

A Contemplation on Rehabilitation Models for Adult Clients with Dual Diagnosis of Acquired Brain Injury and Mental Illness in Australia

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Abstract Acquired Brain Injury (ABI) of different forms represents one of the major public health problems for the world. Numerous neuropsychiatric disorders are associated with brain Injury including depression, anxiety disorder, irritability and aggression and mania which makes the presentation of these patients complex. The dual diagnosis of ABI and mental illness is often missed making the management of these patients difficult. Review of literature, websites and case study examples are used to illustrate the implications on care needs and discharge planning of these patients post rehabilitation phase. Majority of the models reviewed in Australia have advanced approaches for rehabilitation of clients with brain injury but none of them other than the brain disorders programme in Victoria offers rehabilitation services to clients with dual diagnosis of acquired brain injury and mental illness. Despite of the evidence that ABI can often result in ongoing mental health problems, there are a few facilities that provide for this dual diagnosis and there is not even a single model of rehabilitation which can cater for the needs of these patients. Current and existing models offer alternative approaches that are particularly applicable to person with disabilities. These include the strength-based and empowerment approaches as well as case management and independent living models.

Keywords Acquired Brain Injury, Mental Illness, Rehabilitation Models, Traumatic Brain Injury, Dual Diagnosis, Rehabilitation Services

1. Introduction

This project is aimed at a thoughtful analysis of the current situation of Australians with dual diagnosis of brain Injury and mental illness and their needs for rehabilitation and also discusses the current rehabilitation services for these patients in Australia and its effectiveness. The major terms such as

Dual diagnosis, Brain injury and Mental Illness are defined in Appendix A. ABI & Mental Illness statistics on incidence and prevalence shows the plethora of the problem. It is also interesting to see how a dual diagnosis of brain injury and mental illness exists, the issues of treatment, support and implications on care of these patients and their families. Also thoughts are extended towards the need for a more effective model of rehabilitation of these clients and supporting their families.

2. The Context

2.1. Statistics on Incidence and Prevalence of ABI & Mental Illness

There is a plethora of data available on the incidence and prevalence of ABI and mental illness as separate entities. Some researchers have commented that the prevalence data is likely to be an underestimate; firstly because diagnostic and assessment tools generally did not include ABI or TBI specific measures, and secondly because the clinical presentation of ABI and mental illness can be very similar and the co-morbidity may not be recognised.

2.1.1. Australian Statistics

Based on analyses of the Australian Bureau of Statistics' (ABS, 2003) Survey of Disability, Ageing and Carers: ABI is common with around 1 in 45 Australians (432,700 people) having ABI with activity limitations or participation restrictions due to disability. Almost three-quarters of these people were aged less than 65 years and about 20,000 children aged less than 15 years had ABI. Prevalence rates were higher for males than females at all ages.

In 2003 around [3]438,300 people had ABI with disability and about [3] 432,700 people had ABI and some activity

limitations or participation restrictions—[3]2.2% of the population. Almost three-quarters of these, or [3] 311,800 people, were aged less than 65 years. Almost [4] 157,500 people had ABI and a severe or profound core activity limitation—0.8% of the population. Close to two-thirds of these, or 99,900 people, were aged less than 65 years. Of those people with activity limitations or participation restrictions,[4] 28,700 nominated ABI as their main condition—[4]0.1% of the population. Almost all [4](27,300) were aged less than 65 years. Of those [4]28,700 people whose main condition was ABI almost three-quarters were males. [2] (ABS, 2003)

Prevalence was highest among young adults—slightly less than half were between 15 and 34 years old. Approximately 2% of the Australian population is estimated to have developed a brain injury related to the effects of alcohol and / or drug abuse and at least 37,000 Australians suffer a stroke each year [4] (AIHW, 2007)

2.1.2. United States Statistics

According to [8] Brain Injury Association of America (2008) annually, one million Americans are treated and released from hospital emergency departments as a result of TBI. [8] 230,000 people are hospitalized and survive. [8] 80,000 people are estimated to be discharged from the hospital with some TBI-related disability,[8]50,000 people die. An estimated [8]5.3 million Americans are living today with disability related to traumatic brain injury. Most studies indicate that males are far more likely to incur a TBI as females. The highest rate of injury occurs in between the ages of 15-24 years. Persons under the age of 5 or over the age of 75 are also at higher risk.

2.3.1. European Statistics

Each year, an estimated 1 million people in the UK go to hospital as a result of a head injury. Males are two or three times more likely to have a head injury than females and the age group most at risk is between 15 and 29 years of age. Most studies agree that approximately 85% of people with ABI attending accident and emergency department will be admitted as inpatients [6] (Beecham, Perkins, Snell & Knapp, 2009). Although mental disorders are widespread, serious cases are concentrated among a relatively small proportion of people who experience more than one mental health problem (this is known as ‘co-morbidity’) (The British Journal of Psychiatry, 2005). 1 in 4 British adults experience at least one diagnosable mental health problem in any one year, and one in six experiences this at any given time (The Office for National Statistics Psychiatric Morbidity report, 2001).

3. How Does a Dual-diagnosis of Mental Illness & ABI Develop?

A mental illness may have been present prior to an ABI or TBI or it may have developed following a brain injury.

Traumatic brain injury or Acquired Brain Injury is a risk factor for the development of a mental illness [14](DHS, 2004). [15] Non-organic factor, including pre-morbid personality traits and post-injury psychological reactions to disability and trauma, are implicated in the generation and maintenance of post-TBI psychiatric disorder. There remains insufficient evidence to conclude what role the neuro pathological consequences of TBI play in the development of post-TBI psychiatric disorder [36] (Rogers & Read, 2007). A significant range of psychiatric disorders occur after traumatic injury. The identification and treatment of a range of psychiatric disorders are important for optimal adaptation after traumatic injury Bryant et.al (2010) [10]. Psychiatric history has been shown to be a risk factor for post-TBI psychiatric illness in some studies but not all. Similarly, the relationship between TBI severity and prevalence of subsequent psychiatric disorders has been inconsistent. The effects of psychiatric history and TBI severity on risk of psychiatric problems following TBI have not been systematically and longitudinally studied in large TBI and comparison samples. Both moderate to severe and mild TBI are associated with an increased risk of subsequent psychiatric illness. Whereas moderate to severe TBI is associated with a higher initial risk, mild TBI may be associated with persistent psychiatric illness [18] (Fann, Burington, Leonetti, Jaffe, Katon & Thompson, 2004). Compared with the general population, people with an ABI are more likely to suffer from mental health problems. Adjustment disorders, depression, anxiety and drug and alcohol addiction are common reactions to having experienced an ABI. In addition, the brain injury itself can cause symptoms similar to syndromes such as psychosis and dementia. Most problematically, an ABI can lead to significant problems with impulse control, social skills and self-awareness. These problems may manifest as agitated, difficult, disruptive, inappropriate and/or aggressive behaviour. Such behaviour may or may not be associated with a serious mental illness or disorder. It is these challenging behaviors and loss of insight that often cause the greatest concern to carers and workers assisting people with an ABI [33](Todd, Kelly, & Lowey, 2004). According to (Duchrme 1999) [17], a large proportion of individuals have severed ABI exhibit externalising behavior, such as aggression and destruction, in the acute care setting, and often into post-acute rehabilitation.

Aggressive behavior encompasses both verbal aggression and physical aggression against the self, objects and other people; it may range from sporadic explosive outbursts through to constant irritability and anger [19](Fleminger, Greenwood & Oliver, 2003). Common brain injury behavioural changes such as impulsivity, lowered frustration tolerance and reduced initiative may mimic symptoms of mental illness, making diagnosis and management difficult. [5] (Beadle, Hardwick & Smith, 2007). Other behaviour changes that can emerge as a result of an ABI include inactivity and lack of motivation. These behaviours make

rehabilitation complex and one rehabilitation model does not clearly fit such diverse and complex presentations. [10] The changes in mental function caused by an ABI are complex and produce various clusters of symptoms, including changes in executive functions, thought, and emotional regulation. Emotional and behavioral changes may also reflect the grief caused by the trauma and the associated losses. There are often major social sequelae to an ABI, including loss of employment (with subsequent financial hardship), changes in social participation, marital strain or separation, and loss of friends and family support. These issues can lead to social isolation (Hemingway and McAndrew, 1997, National Institute of Health, 1999). While varying degrees of recovery can occur, there is typically some degree of permanent psychosocial impairment, ranging from mild to severe.

According to a report released by the Australian Institute of Health and Welfare 2006 [3], as high as 42% of people aged below 65 with ABI report have a psychiatric disability. Following ABI, people are at a higher risk of developing mental health conditions such as adjustment disorders, depression, anxiety and drug and alcohol addictions. The risk is elevated for a number of reasons some include issues with grief and loss, adjustment to disability, pre-injury personality traits and strengths, coping skills and level of social support. It also works in the other direction.

People with a Mental Disorder are found to be at an increased risk of ABI due to changes in cognitive abilities including reaction time, alertness and increased risk of self-harm which may lead to intentional and un-intentional accidents resulting in brain injury. Majority of research focuses on ABI and people with a mental illness are often excluded from studies as they are unable to give informed consent as well as decision making [29] (Mc Cluskey, Johnson & Tate, 2007).

In ABI-specific research in 2006, the Australian Institute of Health and Welfare found that multiple disabilities are characteristic of the population with ABI. When compared with all disability groups, people with an ABI are far more likely to have multiple conditions including mental health problems and substance abuse. There is significant co-morbidity of ABI with depression, mental illness, substance abuse and other high risk situations including homelessness and involvement in the criminal justice system. Findings from other studies provide evidence that brain injury not only causes mental illness, but that after a brain injury an individual can have likelihood of developing a diagnosable mental illness. Emotional disturbances after TBI are some of the most disruptive consequences socially and occupationally. TBI may produce a variety of neuropsychiatric problems including impaired cognition, depression, mania, affective liability, irritability, anxiety and psychosis. There is a strong association between TBI and mood and anxiety disorders. Prevalence of anxiety disorders in TBI patients may be in the order of 10-20% with post-traumatic stress disorder, obsessive compulsive

disorder and generalized anxiety disorder being much more likely to occur than phobias. Major depression occurs in approximately 27% of TBI patients. There is a 1.5 times higher lifetime chance of depression in TBI compared with non head-injured patients. Schizophrenia is approximately twice as common in TBI patients as in the general community. A mental illness can jeopardize the rehabilitation process, by effecting motivation and creating unhelpful coping mechanisms and negative mind set. A mental health disorder can exacerbate risks associated with an ABI including social isolation family breakdown, unemployment, aggression and risk of exploitation [8](Brain Injury Australia (BIA), 2007).

4. Issues after ABI for Person and Family

Family and friends are a vital source of support for a person with an acquired brain injury. During the hospital phase, key family members may play multiple roles including advocate, guardian, and nurse. Feelings during these times may fluctuate from overwhelmed and distressed, to hope and joy with the family member progression. This explains why carers struggle with information, feel powerless and have no control over a situation; carers are often perceived as difficult or complex. Back in the home family, partners and friends may be required to cope with personality and behavioural changes that can arise following acquired brain injury or mental illness. This can put strain on family relationships as the family try to learn ways to assist their loved one [8](BIA, 2007).

Carers often find they have to support family members in addition to the person with an injury. This can mean that it is harder for carers to deal with their own grief and personal needs. Carers may also be challenged by other family members about the care they are providing. Combined with the demands of caring for a person with a brain injury this can result in carers suffering chronic stress. While supporting a loved one, it is important that personal well-being is regularly checked on and given adequate attention. This way better support can be provided to a loved one in the long run, by lowering stress levels and feelings of burden. Creating strong connections with other carers can provide much needed social and emotional support and understanding [8] (BIA, 2007).

5. Treatment Pathways for ABI

Following the accident, a person with a severe brain injury requires medical stabilization to monitor and manage basic life systems such as respiration.[15] Many individuals need neurosurgery followed by a phase of intense medical supervision in an Intensive Care Unit (ICU). As the person stabilizes and the life threatening aspects of the injury subside, he or she is considered for a hospital-based medical

rehabilitation program. The medical rehabilitation program provides therapies to facilitate movement and the better control of movement, such as physiotherapy, occupational therapy and speech therapy, while continuing to provide medical and nursing supervision [34] (Neurologic Rehabilitation Institute of Ontario, 2008).

Once hospital-based rehabilitation has been completed the person may require a community-based program or ongoing outpatient rehabilitation services. Recovery from brain injury depends on the areas of the brain that were injured and the extent of the injury [22](Greenwald &, Rigg, 2009). Rehabilitation helps stimulate the brain to retrain other neurons to take the place of those that have died (Neurologic Rehabilitation Institute of Ontario, 2008). Often a person must relearn physical skills as well as functional skills. Through rehabilitation, the person also learns to use adaptive strategies and apply skills to solve the problems they are experiencing in their recovery. The recovery process can only be measured individually due to the complexity of the brain and its ability to continue recovery over time. The return of functional skills continues for years following the injury [35] (Parish & Oddy, 2007). In the post-acute phase, the emphasis is on teaching functional skills and bringing rehabilitation into the individual's home, work, community and school.

Some interventions in brain injury rehabilitation may be studied within a social model of disability in which the target of intervention is the individual's environment or social system. While the pursuit of a scientific basis for practice is clearly an ethical mandate, defining ethical practice in the absence of strong evidence and in the presence of competing methodologies is elusive. Balancing these considerations, the ethical practice of brain injury rehabilitation requires awareness not only of the scientific evidence for an intervention but also of current best practices recommended by professional traditions and consensus, the practice situation, and the individual's current and evolving situation, needs and preferences [28](Malec, 2009).

A systematic review by Geurtsen, vanHeugten, Martina & Geurts (2010) [21] shows that comprehensive rehabilitation programmes appear to be effective in terms of a reduction in psychosocial problems, a higher level of community integration and an increase in employment. As people with brain injury go through the aging process, specialized support services are needed to assist them in maintaining their independence. Interventions must also reflect the need for long-term supports and interventions that can be flexibly used and adapted by a range of people (individuals with brain injury, family/carers, other community workers and professionals) across an individual's lifespan and changing circumstances [31](Morriss, 2008).

6. Treatments and Supports for ABI & Mental Illness

A person with a dual-diagnosis of brain injury and mental illness requires additional support and consideration. Support should be holistic and consider all the needs of the person, include needs associated with the acquired brain injury. Treatment for a mental health condition should be part of the support received for the effects of an ABI [8] (BIA, 2007).

Many of the same treatments used for a mental illness can be utilized when a person has an Acquired Brain Injury. Treatments include medication, psychological therapy, and programs focusing on social skills/living skills re-training. The first step is to get an appropriate assessment by a qualified specialist, such as a Neuropsychologist or Psychiatrist. A person with an ABI and Psychiatric illness should have a care plan in place if being discharged from a hospital facility that outlines the supports and services to assist the person back in the community [22] (Greenwald &, Rigg, 2009). This is important for preventing relapse and re-admission into a psychiatric facility. Case Management should be provided to co-ordinate any mental health and ABI services the person is to be receiving. Continued follow up and support from a mental health professional, such as a psychiatrist, clinical psychologist or neuropsychologist, are also important to monitor progress [15] (DHS, 2004).

7. Overview of Some Recognized Rehabilitation Services/Models for Dual Diagnosis of ABI & Mental Illness

The rehabilitation of traumatic brain injury has undergone tremendous development over the past 20 years. A much more aggressive, extended and comprehensive approach is now common and clinically accepted. Multiple new forms and sites of treatment are utilized such as cognitive, behavioural, sub-acute and post-acute rehabilitation programme. There has been a rapid growth of specialized brain injury rehabilitation which has tended to outstrip the development of an integrated system of care for brain injury patients and has developed in a more orderly fashion. There is little regard to the changing needs of these patients over time, severity of injury, age, [6] financial ability to pay for services, or geographical distribution of services even though the facilities have developed in a somewhat ad-hoc manner in both the public and private health systems [37] (Teasell, Bayona, & Marshall, 2007).

A wide literature search was done and only scarce literature is available on a rehabilitation model for the dual diagnosis of ABI and mental illness. Current models/services exist for the rehabilitation of ABI clients with behavioural disturbances and only a few models are proposed as such for the rehabilitation of patients with dual diagnosis of ABI and mental illness.

Some of the existing services internationally as well as in Australia are listed in Appendix B.

8. Implications for Ward Practice and Discharge Planning

Nurses and other health-care professionals need to be knowledgeable about Traumatic Brain Injury, its effects, optimal ways of supporting patients and current service provision available to assist in both the acute and long-term rehabilitative phase. Future nursing care may also be informed by research into new head injury treatments and which enhances our understanding of the physiological and neuro-chemical responses after head injury, and effect on secondary brain injury [30](Marshall, 2000).

People with both mild to severe head injury are likely to have a range of physical, cognitive, behavioural and social problems, which may result in intractable difficulties. Assisting the patient and family with these problems requires skilled nursing care. Indeed, as brain injury may cause other cognitive and communication difficulties, it may be difficult to disentangle the effects of the brain injury itself and possible depression or other challenging behaviours [25] (Hassan et al., 2002). It is therefore important that the nursing assessment process considers the patients' mood and mental state and emotional support is provided. It is also vital that nurses are able to find ways of maximizing patient and family autonomy and quality of life.

For health professionals working with families of head-injured patients, it is vital then that the impact of a long-term caring role on the carers own wellbeing is considered. Potential sources of difficulty should be identified early and mechanisms put in place to meet unmet needs as they arise. In order to provide families with this kind of long-term support and monitoring, a care management model could be beneficial with regular reassessments of the family context. The provision of periods of respite care could help carers to maintain some sense of personal agency. Neuro-behavioural problems may also lead to particular strain on the family of the head-injured person, potentially increasing care giver's risk of developing depression or anxiety [26] (Kneafsey & Gawthorpe, 2004). Targeting extra support at those families caring for a relative with such symptoms could be an important way of preventing carer morbidity. Whilst many classes of medication can be used in the management of agitation (Fleminger, Green wood & Oliver, 2003) [19] from antipsychotics, anticonvulsants (as patients could be experiencing subclinical epileptic activity), benzodiazepines and antidepressants, all of these have numerous side-effects including increasing agitation. Thus, the specialist skills of the nurse will be called upon to address the current situation, but also to consider the implications for discharge planning and impact on informal carers.

According to (Kneafsey & Gawthorpe, 2004) [26] nurses may also need support to deal with the specific challenges that arise when caring for patients with behavioural problems, agitation or aggression post head injury. Typical behaviours include restlessness, verbal abusiveness, sexually inappropriate comments or actions or threats or attempts at physical violence. In addition to psychological and

behavioural problems, an array of physical symptoms may occur such as limb weakness, paralysis, stiffness, disturbed gait, contractures, impaired balance, sensory impairment and impaired proprioception. Further difficulties may be caused by incontinence, inability to self-care, cognitive problems relating to concentration, memory and speed of thought, perception, language and reasoning. Physical issues such as these may be superimposed on cognitive and emotional problems such as altered-body image and body perception, lack of self-esteem and confidence, emotional lability, anxiety and frustration. With such a complex array of potential issues, the importance of specialist nursing and well-informed health-care professionals in general is clear. Without sufficient expertise, possible deteriorations in the patient's condition could be missed and important advice and care in the post-acute phase omitted. Without adequate knowledge of possible outcomes and sequelae of brain injury, non-specialist staff may hold inaccurate views of TBI or possess limited insight into the potential for recovery, given sufficient time, rehabilitation and support. In any case, specialist skills from a range of professionals will be essential and multi-disciplinary and inter-agency team working will become paramount [24] (Halliday & Absalom, 2008).

As part of this team, nurses have an important role to play. The potential of every nurse in any setting to contribute to patients' rehabilitation and identifies six specific nursing contributions including assessment, coordination, emotional care, supporting the family, therapy integration and therapy carry-on and physical care. By assisting the patient to formulate patient centered goals, the nurse may be instrumental in maintaining the patient's autonomy and assisting them to achieve the optimal level of functioning in roles that they value. Alongside this, however, it is also recognized that current educational provision to support the nursing role in rehabilitation is inadequate. As a result, whilst some nurses may be personally motivated to practice from a rehabilitative framework, others may be unaware of the importance of their potential contribution or lack the required skills to meet patients and carers needs [26] (Kneafsey & Gawthorpe, 2004).

Discharging clients with acquired brain injury can be a challenging process for all parties involved. According to (Togher, 2010) [38] three issues are raised which are relevant to the discussion of discharge and may offer some solutions to the dilemmas faced during this time. The first issue is that discharge may not always be necessary depending on the service delivery model that is used. The second issue is that recent advances in experience-dependent neuroplasticity research may change the way clinicians determine treatment goals, which has implications for discharge decisions. Finally, an alternative strategy to assist with discharge is the facilitation of social engagement for the person with brain injury and their social networks. While it is acknowledged that discharge can be a positive time for some clients, it can also be a time where people feel abandoned, even bereft and,

in some cases, angry. Avoiding this scenario requires forward planning from the outset of treatment and the use of strategies to ensure that the person is well supported at the time of discharge [26](Kneafsey & Gawthorpe, 2004).

Furthermore the case examples below will briefly describe the above discussed issues.

8.1. Case Study 1

Ms. Rosemary is a 50 year old female with ABI in 2003, with a history of Chronic psychiatric disorders such as paranoid delusions and commanding auditory hallucinations and suffered an acquired brain injury as a consequence of stabbing herself in head in 2003. Schizophrenia and substance abuse are believed to have contributed to this incident. She was unemployed, separated from her husband and lived with her son when she had a brain injury. Rosemary was a fun loving and friendly person who used to be an active member in her church. Developmental milestones were normal according to her siblings.

The problems during admission were (L) sided hemiplegia and cognitive impairments, screaming and shouting for help or for a nurse's attention when frustrated, demanding behaviour, multiple demands to multiple staff, manipulating behaviors and putting too many hats on her head to prevent sore ears. She is wheelchair bound, moves backwards and may collide with other residents, always likes to apply 2 straps to secure her (Lt) leg to wheelchair foot plate and is repeatedly asking staff to check them. She is overweight and requires 2 staff assistance for ADLs. She is a non-vegetarian and has a craving for sweet foods, esp. chocolates.

She was admitted to the present unit as a voluntary patient from a nursing home in 2004, for her behavior improvement and rehabilitation aimed at maximizing independence. Her behaviour has improved since admission, but has deteriorated in her physical strength. Medications were reviewed from time to time and behaviour management strategies were in place to manage her behavior. Once admitted to the current unit, she lost her bed in the previous nursing home. After receiving rehabilitation for a period of 6yrs the treating team and case manager couldn't find an appropriate accommodation due to her complexity of presentation.

8.2. Case Study 2

Mr. Anthony is a 43yrs old man with ABI in 2008, and a history of antisocial personality traits and substance abuse disorder. He underwent a Mitral Valve replacement surgery in 2008 and was non-compliant to the drug Warfarin, which resulted in a major stroke in 2008 leading to a (L) sided weakness. Anthony underwent some rehabilitation after his major stroke episode but was non-cooperative to treatment and started to live in his house by himself where he continued his substance abuse and got evicted from the house as he filled the house with syringes. He then started to live in his car. Anthony has a partner and child and the

partner has obtained an intervention order against him seeing his son due to his unsafe substance abuse issues. Anthony didn't have a good relation with his mother and siblings. He abuses them and sends threatening messages to their mobiles. Anthony had a tourist business and the business has been liquidated due to his debts.

Anthony was admitted to the present unit as an involuntary patient, for rehabilitation, review of his medication and management of behaviours, from another hospital where he had an interim admission through crisis assessment and treatment team for chest pain. Since admission Anthony continued to be uncooperative to the treatment team and abused those on every occasion of contact. He challenged his involuntary status at mental health review board twice. Anthony claims that he is quite capable of living by himself and wants to leave the unit. Anthony neglects his personal hygiene by not showering for many days and wearing the same clothes. Also, he refuses to accept appointments made to public hospitals as he wishes to be treated through a private hospital and claims that he can pay the bills but is not willing to provide any evidence of his bank account. He has no funding other than his disability pension which is not even sufficient enough to pay his bed fee for the current inpatient unit.

8.3. Case Study 3

Leanne is a 52yrs old lady with ABI due to drug and alcohol consumption. She was admitted voluntarily to the current unit for a period of rehabilitation.

Her problems during admission were dependence on medications like Benzodiazepines and Quetiapine, anger management difficulties, lack of structure and routine in her life, loss of husband, challenging relationship with her daughter and anxiety related to returning to her house and an environment where she had been heavily involved in drug and alcohol abuse and paranoia around socializing as she thinks people are looking at her and hence never engaged with any mental health services in community. Leanne was independent with physically but lacked motivation to engage in activities as part of her community integration program. During the 7months stay, she remained drug and alcohol free, even had trial periods at home, gradually weaned off from benzodiazepines, smoking issue substantially reduced with nicotine patch augmentation, utilized gym facilities for exercise, successfully undertook 10 sessions of CBT and received 1:1 support for community access and social activities.

Before discharge the case manager and treating team formulated a crisis plan for Leanne to act on during adverse events. She was linked to the Area mental health team and community assessment team for further follow up and management and the question remains - will she be able to receive the same support while in community and continue the structured routines? If not, what will be the scenario?

The above discussed patients had multiple levels of complexities due to their ABI and pre/past morbid

personalities which have definitely impacted their care and discharge planning.

9. Evaluation

People with both an ABI and mental illness are a vulnerable group. It is not uncommon for people with both conditions to experience difficulties with accessing services. People with an ABI, who have developed a mental illness, may be denied access to mental health services and programs. It is not uncommon for people with ABI and mental illness to be told that because they have an ABI they are best supported by disability services. Some people may go back and forward between the two service sectors. A lack of awareness and understanding of acquired brain injury exists in some mental health services. The presentation of ABI and mental illness look very similar, so acquired brain injury can be vulnerable to mis-diagnosis if there are no clear medical records [8](BIA, 2007).

This group of people is often admitted to the rehabilitation units after a series of failed placements in residential aged care facilities. Although this meets the needs of a small subset of the target group described, there are a number of substantial limitations: beds are restricted to those with both brain impairment and a co-morbid psychiatric diagnosis, only a handful of people are admitted each year (discharging existing patients is very slow due to a lack of suitable long-term accommodation options), and patients often have limited access to therapy, attendant care and community access [33](Kelly and Winkler, 2007).

According to (Kelly & Parry 2008) [32], a major disadvantage for people with acquired brain injury is that there is no legislated form of assistance as there is for people with mental illness. Unless people with acquired brain injury have the ongoing support of a good network of family and friends, they find it difficult to obtain any form of assistance. Across Australia, people with acquired brain injury have difficulty accessing mental health/psychiatric services even though they “have a greater risk post injury of developing depressive illness and schizophrenia than the general population”.[20]The Victorian Coalition of ABI Service Providers encapsulates these difficulties, which include psychiatric services deciding that clients do not meet psychiatric service criteria, not feeding back to referring service or case manager the information gained from assessment of client, refusing admission to people with acquired brain injury, manifesting psychosis or behavioural problems due to a belief that it is not possible to have an acquired brain injury and a psychiatric condition, in some cases not having sufficient knowledge of acquired brain injury, refusing clients because of problems with alcohol, not following through with clients post-discharge and/or arranging for ongoing management. Mental health services are particularly necessary for people with acquired brain injury who are experiencing severe mood and behavioural changes, psychiatric episodes and suicidal thoughts and

actions. In most states of Australia there are no services dedicated to responding to people in these situations. Where these services do exist, for example, in Victoria, they do not provide crisis response or access to acute care [8] (BIA, 2007).

Based on the literature reviewed the following essential elements are to be considered and included in a model service system designed to provide support for people with brain Injury and mental illness with multiple and complex needs. There should be formal, legislated mechanisms to ensure intra and inter agency co-ordination, close collaboration, formally documented, between disability services, mental health services, physical health services and police, joint funding of services involving disability services, mental health services and physical health services, building upon existing service infrastructure (e.g., local community health centers and established intake services). There should be collaboration between government sector and non-government sector agencies, needs based (not diagnosis based) eligibility criteria for services, intense, long-term case management services (not limited to periodic, crisis co-ordination), specialist (outpatient) assessment services, typically linked to university clinics and teaching hospitals, access to multi-disciplinary specialist teams, including access to psychiatrists, flexible assessment services that can visit people at their home, adoption of a bio-psycho-social model of assessment and interventions based on comprehensive rehabilitation programs (CHRP)[11] (Cattelani, Zettin & Zoccolotti, 2010). There also a need for education services for families and service providers, developing a specialized treatment option for severe challenging behaviours and specialized community residential facilities [33] (Kelly & Winkler 2007). It is also important that the provision for both planned and crisis respite services as well as acute, in-patient facilities at major teaching hospitals, provision of specialist short-term accommodation services, focusing on short-term treatment / rehabilitation and re-integration of the person into more generic accommodation services, continuum of services to provide for a range of accommodation options, including group and independent living, capacity for long-term follow-up by specialist clinical services (acknowledging that the needs of people with high and complex needs are typically chronic). There is a need for a separate service provision for people enmeshed in the criminal justice system, use of tele-conferencing for client reviews, especially in remote or rural settings, hiring and retaining direct support staff with tertiary level qualifications, support for the provision of tertiary training courses to ensure sufficient numbers of appropriately qualified staff are available (both in direct support and professional / clinical services); involving both TAFE & University programs. The human resource management is identified as a critical determinant of service quality and sustainability, and research and development, including longitudinal evaluation, built into the provision of services, involving University Centers [8] (BIA, 2007).

10. Limitations

In reviewing a broad literature a number of approaches have been advanced for the rehabilitation of clients with brain injury. But most of the models and approaches are primarily focused on rehabilitation of clients with ABI; none of them except Brain Disorders program of Victoria runs a unique model for slow stream rehabilitation of clients with the above mentioned dual diagnosis, who require prolonged care in a hospital environment. There is the need for more research to be conducted in this area to develop a comprehensive holistic rehabilitation program which would benefit the clients and their families.

11. Conclusions

Despite the valuable works that have been undertaken in relation to head injury, more research is needed to focus on areas deemed important for TBI or ABI patients with mental illness. Interdisciplinary research is also needed to explore how continuity of care across professions and care settings can be maximized and the current care pathways experienced by patients, should be reviewed. It is also particularly important to examine differences in outcome for patients receiving different rehabilitation strategies and different types of service. The report from Headway highlights a number of gaps in the evidence base, suggesting that more information is needed on the support services available to people with head injury. It also recommends that GPs and employees should be more aware of the impact of TBI and that greater knowledge about the effectiveness of services, in improving outcomes for both patients and families, is needed. Learning about how people with TBI and their families can best be supported is a vital part of service planning and development. Supporting families is a crucial part of this holistic care and needs to be planned for carefully. Without continued support for both patient and family, the challenges of head injury may be difficult to cope with.

Assistance may come from family members, trained rehabilitation professionals and paraprofessionals [34] (Neurologic Rehabilitation Institute of Ontario, 2010)

Appendix

A: Definitions

Dual Diagnosis

The term ‘dual-diagnosis,’ is generally used when someone is affected by two different conditions at one time. Other related terms include ‘co-morbidity’, ‘co-existing disorders’ or ‘dual-disability.’ The terms used may depend on the country and professional background of a person. For example, a psychiatrist or health professional may commonly use the terms co-morbidity or dual-diagnosis,

whereas someone from disability organization may use the term ‘dual disability.’ A dual diagnosis of mental illness and acquired brain injury means a person has both a diagnosable mental illness and acquired brain injury. (<http://braininjury.org.au> [cited on 13 November 2010])

Acquired Brain Injury

Acquired brain injury (ABI) is defined as an: “injury to the brain which results in deterioration of cognitive, physical, emotional or independent functions. It can occur as a result of trauma, substance abuse, stroke, hypoxia, infection or degenerative neurological disease. Impairments to cognitive abilities, sensory or physical functioning can be either temporary or permanent and can cause partial or total disability or psychosocial maladjustment”. [12](Commonwealth Department of Health and Aged Care, 2001)

ABI as defined by Brain Disorders program, Victoria, are the injuries to the brain which result in deterioration of cognitive, physical, emotional or independent functions. It can also occur as a result of trauma, hypoxia, infection, substance abuse, degenerative neurological disease or stroke. These impairments to cognitive abilities, sensory or physical functioning can be either temporary or permanent and cause partial or total disability or psychosocial maladjustment. (www.bdpv.org.au) [Cited 28 September 2010]

Traumatic Brain Injury (TBI)

Traumatic brain injury (TBI), a form of acquired brain injury, occurs when a sudden trauma causes damage to the brain. TBI can result when the head suddenly and violently hits an object, or when an object pierces the skull and enters brain tissue.[14] (Department of Human Services 2004, [23] Grimshaw, 2007)

Mental Illness

Psychiatric illness in association with ABI or Neurodegenerative disease may vary widely in its presentation and response to treatment. Even what may seem a clear cut psychiatric illness, such as psychosis, may be influenced in its presentation or treatment by the presence of co-morbid cognitive or physical problems. (www.bdpv.org.au) [Cited 28 September 2010]

B: Internationally Existing Recognized Rehabilitation Services

Several organizations within in U.K, US, Canada are working towards rehabilitating clients with ABI and behaviour management has always been a great challenge in that path as identified from the literatures available. The recognized models available internationally are discussed below.

The Brain Injury Rehabilitation Trust (BIRT) in UK is a division of The Disabilities Trust and the means by which The Disabilities Trust provides its brain injury services. BIRT offers a wide range of services designed for people at

all stages of the rehabilitation process. The model of clinical assessment and rehabilitation is designed to meet the needs of people who require post-acute rehabilitation, where service users are admitted directly from neurosurgical or acute medical/surgical services, and also of those people seeking community integration rehabilitation. The aim is to provide a continuous link for each individual through their pathway of care from in-patient services through to re-integration into community. Under this model, each service user has an individual rehabilitation plan, which includes structured learning programmes, practicing daily living skills, community access skills, behavioural management techniques, social skills training and vocational training and support. (<http://www.birt.co.uk>, [Cited 10November] , [31] Morriss 2008)

Redford Court Lodge in Liverpool is a center for the continuing rehabilitation of five people with acquired brain injury and/or additional complex health needs. The service is run by the Brain Injury Rehabilitation Trust (BIRT). (<http://www.birt.co.uk>, [Cited 10November] Morriss 2008).

York House Rehabilitation unit in UK is a 28-bedded neurobehavioral rehabilitation unit, which is registered as an independent hospital. An individualized treatment programme is suggested and specific goals are proposed here during the rehabilitation assessment. (<http://www.birt.co.uk>, [Cited 10November], [31] Morriss 2008)

Community Services Supported Accommodation – York within BIRT offer options for individuals to live in residential accommodation with 24/7 support in the community. A mobile team, which includes a neuropsychologist, can provide high levels of support when required. Individual behaviour management plans are developed and monitored by the neuropsychologist. Services such as this allow individuals with brain injury to transition into more independent living options in their local communities. (<http://www.birt.co.uk>, [Cited 10November], [31] Morriss 2008)

Leeds Community Brain Injury Team is a small interdisciplinary team created in 1992, providing community based rehabilitation to people with traumatic Brain Injury (less than five years post -injury and support to their families). The approach is collaborative, client centered and aims to enhance participation in meaningful activity – individual goal planning is seen as essential to the rehabilitation process. Family and carers are also involved in the assessment and development of a rehabilitation plan. (<http://www.birt.co.uk>, [Cited 10 November], [31] Morriss 2008)

School and Community Support (SCSS), Schenectady, **New York State, USA** exists to work in the community with children and adults with acquired brain injury and challenging behaviour. Flower City Health Traumatic brain injury Services and Pralid in Rochester; both services provide support to individuals with ABI living in the community. It is based on the idea that self- regulation will be more effective than external regulation of behaviour alone,

particularly for young people with brain injury. The self-coaching framework of ideas provides opportunity for insight and reflection regarding behaviour for individuals with self-regulatory impairments. It also supports the person to achieve greater independence and effective achievement of goals. [31] (Morriss 2008)

Missouri TBI Demonstration Project, University of Missouri, Columbia, Missouri utilizes teleconferencing technology to educate rural clinicians about brain injury and management of behavioural changes. Teleconferencing was considered uniquely suited to provide this education and ongoing supervision because of cost effectiveness, time efficiencies, facilitation of direct communication and collaborative relationships, and immediacy in service delivery. (Morriss 2008)

Rusk Rehabilitation Centre, Columbia, Missouri provides inpatient and outpatient brain injury rehabilitation services as well as to individuals with spinal injury .It consists of a phased rehabilitation model of short focused rehabilitation intervention. This rehabilitation facility works towards readiness to return to living in the community and return to employment.[31] (Morriss 2008)

Rehabilitation Institute Washington University St Louis, Missouri

The Rehabilitation Institute was established in 2001, providing an 80-bed rehabilitation hospital. It provides rehabilitation, research, education and community services to individuals with traumatic brain injury stroke and a specialist Aphasia assessment and rehabilitation program which provides neuro-rehabilitation aimed at improving functional and cognitive recovery after brain injury. Inpatient and community re-integration services, behaviour management, patient and family support groups and neuropsychological assessment are all available. [31] (Morriss 2008)

University of Washington Medical Center - Neurorehabilitation Program, Seattle

The brain injury Rehabilitation Clinics (BIRC) and Out-Patient Neuro-Rehabilitation Programs here offer a wide range of services directed toward helping clients 18 years of age and older cope with the complex and long-term consequences of brain injury .The Centre offers comprehensive and individually tailored programs for return to work, living in the community, or return to study. Rehabilitation of communication and speech impairments is also provided, in addition to training in memory and cognitive strategies, management of anger, depression, anxiety and other behavioural changes. [31] (Morriss 2008)

GF Strong Rehabilitation Centre, Vancouver Canada

This ABI rehabilitation program is for adults who have sustained a brain injury and it offers Inpatient, Outpatient and Outreach services staffed by a range of disciplines including neuropsychologists, physiotherapists, occupational therapists, speech pathologists etc. [31]

(Morriss 2008)

Rehabilitation Services in Australia

Brain Disorders Program of Victoria (BDP) exists as a unique state wide service to provide neurobehavioral rehabilitation for persons between the ages of 16 and 65 with the dual disabilities of brain impairment and psychiatric disturbance. The brain disorders program provides services to adults with acquired brain injury or neurodegenerative conditions with associated psychiatric disorder. The programme runs on a unique model, with the inpatient and transitional units focusing on slow-stream rehabilitation, for the client with dual diagnosis of ABI and mental illness who requires prolonged care in hospital setting. The community and outpatient teams at BDP focuses on strengthening both the individual and their system via secondary consultation, education and, where appropriate, time-limited co-case management with appropriate agencies and ABI behaviour consultancy working towards minimizing socially unacceptable behaviours such as aggression, sexual disinhibition and withdrawal associated with ABI.

The BDP Community Service comprises of Community Brain Disorders Assessment and Treatment service (CBDATS) & the ABI Behaviour Consultancy. These teams have separate though overlapping functions, and together provide a wide range of community-based services to individuals, their families, carers, and to their service providers. There is a common point of intake for these teams and each referral is examined carefully before being allocated to the appropriate team. The most notable difference between the two teams is that (a) CBDATS focuses mainly on individuals that have a *mental illness* and therefore reports to the *mental health branch of DHS*, while (b) the ABI Behaviour Consultancy focuses mainly on individuals who have behavioural disorders but do not meet criteria for a major mental illness, and therefore report to the *disability branch of DHS*. Thus, the scope of the programme is broad, more inclusive than exclusive, and functioning in line with recommendations laid out by the Victorian Department of Human Services (DHS) .(www.bdpv.org.au) [Cited 28 September 2010]

The Acquired Brain Injury Outreach Service (ABIOS), Queensland

ABIOS is a specialist community-based rehabilitation service to enhance the service system for people with ABI and their families. The mission is to assist people with ABI in Queensland, their families and carers to achieve and improve quality of life and community integration through increased independence, choice, opportunity and access to appropriate and responsive services. (http://www.health.qld.gov.au/abios [Cited 01 October 2010])

The Illawarra Brain Injury Service, New South Wales

This service provides comprehensive goal directed rehabilitation to clients with a traumatic brain injury residing

in the Illawarra Area Health Service and aged 5 - 65 years .Rehabilitation is provided on an outreach/outpatient or community basis.

(http://www.health.nsw.gov.au/initiatives/birp/services_ibis.asp Cited 11 October 2010)

The Brain Injury Rehabilitation unit in Liver pool, New South Wales provides rehabilitation services to clients between 16 and 65 years who sustained a traumatic brain injury who are medically stable after the initial injury and a resident in the South Western or Southern Sydney regions or have a responsible family member residing in the region. (http://www.sswahs.nsw.gov.au/liverpool/biru/ Cited 31 October 2010)

Recommendation

The current models of rehabilitation should be substituted by a comprehensive holistic model of rehabilitation to suit the needs of clients and to optimize the recovery through community integration and supporting their families.

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REFERENCES

- [1] Anstey, K.J.et al. (2004) A Population Survey found an association between self-reports of traumatic brain injury and increased psychiatric symptoms, Centre for Mental Health Research, Australian National University, Canberra,
- [2] Journal of Clinical Epidemiology, Vol.57, 1202-1209.
- [3] Australian Bureau of Statistics, (2003).Canberra, Australia.
- [4] Australian Institute of Health and Welfare (AIHW), (2006) a. Australia's Health, Cat. No. AUS 73, AIHW, Canberra.
- [5] Australian Institute of Health and Welfare (AIHW), 2007. Disability in Australia: acquired brain injury. Bulletin no. 55. Cat no. AUS 96. Canberra.
- [6] Beadle, O., Hardwick, D., Smith, D. (2005) .The Development of Bipolar Disorder Following sever traumatic brain injury: A case study of evolution, diagnosis and collaborative management between ABI and mental health services, Brain Injury, Vol.19, Suppl.1, Abstracts of the 6th World congress on Brain Injury, Melbourne.
- [7] Beecham, J., Perkins, M., Snell, T.,& Knapp, M. (2009).

- Treatment paths and costs for young adults with acquired brain injury in the United Kingdom, *Brain Injury*, Vol.23, Issue.1, 30-38.
- [8] Brain Injury Association of America. (BIAA). (2008), [Cited 20 November 2010]. Available: http://www.biausa.org/about_us.htm
- [9] Brain Injury Association of Australia (BIA). (2007), [Cited 12 September 2010]. Available: <http://www.bia.net.au/>
- [10] Brain Injury Association of Canada. (BIAC). (2008). [Cited 10 October 2010]. Available: <http://biac-aclc.ca/en/about/>
- [11] Bryant, A.R, O'Donnell, L.M., Creamer, M., McFarlane, M., Clark, C.R., & Silove, D., (2010). The Psychiatric Sequelae of Traumatic Injury *American Journal of Psychiatry*; Vol. 167,312-320.
- [12] Cattalani, R., Zettin, M., & Zoccolotti, P. (2010). Rehabilitation treatments for adults with behavioural and psychosocial disorders following acquired brain injury: a systematic review, *Neuropsychology review*, Vol.20, Issue.1, 52-85.
- [13] Commonwealth Department of Health and Aged Care, (2001) [Cited 18 November 2010]. Available: Department of Human Services, Victoria.
- [14] Cope, N.D. (1995). The effectiveness of traumatic brain injury rehabilitation: A review. *Brain Injury*, Vol.9.No.7, 649-670.
- [15] Department of Human Services, (DHS). (2004).Acquired brain injury and Mental illness: Issues paper, Metropolitan Health and Aged Care Division, DHS, Melbourne, Victoria
- [16] Department of Human Services, (DHS). (2004).Acquired Brain Injury and mental illness: protocol between mental health and other services, Metropolitan Health and Aged Care Division, DHS, Melbourne, Victoria.
- [17] Department of Human Services, (DHS). (2004).Getting your head around ABI: Resource Manual, DHS, Melbourne, Victoria
- [18] Du Chrame, M. J. (1999).A conceptual model for treatment of externalizing behaviour in Acquired brain injury, *Brain Injury*, Vol.13, No. 9, 645 – 668.
- [19] Fann, J. R., Burington, B., Leonetti, A., Jaffe, K, Katon, J. W., & Thompson, R.S (2004).Psychiatric Illness Following Traumatic Brain Injury in an Adult Health Maintenance Organization Population, *Archives of General Psychiatry*, Vol: 61, 53-61.
- [20] Fleminger S., Greenwood R.J. & Oliver D.L. (2003). Pharmacological management for agitation and aggression in people with acquired brain injury. *The Cochrane Library*, Issue 1.
- [21] Fortune, N. (2006). Australian Institute of Health and Welfare, Presentation at the Brain Injury Association National Conference, Melbourne.
- [22] Geurtsen,G.J.,vanHeugten,C.M.,Martina,J.D.,&Geurts.(2010). Comprehensive rehabilitation programmes in the chronic phases after severe brain injury: a systematic review, *Journal of Rehabilitation Medicine*. Vol.42, No.2, 97-110.
- [23] Greenwald, B. D., & Rigg, J. L. (2009).Neurorehabilitation in traumatic brain injury: does it make a difference? *The Mount Sinai Journal of Medicine*, Vol.76, No.2, 182-189.
- [24] Grimshaw, L. (2007). Complexities of co-morbidity (acquired brain injury and mental illness) and the intersection between the health and community services systems. A Summary Paper prepared by Brain Injury Australia Inc. for the Department of Families, Community Services and Indigenous Affairs.
- [25] Halliday, J., & Absalom, A. R. (2008). Traumatic brain injury: from impact to Rehabilitation, *British journal of Hospital Medicine*, Vol.69, No.5, 284-289.
- [26] Hassan, N., Turner–Stokes L., Pierce K. & Clegg F. (2002). A completed audit cycle and integrated care pathway for the management of depression following brain injury in a rehabilitation setting, *Journal of Clinical Rehabilitation*, Vol.16, 534–540.
- [27] Kneafsey, K., & Gawthorpe, D. (2004).Head injury: long-term consequences for patients and families and implications for Nurses, *Journal of Clinical Nursing*, Vol.13, 601–608.
- [28] Mackelprang, W.R. & Salsgiver, O. R (2009). *Disability: A Diversity Model Approach in Human Service Practice* (2nd ed.). Chicago, Illinois: Lyceum Books, Inc.
- [29] Malec, J. F., (2009). Ethical and evidence-based practice in brain injury rehabilitation, *Neuropsychological Rehabilitation*, Vol.19, No.6, 790-806.
- [30] Mc Cluskey, A, Johnson, M., & Tate, R., (2007). The Process of Care Management Following brain injury: A Grounded Theory study, *Brain Impairment* Vol. 8, No.3, 293-311
- [31] Marshall, L. F. (2000). Head injury: recent past, present and future, *Neurosurgery*, Vol.47, 546–561.
- [32] Morriss, E. (2008).A report on The Bob and June Prickett Fellowship to study “Support for Adults with Brain Injury and Family/Carers”, Winston Churchill Memorial Trust of Australia.
- [33] Kelly, G. & Parry, A. (2008).Managing Challenging Behaviour of People with Acquired Brain Injury in Community Settings: The First 7 years of a Specialist Clinical Service, *Brain Impairment*, Vol.9, 293-304.
- [34] Kelly, G. & Winkler, D.(2007). Long- Term Accommodation and Support for people with Higher Levels of Challenging Behaviour, *Brain Impairment*, Vol.8, No.3, 262-275.
- [35] National Neurologic Rehabilitation Institute of Ontario (2008), [Cited 3 October 2010]. Available: <http://www.nrio.com/index.html>
- [36] Parish, L. & Oddy, M. (2007), Efficacy of rehabilitation for functional skills more than 10 years after extremely severe brain injury, *Neuropsychological Rehabilitation*, Vol .17, No.2, 230-24,
- [37] Rogers, M.J., & Read, A.C. (2007). Psychiatric co morbidity following traumatic brain injury, *Brain Injury*, Vol. 21, No. 13-14, 1321-1333.
- [38] Teasell R, Bayona N, Marshall S, et al. (2007) A systematic review of the rehabilitation of moderate to severe acquired brain injuries, *Brain Injury*, Vol. 21, 107-112.
- [39] Togher, L. (2010). The dilemma of discharge and some possible solutions, *International Journal of Speech-Language Pathology*, Vol.12, No.4, 320-3.