Aggression and sexual behaviours in individuals with acquired brain injury

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Prof Nick Alderman, Director of Clinical Services, Brain Injury Services, PIC
The context of ABI

- physical
- functional
- cognitive
- emotional
- psychosocial
- behavioural
## Most Frequent Problems Reported by Relatives after TBI

*(From Brooks et al 1986)*

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>1 YEAR</th>
<th>5 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personality Change</td>
<td>60</td>
<td>74</td>
</tr>
<tr>
<td>Slowness</td>
<td>65</td>
<td>67</td>
</tr>
<tr>
<td>Poor Memory</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>Irritability</td>
<td>67</td>
<td>64</td>
</tr>
<tr>
<td>Bad Temper</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Tiredness</td>
<td>69</td>
<td>62</td>
</tr>
<tr>
<td>Depression</td>
<td>51</td>
<td>57</td>
</tr>
<tr>
<td>Rapid Mood Change</td>
<td>57</td>
<td>57</td>
</tr>
<tr>
<td>Tension &amp; Anxiety</td>
<td>57</td>
<td>57</td>
</tr>
<tr>
<td>Threats of Violence</td>
<td>15</td>
<td>54</td>
</tr>
</tbody>
</table>
Frequency & Severity Behaviour Change Over Time Following Severe Head Injury

(From Johnson & Ballen 1996)
Wood (2001)
Complex, subtle, pervasive constellation of cognitive-behavioural changes that characterise post-acute ABI

Neurobehavioural Disability
Neurobehavioural Disability

- executive dysfunction
- attention deficits
- diminished insight
- poor social judgement
- labile mood
- problems with impulse control
- personality change

Symptoms of Neurobehavioural Disability

Social Handicap
Long-term Psychosocial Outcome

- Capacity for independent living
- Employment
- Relationships
- Contact with forensic services
- Quality of life

Presence of NBD = poorer prognosis
What constitutes ‘challenging behaviour’ in ABI?

- Is the behaviour ‘challenging’?
- Is it ‘right’ to intervene?
Behaviours whose presence:

- increases vulnerability
- limits/delays access to community resources
- constrains participation in post-acute neurorehabilitation leading to failure to exploit and attain the persons full potential for recovery

(Eames & Wood, 1985; Wood, 1987; Alderman, 2001)
Post-ABI Challenging Behaviour That Might Be Referred for Intervention

- blunt social behaviour
- irritability
- low frustration tolerance
- impulsive behaviour
- non-cooperation
- sexual disinhibition
- shouting

- passivity/low arousal
- apathy/lack of drive
- escape/avoidance
- verbal aggression
- self-injurious behaviour
- aggression towards objects
- physical assaults on others
“Of the many psychiatric symptoms that may result from brain injury, agitation and/or aggression are often the most troublesome.”

Fleminger, Greenwood & Oliver (2003)
How characteristic of TBI is aggression?

- literature review
- prevalence varied 11 – 96% studies
- in their study, 34% had engaged in significant aggressive behaviour within 6 months after injury

*Tateno, Jorge & Robinson (2003)*
Prevalence of Aggression after TBI

- Followed up TBI survivors (moderate – severe injury) 6, 24 and 60 months post-injury in Australia

- 25% demonstrated significant levels of aggression at each of these times

- Concluded it was common and long-term following of TBI

*Baguley, Cooper & Felmingham (2006)*
Why is Aggression Associated with ABI?  

- Episodic Dyscontrol Syndrome
  - associated with damage to medial portion of the temporal lobe, contains limbic structures involved in regulating emotion & behaviour

- Frontal Lobe Damage
  - reduced ability to inhibit/regulate emotional response, leading to lower threshold for aggressive behaviour

- Exacerbation Negative Premorbid Traits
  - impulsive/inflexible cognitive style, poorly developed self-control pre-injury, more evident post-injury
Neuroanatomical Correlates of Post-ABI Aggression
behaviour

- neurocognitive factors
- premorbid traits
- neuro-psychiatric
- organic
- learned response
- environment
- poor insight
- poor adjustment
Inappropriate Sexual Behaviour

- Inappropriate Sexual Behaviour (ISB) a frequent reason for referral
- Significant consequences for individual and those around them
- Often overlooked in comparison to other forms of challenging behaviour
Challenges of dealing with ISB

• Limited published research
  – Variable estimates of prevalence

• Inconsistent terminology & definition
  – Confusing mix of terminology and subjectivity
  – For example
    • “True sexually inappropriate behaviour consists of overt acts with a sexual meaning”
      (Zeiss et al, 1996)
Our attempt!

“Inappropriate Sexual Behaviour is any verbal or physical act of an explicit or perceived sexual nature which is unacceptable within the social context in which it is carried out.”
The question of “intent”

– Need to separate the WHAT from the WHY to have confidant reporting and analysis
– “Did they really mean it like that?”
– Factors which may influence this judgement:

Environment/context

Nature of incident
Perceptions and values of the observer
Culture of service
Premorbid personality of service user

Yes or No
A Process Model for Guiding Intervention

(Alderman, 2001)
1. define behaviour to be changed
2. measure (baseline) behaviour perform task/behavioural analysis
3. derive working hypothesis concerning reasons for behaviour
4. design & implement intervention
5. evaluate (remeasure) intervention
6. fade out intervention consider maintenance & generalisation of gains

knowledge of ABI context

knowledge of cognitive theory
Direct Observational Assessment

Standardised Observational Rating Scales

- Known Psychometric Properties
  - validity
  - reliability
- Common Language
  - within clinical team
  - between services
- Informs Process
  - information gathering role that informs
  - assessment and outcome measurement
“Use of a Modified Version of the Overt Aggression Scale in the Measurement and Assessment of Aggressive Behaviours Following Brain Injury”

Nick Alderman
Caroline Knight
Collette Morgan

Brain Injury, 11, 503-523, 1997
OAS-MNR

- OAS (Yodofsky et al, 1986) provides information about aggression in psychiatric hospitals
- Modified and extended to use in neurobehavioural services (widespread use)
- Conceptual framework for understanding behaviour is operant conditioning – relationship between environment and behaviour
- Type aggression, severity, setting events, immediate antecedents and interventions
- Recording system provides shorthand means of capturing complex information simply
### 1. BEHAVIOURS

<table>
<thead>
<tr>
<th>Verbal aggression</th>
<th>Physical aggression against objects</th>
<th>Physical aggression against self</th>
<th>Physical aggression against other people</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makes loud noises, shouts angrily, is not person directed. E.g. “Bloody hell!”</td>
<td>Slams doors, scatters clothing, makes a mess in response to clear antecedent</td>
<td>Picks/scratches skin, hits self, pulls hair (with no/minor injury)</td>
<td>Throwing gesture clearly person directed, swings at people, grabs clothes, spitting at people</td>
</tr>
</tbody>
</table>

### 2. ANTECEDENTS

**Set One**

- Contributing Factors (coded 1-3)
  - 1. Structured activity
  - 2. Noisy environment
  - 3. Had epileptic fit in last 24 hrs

**Set Two**

- Observed Directly Before Behaviour (coded 11-25)
  - 11. Given direct verbal prompt to comply with instruction
  - 12. Given verbal/guidance/advice to assist completion of task/activity
  - 13. Given verbal/visual feedback about performance
  - 14. Direct response to other clients verbal behaviour
  - 15. Request specifically denied by other person
  - 16. Any other verbal interaction
  - 17. Physical guidance/facilitation to complete a task
  - 18. Direct response to other clients physically aggressive behaviour when directed at them
  - 19. Direct response to other clients physically aggressive behaviour when directed at another person
  - 20. During restraint
  - 21. Given item e.g. food/therapy materials
  - 22. Purposeful behaviour is ignored or “played down” by person to whom it is directed at
  - 23. Obviously agitated or distressed
  - 24. No obvious antecedent
  - 25. Other (please specify on the back of the recording form)
# Overt Aggression Scale – Modified for Neurorehabilitation (OAS-M)

**Alderman, Knight & Morgan, 1997**

## 1. Behaviours

<table>
<thead>
<tr>
<th>Verbal aggression</th>
<th>Physical aggression against objects</th>
<th>Physical aggression against self</th>
<th>Physical aggression against other people</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA</td>
<td>PO</td>
<td>PS</td>
<td>PP</td>
</tr>
<tr>
<td>Makes loud noises, shouts angrily, is not person directed. E.g. &quot;Bloody hell&quot;</td>
<td>Slams doors, scatters clothing, makes a mess in response to clear antecedent</td>
<td>Picks/scratches skin, hits self, pulls hair (with/without minor injury)</td>
<td>Threatening gesture clearly person directed, swings at people, grabs clothes, spitting at people</td>
</tr>
<tr>
<td>Mild personal insults clearly directed at some other person, not including swearing/offensive sexual comments. E.g. &quot;You are stupid, idiot&quot;</td>
<td>Throws objects down, kicks furniture without breaking it, marks the wall (without others being at risk of being hit)</td>
<td>Bangs head, hits fist into object, throws self onto floor or into objects (hurts self without serious injury)</td>
<td>Strikes, kicks, pushes, pulls hair (without significant injury)</td>
</tr>
<tr>
<td>Swearing, moderate threats clearly person directed at others or self, e.g. &quot;Fuck off you bastard&quot;</td>
<td>Breaks objects, smashes windows</td>
<td>Inflicts small cuts, bruises, minor burns to self</td>
<td>Attacks others causing mild-moderate physical injury (bruises, sprains, welts) to person aggression directed at</td>
</tr>
<tr>
<td>Clear threats of violence directed at others or self. E.g. &quot;I’m going to kill you&quot;</td>
<td>Sets fire, throws objects dangerously (some other person is at risk of being hit, regardless of intention)</td>
<td>Mutates self, causes deep cuts, bites that bleed, internal injury, fracture, loss of consciousness, loss of teeth</td>
<td>Causes severe physical injury (broken bones, internal injury) to person aggression directed at</td>
</tr>
</tbody>
</table>

**Notes:**
- **VA**: Verbal aggression
- **PO**: Physical aggression against objects
- **PS**: Physical aggression against self
- **PP**: Physical aggression against other people
## 2. ANTECEDENTS

### Set One
**Contributing Factors (coded 1-3)**

1. Structured activity
2. Noisy environment
3. Had epileptic fit in last 24 hrs

### Set Two
**Observed Directly Before Behaviour (coded 11-25)**

11. Given direct verbal prompt to comply with instruction
12. Given verbal guidance/advice to assist completion of task/activity
13. Given verbal/visual feedback about performance
14. Direct response to other clients verbal behaviour
15. Request specifically denied by other person
16. Any other verbal interaction
17. Physical guidance/facilitation to complete a task
18. Direct response to other clients physically aggressive behaviour when directed at them
19. Direct response to other clients physically aggressive behaviour when directed at another person
20. During restraint
21. Given item e.g. food/therapy materials
22. Purposeful behaviour is ignored or “played down” by person to whom it is directed at
23. Obviously agitated or distressed
24. No obvious antecedent
25. Other (please specify on the back of the recording form)
3. INTERVENTIONS

Set One
Contributing Factors (coded A-N)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Aggression ignored or “played down” completely</td>
</tr>
<tr>
<td>B</td>
<td>Talking to patient including prompts</td>
</tr>
<tr>
<td>C</td>
<td>Closer observation</td>
</tr>
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<td>D</td>
<td>Holding patient (physical restraint)</td>
</tr>
<tr>
<td>E</td>
<td>Immediate medication given by mouth</td>
</tr>
<tr>
<td>F</td>
<td>Immediate medication given by injection</td>
</tr>
<tr>
<td>G</td>
<td>Isolation without seclusion</td>
</tr>
<tr>
<td>H</td>
<td>Seclusion</td>
</tr>
<tr>
<td>I</td>
<td>Activity distraction</td>
</tr>
<tr>
<td>J</td>
<td>Injury requires immediate medical treatment for patient</td>
</tr>
<tr>
<td>K</td>
<td>Injury requires immediate medical treatment for other</td>
</tr>
<tr>
<td>L</td>
<td>Special programme</td>
</tr>
<tr>
<td>M</td>
<td>Physical distraction (leading the patient away)</td>
</tr>
<tr>
<td>N</td>
<td>Other (please specify on the back of the recording form)</td>
</tr>
</tbody>
</table>
# OVERT AGGRESSION SCALE – MODIFIED FOR NEUROREHABILITATION (OAS-MNR)

Alderman, Knight & Morgan, 1997

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Observer Initials</th>
<th>Antecedents</th>
<th>Multiple Recordings*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Contributing Factors – tick if applies</td>
<td>(when multiple identical incidents take place in quick succession)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Structured Activity</td>
<td>Agression (type, rating)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Noisy Environment</td>
<td>Interventions (A-N)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Epilepsy prev 24 hrs</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Observed Directly Beforehand (1-25)</td>
<td></td>
</tr>
</tbody>
</table>
Shorthand means of recording complex behaviour sequences

**OVERT AGGRESSION SCALE - MODIFIED FOR NEUROREHABILITATION**

<table>
<thead>
<tr>
<th>Name</th>
<th>NICK ALCERMAN</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Antecedents</th>
<th>Aggression (type, rating)</th>
<th>Intervention (A-I)</th>
<th>Multiple Recordings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Contributing factors ✓ or x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Structured activity</td>
<td>Noisy environment</td>
<td>observed directly beforehand (1-25)</td>
<td></td>
</tr>
<tr>
<td>11/6</td>
<td>10:25</td>
<td>✓</td>
<td></td>
<td>11</td>
<td>VA1</td>
</tr>
<tr>
<td>11/6</td>
<td>10:30</td>
<td>✓</td>
<td></td>
<td>22</td>
<td>PP2</td>
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<tr>
<td>11/6</td>
<td>10:36</td>
<td>✓</td>
<td>✓</td>
<td>16</td>
<td>PO3</td>
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<tr>
<td>11/6</td>
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<td>✓</td>
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<td>28</td>
<td>VA3</td>
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<tr>
<td>11/6</td>
<td>11:00</td>
<td>✓</td>
<td></td>
<td>24</td>
<td>VA1</td>
</tr>
</tbody>
</table>

 ✓ when multiple identical incidents take place in quick succession
The Development of The St Andrew’s Sexual Behaviour Assessment (SASBA) Scale

Neuropsychological Rehabilitation: April 2008, 18(2) 129–159

Dr Caroline Knight
Professor Nick Alderman
Chrissie Johnson
Dr Sharon Green
Dr Louise Birkett-Swan
Dr Graeme Yorston
# ST ANDREW’S SEXUAL BEHAVIOUR ASSESSMENT SCALE (SASBA SCALE)

Knight, Alderman, Johnson, Green, Birkett-Swan & Yorston, 2008

## 1. BEHAVIOURS

<table>
<thead>
<tr>
<th>Verbal Comments</th>
<th>Non Contact</th>
<th>Exposure</th>
<th>Touching Others</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VC</strong> Intimate personal comments of mild severity, e.g. “Have you got a girlfriend?”, “I love you”, “You’re gorgeous.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NC</strong> Blowing kisses, kissing self or staring at another persons groin, female breasts or buttocks, or makes obscene gesture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>E</strong> Appears unaware that is exposing genital, female breasts or buttocks in a public setting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TO</strong> Touches for a prolonged period (excess of 2 seconds) or strokes another person – does not include groin, female breasts or buttocks</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 2. ANTECEDENTS

### Set One
Contributing Factors (coded 1-3)

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<th>(coded A-N)</th>
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<td>M Physical distraction (leading the patient away)</td>
</tr>
<tr>
<td>N Other (please specify on the back of the recording form)</td>
</tr>
</tbody>
</table>

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*Note: Masturbation = rubbing own genital

*Bedrooms and bathrooms are non public/non-shared environments

*Attempts to touch which are only prevented by staff intervention, should be rated as if contact occurred

© 2008 St Andrew’s Healthcare
## 1. Behaviours

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<td>E</td>
<td>TO</td>
</tr>
<tr>
<td><strong>1.</strong> Intimate personal comments of mild severity, e.g. &quot;Have you got a girlfriend?&quot;, &quot;I love you&quot;, &quot;You're gorgeous&quot;</td>
<td>Blowing kisses, kissing self or staring at another persons groin, female breasts or buttocks, or makes obscene gesture</td>
<td>Appears unaware that is exposing genitals, female breasts or buttocks in a public setting</td>
<td>Touches for a prolonged period (excess of 2 seconds) or strokes another person – does not include groin, female breasts or buttocks</td>
</tr>
<tr>
<td><strong>2.</strong> Comments of a sexual nature, clearly not person directed, e.g. &quot;I've got a big dick&quot;</td>
<td>Touches own groin, female breasts or buttocks over or under clothes (no exposure)</td>
<td>Wearing no clothes in a public setting, clearly not person directed</td>
<td>Kissing another person</td>
</tr>
<tr>
<td><strong>3.</strong> Descriptions of another persons groin, female breasts or buttocks clearly directed to another person e.g. &quot;You have a nice bottom&quot;, &quot;She’s got lovely breasts&quot;</td>
<td>Masturbates in a non shared setting where staff are present (e.g. begins when staff enter bedroom or in bath)</td>
<td>Intentionally exposes genitals, female breasts or buttocks to another person (appears to be a deliberate premeditated behaviour)</td>
<td>Lifting skirts, pinching or touching buttocks, sitting on other’s knee</td>
</tr>
<tr>
<td><strong>4.</strong> Explicit accounts of sexual intent, requests or activity e.g. &quot;Show me your knickers&quot;, &quot;I want to shag you&quot;</td>
<td>Masturbates without genitals being exposed in a public setting, including ward shared areas (e.g. dining room)</td>
<td>Masturbates with genitals being clearly exposed in a public setting, including ward shared areas (e.g. patient’s lounge)</td>
<td>Touching others groin, female breasts, or rubbing own genitals or female’s breast against another person</td>
</tr>
</tbody>
</table>

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A charity leading innovation in mental health
<table>
<thead>
<tr>
<th>Date</th>
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<th>Epilepsy prev 24 hrs</th>
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<th>Behaviour (type, rating)</th>
<th>Interventions (A-N)</th>
<th>Multiple Recordings (identical incidents take place in quick succession)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/10</td>
<td>11:00</td>
<td>PG</td>
<td>✓</td>
<td>✓</td>
<td>11</td>
<td>VC3</td>
<td>A</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>8/10</td>
<td>11:04</td>
<td>PG</td>
<td>✓</td>
<td></td>
<td>11</td>
<td>VC4</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/10</td>
<td>11:06</td>
<td>PG</td>
<td>✓</td>
<td></td>
<td>22</td>
<td>TO1</td>
<td>B</td>
<td></td>
<td>✓✓✓✓✓</td>
</tr>
</tbody>
</table>
OAS-MNR & SASBA

• Clinical Work
  ▶ behaviour analysis
  ▶ evaluating effectiveness of treatment

• Audit
  ▶ prevalence aggression
  ▶ what, where, when, with whom, how managed?
  ▶ resource management

• Research
  ▶ identifying factors contributing to aggression
  ▶ new treatments
Aggressive behaviour exhibited by 108 service users over a 14 day period

5548 episodes
Frequency Aggression Recorded during a 14 Day Observation Period

(N = 5548)
Use of OAS-MNR in Neurorehabilitation

- Neurobehavioural services are asked to manage very high levels of aggression.
- Aggression function of individual characteristics and situational variables.
- Most aggression preceded by either a verbal prompt or no obvious antecedent.
- Most aggression (80% physical assaults) shown in people with language impairment and severe symptoms of neurobehavioural disability.
Aggression also a function of complex interactions between individual and situational variables.

- Severe neurobehavioural disability
- More structured activity
  - + verbal prompt

Predictable, planned intervention possible, more risks may be taken in rehab.
language impairment + severe neurobehavioural disability

less structured activity + no overt antecedent

most frequent aggression
most severe aggression
most intrusive methods to manage

Unpredictable, more reactive management, greater challenge to rehab services
Prevalence ISB in Neurorehab Service

SASBA and OAS-MNR data for 12 week period sampled across ABI service:

- 91 patients referred with challenging behaviour and wider rehabilitation needs
- 7 separate wards for acute neurobehavioural rehabilitation (4) and those with slow stream long-term needs (3)
- 2 areas mixed gender (BC) + 4 for men and 1 for women
Total pts = 91; 699 events recorded over 3 mth period
Least intrusive intervention?

<table>
<thead>
<tr>
<th>Intervention</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ignore or ‘downplay’ behaviour</td>
<td>482</td>
<td>71.8</td>
</tr>
<tr>
<td>talk/prompt patient</td>
<td>148</td>
<td>21.6</td>
</tr>
<tr>
<td>special programme</td>
<td>40</td>
<td>5.8</td>
</tr>
<tr>
<td>physical distraction</td>
<td>2</td>
<td>.3</td>
</tr>
<tr>
<td>other</td>
<td>2</td>
<td>.3</td>
</tr>
<tr>
<td>holding patient</td>
<td>1</td>
<td>.1</td>
</tr>
</tbody>
</table>
Frequency ISB x Patient in ABI Service

Individual Patients

Total SASBA Events

Frequency ISB x Patient in ABI Service
ORIGINAL ARTICLE

The development of the St Andrew’s-Swansea Neurobehavioural Outcome Scale: Validity and reliability of a new measure of neurobehavioural disability and social handicap

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¹National Brain Injury Centre, St Andrew’s Healthcare, Northampton, UK, and ²Swansea University, Singleton Park, Swansea, UK

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Abstract
Primary objective: Neurobehavioural disability (NBD) has a major impact on long-term psychosocial outcome following acquired brain injury (ABI). A recent review highlighted that a reliable and valid measure that can adequately capture the subtle and varied characteristics of NBD has yet to be developed. In this paper, the work underpinning the ‘St Andrews-Swansea Neurobehavioural Outcome Scale’ (SASNOS) is described using a conceptual framework underpinned by the WHO ICF. The intention is that SASNOS will provide a reliable and valid means of measuring NBD.

Methods and procedures: Three hundred and thirty-six sets of ratings were made regarding ABI and neurologically healthy samples. The initial pool of 117 items was subjected to exploratory factor analysis and Rasch analysis. Reliability and validity of the new measure were determined using a range of appropriate statistical methods.

Main outcomes: Forty-nine items were retained, falling into five principal factors. Content and construct validity are calculated. SASNOS has excellent discriminant/diagnostic validity. Inter-rater and test–re-test reliability are good.

Conclusions: SASNOS has a range of clinical and research applications and can be employed when measuring outcome. This new measure will enable neurorehabilitation services to directly compare the clinical populations they serve using the same frame of reference for NBD.

Keywords: Acquired brain injury, neurorehabilitation, outcome measurement
### St Andrews - Swansea Neurobehavioural Outcome Scale (SASNOS)

This questionnaire is based on the difficulties that people experience when they acquire a brain injury. We would like you to think about your recent observations and experiences of the patient and rate each of the items on a scale from 'Never' to 'Always'. Please circle your responses and mark any comments. If items cannot be read, please circle 'N'.

#### Interpersonal Relationships

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interacts appropriately with strangers</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
<tr>
<td>2. Tactful and discreet in the presence of others</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
<tr>
<td>3. Maintains good personal hygiene</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
<tr>
<td>4. Expresses distress or fear appropriately</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

#### Social Interaction

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Expresses distress or fear appropriately</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

#### Relationships

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Maintains eye contact with others</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
<tr>
<td>7. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

#### Engagement

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Demonstrates a desire to participate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
<tr>
<td>9. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

### Cognition

#### Executive Function

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Follows instructions of a complex task</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
<tr>
<td>11. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

#### Attention and Memory

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. Follows instructions of a complex task</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
<tr>
<td>13. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

### Communication

#### Speech and Language

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
<tr>
<td>15. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

### Inhibition

#### Social

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>16. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

#### Overt Aggression

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

### Aggression

#### Provocative Behaviour

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>18. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

#### Irritability

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

### Overactivity

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>20. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

### SASNOS

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Slightly</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. Verbal and non-verbal communication is appropriate</td>
<td>Never</td>
<td>Slightly</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>

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Principal Factors

- Interpersonal Behaviour
  - Social interaction
  - Relationships
  - Engagements
- Cognition
  - Executive function
  - Attention & memory
- Aggression
  - Provocative behaviour
  - Irritability
  - Overt aggression
- Inhibition
  - Sexual
  - Social
- Communication
  - Speech & language
  - Mental state
Comparison of ABI and Control SASNOS Ratings

Significant difference between all mean scores at $p<0.001$
Visual Representation of Functional, Neurobehavioural and Social Outcome Following ABI Rehabilitation

[Diagram showing various outcomes and categories such as Cognitive Function, Self Care, Sphincter Control, Psychosocial Adjustment, Mobility/Transfers, Communication, Interpersonal Behaviour, Inhibition, Aggression, and Cognition, with visual indicators for admittance (Adm), current status (Cur), and goals (Goal).]
Longitudinal Change in SASNOS Ratings Over 6 Months in Rehabilitation

- Sum Ratings*
- Interpersonal Relationships
- Cognition
- Inhibition*
- Aggression*
- Communication*

Median T-Score

Interval (*R1 – R3 p<.05)

A – Admission
1 – CPA 1
2 – CPA 2
Management of Post-ABI Behaviour Disorders

Non-Medical Treatment options include:

- psychotherapy
- cognitive-behavioural therapy
- operant learning theory
Psychotherapy

- Broad concept, many varied therapies drawn from different models of psychopathology

- People with severe challenging behaviour typically excluded from such programmes
Cognitive-Behavioural Therapy

- Outcomes lacking
- Challenges to overcome (attention, monitoring, memory, insight/awareness)
- Resource intensive
- Applications in severe learning disability suggest may have greater potential for use in ABI
Forms of Learning: ‘behaviour therapy’

Nonassociative vs Associative

- habituation
- sensitisation

- classical conditioning
- operant conditioning
- declarative learning
- procedural learning
- errorless learning
Operant Conditioning

Theory that predicts how people learn through their experience of interacting with the world.

All behaviour has an impact on the environment; the nature of these consequences (pleasant, unpleasant) will influence the likelihood of the same behaviour being repeated in the future.
Use of Operant Conditioning Procedures

- used with wide range of clinical populations
- extensively researched and documented
- diverse range of methods have emerged
  
  reinforcement
  shaping
  chaining
  relaxation
  time-out
Neurobehavioural Rehabilitation

“…a neurobehavioural paradigm incorporates constructs, theories and procedures from cognitive, behavioural and social psychology to promote the acquisition and spontaneous use of functional and social skills that will ameliorate the social handicap produced by permanent forms of neurobehavioural disability.”

Wood & Worthington (2001)
Specialised Neurobehavioural Units

- structures to minimise effects of cognitive impairment
- structures to maximise opportunities for new (adaptive) learning
‘Structure’ Imposed Through

• physical environment
• transdisciplinary & interdisciplinary teams
• daily routine
• neurobehavioural interventions
These structures create a ‘prosthetic environment’ within which a person’s awareness and capacity for social learning are optimised.

\[(\text{Wood & Worthington, 2001})\]

- *increase awareness*
- *improve motivation*
- *shape behavioural responses into acceptable form*  
  \[(\text{Wood, 1990})\]
Change Behaviour Through

- reinforcement of appropriate, desirable behaviour
- ‘play down’ undesirable, inappropriate behaviour
initial admission

entry into programme

follow-up

frequency aggression

weeks

Lorazepam

Haloperidol

Procyclidine

Carbamazepine

frequency

severity

intervention

mean severity & intrusiveness intervention

weeks
WT: reduction of shouting in hygiene programme

Structured Hygiene Programme & DRL

Post-DRL Follow-ups

B’line

Frequency

Days

Weeks

WT: reduction of shouting in hygiene programme

Structured Hygiene Programme & DRL

Post-DRL Follow-ups

B’line

Frequency

Days

Weeks

WT: reduction of shouting in hygiene programme

Structured Hygiene Programme & DRL

Post-DRL Follow-ups

B’line

Frequency

Days

Weeks
Assess Period

Intervention

Frequency SASBA

Weeks

All SASBA

‘Touching Others’
Effect of Prompting vs “time-out-on-the-spot” and Differential Reinforcement on Inappropriate Interaction

Prompting “don’t do that”

TOOTS & DRI

Weeks

Frequency

1 4 7 10 13 16 19 22

Weeks
Effect of “time-out-on-the-spot” on disinhibited behaviour

- General touch on admission: 600
- Sexual touch on admission: 100

After 8 weeks:
- General touch: 100
- Sexual touch: 100
Reduction of Overt Aggression Whilst Increasing Rehabilitation Expectations in a Neurobehavioural Unit

- **SM**: Frequency aggression (red) and expectations (yellow) for all aggression.
- **MW**: Frequency aggression (red) and expectations (yellow) for physical aggression.
- **BC**: Frequency aggression (red) and expectations (yellow) for physical aggression.

Parameters: frequency aggression, expectations (NES)
Elements of the neurobehavioural approach

- Clear leadership and accountability
- Ownership by all
- Transdisciplinary
- Clear treatment goals
- **Daily therapeutic programme**
- **Ward rules**
- Levels/step system
- Functional analysis
- Formulation and sharing ideas about way forward
- Individual programmes
- **Reinforcers**
- **Feedback**
- Points/tokens
- **Recordings**
What are the outcomes?

- Adults discharged from BIRT residential rehabilitation units followed up after 18 months (average)

- “significant gains” found at discharge and follow-up re social outcome

- Improvements made regardless of time since injury

- Initial costs of rehab offset by savings to medium & longer term costs within 2 years

“It is a mistake for local services to believe that they can treat persisting and severe behaviour problems (less expensively) in a non-specialised unit or that such a unit can easily be created locally...a programme that allows immediate and consistent responses to inappropriate behaviour is required, in an environment which itself operates as a therapeutic milieu.”
Comparison of median AAS scores for the first and most recent 3 months of admission within ABI and PNC services

<table>
<thead>
<tr>
<th></th>
<th>First 3 Months</th>
<th>Last 3 Months</th>
<th>% Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ABI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>104</td>
<td>61</td>
<td>- 41.3</td>
</tr>
<tr>
<td>AAS</td>
<td>408</td>
<td>213</td>
<td>- 47.8</td>
</tr>
<tr>
<td><strong>PNC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>16</td>
<td>23</td>
<td>+ 30.4</td>
</tr>
<tr>
<td>AAS</td>
<td>90</td>
<td>55</td>
<td>- 38.9</td>
</tr>
</tbody>
</table>

*Alderan, Knight, Stewart & Gayton, 2011*
Comparison of median frequency and AAS for the first 12 weeks of admission, 12 weeks prior and 12 weeks post implementation of the new levels system on Tavener Unit.

- **First 12 weeks of admission**: Frequency = 90.0, AAS = 267.3 (n = 9)
- **12 weeks prior**: Frequency = 25.0, AAS = 55.0 (n = 9)
- **12 weeks post**: Frequency = 16.0, AAS = 25.9 (n = 9)

52.9% reduction in AAS.
Service User Comments

“I like it because it shows me and others how well I am doing.”

“I like the STAR reinforcers.”

“It keeps me on track and is building my confidence.”

“It reminds me that my rehab is worth sticking to.”
Knowing what I can achieve on level 4 and receiving a STAR helps me to change my behaviour. It gives you something to work towards.”
Staff Comments

“Being part of the feedback session allows me to remember what all the hard work is for. It allows me to return to my nursing roots, to see the positive engagement between the staff and service users, to interact in a positive way with the service users, to hear the positive comments both staff and service users have to say about one another. What strikes me the most is the benefits that are there to see on everyone’s face, the smiles, the laughter and the positive interactions. For me it’s the perfect way to start a working week!”

“It is so wonderful to see all the patients totally engaged in and committed to the new level system. During the Monday morning sessions the patients are all so very supportive and encouraging of each other.”