The Community Mobility Assessment-2 for youth: A reliability and validity study

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Holland Bloorview Kids Rehabilitation Hospital

Canada’s largest children’s rehabilitation hospital focused on improving the lives of kids with disabilities
What is community mobility?
Our client ...

- Emma is a 16 year old female who had a right intraparenchymal hemorrhage as a result of an arteriovenous malformation
- Inpatient rehab for 4 months
- Previously independent in community mobility and wanted to get back to shopping with her girlfriends
- Parents were afraid to let her go out alone!

The issues...

- Left homonymous hemianopsia, but was scanning fairly well in the familiar hospital setting
- Decreased speed of processing
- Left sided weakness, walking independently wearing left ankle brace
- Decreased balance
- Excessive fatigue
Discharge findings...

- Gross Motor Function Measure – 93%
- Fully oriented within the building
- Behavioural Assessment of Dysexecutive Syndrome – Child (BADS-C) – in the average range, performance improved when tasks were structured
- 6 Minute Walk Test – 550 metres (lower end of normal)
- PEDI–CAT – percentile rank less than 5 for mobility and social cognition

Projecting performance in a real life environment

- Slow walking speed
- Potentially not looking to the left even though she managed well within the hospital
- Overly reliant on written instructions
- Challenges with attending to the street lights, signage and crowds at a busy intersection
- Not recognizing the bus stop
The Question?

Will our in-clinic assessments tell us how Emma will actually perform when placed in a real life situation?

WILL SHE BE SAFE?

How we might evaluate Emma’s community independence before she goes home?

- Aspects of ‘community mobility evaluation’ are embedded within several validated participation or community integration evaluation questionnaires.
- Self-report questionnaires may be problematic for ABI clients since they frequently have poor insight into their abilities and may not accurately report their performance.
- Using a parent as a proxy respondent may also lead to errors in measurement of actual skills and behaviours.
- The actual skills required to get about in the community are only touched upon in these assessments.
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This set the stage for the creation of our Community Mobility Assessment (CMA).

The Development of the original CMA (1998)*

- 17 Physical items
- 23 Cognitive items
- Performance-based observational assessment in which youth (12-19 years) with an acquired brain injury go on a planned outing in the community.
- Items divided into 7 sections: Outing preparation, Road Safety, Outdoor Groundwork, Indoor Groundwork, Orientation, and Community Activity.

EXAMPLES OF SKILLS ASSESSED

- Brings appropriate amount of $
- Crosses streets within sufficient time frame
- Follows a planned route
- Manages escalators
- Anticipates bus stop
- Exits bus by rear doors
- Shows social appropriateness (e.g., at restaurant, store)

Reliability of the original CMA*

- Quantitative inter-rater reliability study was completed in 2005 where subjects were independently rated by one expert rater and one student rater
- Descriptive statistics were computed for physical and cognitive summary scores
- Excellent inter-rater reliability for physical components and good inter-rater reliability for cognitive components

Evolution of the CMA-2

- Clinicians working in ABI became increasingly aware of changes to the built environment (e.g., countdown street lights) and advances in communication technology (e.g., prevalence of cell phones)
- Did the CMA content really reflect these changes?

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Was the CMA still valid?
Updating the CMA

- Purpose of our 2014/15 measurement study: To update the CMA to reflect youth’s use of technology and changes in the built environment
- Mixed methods approach
- Quantitative web-based clinician surveys were complemented with separate focus groups with youth and clinicians to determine pertinent items
- Name changed to the CMA-2 to reflect the updated tool

Shenstone J, Rodak M, Brewer K, Geisler P, Woodhouse J, Wright FV, Updating the Community Mobility Assessment due to technological and built environment changes, unpublished paper, 2015)

CMA-2 Rating Scale

- Changed to a 4 point rating scale:
  - 3 points - Accomplished independently
  - 2 points - Asks for confirmation/assistance
  - 1 point – Single prompt/assistance required
  - 0 points – Multiple prompts/not accomplished
Groundwork – Outdoor Stairs

3 Ascends and descends stairs in a safe manner, adjusts speed to weather conditions
2 Asks therapist for assistance in anticipation of difficulties (eg. Holds their arm) OR stumbles but recovers balance independently
1 Does not use handrail when it is necessary and therapist must prompt client to use handrail for safety
0 Almost falls on stairs and therapist must physically intervene to ensure client safety

CMA-2 Validation Study Was Essential
Funded by the Holland Bloorview Centres for Leadership 2016-17

- Single group, measurement study design
- Inclusion criteria:
  - 11-19 years with an acquired brain injury
  - Inpatients, day patient or out patient
  - Walk more than >750 metres in 25 minutes
  - Scored >95% on our topographical orientation scale
- Exclusion criteria:
  - Behavioral issues precluding safe community mobility
Study Process

- Two trained assessors (PT and OT pair) accompanied youth on CMA-2 outing
  - one administered CMA while other observed
- Scoring completed independently by each assessor post outing
- Separate assessment by an independent OT assessor with validity measures:
  - 6 minute walk test
  - PEDI-CAT (mobility, social/ cognitive/ responsibility domains)
  - Behavioural Assessment of Dysexecutive Syndrome (BADS - Child version)

Interpretation of Results

- Excellent reliability for Cognitive component and good reliability for Physical component – sufficient to move ahead with the CMA-2
- Physical component reliability was negatively affected by the surprising lack of score spread in this ABI sample
- Evidence of adequate construct validity given the moderate associations with PEDI-CAT and 6 Minute Walk Test
Interpretation of Results...

- Executive function **association** *(BADS-C test)* did not reach hypothesized levels

- Other than power limitations linked with a small ‘n’, unclear why the BADS-C did not show stronger association

- **Further studies** with larger samples are needed to investigate the **executive function** construct
How did Emma perform on her CMA-2?

- 85% on physical items, 58% on cognitive items
- Slow walking speed crossing multi-lane roads
- Needed multiple prompts to look left when crossing streets both with and without lights
- Missed signage to find the restaurant in the mall, overwhelmed by crowds which impacted her ability to follow a planned route
- Needed prompt at the correct stop to exit bus
- Cognitive and physical performance declined on return trip due to fatigue

**Client is not safe and supervision is recommended**

Current Research related to Knowledge Translation of the CMA-2

- Develop and pilot test a **Certification Training program** for PTs and OTs to support CMA-2 transfer to clinical care and research
- Design a **Simulation Based** training program – in situ training (OT and PT participants go into the community on a CMA-2 outing with a simulated patient)
- Build **training materials** to be housed in a **cloud based educational platform**
- In 2019, we will be looking for PT’s and OT’s to do our online training and evaluate the CMA-2 materials
Acknowledgments

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