklist of Challenging Behaviour and that these measures will usefully delineate challenging behaviour in the patient group studied.

Design

The design is correlational, between subjects, comparing different measures of challenging behaviour for the same patients over the same time period.

Participants

The behaviour of 22 patients, resident within the unit for the period of assessment, was measured by staff. Twenty-seven staff took part: 20 nurses (all trained, grade 'd' and above) and 7 other therapeutic staff (two qualified psychologists and the assistant psychologist, two qualified occupational therapists, the art therapist and the physiotherapist). The group of staff sampled differed in composition from those who

responded in Part One. To reduce the potential variance in the nursing group, only trained nurses took part in this part of the study.

Measures

The screening measures of behaviour used were the Agitated Behaviour Scale (ABS) (Corrigan 1989), Checklist of Challenging Behaviour (CCB) (Harris et al. 1994), and in the initial stage of this part of the project, the Comprehensive Assessment Inventory for Rehabilitation (CAIR) sections on Verbal and Physical Maladaptive Behaviours were included (Haffey and Johnson 1989). Staff made retrospective ratings of the patient's behaviour over the preceding seven days.

Agitated Behaviour Scale (ABS) For a copy of the version of this scale used, refer to Appendix 4. Fourteen behavioural items are rated on a four-point scale for frequency/disruptiveness (absent, present to a slight degree, present to a moderate degree, present to an extreme degree). Although the original scale used numerical values 1-4 to label these points, this study used 0-3 to avoid confusion with other scales which use 0 as the absent value. A single numerical total score is obtained by adding the 14 item scores.

The wording of item 7 'pulling at tubes, restraints etc.' was changed because in was not consistent with the treatment methods used at the unit. The word 'restraints' was replaced with 'clothing'.

Checklist of Challenging Behaviour (CCB) (See Appendix 5). This scale comprises 14 items concerning aggressive behaviours and 18 items concerning other challenging behaviours. Each item on the scale is rated for frequency and management difficulty separately using anchored five-point scales (labelled numerically 0-4). In addition the 14 aggressive behaviour items are rated for severity using a five-point scale of physical injury caused. Five total scores are obtained: frequency, management difficulty and severity of aggressive behaviours; frequency and management difficulty of other challenging behaviours. The CCB includes a section for written descriptions of challenging behaviour not listed in the checklist. These items are not included in the scoring.

The wording of the items on the CCB remained essentially the same as in the original version. However, Item 4 of the aggressive behaviour section was changed from 'hitting out at people i.e. punching or slapping' to simply 'punching or slapping people' as it was anticipated that 'hitting out' might also be interpreted as describing some of the other behaviours on the checklist. Item 2 of the other challenging behaviour section 'smashing windows' was changed to 'smashing (or attempting to smash) windows'.

The anchor points for the five-point rating scales were also changed slightly for the purposes of this study. The original deals with a time scale of the previous three months. The frequency ratings were amended to relate to the preceding seven days. The management difficulty ratings were amended to take account of the number of staff required to manage the behaviour when it occurs. The anchor points for the two highest ratings of management difficulty were changed to better reflect working practice at the

unit. 'I find it very difficult to manage this situation on my own' and 'I simply cannot manage this situation without help' were changed to 'I need help from another person to manage this situation' and 'I need help from two or more people to manage this situation' respectively.

Comprehensive Assessment Inventory for Rehabilitation (CAIR), Sections on Verbal and Physical Maladaptive Behaviour (See Appendix 6). This includes 9 items on 'maladaptive verbal behaviours' and 14 items on 'maladaptive physical behaviours'. Each item is scored separately for frequency using an anchored five-point scale and disruptiveness using a six-point scale. Four total scores may be obtained: frequency of verbal maladaptive behaviour; disruptiveness of verbal maladaptive behaviour; frequency of physical maladaptive behaviour; disruptiveness of physical maladaptive behaviour.

Several changes to the terminology in this scale were made before it was given to staff. The term 'maladaptive behaviour' was replaced with 'challenging behaviour', which it was felt would be more acceptable to the staff at the unit. Also the term 'physically belligerent' was omitted from Item 2 of the Physical Actions Section for the same reason as it appears to be an unnecessary label for behaviour which can be described more accurately in other ways. Items 7 and 8 of the Physical Actions scale 'attempts to leave the treatment centre without authorization' and 'leaves treatment centre without authorization' were replaced with 'attempts to leave the treatment centre inappropriately i.e. leaving would endanger self or others' and 'leaves treatment centre inappropriately

i.e. endangering self or others' respectively. The term 'hyperagitated behaviour' was replaced with 'agitated behaviour', a term more familiar to staff.

The anchor points for the frequency ratings were changed to reflect the timescale of the ratings over seven days (the original scale uses a 14 day timescale). The disruptiveness ratings remained the same except that the final item for the disruptiveness ratings, 'totally disruptive', was changed from 'the behaviour is so extreme that discharge to a special secure facility is required' to 'the behaviour cannot be appropriately managed in this setting - discharge to another facility is required' because the patients under study were already resident in a specialist secure unit.

Clinical data: Incident Reports Clinical data were gathered from Incident Reports, which are filled in whenever there is an incident presenting risk of physical harm to patients, staff or others. A coding system was devised to extract information from the Incident Reports regarding the types of patient behaviours described (classified as physical aggression, verbal aggression and other challenging behaviours), management difficulty presented and severity in terms of physical harm caused (coded using five-point scales similar to those for the Checklist of Challenging Behaviour). The coding scheme for Incident Reports is presented in Appendix 7. Records were reviewed for incidents involving patients in the seven days corresponding with assessment using the screening measures. These were then coded for behaviour type, management difficulty and severity by two independent raters (the author and an assistant psychologist at the unit). Total scores were obtained for frequency of aggressive behaviour, management difficulty of aggressive behaviour, severity of aggressive behaviour, frequency of other

challenging behaviour, management difficulty of other challenging behaviour and severity of other behaviour. There was a high level of agreement between raters (78 to 87 per cent). Combined scores for each of the totals were produced using the mean of the two raters' scores.

Clinical data: Event Records Ongoing clinical records are routinely kept for many patients, recording instances of challenging behaviour soon after they occur. These instances may or may not be sufficiently severe to warrant an Incident Report being compiled. Behaviours are classified into types using numerical codes. For the purpose of analysis, these codes were collapsed into three classifications: physical aggression, verbal aggression, and other challenging behaviour. Total frequencies for these three categories were tallied for the seven days corresponding with assessment using the screening measures.

Procedure

Pilot study The screening measures were introduced to staff during a two week pilot period. Five patients were assessed using the ABS, CCB and CAIR during this time. Two nursing staff and one member of non-nursing clinical staff completed the measures independently of each other on the same day. To minimise potential variation between nurses' responses, only trained nurses were asked to take part. The choice of staff to complete the screening measures was opportunistic, relying on who was on shift on the day, although an effort was made to involve staff who had had some contact with the patient over the preceding week. The two nurse raters were allocated randomly to two groups - rater1 and rater2, the non-nursing staff being rater3.

The pilot period produced five complete responses for rater1, five for rater and two for rater3. Inter-rater agreement between rater1 and rater2 was analysed using Spearman correlations. Spearman correlation co-efficients between rater1 and rater2 were: .60 for the ABS; for the five totals from the CCB .71, .97, .81, .98, -.18; for the four totals from CAIR .90, .41, .10, .36. The CAIR showed low association between raters for three of its total scores, the CCB for one.

Verbal feedback from the staff involved was sought regarding the practicality of completing the questionnaires. There was consensus that it was difficult to find time to complete the three screening measures due to other demands on staff time. Some comments received suggested that the CAIR measure continued to have inappropriate terminology and that the items were less easily understood than those of the other measures.

Main study Based on the results from the pilot period, and for practical purposes, the screening measures used were reduced to two: the ABS and CCB. Comments received early in the pilot period regarding Item 13 of the ABS, 'easily initiated or excessive crying or laughing', suggested that the wording could be misinterpreted as relating to some patients' difficulties with initiation of actions following brain injury. The item was changed to 'cries easily or excessively'.

Cohen's (1988) power calculation was used to predict the sample size needed to test the correlation between different ratings. To achieve power of .80 with an expected effect

size of .60 at a significance level of $p < .01$, a sample size of 24 is required. Cohen argues that for the behavioural sciences, an effect size of .50 may be considered a large effect size. However, when testing inter-rater reliability of a measure, a higher level of agreement may be anticipated, therefore the expected effect size of .60 was chosen for this study. Because a great many separate statistical analyses were planned, there is an increased chance of a Type I error and to counteract this, results were only accepted as significant at the $p<.01$ level.

Over a four month period a total of 22 patients were assessed. Due to the limited number of patients available at the unit during the timescale of the study (the unit accommodates 17 patients), repeat assessments were carried out with some patients, between 6-12 weeks after first assessment. The total number of observation periods was 32. For each assessment three members of staff - two trained nurses and one other member of therapeutic staff - retrospectively rated the patient's behaviour for the preceding seven days using the ABS and CCB. Routine clinical data from Incident Reports and Event Records was gathered for the patient over the seven day assessment period as above.

Analysis of Results

Associations between raters for the screening measures were analysed using Pearson's correlations. *Post hoc* analysis of differences between raters was carried out using analysis of variance (ANOVA) and independent t-tests. Concordance between screening measure scores and clinical data from Incident Reports and Event Records was analysed using Pearson correlations.

RESULTS

1. Characteristics of the sample

Hypothesis 1: Staff

There were 28 respondents in Part One of the study: 10 men and 18 women aged between 23 and 50 years (mean 36.12, standard deviation 7.46). Length of employment within the unit ranged from less than one month to eight years (mean 29.74 months, standard deviation 28.52). Total length of experience working with people with challenging behaviour ranged from less than one month to twelve years (mean 55.74 months, standard deviation 38.65). Twenty-one of the respondents were nurses, eleven nursing assistants and ten trained nurses (grade 'd' through to 'g'). The other respondents were three psychologists (two qualified and one assistant), two occupational therapists, a speech and language therapist and a social worker. In the four weeks prior to completing the questionnaire: 23 of the respondents had worked full time 4 had worked part time and one did not give this information; 8 had worked exclusively on the larger of the two wards, 7 had worked exclusively on the smaller ward, 11 had worked on both wards, one described their work location as 'other', and one did not give this information.

Hypothesis 2: Staff

Twenty-eight members of staff also took part in Part Two of the study, although the composition of this group was different from that in Part One. Respondents were 20 trained nurses and 8 other professionals (two occupational therapists, two clinical

psychologists, an assistant psychologist, a speech and language therapist, an art therapist and a physiotherapist). Staff were divided into three groups: rater1, rater2 and rater3. Rater1 and rater2 were both groups of nurses. Each contained 16 individuals: 8 men and 8 women in the rater1 group; 7 men and 9 women in the rater2 group. Twelve nurses were allocated to both rater1 and rater2 at different assessment periods. A further four nurses were only ever allocated to rater1 and another four only to rater2. The other professionals, rater3, were 1 man and 7 women.

Hypothesis 2: Patients

A total of 22 patients were assessed in Part Two of the study. All of these people were inpatients at the unit during the period for which their behaviour was assessed, 16 of them in the larger of the two wards and 5 in the smaller. They were 18 men and 4 women aged between 20 and 57 years. Details of age, length of stay and time since injury are shown in *Table 1*. Mean age was 39.74years (standard deviation 10.36) and median age was 39.59years. Their length of stay at the unit at the time of assessment was between 1 week and 4 years 19 weeks (227weeks). Mean length of stay was 45.5 weeks (standard deviation 62.5) and median length of stay was 26.7 weeks. Time since injury for those who sustained their brain injury in adulthood (when aged over 16 years) was between 6 weeks and 7 years 43 weeks (407 weeks). Mean time since injury for these patients was 121 weeks (standard deviation 37.38) and median time since injury was 109 weeks. The remaining two patients sustained brain injury in childhood 27 years and 18 years ago respectively.

Table 1: Details of age, length of stay and time since injury for the patients studied.

	Age (years)	Length of stay (weeks)	Time since injury (weeks)
Minimum	20	1	6
Maximum	57	227	407
Mean (SD)	39.74	45.50	121.58
Standard Deviation	10.36	62.50	108.45
Median	39.59	26.71	109.21
N	22	22	20

Most of the patients at the unit have severe neurological impairment. Information on severity of brain injury was available in the form of GCS scores for 11 of the 22 patients studied. These scores were all in the severe to very severe category (GCS 3-8). Many of the patients have severe cognitive and communication deficits as a result of their brain injury. The most common mechanism of injury amongst the group studied is traumatic brain injury, accounting for 17 of the 22 patients. Of those with traumatic injuries, eight were known to be caused in road traffic accidents, three as a result of assaults, three as a result of falls, and a further three were of uncertain cause. Two of the patients had suffered anoxic brain damage as a result of suicide attempts, two had sustained their injuries associated with seizures in childhood, and one had developed neurological problems post neural surgery. Three of the patients had sustained previous brain injuries.

Referrals to the unit come from all over Scotland, and occasionally from other areas of the UK. Of the group studied here, seven were referred from a specialist neuro-rehabilitation unit, seven from general hospital wards, two from psychiatric wards, two direct from their homes, two from nursing homes, one from prison and one from the

State Hospital. The policy of the unit is to use formal detention only when absolutely necessary. At the time of assessment, only six of the 22 patients studied were formally detained, five under the Mental Health Act and one under the Criminal Procedures Act.

This patient group has complex multiple presenting difficulties. A high proportion have forensic or psychiatric histories, either before or after their brain injury. Of the 22 patients in this sample, seven have faced criminal charges against them and twelve have had a psychiatric diagnosis, eight of these for depressive illness. A history of substance abuse is documented for 12 of the 22 patients. All were admitted to the unit due to presenting problems including aggressive behaviour, agitation or inappropriate sexual behaviour, and most were described as having severe cognitive deficits or confusion at the time of admission.

2. Results: Part One

Hypothesis 1A

There will be a shared understanding of the concept of challenging behaviour amongst staff working at the unit, in keeping with Emerson's (1995) definition of challenging behaviour.

Hypothesis 1A (i.)-(iv.)

Due to the differing types and severity of behaviours described in each vignette, ratings of the four vignettes will differ from each other such that:

(*i.*) Overall management difficulty will be rated highest for vignette1, followed by vignette4, then vignette2, and vignette3 lowest.

(*ii.*) Threat to physical safety of the patient will be rated higher for vignette1 than for the remaining three vignettes.

(*iii.*) Threat to physical safety of others will follow the same pattern as (*i*) above: highest ratings for vignette1, followed by vignette4, then vignette2, and vignette3 lowest.

(*iv.*) Impact on access to community facilities will be rated as higher for vignette1 and vignette4 than for the remaining two vignettes.

Friedman tests were used to compare the scores between the four vignettes for 'overall management difficulty', 'physical safety of the patient', 'physical safety of others', and 'access to community facilities'. All found significant differences between the vignettes (respectively $Xr^2 = 38.93$, $Xr^2 = 23.07$, $Xr^2 = 69.51$, $Xr^2 = 62.73$, $p < .01$) (See *Table 2a*). The direction of differences between mean ranks is shown in *Table 2b.*

Table 2a: Friedman tests comparing mean ranks of scores for each rating scale by vignette.

Rating scale	Mean Ranks for each Vignette				Xr^2 (Sig.)
	Vignette1 (Darren)	Vignette2 (Sophie)	Vignette3 (Paul)	Vignette4 (Colin)	
Overall management difficulty	3.27	2.38	1.43	2.93	38.93 (.000**)
Threat to physical safety of patient	2.91	1.89	2.14	3.05	23.07 (.000**)
Threat to physical safety of others	3.64	2.29	1.04	3.04	69.51 (.000**)
Impact on access to community facilities	3.18	2.18	1.23	3.41	62.73 (.000**)

Table 2b: Direction of differences in mean ranks.

Rating scale	Direction of differences between mean ranks of vignettes on each scale
Overall management difficulty	**Vignette1 > Vignette4 > Vignette2 > Vignette3**
Threat to physical safety of patient	**Vignette4 > Vignette1 > Vignette3 > Vignette2**
Threat to physical safety of others	**Vignette1 > Vignette4 > Vignette2 > Vignette3**
Impact on access to community facilities	**Vignette4 > Vignette1 > Vignette2 > Vignette3**

Hypothesis 1A(*i.*), that overall management difficulty will be rated highest for vignette1, followed by vignette4, then vignette2, and vignette3 lowest is supported. Hypothesis 1A(*ii.*), that threat to physical safety of the patient will be rated higher for vignette1 than for the remaining three vignettes, is not supported as vignette4 is rated highest for this aspect of challenging behaviour. However, vignette1 is rated higher than the remaining two vignettes. Hypothesis 1A(*iii.*), that threat to physical safety of others will be rated highest for vignette1, followed by vignette2, then vignette4, and vignette3 lowest, is not supported because vignette4 is rated higher than vignette2. However, the pattern of responses is otherwise as expected. Hypothesis 1A(*iv.*), that impact on access to community facilities will be rated higher for vignette1 and vignette4 than for vignette2 and vignette3 is supported.

These results support the hypothesis that staff are able to meaningfully differentiate the case vignettes in terms of elements of Emerson's (1995) definition of challenging behaviour. Ratings of different vignettes differ significantly from each other on each of the four ratings scales and the pattern of mean ranks suggests the direction of these

differences are broadly as predicted in Hypotheses 1A(*i.*)-(*iv.*). However, the statistical tests used do not allow for evaluation of the significance of these trends.

Hypothesis 1.A(v.)-(x.)

The concept of challenging behaviour is expected to be a coherent one, and therefore the four elements of the definition used in the vignette ratings are expected to correlate with each other. For each of the four vignettes significant correlations are predicted between:

(v.) Overall management difficulty (MD) and Threat to physical safety of patient (PP).

(vi.) Overall management difficulty (MD) and Threat to physical safety of others (PO).

(vii.) Overall management difficulty (MD) and Impact on access to community facilities (CA).

(viii.) Threat to physical safety of self (PP) and Threat to physical safety of others (PO).

(ix.) Threat to physical safety of self (PP) and Impact on access to community facilities (CA).

(x.) Threat to physical safety of others and Impact on access to community facilities (CA).

These relationships were tested using Spearman correlations with the following results (see *Table 3*).

(v.) Overall management difficulty (MD) and Threat to physical safety of self (PP) are significantly correlated for vignette4 (r =.678, p <.01) but not for the other vignettes.

(vi.) Overall management difficulty (MD) and Threat to physical safety of others (PO) are significantly correlated for vignette1 (r =.444 , p <.01), vignette2 (r =.611, p <.01) and vignette4 (r =.551, p <.01) but not for vignette3.

(vii.) Overall management difficulty (MD) and Impact on access to community facilities (CA) are not significantly correlated for any of the vignettes.

(viii.) Threat to physical safety of self (PP) and Threat to physical safety of others (PO) are not significantly correlated for any of the vignettes.

(ix.) Threat to physical safety of self (PP) and Impact on access to community facilities (CA), are significantly correlated for vignette1 (r =.479, p <.01) but not for the other vignettes.

(x.) Threat to physical safety of others (PO) and Impact on access to community facilities (CA) are significantly correlated for vignette1 (r = .488, p <.01) and vignette4 (r = .464, p <.01) but not for the other vignettes.

Table 3: Spearman correlations between elements of the definition of challenging behaviour for each of the four vignettes.

Association	Value of Spearman r (significance level)			
	Vignette1	Vignette2	Vignette3	Vignette4
i. MD – PP	.395* (.019)	.248 (.101)	-.008 (.485)	.678** (.000)
ii. MD – PO	.444** (.009)	.611** (.000)	.274 (.079)	.551** (.001)
iii. MD – CA	.215 (.136)	.214 (.138)	.198 (.156)	.326* (.045)
iv. PS – PO	.110 (.288)	.377* (.024)	.188 (.169)	.409* (.015)
v. PP – CA	.479** (.005)	.350* (.034)	-.016 (.469)	.417* (.014)
vi. PO – CA	.488** (.004)	.310 (.054)	-.134 (.248)	.464** (.006)

** Correlation is significant at the .01 level (1-tailed).
* Correlation is significant at the .05 level (1-tailed).

Key: MD overall management difficulty
PP threat to physical safety of patient
PO threat to physical safety of others
CA impact on access to community facilities

The relationships between different elements of the definition of challenging behaviour vary between different case vignettes and despite some significant correlations, the amount of variance explained is limited to between 20 and 46 per cent. Notably, vignette1 and vignette4, which have higher severity ratings for the elements of challenging behaviour, also show a higher level of association between these elements. For vignette1, significant correlations were between: management difficulty and threat to physical safety of others (MD-PO); impact on access to community facilities and threat to physical safety of others (CA-PO); threat to physical safety of patient and impact on access to community facilities (PP-CA). For vignette2, only the association between management difficulty and threat to physical safety of others (MD-PO) was significant. None of the elements of challenging behaviour are associated with each other for vignette3. This is likely to be because vignette3 was designed to describe behaviour not sufficiently disruptive to warrant a definition of challenging behaviour. For vignette4, three correlations are significant: overall management difficulty and threat to physical safety of patient (MD-PP); management difficulty and threat to physical safety of others (MD-PO); threat to physical safety of patient and impact on access to community facilities (PP-CA).

The most consistent association was between management difficulty and threat to physical safety of others, suggesting that this was a particularly salient association in the interpretation of challenging behaviour for the staff group surveyed. Relationships between management difficulty and community access and between physical safety of self and physical safety of others were not significant. This may have been because the

staff tended to interpret the behaviours in the context of the unit rather than extrapolating to community settings.

From these results it appears that challenging behaviour is not one coherent concept, but consists of distinct elements which vary in salience according to the particular circumstances of the behaviour. It is also likely that ratings of overall management difficulty are understood by staff as distinct from the overall challenge to service provision which these ratings were intended to measure, being interpreted instead in terms of immediate difficulties posed within the unit by features such as threat to physical safety of others. The concept of challenging behaviour may also involve factors not included in ratings on this measure.

Examination of the comments received on additional factors which make the behaviour easier or harder to manage reveals some common themes. Of the 28 respondents, 19 made some comment on additional factors contributing to ease or difficulty of management for the behaviours described. A total of 106 comments were received, 52 on factors contributing to ease of management and 54 on factors contributing to management difficulty. Two raters classified these responses into themes identified by the author and agreement between raters was 82 per cent and 88 per cent for comments on ease and difficulty of management respectively. The frequency of themes in comments is given in *Table 4a* and *Table 4b*.

The most frequent theme contributing to ease of management is the identification of a possible intervention strategy. This theme is evident for all the vignettes. Predictability

of the behaviour or identified antecedents are also a frequent theme contributing to ease of management difficulty, predominantly for vignette2.

Lack of predictability or lack of identified antecedents to the behaviour is the most frequent theme contributing to management difficulty and applies almost exclusively to vignette1. Themes relating to management difficulty are more varied than those relating to ease of management.

Table 4a: Themes identified in comments on additional factors which make the behaviour easier to manage and frequency of these themes occurring in comments for each vignette.

	Vignette1	Vignette2	Vignette3	Vignette4	Total
1 Need for further information identified.	0	1	0	0	1
2 A particular approach is identified already known to be effective in decreasing instances of challenging behaviour OR A specific intervention is suggested which may help.	6	3	8	4	21
3 Predictability. Antecedents to behaviour identified.	1	9	0	1	11
4 Patients' insight into the problem e.g. awareness of own emotions / reasons for behaviour.	3	0	0	4	7
5 No aggression OR low or absent risk to self or others.	1	1	4	1	7
Raters did not agree on code.	2	0	1	2	5
Total number of comments.	13	14	13	12	52

Table 4b: Themes identified in comments on additional factors which make the behaviour harder to manage and frequency of these themes occurring in comments for each vignette.

	Vignette1	Vignette2	Vignette3	Vignette4	Total
1 Need for further information identified.	0	1	1	2	4
2 Patient is unresponsive/ unable to co-operate with interventions.	0	1	3	0	4
3 Lack of predictability/ antecedents not known.	11	0	0	1	12
4 Patient lacks insight into the problem.	1	0	0	1	2
5 Severe outcomes of behaviour. High risk to self/others.	1	1	4	3	9
6 Need for supervision from staff.	0	0	0	1	1
7 Potential staff response (or lack of it) to patient behaviour.	2	0	2	0	4
8 Behaviour is difficult to change because it is directly related to brain injury.	0	1	1	1	3
9 High level of dependency.	0	3	1	0	4
10 Triggers to behaviour are difficult to avoid.	0	2	0	0	2
Raters did not agree on code.	1	2	3	3	9
Total number of comments.	16	11	15	12	54

Hypothesis 1B

Because of the shared model of challenging behaviour amongst staff at the unit, staff characteristics are not expected to produce significant differences between ratings. No significant differences will be found between groups of staff divided by: (*i.*) professional group and level of training; (*ii.*) length of work experience at the unit; (*iii.*) length of experience with people with challenging behaviour; (*iv.*) age.

1B(i.) Professional group and training The respondents were divided by training and profession into three groups: nursing assistants (grade 'a'); qualified nurses (grade 'd' to 'g'); other professionals (a group including clinical psychologists, occupational therapists, a speech and language therapist and a social worker). These groups are not expected to differ in their ratings of vignette items. The null hypothesis is that these groups will differ significantly in their ratings of the vignettes.

Kruskal-Wallis tests were used to compare scores for each item on each vignette for the three professional groups (11 nursing assistants, 10 qualified nurses and 7 other professionals). No significant differences were found (see Appendix 8) and the null hypothesis was therefore rejected.

Staff do not differ significantly in their interpretation of challenging behaviour by professional group and training.

1B(ii.) Length of work experience at the unit It is further predicted that staff ratings of vignette items will not differ according to duration of employment at the Unit. The null hypothesis is that there will be significant differences between ratings of vignettes due to duration of employment at the Unit. Staff were divided into groups as shown in *Table 5a* and significant results of analyses are presented in *Table 5b.* For full results see Appendix 9.

Firstly, the staff were divided into two groups based on length of employment at the unit: those who had worked at the unit for up to 12 months and those who had worked there for more than 12 months. Mann-Whitney tests were used to compare the ratings of these two groups. Threat to physical safety of others for vignette4 was rated as more severe by the group who had worked at the unit for 0-12 months than the group who had worked at the unit for more than 12 months ($U = 34$, $p<.01$). There were no significant differences between the groups for the remaining items, though for management difficulty of vignette4 the difference was marginally non-significant ($U = 37.5$, $p<.05$). The null hypothesis was therefore rejected for all the remaining items.

The staff group was divided again, this time into those who had worked at the unit for 24 months or less and those who had worked there for more than 24 months. Mann-Whitney tests indicated significant differences between these two groups for management difficulty of vignette4 ($U = 38$, $p<.01$) and threat to physical safety of patient for vignette4 ($U = 37$, $p<.01$). There were no significant differences between the remaining items, for which the null hypothesis was therefore rejected, including one

marginally non-significant result for threat to physical safety of others of vignette2 (U = 43, $p<.05$).

These analyses were repeated excluding the rating of non-nursing staff to eliminate the effect of variability in training and professional orientation in the non-nursing group. The only significant difference between nurses' ratings was that nurses who had worked at the unit for 24 months or less (N = 10) rated management difficulty for vignette4 higher than nurses who had worked at the unit for more than 24months (N = 10) (U = 16.5, $p<.01$). The null hypothesis was rejected for the remaining items, including marginally non-significant results for impact on community access for vignette1 rated higher by nurses employed for 12 months or less than those employed for more than 12 months at the unit (U = 23.5, $p<.05$), and management difficulty for vignette4 rated higher by those employed for 12 months or less than those employed for more than 12 months at the unit (U = 21, $p<.05$).

Table5a: Divisions used to investigate effect of duration of employment at the unit on vignette ratings showing number of staff in each division.

		All staff	Nurses only
Method One	A. 12 months and less	10	8
	B. 13-96 months	17	12
	Total	27	20
Method Two	A. 24 months and less	14	10
	B. 25-96 months	13	10
	Total	27	20

Table 5b: Significant results obtained on Mann-Whitney tests (value of U and p given) between groups divided by duration of employment at the unit.

	Method one A. 12 months and less B. 13 –96 months Value of *U* and significance level		Method two A. 24 months and less B. 25 – 96 months Value of *U* and significance level	
Item	All staff (Direction)	Nurses only (Direction)	All staff (Direction)	Nurses only (Direction)
Vignette1 CA	51.0 (.063)	26.5 (.098)	55.0 (.085)	23.5* (.043)
Vignette2 PO	62.0 (.264)	37.5 (.427)	43.0* (0.019) (A >B)	29.5 (.123)
Vignette4 MD	37.5* (0.015) (A >B)	21.0* (0.39) (A >B)	38.0** (0.009) (A >B)	16.5** (0.009) (A >B)
Vignette4 PP	34.0** (0.009) (A >B)	23.0 (.057)	52.0 (.061)	26.0 (.075)
Vignette4 PO	49 (.074)	33.5 (.270)	37.0** (.008) (A >B)	26.5 (.075)

* marginally non-significant at $p < 0.05$
** significant at $p < 0.01$

MD = Overall management difficulty
PO = Threat to physical safety of others
PP = Threat to physical safety of patient
CA = Impact on access to community facilities

From these results there appear to be some differences in interpretation of challenging behaviour by length of employment at the unit, staff who have worked there for two years or less rating the effects of the behaviours as more severe. The only significant differences were for vignette4, though there were some marginally non-significant results for other vignettes. Fewer significant differences were found when nursing staff ratings were analysed separately from other staff, indicating greater agreement amongst nursing staff regarding the definition of challenging behaviour than amongst the staff group as a whole.

1B(iii.) Length of work experience with people with challenging behaviour Many staff at the Unit have considerable experience of working with people with challenging behaviour prior to employment at the unit. Therefore, total duration of work experience

of people with challenging behaviour was investigated as a possible factor affecting the results.

The hypothesis is that staff ratings of vignette items will not differ significantly according to duration of experience working with people with challenging behaviour. The null hypothesis is that there will be a significant effect of duration of experience working with people with challenging behaviour on staff ratings of the vignettes. The staff were divided into groups according to length of experience working with people with challenging behaviour as shown in *Table 6a* and significant results from the analyses are presented in *Table 6b*. For full results see Appendix 10.

Firstly, the whole staff group was divided into two groups according to length of experience working with people with challenging behaviour: 48 months or less and more than 48 months. Mann-Whitney tests comparing the scores of these two groups found no significant results. Only one difference was marginally non-significant: threat to physical safety of the patient for vignette3, which tended to be rated higher by more experienced staff ($U = 49.5$, $p<.05$). The null hypothesis was rejected.

The staff were again divided, this time into four groups based on length of employment at the unit: 0-24 months; 25-48 months; 49-72 months; more than 73 months. Kruskal-Wallis tests found no significant differences between these groups for each of the items for each vignette. There were two marginally non-significant results: threat to physical safety of others for vignette1 ($H = 10.395$, $p<.05$) and threat to physical safety of patient for vignette3 ($H = 8.061$, $p<.05$). Staff with between four and six years experience or

with less than two years experience tended to rate these items as more severe than staff with between two and four years experience or with more than six years experience. The null hypothesis was rejected.

These analyses were repeated for the scores of nursing staff only. No statistically significant differences between nurses according to length of experience working with people with challenging behaviour were found. A similar pattern was evident amongst marginally non-significant results to that observed in the whole staff group. Nurses with more than four years experience tended to rate threat to physical safety of the patient higher for vignette3 than nurses with four years experience or less. When four experience groups are used there are marginally non-significant differences between groups of nurses in their ratings of threat to physical safety of others for vignette1, following the same pattern as for the whole staff group.

Table 6a: Divisions used to investigate effect of duration of employment at the unit on vignette ratings showing number of staff in each division.

		All staff	Nurses only
Method One	A. 48 months and less	13	11
	B. 49 - 144 months	14	9
	Total	27	20
Method Two	A. 24 months and less	6	5
	B. 25 - 48 months	7	6
	C. 49 - 72 months	6	4
	D. 73 - 144 months	8	5
	Total	27	20

Table 6b: Significant results obtained on Mann-Whitney and Kruskal-Wallis tests between groups of staff divided by length of experience working with people with challenging behaviour .

	Method one A. 48 months and less B. 49 - 144 months Value of *U* and significance level		Method two A. 24 months and less B. 25 - 48 months C. 49 – 72 months D. 73 – 144 months Value of *H* and significance level	
Item	All staff (Direction)	Nurses only (Direction)	All staff (Direction)	Nurses only (Direction)
Vignette1 PO	67.5 (.259)	38.5 (.412)	10.395* (0.015) (C > A > B, D)	9.527* (0.023) (C > A > B, D)
Vignette3 PP	49.5* 0.043 (B > A)	18.5* (0.016) (B > A)	2.335 (.506)	2.427 (.489)
Vignette4 MD	90.0 (.981)	48.5 (.941)	8.061* (.045) (A > C > D > B)	6.730 (.081)

* marginally non-significant at $p < 0.05$
** significant at $p < 0.01$
ns not significant

PO = Threat to physical safety of others
PP = Threat to physical safety of patient

From these results, very minor differences in interpretation of challenging behaviour may be associated with length of experience working with people with learning disabilities. Staff with between four and six years experience or with less than two years experience tended to rate these items as more severe than staff with between two and four years experience or with more than six years experience. This pattern may be indicative of developmental changes in individuals' understanding of challenging behaviour over a number of years.

1B(iv.) Age Age is a potentially confounding variable affecting the impact of length of work experience. This was investigated with the hypothesis as above that age will not have a significant effect on interpretations of challenging behaviour. The null

hypothesis is that significant differences in ratings of the vignettes will be found due to age.

The whole staff group was divided according to age into three categories: 23-31 years inclusive; 33-38 years; 39-50 years. Kruskal-Wallis tests were used to compare the ratings of these groups. No significant difference in scores were found. The staff were again divided, this time into five groups based on age: 23-28; 29-34; 35-40; 41-46; 47-52 years. Kruskal-Wallis tests found no significant differences between these groups. These analyses were repeated with nursing staff only and again no significant differences between groups were found. (See Appendix 11.) The null hypothesis was therefore rejected.

The results showed no differences in interpretation of challenging behaviour by age of respondent.

Summary of results: Hypothesis 1

Results indicate that staff are able to meaningfully and consistently differentiate between challenging behaviours described in the vignettes (results from testing Hypothesis 1A(*i.*)-(*iv.*)). However, the understanding of challenging behaviour does not appear to be based on one coherent underlying concept, but rather there are several distinct elements to the understanding of challenging behaviour which vary in importance between different situations (results from testing Hypothesis 1A(*v.*)-(*x.*)). More severe challenging behaviour produces greater coherence amongst the elements of the concept measured here. Although contextual factors

were not directly addressed by the measure, ratings appear to be context-specific to the unit, in keeping with Emerson's definition. Furthermore, factors not directly addressed by the ratings of vignettes are likely to be important in the interpretation of challenging behaviour. Common themes in comments from staff on factors which modify management difficulty centre around identification of a possible intervention strategy and predictability of behaviour. A wide range of other factors are also mentioned in comments.

Staff interpretations of challenging behaviour are not significantly affected by professional group and training per se. However, the ratings made by nursing staff show fewer differences by length of experience at the unit than those of the whole staff group. Staff who have worked at the unit for two years or fewer rate some aspects of challenging behaviour as more severe than staff who have worked there for more than two years. There appears also to be a developmental change in staff interpretations of challenging behaviour based on total length of experience working with people with challenging behaviour. There is no significant effect of age of respondent on interpretation of challenging behaviour. (Results from testing Hypothesis 1B.)

3. Results: Part Two

Hypothesis 2

There will be shared understanding between staff of actual instances of challenging behaviour in the Unit, demonstrated by good inter-rater reliability on the Agitated Behaviour Scale and Checklist of Challenging Behaviour. The Agitated Behaviour Scale and Checklist of Challenging Behaviour will have good concordant validity with each other and with other clinical data (Incident Reports and Event Records).

Characteristics of data

The Agitated Behaviour Scale score (ABS) yields one total. The Checklist of Challenging Behaviour gives five totals: total frequency of aggressive behaviours (AF); total management difficulty of aggressive behaviours (AMD); total severity of aggressive behaviours (AS); total frequency of other challenging behaviours (OF); total management difficulty of other challenging behaviours (OMD).

A high proportion of scores on the CCB for aggressive behaviour (AF, AMD, AS) were zero (40-78 per cent) and scores are clustered around the low end of the scale for CCB other behaviour (OF, OMD). A broader spread of scores was obtained on the ABS measure. (See Appendix 12 for descriptive data on scores.) Although the range of scores was restricted, parametric statistical analyses were calculated to maximise the explanatory power of the tests used.

The CCB includes space to record behaviours other than those included in the checklist. These items are not included in the total scores. From a total of 89 valid responses to the CCB, 26 per cent of respondents identified an aggressive behaviour not mentioned on the checklist and 22 per cent identified a non-aggressive challenging behaviour not mentioned on the checklist.

Incident Report total scores were obtained for frequency, management difficulty and severity of aggressive behaviour and of other challenging behaviour. A very high proportion of the patients sampled had not been involved in any incidents which were formally reported and therefore a high proportion of the total scores (65 to 84 per cent) were zero. If all patients for whom there were no incident reports are removed from the sample, only 7 remain. The very low range of scores limits the usefulness of this measure.

Event records were available for 13 patients for a total of 20 assessment periods. These records were not generally kept for patients whose behaviour was well controlled or followed a long term pattern which was well known to staff. The Event Records were used to obtain total scores for frequency of aggressive behaviour, frequency of other challenging behaviour, and frequency of all challenging behaviour (aggressive and other) in the period of assessment. Only two patients for whom records were kept had no recorded instances of challenging behaviour in the period of assessment.

Hypothesis 2A

Scores for rater1, rater2, and rater3 scores will be highly associated with each other for the ABS score, and for each of the CCB scores (AF; AMD; AS; OF; OMD).

Pearson correlations were calculated for relationships between rater1 and rater2; rater1 and rater3; and rater2 and rater3 (see *Table 7*).

Table 7: Pearson correlations between rater1, rater2, and rater3 for each of the screening measure total scores. N given for row above.

Association	ABS	AF CCB	AMD CCB	AS CCB	OF CCB	OMD CCB
rater1-rater2	.501** (.002)	.830** (.000)	.721** (.000)	.439** (.009)	.674** (.000)	.441** (.008)
N	31	29	29	29	29	29
rater1-rater3	.406* (.022)	.484** (.007)	.370* (.034)	.032 (.440)	.663** (.000)	.601** (.001)
N	25	25	25	25	25	25
rater2-rater3	.611** (.001)	.834** (.000)	.762** (.000)	.445* (.019)	.809** (.000)	.546** (.004)
N	24	22	22	22	22	22

** Correlation is significant at the 0.01 level (1-tailed).
* Correlation is significant at the 0.05 level (1-tailed).

The ABS scores were significantly correlated between rater1 and rater2 ($r = .501$, $p<.01$) and between rater2 and rater3 ($r = .611$, $p<.01$). The association between rater1 and rater3 was marginally non-significant ($r = .406$, $p<.05$).

CCB total frequency of aggression score (AF), showed significant correlations between rater1 and rater2 ($r = .830$, $p <.01$), rater1 and rater3 ($r = .834$, $p<.01$), and rater2 and rater3 ($r = .484$, $p<.01$).

CCB total management difficulty of behaviour (MD), showed significant correlations between rater1 and rater2 ($r = .721$, $p<.01$) and between rater2 and rater3 ($r = .762$, $p<.01$). The association between rater1 and rater3 was marginally non-significant ($r = 370$, $p < .05$).

CCB total severity of aggressive behaviour (AS), showed a significant correlation between rater1 and rater2 ($r = .439$, $p<.01$), whilst there was no significant association between rater1 and rater3 ($r = .032$, $p<.50$) and the association between rater2 and rater3 is marginally non-significant ($r = .445$, $p<.05$).

For CCB total frequency of other challenging behaviour (OF), there are significant associations between rater1 and rater2 ($r = .674$, $p<.01$), rater1 and rater3 ($r = .663$, $p<.01$), and rater2 and rater3 ($r = .809$, $p<.01$).

For CCB total management difficulty of challenging behaviour (OMD) there are significant associations between rater1 and rater2 ($r = .441$, $p < 0.01$), rater1 and rater3 ($r = .601$, $p<0.01$) and rater2 and rater3 ($r = .546$, $p<.01$).

Correlations between rater1 and rater 2 were statistically significant for all of the screening measure scores (r between .439 and .830). The proportion of variance explained by these relationships is between 19 and 69 per cent, the most robust associations being for CCB frequency of aggressive behaviour (AF) and management difficulty of aggressive behaviour (AMD).

Rater1 and rater3 are not so strongly associated with each other. Significant correlations were obtained for CCB frequency of aggressive behaviour (AF), frequency of other challenging behaviour (OF) and management difficulty of other challenging behaviour (OMD), accounting for between 23-44 per cent of the variance in scores. Correlations between rater1 and rater3 were not significant for the ABS score, CCB management difficulty of aggressive behaviour (AMD) and severity of aggressive behaviour (AS).

Rater2 and rater3 were significantly correlated for all the screening measure scores except CCB severity of aggressive behaviour (AS). The proportion of variance in scores accounted for by the significant associations for rater2 and rater3 is between 20 and 65 per cent. The most robust associations were between CCB frequency of aggressive behaviour (AF), management difficulty of aggressive behaviour (AMD), and frequency of other challenging behaviour (OF).

The results indicate that there is a reasonable level of agreement between scores of rater1, rater2 and rater3 on the ABS and CCB. In particular, the two groups of nurses, rater1 and rater2, show consistent reasonable levels of agreement. Other professionals' scores, rater3, are not consistently associated with nurses' scores, rater1. However, nurse scores, rater2, and other professionals' scores, rater3, show a level of agreement similar to that between the two nurses' scores, rater1 and rater2. Therefore, Hypothesis 2A is generally supported for the relationships between rater1 and rater2 and between rater2 and rater3.

The level of agreement between raters differs for different measures. A high level of agreement is evident for CCB frequency of aggression (AF), management difficulty of aggression (AMD) and frequency of other challenging behaviours (OF). ABS and CCB management difficulty of other challenging behaviour (OMD) show an intermediate level of agreement. There is poor agreement regarding CCB severity of aggressive behaviour (AS).

Because the proportion of variance in scores accounted for by the association between raters is relatively low for some scores, between groups tests were calculated to investigate the relationships between the raters further. No significant differences were found between rater1, rater2 and rater3 using one-way ANOVA, indicating that although some associations between the raters were not as strong as had been hoped, there were no significant differences between the raters (see *Table 8*).

Table 8: F values, degrees of freedom (df) and significance level (p) for ANOVAs between raters for each of the screening measure total scores.

Score	*F* value	*df*	*P*
ABS	1.138	2, 85	.325
AF	.174	2, 84	.840
AMD	.770	2, 83	.466
AS	1.216	2, 83	.302
OF	.737	2, 84	.482
OMD	.058	2, 83	.944

For the purpose of comparison with clinical measures, a combined score was derived from the mean of rater1 and rater2. Only rater1 and rater2 were chosen to produce a

composite score despite the fact that the correlation between them does not always account for a great deal of the variance in scores and that some correlations involving rater3 were also significant. The rationale for this is that rater1 and rater2 are from the same staff group, nurses, who are also primarily involved in recording the clinical data used for comparison.

To investigate the relationship between the combined nurses' score (raterN) and other professionals' score (rater3), Pearson correlations were calculated (see *Table 9*). RaterN and rater3 are significantly correlated for all the screening measure scores except for CCB total frequency of aggression (AS) ($r = .306$, $p<.10$). For the significant associations, the proportion of variance in scores explained is between 38 and 64 per cent.

Between groups analyses were calculated for raterN and rater3 using independent t-tests. No significant differences between raterN and rater3 were found (see *Table 10*).

Table 9: Pearson correlations between raterN and rater3, N= 25.

	ABS	AF	AMD	AS	OF	OMD
Pearson correlation (Significance 1-tailed)	.630** (.000)	.638** (.000)	.618** (.000)	.306 (0.68)	.799** (.000)	.679** (.000)

** Correlation is significant at the .01 level (1-tailed).

Table 10: Independent samples t-tests, between raterN and rater3 for each screening measure score: t , degrees of freedom (d.f.) and significance(p) are given, equal variances not assumed.

score	*t*	*df*	*p (2-tailed)*
ABS	1.538	42.29	.131
AF	.059	52.59	.953
AMD	-.564	38.85	.576
AS	-.909	35.11	.369
OF	1.166	47.42	.249
OMD	-.124	35.12	.902

Hypothesis 2B

Hypothesis 2B is that the Agitated Behaviour Scale and Checklist of Challenging Behaviour will have good concordant validity with each other and with other clinical data (Incident Reports and Event Records).

The combined nurses ratings, raterN, from the previous analyses were used for comparison with the clinical data from Incident Reports and Event Records. Specific hypotheses are as follows.

(*i.*) CCB scores (AF, AMD, AS, OF, OMD) will inter-correlate with each other. ABS score will correlate with CCB scores (AF, AMD, AS, OF, OMD).

(*ii.*) Incident Report data will correlate with Event Record data for frequency of aggressive behaviour and frequency of other challenging behaviour. Incident Report data for frequency, management difficulty and severity will be inter-correlated.

(*iii.*) ABS score will correlate with Incident Report data on total frequency, management difficulty and severity of all challenging behaviours (combined aggressive and other) and with Event Records data on frequency of all challenging behaviour.

(*iv.*) CCB scores will correlate with Incident Reports and Event Records data such that:

AF(total frequency of aggression) will correlate with Incident Report data and Event Record data on total frequency of aggression;

AMD (total management difficulty of aggressive behaviour) will correlate with Incident Report data on total management difficulty of aggressive behaviour;

AS (total severity of aggression) will correlate with Incident Report data on total severity of aggression;

OF (total frequency of other challenging behaviour) will correlate with Incident report data and Event Records data on total frequency of other challenging behaviour;

OMD (total management difficulty of challenging behaviour) will correlate with Incident Report data on total management difficulty of other challenging behaviour.

Hypothesis2B(i.) CCB scores (AF, AMD, AS, OF, OMD) will inter-correlate with each other. ABS score will correlate with CCB scores (AF, AMD, AS, OF, OMD).

Pearson correlations were used to test these relationships (see *Table 11*). CCB scores for aggressive behaviour frequency (AF), management difficulty (AMD) and severity (AS) are strongly associated with each other (r between .863 and .897, $p<.01$). CCB scores for other challenging behaviour frequency (OF) and management difficulty (OMD) are also highly associated with each other ($r = .850$, $p<.01$). Associations between ratings for aggressive behaviours and other challenging behaviour were less

strong (r between .420 and .604, $p<.01$), as were associations between the ABS score and each of the CCB scores (r between .468 and .637, $p<.01$).

All of the screening measures scores are fairly closely associated with each other. Particularly strong associations are found between the scores which specifically measure aggressive behaviour (AF, AMD, AS). Specific measures of other challenging behaviours are also strongly associated with each other (OF, OMD). These results suggest that frequency, management difficulty and severity of challenging behaviour are closely associated with each other.

Table 11: Pearson correlations (and significance level) between total scores for the screening measures, N = 32, raterN scores used.

	AMD	AS	OF	OMD	ABS
AF	.897** (.000)	.887** (.000)	.507** (.002)	.420** (.008)	.638** (.000)
AMD		.863** (.000)	.604** (.000)	.569** (.000)	.591** (.000)
AS			.449** (.004)	.420** (.008)	.608** (.000)
OF				.850** (.000)	.637** (.000)
OMD					.468** (.003)

** Correlation is significant at the 0.01 level (1-tailed).
* Correlation is significant at the 0.05 level (1-tailed).

Hypothesis 2B(ii.) Incident Report data will correlate with Event Record data for frequency of aggressive behaviour and frequency of other challenging behaviour. Incident Report data for frequency, management difficulty and severity will be inter-correlated.

Pearson correlations were used to investigate these relationships (see *Table 12a* and *Table 12b*).

For aggressive behaviour, Event Records of frequency are not significantly associated with Incident Report data on frequency, management difficulty or severity of aggressive behaviour. Incident Report data for frequency, management difficulty and severity of aggressive behaviour are significantly correlated with each other (r between .455 and .908, $p<.01$). The association between Incident Reports frequency of aggression and management difficulty of aggression was very strong ($r = .908$, $p<.01$).

Table 12a: Pearson correlations (and significance level) for associations between Incident Reports scores for frequency and management difficulty of aggressive behaviour, and Event Records frequency of aggressive behaviour.

	Incident Reports Frequency of aggression	Incident Reports Management difficulty of aggression	Incident Reports Severity of aggression
Event Record Frequency of aggression	.331 (.077)	.293 (.105)	.102 (.334)
N	20	20	20
Incident Reports Frequency of aggression		.908** (.000)	.455** (.004)
N		32	32
Incident Reports Management difficulty of aggression			.620** (.000)
N			32

** Correlation is significant at the 0.01 level (1-tailed).
* Correlation is significant at the 0.05 level (1-tailed).

For frequency of other challenging behaviours, the association between Event Records and Incident Reports is marginally non-significant ($r = .394$, $p<.05$). However, Incident Reports severity of other behaviour is significantly correlated with Event Records frequency of other challenging behaviour, though this association accounts for only 25 per cent of variation in the scores ($r = .533$, $p<.01$).

Incident Reports scores for frequency, management difficulty and severity of other challenging behaviour are all significantly correlated with each other at a high level of association (r between .817 and .960). Incident Report data on frequency and management difficulty of other challenging behaviour are virtually identical to each other ($r = .960$, $p<.01$).

Table 12b: Pearson correlations (and significance level) for associations between Incident Reports scores for frequency and management difficulty of other challenging behaviour, and Event Records frequency of other challenging behaviour.

	Incident Reports Frequency of other challenging behaviour	Incident Reports Management difficulty of other challenging behaviour	Incident Reports Severity of other challenging behaviour
Event Records Frequency of other challenging behaviour	.394* (.043)	.356* (.061)	.533** (.008)
N	20	20	20
Incident Reports Frequency of other challenging behaviour		.960** (.000)	.817** (.000)
N		32	32
Incident Reports Management other challenging behaviour			.837** (.000)
N			32

** Correlation is significant at the 0.01 level (1-tailed).
* Correlation is significant at the 0.05 level (1-tailed).

As in (*i.*) above, these results indicate that within similar measurement methods, ratings of frequency, management difficulty and severity of challenging behaviour are very closely associated with each other. However, different measurement methods (Incident Reports and Event Records) are not concordant with each other.

Hypothesis 2B(iii.) The ABS will correlate with Incident Report data on total frequency, management difficulty and severity of all challenging behaviours (combined aggressive and other) and with Event Records data on frequency of all challenging behaviour.

Pearson correlations were used to test these relationships (see *Table 13*).

None of the Pearson correlations between the ABS and Incident Reports were significant and ABS was not significantly correlated with Event Records.

Table 13: Pearson correlations. r (and significance level) between ABS and Incident Reports and Event Records relating to all challenging behaviours (aggressive and other).

	Event Records, Frequency of all challenging behaviours	Incident Reports, Frequency of all challenging behaviours	Incident reports, Management difficulty of all challenging behaviours	Incident reports, Severity of all challenging behaviours.
ABS	.072 (.381)	.170 (.176)	.047 (.398)	-.044 (.406)
N	20	32	32	32

** Correlation is significant at the 0.01 level (1-tailed).

Hypothesis 2B(iv.) CCB scores will correlate with Incident Reports and Event Records data. Pearson correlations were used to test these relationships (see *Table 14a* and *Table 14b*).

For measures of aggressive behaviour the only significant correlation between CCB scores and clinical measures (Incident reports and Event Records) was between CCB management difficulty of aggression and Incident Report data on frequency of aggression ($r = .417$, $p < .01$).

For measures of other challenging behaviour, the only significant association between CCB scores and clinical measures (Incident reports and Event Records) was between CCB management difficulty of other behaviour (OMD) and Incident Reports frequency of other behaviours ($r = .471$, $p < .01$).

The proportion of variance in scores accounted for by these associations is small, 17-22 per cent; however, they may represent a tendency for staff to complete Incident Reports frequently for behaviours perceived as presenting substantial management difficulties.

Scores obtained using the CCB do not generally concord with clinical data from Incident Reports and Event Records.

Table 14a: Pearson correlations (and significance level) for relationships between CCB aggression items (frequency, management difficulty and severity) and clinical data equivalents from Event Records and Incident Reports, Incident Reports N =32, Event Records N = 20.

	Event Records, Frequency of aggression	Incident Reports, Frequency of aggression	Incident Reports, Management difficulty of aggression	Incident Reports, Severity of aggression
AF	.153	.273	.136	.127
	(.260)	(.065)	(.229)	(.244)
N	20	32	32	32
AMD	-.044	.417**	.305*	.121
	(.427)	(.009)	(.045)	(.255)
N	20	32	32	32
AS	.010	.248	.144	.119
	(.484)	(.086)	(.216)	(.259)
N	20	32	32	32

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

Table 14b: Pearson correlations (and significance level) for relationships between CCB other behaviour items (frequency, and management difficulty) and clinical data equivalents from Event Records and Incident Reports.

	Event Records Frequency of other challenging behaviour	Incident Reports Frequency other challenging behaviour	Incident Reports Management difficulty other challenging behaviour	Incident Reports Severity other challenging behaviour
OFN	.200 (.198)	.367* (.019)	.242 (.091)	.174 (.170)
N	20	32	32	32
OMDN	.163 (.246)	.471** (.003)	.371* (.018)	.305* (.045)
N	20	32	32	32

** Correlation is significant at the 0.01 level (1-tailed).
* Correlation is significant at the 0.05 level (1-tailed).

Summary of Results, Hypothesis2

Ratings by different members of staff of the same patient behaviour showed a reasonably good level of agreement. This level of agreement varies between scores on the ABS and CCB. A high level of agreement is evident for CCB frequency of aggression (AF), management difficulty of aggression (AMD) and frequency of other challenging behaviours (OF). ABS and CCB management difficulty of other challenging behaviour (OMD) show an intermediate level of agreement. There is poor agreement regarding CCB severity of aggressive behaviour (AS).

In particular, the two groups of nurses, rater1 and rater2, show consistent levels of agreement. Ratings by other professionals, rater3, are consistently associated with ratings by nurses in the group rater2 but not with ratings of nurses in group rater1.

No significant differences were found between rater1, rater2 and rater3 using one-way ANOVA, indicating that although some associations between the raters were not as

strong as had been hoped, there were no significant differences between the raters and therefore Hypothesis 2A is generally supported.

For the screening measures, ABS and CCB, combined nurses' rating scores are fairly closely associated with each other. However, the screening measures are not concordant with clinical data from Incident Reports and Event Records. Almost no significant associations were found between screening measure scores and clinical data, with the exception of modest associations between CCB management difficulty and Incident Report data on frequency for aggressive behaviour and for other challenging behaviour, which seems likely to reflect a tendency for staff to fill out more Incident Reports where behaviour is perceived to present substantial management difficulty.

Scores for frequency, management difficulty and severity of challenging behaviour are strongly associated with each other within the measures: CCB items relating to aggressive behaviour; CCB items on other challenging behaviour; Incident Report data on aggressive behaviour; Incident report data on other challenging behaviour. However, the different measurement methods are poorly associated with each other. Incident Reports are not generally concordant with Event Records. Only one significant association was found between the two clinical measures and this was fairly insubstantial: Incident Report data on severity of other challenging behaviour and Event records frequency of other challenging behaviour, possibly reflecting more assiduous record keeping for behaviours which cause physical harm.

DISCUSSION

The aims of the study were to investigate the degree of shared understanding of the concept of challenging behaviour amongst a group of staff at a specialist unit for the rehabilitation of people with acquired brain injury and challenging behaviour. In addition, the applicability of screening measures to challenging behaviour following acquired brain injury was investigated. The study consists of two parts. In Part One, a specially developed vignette-based measure was used to investigate staff understanding of the concept of challenging behaviour in brain injury, based on Emerson's definition. In Part Two of the study, staff understanding of challenging behaviour in the clinical context was investigated using the Agitated Behaviour Scale and Checklist of Challenging Behaviour.

1. Use of Vignettes to Examine Shared Understanding of Challenging Behaviour

1.1 Methodological issues

The results from Part One of the study must be interpreted with caution because of the relatively small sample of respondents. There were 28 respondents - a response rate of 45 per cent of the whole staff group. As just over half of the staff group did not respond to this part of the study, the possibility that response bias may have affected the results obtained must be borne in mind.

The data were treated as ordinal because they were obtained from ratings scales as part of a previously untried measure. Therefore, analysis was carried out using non-

parametric statistical procedures. The statistical procedures used are less powerful than their parametric equivalents. The Spearman correlation co-efficient and Friedman analysis of variance by ranks are about 91 per cent as efficient as their parametric equivalents and therefore may have failed to detect subtle effects (Siegel and Castellan 1988, p.183, p.244).

1.2 Hypothesis 1A

Hypothesis 1A is that staff will share an understanding of the concept of challenging behaviour which is in keeping with Emerson's definition. This was tested by within group comparisons of responses to the vignette-based measure. With the above cautions in mind, the results generally support the hypothesis.

Respondents' severity ratings for different elements of the definition of challenging behaviour differ in a fairly predictable pattern between vignettes describing different behaviours and contexts. Differences between the expected and observed pattern of ratings, particularly for vignette4, suggest that threat to physical safety is interpreted in terms of perceived potential for harm rather than actual harm caused and may be influenced by social norms.

Relationships between different elements of the definition of challenging behaviour were found to vary between vignettes. Vignettes describing more severe challenging behaviour have a higher level of agreement between different defining elements of the behaviour. Although contextual factors are not directly addressed by the measure, there are some indications that interpretations of challenging behaviour are influenced by

context. As above, a shared understanding of challenging behaviour based on Emerson's definition is broadly supported amongst this staff group.

1.2.1 Interpretation of unexpected results obtained on testing Hypothesis 1A

The vignette measure was designed to investigate aspects of Emerson's definition relating to consequences of challenging behaviour, specifically: threat to physical safety of self and others, impact on access to community facilities, and level of challenge to service provision. Definition of challenging behaviour by its consequences is a key part of Emerson's definition. However, the vignette-based measures did not directly address another key part of Emerson's definition - challenging behaviour as culturally abnormal behaviour judged against cultural norms.

Another attempt to define challenging behaviour is Qureshi and Alborz's (1992) definition of severe challenging behaviour which is based primarily on the negative consequences of the behaviour, not its basis in cultural norms (See Introduction p. 24). When the vignettes are re-examined in terms of Qureshi and Alborz's definition, only the descriptions in vignette1 and vignette2 meet criteria for severe challenging behaviour, while vignette3 and vignette4 do not. However, the results show that the consequences of the behaviour described in vignette1 and vignette4 are considered more severe than those for vignette2 and vignette3. For vignette4, staff perception of potential for serious consequences is much greater than the actual consequences described and this vignette also describes potential for sexual behaviour which is extremely socially unacceptable. Therefore, the outcomes of behaviour alone are not sufficient to define the behaviour as challenging. The staff perception of vignette4 as

presenting serious challenges is in keeping with Emerson's definition of challenging behaviour as socially defined, judged against culturally norms.

The social definition of behaviour relies on contextual factors and the results obtained suggest the staff have a collective understanding of the concept of challenging behaviour which tends to be restricted to their work context, and not extrapolated to other settings. The rating item 'overall management difficulty', which was intended to measure the overall challenge to service provision, appears to be understood by staff in terms of immediate management difficulty within the unit such as 'threat to physical safety of staff and other patients' (hence the consistent association between ratings of physical threat to safety of others and overall management difficulty). While there is recognition of the link between physical safety of others and limited access to community facilities (shown by a fairly consistent association between ratings of these items), behaviour is interpreted within the culture of the unit and not in terms of the implications it would have in the wider community. Within the unit, which draws on positive approaches to management of challenging behaviour, physical aggression from the patient does not lead to punishment procedures or retaliation from staff, which might explain why staff do not consistently perceive threat to physical safety of others as associated with threat to physical safety of the patient. It is notable that staff working within a secure unit in which patients necessarily have severely limited access to community facilities did not perceive access to community facilities as strongly related to management difficulty of challenging behaviour. However, staff endeavour to take patients into community settings whenever possible within the limits of the resources

available to them and so it may be that staff perceive patients' lack of access to community facilities as a resource issue rather than a result of the behaviour *per se*.

There is a chance that some staff who took part in both Part One and Part Two of the study interpreted 'overall management difficulty' as relating to immediate management concerns because this is the way 'management difficulty' is defined in the Checklist of Challenging Behaviour used in Part Two of the study. Ideally, Part One would have been completed before Part Two commenced, however this was not possible because of time constraints on the study and so, in effect, both parts of the study were carried out over the same time period. However, the effect of this should not be too great because different (although overlapping) groups of staff were sampled in the two parts of the study.

Qualitative data in the form of written comments, suggest some additional factors which might contribute to the perception management difficulty. The most frequent theme contributing to ease of management was the identification of a possible intervention strategy and the most frequent theme contributing to management difficulty was lack of predictability or lack of identified antecedents to the behaviour. These results bear a notable resemblance to Bromley and Emerson's (1995) findings that absence of any effective way of dealing with the behaviour and difficulty understanding the behaviour were among the most significant sources of stress for staff working with people with learning disabilities and challenging behaviour. Features identified as modulators of management difficulty of challenging behaviour, perhaps not surprisingly, appear to be important influences on staff stress.

1.3 Hypothesis 1B

Hypothesis 1B is that differences in staff characteristics such as profession and work experience will not significantly affect interpretations of challenging behaviour. This was investigated using between groups analyses of ratings on the vignette-based measure. Respondents were divided into groups by profession and training, length of work experience at the unit, total length of work experience with people with challenging behaviour, and age. The hypothesis that these staff characteristics will not affect interpretations of challenging behaviour is generally supported by the results. However, there were some minor differences between staff with different lengths of experience working at the unit and with challenging behaviour in other settings.

1.3.1 Interpretation of unusual results obtained on testing Hypothesis 1B

Differences in interpretation of challenging behaviour with different length of work experience at the unit and total length of experience working with people with challenging behaviour may be accounted for by a developmental change in staff interpretation of challenging behaviour over a number of years. Those who have worked at the unit for two years or less tend to interpret greater management difficulty and threat to physical safety of others for vignette4 than those who have worked at the unit for more than two years. Those with between four and six years work experience with people with challenging behaviour (in this and other settings) tend to rate vignette1 as presenting a greater threat to physical safety of others and vignette4 as a greater management difficulty than those who have either between two and four years or more than six years experience. It would appear,

then, that relatively inexperienced staff perceive the consequences of challenging behaviour as more severe than more experienced staff. However, perception of the severity of the consequences of challenging behaviour peaks again at between four and six years work experience. After six years experience, perceived severity of consequences of challenging behaviour reduces again. These differences between staff may be due to changes in individuals' perceptions over time or changes in composition of the staff group over time. Perhaps perception of severity of the consequences of challenging behaviour has an effect on decisions to leave this field of work. (This is, after all, an area in which there is high turnover of staff.)

Staff characteristics were analysed separately: however, it would have been useful to examine the effect of possible interactions between different staff characteristics. The small sample size in this study precluded adequate statistical analyses of these interactions. However, even when the staff group was divided by characteristics other than profession, fewer discrepancies in scores were found among nursing staff than among the staff group as a whole, suggesting that similarities in training and theoretical orientation do contribute to similarities in interpretations of challenging behaviour.

1.4 The vignette-based measure – potential development

The vignette-based measure attempted to cover a range of features of behaviour and its circumstances which may be involved in defining behaviour as challenging: frequency, type, and duration of behaviour and severity of physical

injury caused. As this study was concerned with challenging behaviour following acquired brain injury, vignettes were also varied in terms of mechanism of injury, severity of injury, level of cognitive impairment, independence in self care and mobility. Some reference was also made to antecedents and consequences of behaviour, including staff reactions, in recognition of the importance of the function of the behaviour. However, specific ratings were only requested for four elements of the definition of challenging behaviour related to severity of outcome.

The vignettes measure attempted to cover differences in these factors, but it was not possible in this study to distinguish each of these separately. The length of the measure was limited to four vignettes to try to maximise the response rate by making the measure fairly simple to complete.

Were this measure to be developed further, the range of vignettes could be expanded to cover different aspects of challenging behaviour in more detail. The rating item on overall management difficulty may need to be reworded to reflect the wider service context. To gain an understanding of how challenging behaviour is defined, it is necessary to explore a range of viewpoints - for example other groups of staff and other interested parties such as patients, relatives, those responsible for making decisions about service provision. The vignette-based measure could be expanded to incorporate specific ratings of discrepancy from social norms, emotional responses to the behaviour, perceived potential for change, and challenges for the person's overall development.

1.5 Summary of conclusions regarding Hypothesis 1

Despite the complexity of the concept, interpretations of challenging behaviour do not appear to be significantly affected by staff characteristics amongst this group. A shared understanding among the staff regarding the concept of challenging behaviour is evident. Features of Emerson's definition of challenging behaviour not directly measured may account for some discrepancies from the expected results: interpretation of challenging behaviour appears to be specific to the context of the unit and appears to be related to cultural norms. Comments from staff suggest additional factors which are important in the interpretation of challenging behaviour. Some minor differences in staff interpretations of challenging behaviour depending on length of work experience may indicate a developmental change in individuals' interpretations of challenging behaviour or may reflect changing composition of the staff group.

2. Use of Screening Measures (Agitated Behaviour Scale and Checklist of Challenging Behaviour) to Investigate Shared Understanding of Challenging Behaviour in the Clinical Setting

The second part of the study investigated shared understanding of challenging behaviour using the Agitated Behaviour Scale (Corrigan 1989) and the Checklist of Challenging Behaviour (Harris et al. 1994). Shared understanding of challenging behaviour in the clinical setting between different members of staff was investigated via inter-rater reliability of the screening measures. The construct validity of these screening measures was investigated via their concordance with clinical records of behaviour.

2.1 Methodological issues

As in Part One, the sample size is relatively small, though sufficient to support the use of parametric statistical analyses (as discussed in the Method section p.58). However, a restricted range of scores was obtained for the Checklist of Challenging behaviour and scores obtained from clinical records; a high proportion of the scores was zero on these measures. Although the Agitated Behaviour Scale produced an acceptable range of scores, the results of statistical analyses on this data should be interpreted with caution.

The very low range of scores of challenging behaviour was unexpected as the study took place within a specialist unit for rehabilitation of people with brain injury and challenging behaviour, all admitted because challenging behaviour interfered with their

ability to live in the community or be cared for by other services. The low scores on the measures used may have been due to inadequacies of the measures or they may reflect the capacity of the unit to effectively manage challenging behaviour. These issues are discussed in more detail in later sections of this discussion.

There are a number of methodological issues relating to how the data were gathered which should be considered when interpreting the results. Among these is the pattern of working hours of nurses over the period of observation. Due to the system of shifts, many of the respondents had not had an opportunity to observe the patients' behaviour for the whole period of seven days prior to completing the screening measures and therefore some of the variance in ratings between different members of staff may be due to differences in opportunities to observe the patients' behaviour. Also, because the measures had to fit around clinical priorities, they were done at a range of different times during the day. This could have an effect on the level of association between different raters if, for example, a patient's behaviour deteriorated or improved between rating1 and rating2. Almost certainly, greater inter-rater reliability would have been attained if behaviour was observed directly by both raters using a time sampling technique. However, sampling behaviour for shorter distinct periods of time does not allow for an understanding of the patients' behaviour generally.

An alternative method of sampling behaviour would be similar to that employed by Alderman et al. (1997) for the OAS-MNR, recording every instance of behaviour which occurs in a given time period using predetermined codes. For this method to be effective though, higher staffing levels than were available in this study are required.

Furthermore, as an attempt to measure the patients' behavioural presentation fairly broadly within the time scale of the study, ratings were made for the patients' behaviour over the preceding seven days. This in itself, however, is a limited period of time and may have failed to adequately capture the range of challenging behaviours of some patients.

2.2 Hypothesis 2A

Hypothesis 2A is that there will be a shared understanding among staff of challenging behaviour occurring in the clinical setting, demonstrated by good inter-rater reliability for the Agitated Behaviour Scale (ABS) and Checklist of Challenging Behaviour (CCB). Results generally support this hypothesis.

The highest level of inter-rater agreement is found for CCB totals for frequency and management difficulty of aggression, and frequency of other challenging behaviours. An intermediate level of agreement is found between raters for the ABS and CCB total management difficulty of challenging behaviour. There was poor agreement between staff regarding the CCB total severity of aggression. Levels of agreement between nurses' ratings are more consistently high than levels of agreement between nurses and other professionals.

2.2.1 Interpretation of results

The more consistent agreement between nurses than between nurses and other professionals may be related to the different work roles of these groups. In particular,

non-nursing professionals may spend less time in direct contact with patients and therapeutic non-nursing interventions tend to be less invasive and more flexible to change if the patient does not wish to participate. The research literature suggests that number of direct contact hours and job role can affect staff emotional reactions to challenging behaviour in the care of people with dementia (e.g. Livingston and Livingston 1984, Willcocks et al. 1987) and in the literature on people with learning disabilities and challenging behaviour, staff emotional response to challenging behaviour has been associated with interpretations of the behaviour (Dagnan et al. 1998, Hastings and Remington 1994). It would therefore be reasonable to suggest that aspects of different work roles may have an impact on interpretations of challenging behaviour in people with acquired brain injury.

However, there is also much greater variation in training, work experience and theoretical orientation within the group of non-nursing other professionals than the group of nurses, and these factors may contribute to less consistency in interpretation of challenging behaviour within the group of non-nursing professionals. It was not possible to investigate this further due to the very small number of non-nursing professionals available at the unit.

There is greater agreement between raters regarding frequency of aggressive and other challenging behaviours and management difficulty of aggressive behaviours. This may suggest that these features of challenging behaviour are more clearly defined within this setting. Management difficulty is defined in the CCB ratings in terms of the immediate response necessary to deal with the behaviour; the unit has clear protocols for reactive

strategies for each patients' behaviour and therefore there is a clear understanding among staff of the immediate management issues. Perhaps not surprisingly, there also appears to be shared understanding of the frequency with which challenging behaviours occur.

There appears to be more variation in the understanding of agitated behaviour measured using the ABS and management difficulty of non-aggressive challenging behaviour measured by the CCB as inter-rater reliability for these items is weaker. This might be because the staff were not formally introduced to the concept of agitation before completing the measure, and because protocols for managing non-aggressive challenging behaviour may rely more on subjective interpretation of when and how much to intervene.

There is poor inter-rater agreement for severity of aggressive behaviour (measured on the CCB) which could be an artefact of the particularly restricted range of scores for this measure. Severity ratings were based on physical harm caused, and therefore did not sample other kinds of severe consequences of behaviour. It would have been useful to broaden the rating of severity to account for other factors.

2.3 Hypothesis 2B

Hypothesis 2B is that there will be concordance between the screening measures - the ABS and CCB - and clinical records of challenging behaviour - Incident Reports and Event Records. The coherence of the construct of challenging behaviour was also addressed by comparisons between different types of ratings.

The screening measures failed to concord with clinical records and therefore the hypothesis was not supported. However, there was fairly good association between the two screening measures, the ABS and CCB. Also a consistently high association between frequency and management difficulty of challenging behaviour was evident both within and between different methods of measurement.

2.3.1 Methodological issues specific to Hypothesis 2B

The methodological issues discussed in section *2.1* above also apply to interpretation of the results from testing of Hypothesis 2B insofar as the clinical records in the form of Incident Reports and Event Records used to test Hypothesis 2B produced a high proportion of scores of zero.

In addition, difficulties arising from the design of the study may have contributed to the failure to find concurrent validity with clinical records. Comparisons between the screening measures are comparisons of scores within the same group of respondents whereas clinical records have been compiled by a range of other members of staff. Respondents for the screening measures were trained nurses (grade 'd' and above) while all grades of nursing and other clinical staff were involved in compiling clinical records. Therefore the failure to demonstrate concordant validity with clinical records may reflect differences between different groups of respondents.

The failure of the screening measures to concord with records of behaviour, may be because respondents differed in their exposure to patients' behaviour by not witnessing

important incidents of behaviour which occurred when they were not on shift. Every Incident Report and Event Record represents a directly witnessed incident; this is much less likely to be the case for the screening measures. The lack of concordance between the screening and clinical measures may therefore be affected by differences between retrospective interpretation using the screening measures and immediate experience. The context in which ratings are made is different therefore factors mediating respondents' perception of the behaviour may also be different.

Furthermore, the clinical records used appear to be inadequate as a basis for concordant validity of screening measures because the clinical records themselves may be unreliable. In a busy clinical setting, where there are numerous competing demands on staff, it is likely that the most severe incidents will be recorded but that those perceived as less severe may not be specifically recorded at the time. Even when incidents are considered severe enough to merit formal reports, these reports are of variable quality. Ongoing event recording is also likely to be unreliable for the same reasons. In addition, the event records used in this study measured frequency only and it is clear that frequency alone is not an adequate measure of challenging behaviour. It would be reasonable to expect prospective clinical ratings of management difficulty and severity as well as frequency to be more likely to concord with screening measures.

It is clear from the methodological issues that have arisen that the study encountered considerable pragmatic difficulties. Fitting the research study around the clinical workload was difficult, and reflects the realities of measuring behaviour in an applied setting. The study was adapted to be as practical as possible in this respect. However, a

great deal of effort was required to gather the data both on the part of the staff who responded and the researcher. Moreover, it appears that existing systems employed in the compilation of clinical records of behaviour are not of adequate scope for this depth of study.

2.3.2 Interpretation of the results from testing Hypothesis 2B

The lack of association between the screening measures used and clinical records may have been due to methodological problems. However, it may also be that the measures do not concord with each other because they relate to different underlying constructs. The two different forms of clinical records used, Incident Reports and Event Records, were not particularly associated with each other: Incident Reports relate to instances where there was actual physical harm or risk of physical harm or where control and restraint protocol had to be implemented to control risk while Event Records are ongoing records of instances of behaviour which may or may not be this severe. It may be that these methods record two separate sets of behaviours of different severity.

The results provide some indications of the structure of the construct of challenging behaviour. When similar measurement methods are used, frequency, management difficulty and severity of challenging behaviour are strongly associated with each other. A very strong association between frequency and management difficulty is found for clinical records, suggesting either that more frequent behaviour is perceived as a greater management difficulty or that behaviour perceived as a greater management difficulty is recorded more frequently. Strong associations between frequency and management difficulty are evident also within the Checklist of Challenging Behaviour. Associations

between frequency and management difficulty are also found, though much more modest, between different measurement methods: CCB management difficulty is modestly related to Incident Report data on frequency; Incident Reports severity and Event Records frequency of non-aggressive challenging behaviour are modestly related. These findings are similar to those of Lowe and Felce's (1995) study of direct care staff working with people with learning disability and challenging behaviour that there is an association between care staff's evaluations of the frequency of behaviour and severity of management difficulty, with more frequent behaviours more often being rated as severe.

The Agitated Behaviour Scale was designed to measure agitation, not challenging behaviour. Nevertheless, it is moderately associated with the Checklist of Challenging Behaviour, a measure which specifically addresses challenging behaviour. This is likely to be because the concept of agitation overlaps considerably with the presentation of patients with acquired brain injury and challenging behaviour. In particular, this group of patients displays aggression and disinhibited behaviour associated with moderate to severe cognitive impairment. The ABS can be divided into three factors (aggression, disinhibition, and lability), and cognitive impairments - specifically attentional deficits - have been associated with agitation in brain injured patients and therefore the ABS appears to be representative of the patient group in this study. The use of the ABS in this context warrants further investigation in order to explore the relationship between agitation and challenging behaviour after acquired brain injury. In particular, it would be useful to investigate whether the association between agitation and challenging behaviour is accounted for by particular factors from the ABS and

whether the ABS corresponds more closely with some presentations or types of challenging behaviour than others.

2.3.3 Summary of findings from Part Two

Results from part two of the study support the hypothesis of a shared understanding of the concept of challenging behaviour among staff at the unit measured using the Checklist of Challenging Behaviour and Agitated Behaviour Scale. Frequency and management difficulty of aggression and frequency of other challenging behaviours are constructs which appear to be well defined in this setting, producing a high level of inter-rater agreement. On the other hand, there is greater variation in interpretations of agitation and management difficulty of non-aggressive challenging behaviours, though still a reasonable level of agreement between staff regarding these constructs, and agreement regarding severity of challenging behaviour is poor. Overall, levels of agreement between nurses' ratings are more consistently high than levels of agreement between nurses and other professionals.

The hypothesis that screening measures such as the ABS and CCB would have good concordant validity with clinical records was not supported. Nevertheless, there was fairly good association between the ABS and CCB, confirming the assumption that agitation and challenging behaviour are related constructs in patients with challenging behaviour following acquired brain injury. Furthermore, a consistently high association between frequency and management difficulty of challenging behaviour was evident both within and between different methods of measurement.

2.4 Measurement issues – suggested development of the screening measures

In Part Two of the study, almost all of the measures of challenging behaviour produced a restricted range of scores with a high proportion of scores of zero. The exception was the Agitated Behaviour Scale, measuring the related construct of agitation, which produced a reasonable range of scores. This finding of apparently low rates of challenging behaviour within the unit was unexpected. Although the low range of scores on the measures of challenging behaviour could suggest low rates of challenging behaviour within the unit, it could be explained by insensitivity of the measures to clinically significant events. For example, if only one episode of challenging behaviour creates difficulties for management during a period of seven days, then this is clinically significant but the resulting score for the CCB would be very low. The CCB includes an 'other' category to describe behaviour which may have occurred but is not covered by the items on the checklist. The 'other' category was not included in the scoring and therefore these behaviours were not reflected in the results. Additionally, the measures were completed for a seven day period and may therefore have failed to detect relatively infrequent challenging behaviour which may have serious consequences.

Another drawback of the CCB is its failure to account for difference in the wider disruption behaviours may cause. The CCB scoring categories attempt to address the differences between frequency, management difficulty and severity of challenging behaviour. However, the ratings of management difficult are restricted to the immediate interventions required to deal with an episode of challenging behaviour and severity ratings are limited to physical harm caused. These items do not account for the full range of consequences of challenging behaviour nor do they accommodate the

importance of cultural norms for the definition of challenging behaviour. Furthermore, the CCB items are all scored with equal weight and summed scores may misrepresent important features of the behaviour: for example, several minor challenging behaviours would appear to be the same as a few serious ones, or many different types of behaviour each occurring infrequently would appear the same as very frequent episodes of one particular form of behaviour. Some of these problems could be overcome by devising weightings for different items based on staff perceptions of the level of challenge presented by each. The use of standardised measures will always result in some loss of detail of the individual case: however, the measures need to be refined to include important elements of the concept of challenging behaviour which they do not currently address directly.

3. Theoretical Implications of the Results

3.1 The definition of challenging behaviour in practice

Challenging behaviour is defined by its consequences and within a social context (after Emerson 1995). Despite difficulty adequately addressing these issues in this study, the findings are consistent with challenging behaviour as a socially defined construct.

In Part One the interpretation of challenging behaviour was investigated using ratings of particular types of consequences in relation to vignette material. Discrepancies between actual physical harm caused and ratings of threat of physical harm for vignette4 - which dealt with potential for extremely socially unacceptable behaviour - are consistent with cultural norms as important defining features of challenging behaviour. The definition

of challenging behaviour as context dependent is also borne out in the results as it appears that the collective understanding of challenging behaviour is restricted to the work context of the unit, and not necessarily extrapolated to other settings. In particular, 'overall management difficulty' appears to be understood by staff in terms of immediate management difficulties within the unit such as 'threat to physical safety of staff and other patients', and not so much within the context of the patients' overall development and the restrictions on their access to community settings.

In Part Two, separate ratings for frequency, management difficulty and severity of behaviour were used to measure consequences of challenging behaviour. However, the severity rating is limited to physical harm caused, and management difficulty is determined by the number of staff needed to manage the behaviour - therefore these ratings did not adequately represent the range of potential consequences of challenging behaviour. The very low range of scores for the CCB, as well as low prevalence of challenging behaviour from clinical records, may be related to the capacity of the unit to contain the behaviours and their consequences: challenging behaviour is less directly challenging in a setting which specialises in managing the behaviour. However, the low scores on the measures of challenging behaviour may misrepresent the more subtle consequences of the behaviours outwith the relatively basic criteria being measured.

The wider issues of service provision for the patients are not addressed. This study took place within a unit which, although informed by psychological theory, is medically led. The concept of challenging behaviour emerged from attempts to provide adequate social and healthcare provision for people with learning disabilities and the focus of these

efforts was socially rather than medically orientated and aimed to maximise the individual's integration into society. To some extent, the unit could be seen as medically institutionalised; despite attempts to extract itself from this, it is embedded within a wider service structure.

Emerson conceptualises challenging behaviour as a social construction. Definition of challenging behaviour in a particular setting depends on: norms and expectations concerning behaviour in that setting; ability of the person to give a plausible account of the behaviour; beliefs held by others in the setting; capacity of the setting to manage any disruption caused. Differences in level of experience, competence, stress, and fatigue amongst members of staff are likely to impact on the setting's capacity to cope - none of these factors is static and therefore, in reality, the range of processes by which the behaviour is defined may be constantly changing and it should not be surprising that accurate definition is very difficult.

There are many intervening factors which may influence the way in which staff evaluate a patient's pattern of behaviour. For example, when staffing levels are low, severity of challenging behaviour may be perceived as greater (MacDonald and Barton 1986). The emotional state of the respondent may also affect their evaluation of patients' behaviour. For example, Dagnan et al. (1998) found that helping behaviour in carers was related to optimism, which was related to aversive emotional state in reaction to the patients' behaviour, which in turn was related to an attribution of controllability of the behaviour. In this example, the carers appear to be motivated to alleviate their own unpleasant

emotional state by providing extra help to the person when the person's behaviour is perceived as controllable. It seems reasonable to assume that the more unpleasant the observer's emotional reaction to a patient's behaviour, the more likely the observer is to perceive the behaviour as presenting a management difficulty. In addition, as well as staff emotional responses to challenging behaviour, attributions about causes of challenging behaviour may interact to affect staff response to behaviour (Hastings 1997), and so such attributions should probably be presumed to be involved in the perception of behaviour as challenging.

Demonstration of shared understanding of challenging behaviour in the study is more notable given the complexity of the concept and the many mediating influences on staff interpretations of challenging behaviour. As the study took place in an applied setting it was not possible to control for the many potential influences on respondents' interpretations of challenging behaviour. Nevertheless, the positive findings of shared understanding of the concept of challenging behaviour suggest that this is a robust concept which makes clear intuitive sense and is applicable in clinical settings.

3.2 Further development of measures

The measures used in this study fail to adequately address the issue of social validity. Because challenging behaviour is a complex social phenomenon it is important to evaluate its social significance and the social significance of the outcomes of interventions from a range of viewpoints. It is essential to establish for whom the behaviour presents a challenge but the measures in this study address one set of viewpoints only - those of staff working directly with these patients. If quick screening

measures are to be useful, they may need to be accessible to use by other interested parties such as patients, their relatives and staff in other settings where challenging behaviour may be encountered.

Emerson (1991) advocates a multifaceted approach to measuring meaningful outcomes of behaviour and behavioural interventions. He proposes that this should include: the behaviour shown by the person; replacement skills and behaviours; procedures for managing the person's behaviour; health-related consequences of the behaviour such as trauma; restrictiveness of residential or vocational settings; broader aspects of the person's life such as physical and social integration, personal life satisfaction, affect, and range of choices; perceived significance of the person's challenging behaviour by others such as family, staff and the general public. If standardised measures of challenging behaviour are to be developed, they need to be used as part of a detailed person-centred assessment.

The results of this study suggest that the scales used may be a useful basis for development of standardised measures of challenging behaviour. Behaviour scales developed in brain injury have tended to focus on the neurobehavioural sequelae of brain injury, e.g. the Neurobehavioural Rating Scale (Levin et al. 1987). Future development of scales needs to address more directly the social context of behaviour by asking directly about social causes and consequences of behaviour as well as the form of the behaviour.

Some specific changes to the scales used in this study have already been suggested such as weighting of items on the Checklist of Challenging Behaviour. The potential usefulness of the screening measures for detecting intervention effects and differences between groups has not been addressed in this study because of the limited timescale, but further work on screening measures of challenging behaviour will need to address sensitivity to changes in the person's behaviour. The Agitated Behaviour Scale has previously been thoroughly standardised and therefore would be expected to be sensitive to changes in agitation; however, whether changes in agitation might be related to changes in challenging behaviour has not been investigated and would provide useful information about the relationship between the concepts of agitation and challenging behaviour. The authors of the Checklist of Challenging Behaviour (Harris et al. 1994) report that the CCB is not sensitive enough to detect change at an individual level, and therefore this measure requires further development. Although inter-rater reliability was fairly good for some of the measures used, due to the methodological problems with this study, replication of these results would be desirable. The staff in this study received no special training in completing the screening measures because the study aimed to identify measures which could be used easily by direct care staff. However, development of measures would usefully include development of training in use of the measures to maximise their reliability. In this study it was very difficult to demonstrate concordant validity, partly because the comparison measures used appeared to inadequately describe the range of consequences of challenging behaviour. Future work to develop screening measures of behaviour will need to identify suitable comparison measures or criteria for construct validity.

Demonstration of a shared understanding of the concept of challenging behaviour is a necessary condition for the development of standardised measures of the concept. Having demonstrated some usefulness of the screening measures in one particular setting, future development in this and other settings is warranted.

3.3 Further development of the theory of challenging behaviour in brain injury settings

The model of challenging behaviour applied here, which was initially developed to try to understand the service challenges faced for people with learning disabilities, is also useful for people with acquired brain injury and challenging behaviour, although further work to develop the concept of challenging behaviour is also warranted for work with people with acquired brain injury. More general assessment of perceptions of challenging behaviour would help to address the views of service planners and people in the wider community within which the patients live.

In particular, the processes by which behaviour is defined as challenging in acquired brain injury could be further investigated. The advantages of vignette-based methods as a tool for investigating the definition of challenging behaviour have already been discussed. In particular, expansion of the measure was suggested to include ratings of discrepancy from social norms, emotional responses to the behaviour, perceived potential for change, and challenges for the person's overall development. Questions such as how normative judgements are related to the definition of challenging behaviour, and how others' expectations of the person with acquired brain injury influence reactions to the person's behaviour might also be addressed.

Work carried out with staff carers of people with learning disabilities and challenging behaviour has attempted to measure emotional responses to challenging behaviour (Mitchell and Hastings 1998), beliefs about challenging behaviour (Hastings 1997) and how these affect helping behaviour (Dagnan et al. 1998, Bromley and Emerson 1995). This literature could be used as a resource for developing similar research with staff working with people who have acquired brain injury and challenging behaviour, and indeed with other patient groups with whom challenging behaviour may be seen such as inpatients on psychiatric wards.

More in-depth understanding of the influences involved in the definition of challenging behaviour would allow development of measures to specifically measure these. Such measures might, for example, prove useful in assessing the capacity of a particular setting or set of carers to cope with a person's challenging behaviour and in identifying potential difficulties to be overcome when planning discharge from a ward-based to a community-based setting. Measures which focus not on the behaviour itself but on the social consequences of the behaviour may be more likely to detect meaningful outcomes.

4. Summary of Conclusions

Given the complexity of the concept, and the numerous influences on it, the study reveals a remarkable level of agreement between staff regarding the recognition of challenging behaviour. This is demonstrated in clinical measurements of patients' actual behaviour as well as ratings of fictional vignette-based material. Therefore it is

reasonable to conclude that within this relatively heterogeneous staff group who share an applied theoretical approach to management of behaviour, challenging behaviour is a meaningful concept applicable to the clinical setting. The model of challenging behaviour applied here, which was initially developed to conceptualise the challenges faced by services for people with learning disabilities, has been found to be applicable with people with acquired brain injury and challenging behaviour and this study provides a starting point for further work.

The results obtained using the CCB and ABS form the groundwork for development of standardised measures of challenging behaviour. These might be further developed by weighting items, training staff in their use, and the addition of scales to specifically measure factors which mediate the definition of challenging behaviour such as emotional response to the behaviour, perceived potential for harm and for effective intervention, and social consequences of behaviour. Although the study did not set out to investigate the social nature of the definition of challenging behaviour, the results illustrate that social context is central to an understanding of the concept.

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APPENDICES

Appendix 1: Vignettes measure

1.1 Instructions and rating scales.

Please read the following brief description and answer the questions below.
(Vignette inserted here)

Answer the following questions about what you have just read. You have been given very little information compared to that you might have if you worked with _____. Therefore, answer the questions as best you can with the information available. There are no right or wrong answers. I am interested in **your opinion** of the behaviour described.

1. Circle one response to rate the **overall severity of management difficulty** posed by the behaviour described.

0	1	2	3	4
No Management Difficulty	Mild Management Difficulty	Moderate Management Difficulty	Severe Management Difficulty	Very Severe Management Difficulty

2. Circle one response to rate the degree to which the **physical safety of the patient** is threatened.

0	1	2	3	4
No Threat	Mild Threat	Moderate Threat	Severe Threat	Very Severe Threat

3. Circle one response to rate the degree to which the **physical safety of others** is threatened.

0	1	2	3	4
No Threat	Mild Threat	Moderate Threat	Severe Threat	Very Severe Threat

4. Circle one response to rate the impact of the behaviour on the **patients** access **to community facilities.**

0	1	2	3	4
No Impact	Mild Impact	Moderate Impact	Severe Impact	Very Severe Impact

5. Are there any additional factors which you think make the behaviour difficult to manage?

6. Are there any features which you think make the behaviour easier to manage?

1.2 Vignettes

Vignette 1. Darren.
Darren is a young man who sustained brain injury three years ago when he was seriously assaulted outside a pub after a night out. He is independent in self-care and mobility but has cognitive deficits resulting from the injury which mean he needs help with everyday living. He occasionally has episodes of very severe aggression towards others which have resulted in the breakdown of living arrangements in the community. There are no clearly identified triggers to his aggression. In the most recent incident, 3 months ago, Darren grabbed a member of care staff by the throat and tried to strangle him. Two members of staff were needed to control this aggressive episode. In the past, assaults by Darren on others have resulted in broken bones. Afterwards, Darren reports being scared that the person he attacked was going to hurt him.

Vignette2. Sophie.
Sophie has severely impaired cognition and requires a wheelchair to mobilise following severe brain injury sustained in a car crash nine months ago. Sophie is verbally aggressive to the people who care for her. Most days, she shouts and swears at care staff and once or twice a week she makes verbal threats that she will harm staff. Sometimes (about three times a month), Sophie nips or scratches staff causing minor skin abrasions. Instances of verbal and physical aggression seem to be associated with attempts to get her basic needs met, for example, help with toiletting and help with pain relief. Normally, Sophie's challenging behaviours subside when these needs are met.

Vignette3. Paul.
Paul was resuscitated after an attempt to hang himself five months ago. He suffered anoxic brain damage and is also being treated for depression. Although he retains most self care skills, he does not initiate these without prompts from another person. He spends a great deal of his time alone in his room and does not initiate contact with other patients. When he does interact with others it is normally to ask staff when his wife is next coming to visit him. He asks repeatedly about this at least twice a day, asking the same questions over and over for up to twenty minutes before staff are able to reassure him.

Vignette4. Colin.
Colin suffered moderate brain injury as a result of a fall down stairs when he was under the influence of alcohol. He has made reasonable progress in his rehabilitation. However, when staff from the rehabilitation unit took him swimming at a local public pool, they noticed him staring at some children who were swimming nearby. When asked why he was staring, Colin said he was 'turned on' by watching the children. Staff redirected Colin away from the children and told him it was unacceptable to stare in this way. Staff no longer feel comfortable about taking Colin out into community settings as part of his rehabilitation.

Appendix 2: Covering letter accompanying vignettes measure

Dear colleague

I am currently doing research on methods of measuring challenging behaviour. As part of this, I am interested in how challenging behaviour is defined. A wide variety of different behaviours and situations are covered by the term 'challenging behaviour' and there is a subjective element to decisions about what constitutes challenging behaviour.

To investigate this I have developed the attached questionnaire for staff. It consists of a few short fictional case descriptions which I would like you to rate in terms of some factors which may influence whether the behaviour described is defined as challenging behaviour. There may be other aspects of the behaviour or situation which influence how challenging this behaviour is and I am interested in your ideas about these too.

Participation in this research is voluntary and responses are anonymous. I have asked for some personal details such as profession and length of experience working with people with challenging behaviour because I want to check whether these kinds of differences between people make a difference to the way they define challenging behaviour. These details will be kept confidential, they will not be seen by anyone except me, and will not be used to identify individual members of staff.

If you wish to take part, please fill in the questionnaire, following the instructions given on each page and return it as soon **as possible.** I hope to have most of them back **before the end of March 2000** so that I can analyse the results. When filling in the questionnaire it would be helpful if you did not consult anyone else. Please put completed questionnaires in the folder marked **'QUESTIONNAIRES FOR JO'** which is in Shona's pigeon hole in the non-smoking staffroom.

I will let you know the results of the project when these are available (in summer 2000). I am usually in on Tuesdays and Wednesdays and would be pleased to hear your comments or answer any questions you might have about the project.

Many thanks,

Jo Gouick

Psychologist in Clinical Training

Appendix 3: Demographics questionnaire accompanying vignettes measure

Definition of Challenging Behaviour - Questionnaire

Please complete the following details before completing the questionnaire.

Date_____

Your profession and grade _____

Length of experience working with people with challenging behaviour

_____ years/ _____ months

For how long have you worked at RFU ? _____ years/ _____ months

Your age _____ years

Do you work **FULL TIME / PART TIME** ? (Circle as appropriate)

Are you **MALE / FEMALE** (Circle as appropriate)

During the **past four weeks** have you worked in

WARD 13 ONLY **WARD 17 ONLY**

BOTH WARD 13 AND WARD 17 **OTHER** (Circle as appropriate)

This information will be treated as confidential.

Please return this sheet with the completed questionnaire by putting it in the folder marked "QUESTIONNAIRES FOR JO" which is in Shona's pigeon hole in the non-smoking staffroom.

Appendix 4: Agitated Behaviour Scale

Agitated Behaviour Scale

Corrigan, J. D. (1989) J. Clin. Exp. Neuropsychology II pp 261-77

Patient_____ Staff (rater)_____

Date _____ Time_____

Rate whether the patient has shown the following behaviours **during the past seven days** and if so to what degree. The degree can be based on either the frequency of the behaviour or the severity of a given incident, use the numerical ratings below. DO NOT LEAVE BLANKS.

Score **Behaviour**

_____ 1. Short attention span, easy distractibility, inability to concentrate.

_____ 2. Impulsive, impatient, low tolerance to pain or frustration.

_____ 3. Unco-operative, resistant to care, or demanding.

_____ 4. Violent and/or threatening violence towards people or property.

_____ 5. Explosive and unpredictable anger.

_____ 6. Rocking, rubbing, moaning or other self-stimulating behaviour.

_____ 7. Pulling at tubes, clothing etc.

_____ 8. Wandering from treatment areas.

_____ 9. Restlessness, pacing, excessive movement.

_____ 10. Repetitive behaviours, motor and/or verbal.

_____ 11. Rapid, loud or excessive talking.

_____ 12. Sudden changes of mood.

_____ 13. Cries easily or excessively.

_____ 14. Self-abusiveness, physical or verbal.

_____ Total

Rating Codes

0 = absent
1 = present to a slight degree
2 = present to a moderate degree
3 = present to an extreme degree

Appendix 5: Checklist of Challenging Behaviour

5.1 Rating scales for Checklist of Challenging Behaviour

Rating Scales for Checklist of Challenging behaviour (P.T.O.)

Frequency
How often has the behaviour occurred during the past week?

1 =	never	this behaviour has not occurred during the past week
2 =	occasionally	has occurred 1 or 2 times in the past week
3 =	often	has occurred 4-7 times in the past week
4 =	very often	has occurred 1 or 2 times each day for the past week
5 =	extremely often	has occurred more than 2 times each day for the past week

Management Difficulty
How difficult do you find it to manage this situation?

1 =	no problem	I can usually manage this situation without any difficulty at all
2 =	occasionally	I can manage this situation quite easily although it does cause me some difficulty
3 =	often	I find this situation quite difficult to manage, but I feel confident that I can
4 =	very often	I need help from another person to manage this situation
5 =	extremely often	I need help from two or more people to manage this situation

Severity
What were the most serious injuries caused by this behaviour during the past week?

1 =	no injury	Did not appear to cause pain or tissue damage
2 =	minor injury	Caused superficial scratching or reddening of skin. First aid or medical attention was not needed.
3 =	moderate injury	Caused moderate tissue damage (e.g. breraking the skin or causing bruises/ sprains). First aid but not medical attention required.
4 =	serious injury	Caused serious tissue damage (e.g. cuts/ wounds requiring stitching). Medical attention essential.
5 =	very serious injury	Caused very serious tissue damage (e.g. broken bones, deep lacerations/ wounds). Hospitalisation and / or certified absences from work necessary.

5.2 Checklist of Challenging Behaviour

Checklist of Challenging Behaviour
Harris et al. Mental Handicap Research 1994 Vol 7 (2) 118-133

Date _____ Time_____

Patient _____ Rater_____

Has the person exhibited any of the following behaviours during the past week? Use the attached scales to rate frequency, management difficulty and severity.

F = Frequency MD = Management Difficulty S = Severity

Aggressive Behaviours	**Enter Appropriate Numbers**		
	F	**MD**	**S**
1. Pinching people	____	____	____
2. Biting people	____	____	____
3. Scratching people	____	____	____
4. Punching or slapping people	____	____	____
5. Grabbing, squeezing, pushing or pulling people	____	____	____
6. Kicking people	____	____	____
7. Headbutting people	____	____	____

	F	MD	S
8. Pulling people's hair	____	____	____
9.Choking or throttling people	____	____	____
10. Using objects hand held objects as weapons against people.	____	____	____
11. Throwing things at people	____	____	____
12. Tearing other people's clothes	____	____	____
13. Making unwanted sexual contact	____	____	____
14. Injuring self (e.g. head banging, eye poking, biting or scratching self)	____	____	____

15. Does the person exhibit any other type of aggressive behaviour (circle y/n) ?

Yes **No**

If yes, please describe:

Other challenging behaviours	**Enter appropriate number**	
	F	**MD**
1. Damaging clothes, furniture or other objects	____	____
2. Smashing (or attempting to smash) windows	____	____
3. Slamming doors	____	____
4.Shouting and swearing at people	____	____
5.Making loud noises (e.g. banging, screeching, screaming)	____	____
6. Threatening to hurt others (verbally or non-verbally)	____	____
7. Taking food or drink from others	____	____
8. Eating inappropriate things (e.g. rubbish, faeces. dangerous objects)	____	____
9. Displaying ritualistic or repetitive behaviour (e.g. closing/ opening doors, rearranging furniture, hoarding rubbish etc.)	____	____
10. Engaging in stereotyped behaviour (e.g. body-rocking, finger-tapping, hand waving etc.)	____	____

	F	MD
11. Showing withdrawn behaviour (i.e. difficult to reach or contact)	____	____
12. Spitting at people	____	____
13. Deliberate soiling, wetting or vomiting	____	____
14. Deliberately smearing or flicking faeces (or anal probing).	____	____
15. Exposing his or her body inappropriately (e.g. stripping or masturbating in public)	____	____
16. Refusing to do things (e.g. eat or move)	____	____
17. Absconding or trying to abscond	____	____
18. Causing night time disturbance	____	____

19. Does the person exhibit any other type of challenging behaviour (circle y/n) ?

Yes **No**

If yes, please describe:

_____

Appendix 6: Comprehensive Inventory for Rehabilitation

6.1 Rating scales for C.A.I.R.

Comprehensive Assessment Inventory for Rehabilitation
(Haffey and Johnson 1989)

Behaviour Frequency Scale

0 = None in the past week.	i.e. during the past seven days
1 = Occassionally.	1-2 times in the past week
2 = Frequently.	3-7 times in the past week
3 = Very frequently.	8-14 times in the past week
4 = Extremely frequently.	15 times or more in the past week.

Social Behaviour Disruption Scale

Rate the impact of the **worst episode** of behaviour.

0 =	None	The behaviour has not occurred.
1 =	Mildly Disruptive Behaviour	The behaviour is situationally inappropriate but does not overtly interfere with other peoples' activities/ routines.
2 =	Moderately Disruptive Bhaviour	The behaviour interrupts normal ongoing environmental activities or routines, but resumption of these is accomplished with little or no effort on the part of others. no risk of physical harm/ danger to anyone or anything.
3 =	Severely Disruptive Behaviour	The behaviour is so disruptive that restoration of normal ongoing activities/ routines is accomplished only when people in the setting expend time/ effort to manage the behaviour. No actual physical harm/ injury to any person.
4 =	Very Severely Disruptive Behaviour	The behaviour involves some harm/ injury or poses an unacceptable threat of physical harm/ injury. Person has to be removed from the setting and/ or chemical/ physical restraint employed.
5 =	Totally Disruptive	The behaviour cannot be appropriately managed in this setting. Discharge to another facility is required.

6.2 Comprehensive Assessment Inventory for Rehabilitation: Section on Impairment of Behaviour Pattern.

Verbal Behaviours - C.A.I.R.

Patient _____ Staff (rater)_____

Date _____

Rate the approximate frequency in the past week of the verbal challenging behaviours listed below. If the behaviour has occurred, rate the degree **of social disruptiveness of the worst incident.**

	Frequency	Disruptiveness
1. Verbally abuses others	_____	_____
2. Verbally threatens to harm property	_____	_____
3. Verbally threatens to harm others	_____	_____
4. Verbally threatens to harm self	_____	_____
5. Verbally threatens suicide	_____	_____
6. Screaming, shouting or other verbally disruptive behaviour (e.g. excessive swearing, profanities)	_____	_____
7. Excessive argumentative/ oppositional behaviour when asked to do something	_____	_____
8. Demanding, complaining verbal behaviour	_____	_____
9. Makes sexually offensive/ vulgar or obscene remarks	_____	_____
10 Other (specify)	_____	_____

_____

Physical Actions - C.A.I.R.

Rate the approximate frequency in the past week of the verbal challenging behaviours listed below. If the behaviour has occurred, rate the degree **of social disruptiveness of the worst incident**.

	Frequency	Disruptiveness
20. Physically threatens to harm people (no actual harm/contact)	_____	_____
21. Violates others' personal space (no specific threat to harm or actual harm/ contact)	_____	_____
22. Physically strikes, hits, bites, kicks others	_____	_____
23. Self abusive self injurious actions	_____	_____
24. Makes suicidal gestures	_____	_____
25 Attempts suicide	_____	_____
26. Agitated behaviour such as thrashing limbs, rapid pacing, excessive movement, wandering	_____	_____
27. Attempts to leave the treatment center inappropriately (i.e. leaving would endanger self or others)	_____	_____
28. Leaves treatment centre inappropriately (i.e. endangering self or others)	_____	_____
29. Touches others in sexually offensive/ aggressive/ inappropriate ways.	_____	_____
30. Displays body inappropriately e.g. undresses in public	_____	_____

	Frequency	Disruptiveness
31. Regressive behaviour e.g. deliberate smearing of faeces, oral exploration of non-food objects	_____	_____
32. Destroys/harms/steals others property	_____	_____
33. Destroys/ harms own property	_____	_____
34. Other (specify)	_____	_____

_____

Appendix 7: Codes for Rating Incident Reports

Behaviour Type

Code	Description
1	Physical aggression directed at another person (includung threatening gestures) OR Physical aggression directed at self (self harm)
2	Verbal aggression directed at other, self or object
3	Any other challenging beahviour including aggression directed towards objects.
Not coded	Challenging behaviour directed at the patient by another person Accidental injury e.g. caused by a fall

Severity

Behaviour type	Codes and descriptions
Physical aggression	0 = no tissue damage 1 = minor tissue damage - no first aid or medical attention needed eg. superficial scratching, reddening of the skin 2 = moderate damage - first aid but no medical attention needed eg. breaking the skin or causing bruising/ sprains 3 = severe damage - medical attention essential eg-cuts/wounds requiring stitching 4 = very severe damage - hospitalisation and/or certified absences from work necessary eg. broken bones, deep lacerations
Verbal aggression	1 = minor - aggressive vocalisation **not** clearly directed at another person 2= moderate - mild personal or other aggressive vocalisations clearly directed at another person 3 = severe - threats clearly directed at self or others, may include swearing / offensive sexual comments. 4 = very severe - clear threat of violence directed at self or others eg . 'I'm going to kill you'
Other challenging behaviour	If no aggression directed towards self or others rate disruption to ward activities - use duration of behaviour and time required to manage it to guide your decision 0 = no disruption to ward activities described 1 = minor disruption 2 = moderate disruption 3 -= severe disruption 4 = very severe disruption

Management difficulty – for all types of behaviour

Code	Description
0	no management difficulty described.
1	managed using minimal intervention eg. verbal redirection only, including verbal prompt to take as-required medication
2	managed using physical redirection or approved control and restraint techniques from one person in addition to verbal management
3	Two or more people required for physical redirection / approved control and restraint.
4	Pharmacological restraint in addition to approved control and restraint

Appendix 8: Table of results, Hypothesis 1B(i.)

Hypothesis 1B(i.), comparisons between professional groups : nurses grad 'a' (N =11), nurses grades 'd'-'g' (N =10), other professionals (N = 7). Results of Kruskal-Wallis test , H and (p) reported, df= 2.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	2.685 (.261)	2.525 (.283)	3.89 (.143)	1.085 (.581)
PP	.703 (.703)	.359 (.836)	.341 (.843)	1.46 (.482)
PO	3.123 (.210)	.336 (.845)	1.468 (.480)	.345 (.841)
CA	2.904 (.234)	.989 (.610)	.990 (.609)	.777 (.678)

Key to table

* marginally non-significant at $p < .05$
** significant at $p < .01$

MD = Overall management difficulty
PO = Threat to physical safety of others
PP = Threat to physical safety of patient
CA = Impact on access to community facilities

Appendix 9: Tables of Results, Hypothesis 1B(ii.)

Hypothesis 1B(ii.), comparisons between groups by length of employment at the unit: 12 months and less (N =10); more than 12 months (N =17). Results of Mann-Whitney tests, 1-tailed , U and (p) reported.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	75 (.639)	64 (.309)	66.5 (.359)	37.5* (.015)
PP	58.5 (.187)	48* (.066)	75 (.639)	34** (.009)
PO	53 (.115)	62 (.264)	77.5 (.711)	49 (.074)
CA	51 (.093)	81 (.863)	59 (.204)	63 (.286)

Hypothesis 1B(ii.), comparisons between groups by length of employment at the unit: 24 months and less (N =14); more than 24 months (N =13). Results of Mann-Whitney tests, 1-tailed, U and (p) reported.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	65 (.220)	65.5 (.220)	73.5 (.402)	38** (.009)
PP	75 (.458)	59.5 (.128)	89 (.943)	52* (.061)
PO	51 (.054)	43* (.019)	17.5 (.35)	37** (.008)
CA	55 (.085)	68.5 (.280)	82 (.685)	59.5 (.128)

Hypothesis 1B(ii.), comparisons between groups of nurses by length of employment at the unit: 12 months and less (N =8); more than 12 months (N =12). Results of Mann-Whitney tests, 1-tailed , U and (p) reported.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	45 (.851)	33 (.27)	29.5 (.157)	21* (.039)
PP	35 (.343)	27 (.115)	44.5 (.792)	23* (.057)
PO	30 (.181)	37.5 (.427)	40.5 (.571)	33.5 (.270)
CA	26.5 (.098)	40.5 (.571)	38 (.473)	44 (.792)

Hypothesis 1B(ii.), comparisons between nurses by length of employment at the unit: 24 months and less (N =10); more than 24 months (N =10). Results of Mann-Whitney tests, 1-tailed, U and (p) reported.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	39 (.436)	33.5 (.218)	38 (.393)	16.5** (.009)
PP	38.5 (.393)	28 (.105)	42.5 (.579)	26 (.075)
PO	27.5 (.089)	29.5 (.123)	39 (.436)	26.5 (.075)
CA	23.5* (.043)	41.5 (.529)	42 (.579)	36 (.315)

Key to tables
* marginally non-significant at $p < .05$
** significant at $p < .01$

MD = Overall management difficulty
PO = Threat to physical safety of others
PP = Threat to physical safety of patient
CA = Impact on access to community facilities

Appendix 10: Tables of Results, Hypothesis 1B(iii.)

Hypothesis 1B(iii.), comparisons between groups by length of experience with people with challenging behaviour: 48 months or less (N = 13); more than 48 months (N = 14). Results of Mann-Whitney tests, 1-tailed, U and (p) reported.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	91 (1.0)	86.5 (.83)	81.5 (.65)	90 (.981)
PP	78 (.55)	90 (.981)	49.5* (.043)	83 (.720)
PO	67.5 (.259)	65 (.22)	71.5 (.35)	79 (.583)
CA	71 (.35)	87.5 (.867)	71 (.35)	83.5 (.72)

Hypothesis 1B(iii.), comparisons between groups by length of experience with people with challenging behaviour:0-24 months (N = 6);25-48 months (N = 7); 49-72 months (N=6); more than 73months (N =6). Results of Kruskal-Wallis test, H and (p) reported, df = 3.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	.047 (.997)	5.261 (.154)	3.663 (.3)	8.061* (.045)
PP	1.775 (.620)	2.546 (.467)	4.547 (.208)	4.937 (.177)
PO	10.395* (.015)	4.11 (.250)	2.335 (.506)	4.064 (.255)
CA	1.454 (.693)	2.653 (.448)	2.352 (.503)	1.544 (.672)

Hypothesis 1B(iii.), comparisons between nurses by length of experience with people with challenging behaviour: 48 months or less (N = 11); more than 48 months (N = 9). Results of Mann-Whitney tests, 1-tailed, U and (p) reported.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	44.5 (.710)	45 (.766)	37 (.37)	48.5 (.941)
PP	48.5 (.941)	48.5 (.941)	18.5* (.016)	42 (.603)
PO	38.5 (.412)	36 (.331)	44.5 (.710)	47.5 (.882)
CA	45.5 (.766)	44.5 (.710)	49 (1.0)	45 (.766)

Hypothesis 1B(iii.), comparisons between nurses by length of experience with people with challenging behaviour:0-24 months (N = 5);25-48 months (N = 6); 49-72 months (N=4); more than 73months (N =5). Results of Kruskal-Wallis test, H and (p) reported, df = 3.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	.232 (.972)	3.597 (.308)	3.565 (.312)	6.730 (.081)
PP	1.066 (.785)	3.056 (.383)	6.377 (.095)	6.955 (.073)
PO	9.527 (.023)	3.977 (.264)	2.427 (.489)	4.589 (.205)
CA	2.797 (.424)	1.708 (.635)	.498 (.919)	4.341 (.227)

Key to tables
* marginally non-significant at $p < .05$
** significant at $p < .01$

MD = Overall management difficulty
PO = Threat to physical safety of others
PP = Threat to physical safety of patient
CA = Impact on access to community facilities

Appendix 11: Tables of Results, Hypothesis 1B(iv.)

Hypothesis 1B(iv.), comparisons between groups by age: 23-31 years (N=8);33-38 years (N = 9);39-50year (N = 8). Results of Kruskal-Wallis tests, H and (p) reported, df = 2.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	.215 (.898)	.520 (.771)	.247 (.884)	2.861 (.239)
PP	.225 (.894)	2.404 (.301)	1.034 (.596)	3.3 (.192)
PO	5.063 (.080)	2.338 (.311)	.971 (.615)	1.176 (.555)
CA	1.375 (.503)	1.533 (.465)	3.709 (.157)	2.640 (.267)

Hypothesis 1B(iv.), comparisons between nurse by age: 23-31 years (N=7);33-38 years (N = 6);39-52 years (N = 6). Results of Kruskal-Wallis tests, H and (p) reported, df = 2.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	.524 (.770)	.775 (.679)	.110 (.946)	2.861 (.239)
PP	.144 (.931)	.842 (.656)	1.399 (.497)	2.225 (.329)
PO	5.077 (.079)	1.340 (.512)	.191 (.909)	.871 (.647)
CA	1.174 (.556)	1.198 (.549)	.261 (.877)	.888 (.642)

Hypothesis 1B(iv.), comparisons between groups by age23-28 years (N=4);29-34 years (N = 6);35-40 years (N = 9), 41-46 years (N=3), 47-52 years (N=3). Results of Kruskal-Wallis tests, H and (p) reported, df = 4.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	5.937 (.204)	2.268 (.687)	2.813 (.59)	3.283 (.512)
PP	3.408 (.492)	3.335 (.503)	8.488 (.075)	4.233 (.375)
PO	8.440 (.077)	1.104 (.894)	2.733 (.603)	5.784 (.216)
CA	6.384 (.172)	3.313 (.507)	10.265* (.036)	8.251 (.083)

Hypothesis 1B(iv.), comparisons between nurses by age23-28 years (N=3);29-34 years (N = 6);35-40 years (N = 6), 41-46 years (N=2), 47-52 years (N=2). Results of Kruskal-Wallis tests, H and (p) reported, df = 4.

	Vignette1	Vignette2	Vignette3	Vignette4
MD	7.709 (.103)	2.441 (.655)	1.826 (.768)	3.304 (.508)
PP	3.026 (.553)	3.213 (.523)	8.128 (.087)	3.380 (.496)
PO	8.637 (.071)	1.427 (.839)	2.233 (.693)	4.939 (.294)
CA	5.162 (.271)	1.676 (.795)	4.150 (.386)	5.12 (.275)

Key to table * marginally non-significant at $p < .05$
** significant at $p < .01$

MD = Overall management difficulty
PO = Threat to physical safety of others
PP = Threat to physical safety of patient
CA = Impact on access to community facilities

Appendix 12: Characteristics of data

12.1 Characteristics of screening measures data

Descriptive data for the ABS, for each of the groups of raters (rater1, rater2, rater3).

	ABS Rater1	ABS Rater2	ABS Rater3
N Valid	33	31	26
N Missing	1	3	8
Mean	13.82	13.42	10.54
Median	13	13	7.5
Standard Deviation	7.30	7.30	9.59
Minimum	0	0	0
Maximum	30	29	31

Descriptive data for the CCB scales on aggressive behaviour for each of the groups of raters (rater1, rater2, rater3): frequency (AF), management difficulty (AMD), severity (AS).

	AF Rater1	AF Rater2	AF Rater3	AMD Rater1	AMD Rater2	AMD Rater3	AS Rater1	AS Rater2	AS Rater3
N Valid	33	30	26	33	29	26	33	29	26
N Missing	1	4	8	1	5	8	1	5	8
Mean	2.36	2.80	3.00	1.48	2.28	2.85	.58	.86	1.58
Median	1	0	0	0	0	0	0	0	0
Standard Deviation	4.70	5.12	5.64	2.86	4.42	6.00	1.50	2.20	3.64
Minimum	0	0	0	0	0	0	0	0	0
Maximum	26	19	21	14	15	24	6	10	13

Descriptive data for the CCB scales on other challenging behaviour for each of the groups of raters (rater1, rater2, rater3): frequency (OF), management difficulty (OMD).

	OF Rater1	OF Rater2	OF Rater3	OMD Rater1	OMD Rater2	OMD Rater3
N Valid	33	30	26	33	29	26
N Missing	1	4	8	1	5	8
Mean	7.24	6.90	5.27	2.76	2.52	3.12
Median	4	5	2.5	1	1	1
Standard Deviation	6.55	6.04	7.56	3.69	2.98	5.82
Minimum	0	0	0	0	0	0
Maximum	23	27	34	12	10	26

12.2 Characteristics of clinical data derived from Incident Reports and Event Records

Descriptive data for Incident Report codes (mean of two raters' codes).

	Frequency of aggression	Management difficulty of aggression	Severity of aggression	Frequency of other challenging behaviour	Management difficulty of other behaviour	Severity of other challenging behaviour
Valid N	32	32	32	32	32	32
Missing N	0	0	0	0	0	0
Mean	0.44	0.48	0.17	0.33	0.63	0.41
Median	0	0	0	0	0	0
Standard Deviation	1.37	1.27	0.43	0.74	1.61	1.12
Minimum	0	0	0	0	0	0
Maximum	8	6	2	3	8	5

	Total frequency of all challenging behaviour	Total management difficulty of all challenging behaviour	Total severity of all challenging behaviour
Valid N	32	32	32
Missing N	0	0	0
Mean	0.77	1.11	0.58
Median	0	0	0
Std. Deviation	1.86	2.52	1.40
Minimum	0	0	0
Maximum	10	9	6

Descriptive data for Event Records totals.

	Event Records Frequency of physical aggression	Event Records Frequency of verbal aggression	Event Records Frequency of other challenging behaviour	Event Records total Frequency of all challenging behaviour
Valid N	22	22	22	22
Missing M	12	12	12	12
Mean	2.64	2.00	5.86	10.50
Median	1.00	2.00	2.50	7.50
Standard Deviation	5.64	1.98	8.56	13.48
Minimum	0	0	0	0
Maximum	26	6	32	58