

## Responsiveness of the Canadian Occupational Performance Measure for Adults with ABI

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### Abstract

**Background:** As survivors of traumatic brain-injury, stroke, and brain tumors live longer programs beyond traditional rehabilitation models must be developed. Community-based therapy programs have increased and evidence-based methods of addressing client needs and program development are critical for this population.

**Purpose:** Determine the responsiveness/validity of the Canadian Occupational Performance Measure in determining occupational priorities for community-based program development for adults with acquired brain injury. Measure convergent validity of the Canadian Occupational Performance Measure with the Community Integration Questionnaire and the Wisconsin HSS QOL Inventory.

**Methods:** Demographic, occupational performance/satisfaction, community integration and needs-based quality of life scores for 80 adults were descriptively examined. One-way analysis of variance of participants' listed occupations was conducted. Correlational analyses explored community integration and quality of life variables associated with occupational performance and satisfaction.

**Findings:** Adults with acquired brain injury in community-based programming have robust occupational priorities. Leisure occupations are significantly more important than self-care and productive occupations ( $F(2,189)=13.59$ ,  $p=0.01$ ). Leisure occupations performed with others are significantly more important than quiet or active recreational occupations ( $F(2,316)=10.29$ ,  $p=0.001$ ). Convergent validity of the Canadian Occupational Performance Measure and the Community Integration Questionnaire was weak, and no convergence was found with the Wisconsin HSS QOL Inventory.

**Implications:** The responsiveness of the Canadian Occupational Performance Measure in detecting significant differences in occupational priorities of adults with ABI provides therapist with critical valid data to guide both intervention and focused program development at the community level that addresses the unique needs of this population. Higher levels of occupational satisfaction could result in higher community integration and higher quality of life for this population.

**Keywords:** Occupational rehabilitation; Brain stroke; Traumatic brain injury

### Introduction

It has been stated that the future of many allied health care professions lies in the community [1-4]. Leaders in occupational therapy (OT) have also given voice to the need for OT to return to its community roots by developing educational curricula that prepare students for this area of practice [5]. This is further supported in the new standards of the Accreditation Council of Occupational Therapy Education (ACOTE) that requires future practitioners to have the skills to articulate the role of OT in the community and to develop community programs that are based on client needs grounded in evidence within the client's natural environment. Schaber defined community-based outcome evidence, stating that it should address health, well-being, participation and quality of life (QOL) [5,6]. Shifting allied healthcare outcomes to a population, occupation-based, focus is an emphasis of the Occupational Therapy Practice Framework (AOTA, 2014) that states that occupational performance, participation

and QOL need to be measured to demonstrate the unique value of the profession [7]. The development of broader assessment and interventions related to social participation at the community level are also emerging [9-11]. These outcomes within community settings for all healthcare professionals will continue to be an emphasis [12].

Adults with acquired brain injury (ABI) can benefit from therapy services at the community level. ABI is the result of physical, functional, or metabolic changes to the integrity of the brain, which are not from congenital, hereditary or degenerative cause. The causes of ABI can include trauma, vascular disruption, stroke, infectious disease, and tumor. Estimates are that in Canada 5.6 million people and in the United States nearly 9 million people are living with the long-term effects of ABI, such as loss of identity, social isolation, depression, substance abuse, physical, emotional and cognitive performance challenges [13,14]. In North America the incidence of ABI has climbed to over 1 million individuals per year [15]. Warren, et al. noted that secondary to medical and pharmaceutical advances ABI survivors' life expectancy is now approaching that of the uninjured population. The increase in life expectancy and the continued

restricted funding for traditional rehabilitation care has created the need for an expanded continuum of care [16,17]. One result has been an increased development of community-based programs for people with ABI, who have common needs and similar occupational performance goals [18,19]. ABI research has traditionally focused on narrowly defined outcomes, such as discharge destination, mobility, self-care and very basic definitions of return to work. An occupational perspective about the issues confronting people with ABI is important but largely missing. This perspective is needed to guide allied healthcare intervention and program development in this evolving area of community-based practice [20,21].

The Canadian Occupational Performance Measure (COPM) [22] is a contemporary outcome measure that is focused on the occupational perspective of individuals participating in therapy. The COPM is an outcome measure for use by therapists to assess client outcomes in the areas of self-care, productivity, and leisure. Self-care includes personal care, functional mobility and community management, productivity includes paid or unpaid work, household management, school and play and leisure includes quiet recreation, active recreation, and social recreation [23]. Several articles have explored COPM data in an attempt to measure its utility for specific populations of clients [24-28].

Two studies have explored COPM data related to adults with ABI in the outpatient setting. Phipps and Richardson studied a group of 158 people with ABI receiving outpatient occupational therapy. On average the participants generated 5.82 goals with a total of 901 occupational performance goals to be worked on during therapy generated. The occupational area of concern for these participants primarily fell under self-care (37.18%) and home management-productivity (33.19%). This study did not record mean COPM scores for performance and satisfaction only change in performance ratings from admission to discharge. Trombly, Radomski, Trexel and Brunett-Smith reviewed 31 individuals with ABI in the outpatient setting in which time post injury ranged from three months to over a year. The authors did not record the specific occupational priorities of the participants but did record initial COPM performance scores at 3.97 and satisfaction scores at 3.13. Both studies found the COPM to be sensitive in measuring performance and satisfaction change through pre and post treatment.

Jenkinson, Ownsworth and Shum explored the COPM with 34 people with ABI all participating in community-based rehabilitation. The authors sought to examine the stability and sensitivity of the COPM and the convergent validity of the COPM with the Brain Injury Community Rehabilitation 39 (BIRCO-39) [29], and the Patient Competency Rating Scale (PCRS) [30]. Findings from this study found participants and relatives ratings on the COPM to not be statistically different illustrating the accuracy of people in ABI in selecting and rating desired areas of occupational performance. It also noted convergent validity with the PCRS but not with the more performance based BIRCO-39. This study supported the sensitivity of the COPM in measuring change. Initial self-reports for occupational performance ranged from 4.53 to 4.87 and satisfaction was 3.89 to 4.70. These authors also noted that levels of awareness of deficits, cognitive functioning and depression did not influence self-ratings of performance and satisfaction, however anxiety did. Kendrick looked at the COPM scores for 53 people with ABI participating in a time-limited community-based rehabilitation program. The initial average COPM performance score for this group was 3.76 and satisfaction was 2.67, 85% of participant's time since injury was six months to over two

years and 15% were less than six months. The authors also noted that 82% of stated participant goals had at least one in self-care, 85% in the productivity, and 73% in leisure. In a study of 132 community residing residents all of whom had survived a stroke, Lund reported the participants prioritized 392 occupational problems primarily related to socialization, active recreation, household and community management, and mobility on the COPM. The authors noted that 41% of occupational interest fell under leisure with 9% being quiet recreation, 18% being active recreation and 14% being social recreation. Jenkinson, Ownsworth and Shum stressed the need for COPM self-ratings to be interpreted in the context of other outcome indicators.

In studies not directly related to community-based or outpatient rehabilitation of adults with ABI the COPM has been used to measure changes in occupational satisfaction and performance, explore convergent validity and describe the occupational nature of population groups. Roberts looked at change in performance and satisfaction scores post treatment, differences in goals related to age, gender or setting, and what occupational area is more important to participants. Initial COPM performance scores for the 62 participants (varied diagnosis) were 4.38 and satisfaction scores were 4.35, in all settings (inpatient hospital, outpatient hospital, community rehabilitation and residential rehabilitation) self-care occupations were found to be most important, and more males (72.6%) than females (54.5%) reported self-care problems. Finally, the authors found that individuals under the age of 65 were more concerned with productivity and those older than 65 were more concerned with self-care. The authors also noted that the COPM was sensitive in measuring change pre and post intervention. Larsen and Carlsson explored the utility of the COPM as an admission and outcome measure in an interdisciplinary community geriatric rehabilitation setting. 124 elder participants generated 404 occupational performance concerns and the authors found the COPM sensitive to change in pre and post intervention. Cresswell and Rugg explored individuals with schizophrenia ranging in age from 17 to 60 years and found them capable of establishing goals for their rehabilitation process. For this population the greatest area of concern was productivity (40%), followed by leisure (primarily social recreation) (35%) and finally self-care (25%). These authors also reported convergent validity of the COPM with the Community Occupational Therapy Initial Assessment (COTIA) [31]. Harper, Stalker and Templeton found in a group of 177 participants, all in a posttraumatic stress program, that social recreation and self-care goals were rated most important. The author's also reviewed the convergent validity of the COPM with the symptom checklist-90 [32]. Modified PTSD Symptom Scale-Self Report [33] and the Traumatic Stress Institute Belief Scale Revised [34]. Significant correlations were noted at the end of treatment and follow-up between the assessments and the COPM. Finally, Nieuwenhuizen compared the COPM to the Pain Disability Index (PDI) and the RAND 36-Item Health Survey (RAND-36) for 87 newly admitted patients with chronic pain in an outpatient setting. The results of the study showed that the COPM, specifically occupational performance was weakly to moderately associate with the outcomes of the PDI and RAND-36. The average COPM performance score on admission was 3.43 and in level of importance 45% of listed occupations fell under social recreation, 15% productivity and 1% under self-care.

It is clear from these studies that the COPM is being used to understand the unique occupational goals and desires of individuals with similar diagnosis, in different levels of care, and stressing the need

to understand the COPM data with broader outcomes tools related to certain diagnosis and unique to specific treatment settings.

Although most of the studies reviewed reported positive outcomes, few reviewed convergent validity of the COPM with other outcome indicators and few addressed people with ABI in community-based programming. The reviewed literature did not discuss how COPM outcome data could be used for program development and enhancement. This is the ultimate use of outcome data, to inform and direct program growth initiatives [35,36].

**The purpose of this study was to examine:** 1) the responsiveness of the COPM in determining occupational priorities for adults with ABI participating in community-based programming; and 2) to determine the validity of the COPM by exploring relationships between performance and satisfaction with occupational priorities and broader outcome measures of social participation and quality of life. The following research questions were explored in promoting community-based practice for adults with ABI:

- Does the COPM detect significant differences among client-identified occupations in three important categories: Self-Care, Work and Leisure?
- Are there significant differences between important occupations listed in one category of the COPM for adults with ABI in community-based practice?
- Does the COPM demonstrate convergent validity with the Community Integration Questionnaire and the Wisconsin HSS QOL Inventory?

## Methods

### Participants

This was an exploratory study that used descriptive statistics to discuss outcomes from a convenience sample of 80 participants, 57 men and 23 women, all of whom participated in one of two community-based programs in northern New England, who had a diagnosis of ABI (TBI, 67.5%; Stroke, 32.5%). Participant ages ranged from 18 to 83 years (mean=47.9 + 16.99). Their mean time post injury was 7.8 years + 6.11 and their mean time of engagement in community-based programming was 21.8 months + 9.02. Of the 80 participants 63 were unemployed, 8 were employed and 9 were retired. Participant records at both facilities were used to extract data on cognitive functioning and levels of mild to moderate were determined from records, all individuals were medically stable, with adequate receptive and expressive communication, competent to give informed consent, were able to participate fully in the six-hour day program offerings, and complete all three assessments associated with the study. Only one participant was questioned on his ability to complete the assessments, so this individual completed the assessment with a primary care giver/relative. Broader participant descriptive data is provided in Table 1.

### Settings

This study was conducted at two community-based programs for adults with ABI. The programs had similar structure: provided programming five days per week with three of those days offering occupation-based groups for six hours per day. Each program employed several allied health care professionals to deliver services as

well as program development. Program details can be found in an earlier publication [18].

### Instruments

This study relied on an intake form for demographic data and three assessments: the Canadian Occupational Performance Measure (COPM) (Law et al. [22]), the Community Integration Questionnaire (CIQ) [37] and the Wisconsin HSS QOL Inventory (WI HSS QOL) [20].

Mean Age	47.9 Years
Mean Years post injury	7.8 Years
Males	75% (60)
Females	25% (20)
Diagnosis	ABI 70% (56)
	CVA 28% (22.4)
	Other 2% (1.6)
Employment	Employed 10% (8)
Depression	No Issues 56% (45)
	Issues Within 6 Months 4% (3)
	No Issues for More Than a Year 39% (31)
	Active Diagnosis 1% (1)
Community Mobility	19% (15.2) Drives Independently
	45% (36) Driving Services
	17% (13.6) Bus Line
	19% (15.2) No Consistent Transportation
Living Arrangement	34% (28) Lives Alone in Home or Apartment
	33% (26) Lives at Home with Spouse or Family
	33% (26) Sheltered Living Situation
Cognitive Level	69% (55) Mild
	31% (25) Mild/Moderate

**Table 1:** Participant Descriptive Data.

**Canadian Occupational Performance Measure:** The COPM is a criterion-referenced assessment that measures an individual's perception of how well he or she performs important occupations and his or her level of satisfaction with the performance. Through a semi-structured interview the occupational therapist asks the client to list those occupations they would like to be more satisfied with and rate the level of importance. The therapist and client then determine five key occupations from the list in the domain areas: self-care, productivity and leisure. Self-care includes personal care (dressing), functional mobility, (transfers), and community management (transportation). Productivity includes paid and unpaid work (volunteering) household management (cleaning) and school (homework). Leisure includes quiet recreation (reading), active recreation (sports), and socializing (visiting friends). The scale

produces an overall occupational performance and occupational satisfaction score for the five important occupations the client has selected. When used as an outcome measure descriptive statistics can be developed to explore meaningful occupations for populations of clients. This approach looks at the average level of meaning all participants place on occupational areas and allows for program development and a deeper understanding of the occupational nature and needs of client populations to guide OT practice (Law et al. [22]).

Research conducted with the COPM on more than 650 participants with varied diagnoses demonstrates its validity, reliability and clinical utility [22,38,39]. Studies reviewing internal consistency have resulted in scores ranging from .63 to .80 for performance and .84 to 89 for satisfaction scores [40]. Studies looking at test-retest statistics have reports ranges of 0.84-0.92 [41].

**Community Integration Questionnaire:** The CIQ is a 15-item questionnaire that measures the extent of participants' level of participation [42]. It looks at living, loving and working to allow an analysis of integration within specific domains of everyday life. Items have been grouped in association with 1) activities primarily related to the home; 2) activities associated with socializing; and 3) education, vocational, volunteerism or other productive activities outside the home. Formally, these are referred to as home integration, social integration and productive integration. The CIQ produces a total score, which ranges from 0-29 points, the home integration ranges from 0-10, social integration ranges from 0-12, and productive integration ranges from 0-7. A higher score represents higher degrees of participation with people in everyday activities.

Data on the reliability and validity of the CIQ is extensive with results for internal consistency at 0.76 ( $p < 0.001$ ) [43], test retest reliability with a span of 10 days resulted in a correlation of 0.91 ( $N = 116$ ). Concurrent validity has resulted in strong correlations with the Craig Handicap Assessment and Reporting Technique [44,45].

**Wisconsin HSS QOL Inventory:** The WI HSS QOL [20] was designed to measure QOL with individuals who have brain injury. The WI HSS QOL consists of 60 items that are broken down into five categories. Theoretically, it is based on Maslow's hierarchy of needs and measures the effect of needs gratification on QOL. Within this context, need satisfaction is viewed as a means to achieve or maintain a certain degree of QOL. The categories of the assessment are physiological health, safety and security, love and belongingness, self-esteem, and self-actualization needs. Human needs can be further categorized into two broader dimensions of deficiency (lower-order) needs and growth (higher-order) needs. This instrument produces a total QOL score ranging from 0-180 and each category produces a score ranging from 0-36.

The WI HSS QOL takes a broad view of life with disability "in which dysfunction monopolizes neither life after onset of neither impairment nor QOL [20]. Unlike many investigator-developed measures of QOL, sound methods of instrument development were used in the creation of the WI HSS QOL, including expert judgment in item generations, multi-trait item scaling analysis, and large-scale convergent and construct validity analyses. Construct validity was investigated using cluster analytic techniques, which yielded five fairly discrete clusters consistent with Maslow's theory. Additionally, a two-cluster solution corresponded to the theoretical distinction between lower and higher-order needs.

Collins reported WI HSS QOL internal consistency ranging from 0.74 to 0.90 ( $p < 0.001$ ) and convergent validity with the QOL Scale

( $r = 0.80$ ) and the Life Satisfaction Index-Form Z ( $r = 0.73$ ) Collins (2000) and colleagues reported test retest reliability (0.90) for a group of survivors of ABI and (0.92) for a group of young college students. Collins also repeated internal consistency testing with a large group of survivors of ABI ( $N = 414$ ) and reported scores ranging from 0.79 to 0.96 ( $p < 0.001$ ).

## Procedure

After receiving ethical approval from the institutional review board of Nova Southeastern University and the boards of directors at the two community-based sites, onsite recruitment for the study was initiated. The intake data were used to determine eligibility and participants who met the inclusion criteria were asked to complete the three assessment instruments (COPM, CIQ, WI HSS QOL). If data was missing the primary researcher scheduled follow-up meetings with participants to complete all assessments.

## Data Entry and Analysis

Once data had been collected from all 80 participants, intake and assessment data was entered into the statistics database (SPSS-15; SPSS, Inc., Chicago). Data from the intake form was used to provide descriptive information on the participant pool. Then data from each assessment tool was analyzed for exploratory descriptive statistics and ANOVA analysis. The data was explored to confirm that the assumptions of ANOVA were met. Upon visual inspection of histogram plots of the data from each variable with a normal curve overlay it appeared that all variables were normally distributed. Skew, kurtosis, and Kolmogorov-Smirnov test of normality results for each variable are provided in Table 2. Finally, ANCOVA analysis was completed to control for age ( $> 45$  years;  $< 45$  years) and time post injury ( $> 7$  years;  $< 7$  years).

To answer the first research question the COPM was explored to determine the total number of occupations generated by all participants as well as the percent of occupations within each specific category measured by the COPM (self-care, productivity, and leisure). To further explore this area the level of importance given to the listed occupations was explored. This was completed to assure that a specific occupational category not only recorded a higher number of occupations but those occupations were viewed as important by study participants. ANOVA was used to determine if there was significant differences between the numbers of generated occupations amongst the COPM categories. If there was a significant difference a Tukey post hoc test was used to determine where the significance was between the three categories.

To further explore the responsiveness of the COPM and answer research question two, the category of highest importance was broken down into subcomponents as defined by the COPM. ANOVA was used to determine if there was a significant difference between the numbers of generated occupations in a subcomponent of an occupational category. If there was a significant difference a Tukey post hoc test was used to determine where the significance was between occupational categories.

In conjunction to the statistical aspect of the COPM, the specific occupations listed by participants were gathered and the five most frequently occurring occupations in each area are provided in Table 2. This allows for a richer understanding of the occupational nature of study participants and also underscores the value of qualitative data generated by the COPM.

The number of priority goals generated by the participant pool was also summed for total number of generated goals. To explore how occupations from the specific domains of the COPM were ranked as member occupational performance priorities, each goal was reviewed and coded for descriptive analysis. If the client performance priority fell under the occupational area of self-care it was coded 1,

productivity was coded 2, and leisure was coded 3 allowing for percentage responses of total distribution to be determined. Finally, the total performance scores and satisfaction scores for these performance priorities were explored. This data was used to further support exploration of the first two research questions.

Self-Care	Productivity	Leisure
1. Getting around community especially taking the bus.	1. Helping more at home with cooking.	1. Using email to touch base with friends and other community program members.
2. Getting to church	2. Helping more at home with cleaning.	2. Be more social at parties and outings.
3. Being safe going up and down stairs.	3. Using microwave to help with cooking.	3. Hiking with others.
4. Dressing self independently.	4. Volunteering at church for choir or help to teach classes.	4. Getting to parks, movies, mall, or somewhere with friends on weekends or when program is closed.
5. Bathing self independently	5. Finding part-time work.	5. Playing cards with friends and other community program members in the evenings or on weekends.

**Table 2:** Priority goal samples from COPM.

To answer research question three exploratory analysis of CIQ and WI HSS QOL categories and total score means, ranges and standard deviations were calculated. Pearson correlational analyses were then performed to measure convergent validity of the COPM scores with those of CIQ and WI HSS. This measure of convergence supports the identification of community integration variables associated with QOL outcomes to help establish how being aware of the occupational nature of participants might guide community program development and occupational therapy practice.

## Results

### Normality of data

Miles and Shevlin noted that if the skew statistic is less than one there should be little problem with issues of skew or kurtosis in the data, the authors also suggested that if the value of skew/kurtosis is greater than twice the standard error suspicion of the sample distribution should be taken. As noted in Table 3, the data for this distribution does not violate these guidelines. Next the Kolmogorov-Smirnov test of normality was completed and no issues found, so normal distribution of data was assumed for statistical analysis.

### Influence of age and time post injury

ANCOVA analysis found no significant difference in groups related to age or years post injury.

### Canadian occupational performance measure

The 80 participants of this study, all with a diagnosis of ABI and participating in a community-based program, generated 742 occupations in which they hoped to improve performance or satisfaction. This is an average of 9.275 desired occupations per participant. When the occupational areas were further explored it was noted that 43.4% of listed occupations were leisure, 30.0%, self-care, and 26.3% work-productivity.

The mean level of importance within each occupational area of leisure, self-care and work-productivity were calculated and can be

found in Table 4. As can be seen from the table, participants ranking of importance for desired occupations were above seven in all areas, however those occupations that fell under leisure on average had a higher level of importance.

Those occupations given the highest level of importance (a score of 10) under leisure captured 53.5% of occupations listed and 84% had a score of five or higher. In self-care 29.6% of occupations were given an importance score of ten and 52.5% were an importance score of five or higher. For productive occupations 23.1% of those listed were scored at a ten and 45.5% a score of five or higher. These percentages further support the level of importance of leisure occupations for this study population, which was higher than self-care and productivity related activities.

In reviewing the number occupations listed in each COPM category significant differences were found when ANOVA analysis was completed. There was a significant difference in number of occupations for self-care, productivity, and leisure categories on the COPM; ( $F(2,189)=13.591, p=0.006$ ). Tukey post hoc test noted that there was not a significant difference between self-care and productivity therefore participants listed significantly more occupations under leisure.

Secondary to the level of importance placed on leisure occupations by participants, the area of leisure was further explored to develop a more precise definition of the occupational nature of adults with ABI participating in community-based programs. As noted earlier this area of occupation on the COPM is divided into quiet recreation, active recreation, and socializing and a total of 322 occupations were recorded. From these 322 occupations 27.6% (89) were quiet recreation, 30.8% (99) were active recreation and, 41.6% (134) were social. Please refer to Table 3 to explore the level of importance placed on the occupations listed in this category of the COPM. Again occupations dealing with doing activities with other people for a social purpose were found to be more important with less deviation.

When the category of leisure was further explored a significant difference was found between categories (quiet recreation, active recreation, social recreation;  $F(2,316)=10.285, p=0.001$ ). Tukey post hoc test found no significant difference between quiet and activity

recreation, therefore participant ranking of level of importance for social recreational occupations was significantly higher.

Variable	N	M	SD	Skew	SE	Kurtosis	SE
WI HSS QOL	80	108.5	29.84	-0.728	0.27	0.145	0.54
CIQ	80	16.37	6.09	0.22	0.27	-0.765	0.53
COPM-S	80	4.55	1.86	0.741	0.26	0.980	0.53
COPM - P	80	5.15	1.94	0.259	0.27	-0.214	0.52

  

Test of Normality-Kolmogorov-Smirnov		
Variable	Statistic	Significance
WI HSS QOL	0.091	0.096
CIQ	0.110	0.018
COPM-S	0.084	0.200
COPM-P	0.081	0.200

**Table 3:** Summary of descriptive data for independent and dependent variables. WI HSS QOL: Wisconsin HSS Quality of Life Inventory; CIQ: Community Integration Questionnaire; COPM-S: Canadian Occupational Performance Measure-Satisfaction; COPM-P: Canadian Occupational Performance Measure-Performance.

COPM Occupational Area	Number of Occupations	Minimum	Maximum	Mean	Std. Deviation
Self-Care	225	1.00	10.00	7.7289	2.81138
Productivity	195	1.00	10.00	7.5128	2.76644
Leisure	322	1.00	10.00	8.7484	2.08886
Quiet Recreation	89	1.00	10.00	7.9101	2.51197
Active Recreation	99	1.00	10.00	8.3636	2.17338
Social	131	1.00	10.00	9.2061	1.87172

**Table 4:** Descriptive analysis of COPM areas of occupational importance.\* Mean represents level of importance rating for COPM occupational area.

To determine if occupations and level of importance were consistent with the goals that participants selected as their main priorities for OT intervention the five priority goals of each participant were explored along with total performance scores and satisfaction scores of these five goals, as recorded on the COPM. On average the 80 participants were able to individually generate 4.88 priority occupational goals. Of these generated goals 232 (59%) were in the leisure area, 93 (24%) were in the productive area, and 66 (17%) were in the self-care area.

Finally, for the five listed goals participant's average occupational performance score was 5.15, and the average occupational satisfaction score was 4.55.

### Community-Integration questionnaire

This group of 80 individuals with ABI participating in community-based programming recorded an average total score on the CIQ of 15.6 (SD=5.9; range 3-28). Sub score means for home integration was 4.7 (SD=3.12; range 1-10), for social integration 7.7 (SD=2.79; range 1-2) and for productive 3.2 (SD=5.93; range 0-6).

### Wisconsin HSS QOL inventory

The WI HSS QOL inventory produces a total score that ranges from 0 to 180 and each category ranges from 0-36. The means, standard deviations and ranges can be found in Table 5.

WI HSS QOL	N	Minimum	Maximum	Mean	Std. Deviation
Total Score	80	35.00	164.00	108.50	29.47
Physiological Needs	80	10.00	36.00	22.38	5.70
Safe and Security Needs	80	3.00	34.00	19.26	6.34
Love and Belonging Needs	80	4.00	36.00	24.06	7.79
Self-esteem Needs	80	1.00	34.00	20.65	8.66
Self-actualization Needs	80	6.00	36.00	22.88	6.43

**Table 5:** Descriptive analysis of WI HSS QOL measure.

### Correlational analyses

The total score and categories of the CIQ were correlated with the total score and categories of the WI HSS QOL to assess the relationship between integration and QOL for this group of participants please refer to Table 6 for results. The COPM satisfaction score demonstrated a significant relationship with the social integration score of the CIQ ( $r=0.27$ ,  $p<0.05$ ).

	CIQ Total Score	CIQ Home Integration	CIQ Social Integration	CIQ Productive Integration
WI HSS QOL				
Total Score	0.32**	0.23*	0.40***	-
Self-Actualization	0.42**	0.31***	0.42***	0.28**
Love and Belonging	0.50***	0.36***	0.62***	-
Physiological	0.25**	-	0.26*	-
Self-esteem	-	-	0.25*	-

CIQ=Community Integration Questionnaire, WI HSS QOL = Wisconsin HSS QOL Inventory.

\*\*\* $p<0.001$ , \*\* $p<0.01$ , \* $p<0.05$ .

**Table 6:** Correlations of WI HSS QOL and CIQ.

## Discussion

The findings of this study demonstrate the responsiveness of the COPM in detecting significant differences in the occupational priorities of adults with ABI. This responsiveness is noted both in broader occupational areas but also specific occupational domains such as active recreation or social recreation occupations. The findings also weakly support the convergent validity of the COPM with other community-based practice outcome measures, allowing for a richer understanding of outcome data.

Unlike the study by Roberts no significant differences were noted related to age and years post injury for adults with ABI in this study. Further inspection of the data clarifies this to some degree. One would expect that individuals under the age of 45 would be primarily concerned with areas of productivity as was found in other participant samples [46,47]. However, for this group the majority of younger participants consisted of the 8 individuals who were employed part-time. This factor could be why these participants listed social recreation as a larger concern decreasing variance in the data. Similar to age, years post injury for the vast majority of the study participants was beyond two years, and at this stage of recovery, and especially since they were already participating in a community-based program, individuals sought more social/leisure improvement than self-care or productivity. This finding points to the importance of how the COPM can be used to better understand the occupational priorities of individuals seeking rehabilitative services.

It is clear from the COPM outcome data that adults who have experienced ABI participating in community-based programming have a robust and diverse occupational nature and are actively seeking to enhance satisfaction, demonstrating a need for services. Studies related to outpatient and community-based programs reported ranges of 392 [48] to 901 [49] goals generated by participants. This range is congruent with the 742 goals generated in this study. Also of note is the increased ability to generate desired goals from one treatment continuum to the next. Phipps and Roberts reported on 158 individuals with ABI receiving outpatient care whom on average generated 5.82 goals each. In this study, which was at the community-based level of care reported on 80 individuals with ABI who on average generated 9.275 goals each. This increase in desired level of participation illustrates the need for community-based programming to assist with goal achievement for this population.

Further inspection of the data continues to support this development across continuums of care in two distinct ways, performance and satisfaction levels and domains of concern. Those studies reporting on admission COPM scores at the outpatient level reported average performance scores from 3.76 to 3.97 and average satisfaction scores from 2.67 to 3.13 on occupations in self-care and productivity (home management) [47,49,50]. Whereas the studies involving community-based programming, which includes the findings of this study, reported average performance scores from 4.87 to 5.15 and average satisfaction scores from 3.89 to 4.70 on occupations related to leisure and community mobility [25,48]. COPM outcome data when analyzed in this manner is able to uniquely define the occupational nature of groups of individuals participating in a shared experience such as community-based programming. Understanding the occupational nature of this group is invaluable to allied healthcare providers for both direct intervention and overall programming.

In regards to the third research question, the convergent validity of the COPM with those measures frequently used in community-based programs for adults with ABI was low. There was a weak correlation between the COPM satisfaction score and the CIQ social integration score. This finding was also noted in other studies looking at convergent validity of the COPM in adults with ABI as well as other diagnosis [25,51]. Although these findings were expected based on prior research and the construct of the COPM, when viewed with the CIQ and the WI HSS QOL a stronger awareness of the client is obtained. This concept illustrates the point made by Jenkinon, Ownworth and Schum that self-ratings need to be interpreted in the context of other outcome indicators unique to populations and treatment settings. Since the satisfaction score for the participant was largely discussing social recreation the relationship to social integration of the CIQ is logical. There is weak evidence that as satisfaction with social occupations increase level of social integration increases as well. Also as other authors have echoed, the COPM based on its design, does not lend itself to creating variance in the data [52] as noted in this study the mean performance score was 5.15 with a standard deviation of 1.9 and the mean satisfaction score was 4.55 with a standard deviation of 1.86.

It is interesting that many of the participants' priority goals related to socializing, focused on creating ways to communicate and engage with other members outside of the community-based program, such as getting together to play cards or go to a movie outside of program hours. This desire is clarified by the mean scores on the CIQ, which represent lower than expected integration in home, social and productive activities. This finding suggests that members continue to be isolated and not integrated into the broader community at large. So while participation in community-based programs is worthwhile, there are limitations. Again knowledge of the nature of occupational participation by this group provides occupational therapists with knowledge for direct intervention and overall programming. Clearly skill generalization and application, be it direct or group intervention, in the broader community continues to be critically important to enhance the occupational performance and satisfaction in desired occupations for this group of individuals.

The productivity area of occupation on the COPM and the productive integration score of the CIQ is an area that needs further exploration to better develop effective intervention with this population. Results for both assessments demonstrated low integration and low occupational interest, especially when years post injury (6.86 years +6.11) and on average almost a full year of participating in a community-based program are considered. Determining why this occupational area is of low interest is important since many individuals with ABI have difficulty achieving and sustaining financial independence. The low score from the WI HSS QOL supports this in safety and security where security includes financial. An area for further research is exploration of ABI survivors' attitudes toward involvement in community-based practice related to their attitudes toward employment and volunteering. It has been found in the literature that motor, process, and social aspects of work are challenging for adults with ABI, so the question is do the findings from this study represent a lack in work interest or are barriers seen as insurmountable by this population or has community-based programming involvement replaced work or volunteering goals. Again this need area requires further investigation and strategy development in therapy intervention.

The WI HSS QOL scores also demonstrate the benefit of occupation-based community programming in that overall QOL scores were higher than expected and the higher order needs of this participant pool were higher than expected. It appears from these scores that community-based programming may assist with identity formation after injury in that self-esteem and self-actualization scores were high. Love and belonging needs are being met through community-based programming, which is significant since isolation and depression are of major concern for ABI survivors and their families. From a theoretical perspective it could also be stated that this need satisfaction is facilitating confidence and growth in higher order needs such as self-esteem and self-actualization. Finally, for therapy intervention considerations, the low score on safety and security needs should be noted. Since this population has a strong desire to be active in social occupations outside of program the fact that they do not feel safe and secure could be a contributor to the CIQ integration scores being low and should be addressed in therapy intervention.

The merit of the COPM in demonstrating the link between desired occupations, community integration and client needs in community-based programming are provided by the correlational findings of this study. Individual or group therapy intervention that focuses on improving social integration for ABI survivors correlates positively with overall QOL as well as several need areas such as self-esteem and self-actualization that directly influence QOL. Intervention that improves home integration (such as helping more at home with cleaning) also has a positive correlation with QOL making the member feel appreciated and that they contribute to the home environment and appears to allow them to better understand their role at home. Finally, addressing productive integration has a positive correlation with the member's understanding or identifying their role in their community after injury. It does appear from this study that social integration improvement is related to a wider array of positive outcomes and needs satisfaction for this population [53-62].

## Limitations

This study was performed at two community-based occupational therapy settings in New England so therefore the sample does not reflect the entire population of individuals with ABI and the ability to generalize the results is limited. As is typical in ABI populations the larger percentage of participants were male, so future studies with higher female participation would add to the literature on this population. The correlations used in this study do not provide evidence of cause and effect. Also there were no post measurement scores taken so therefore sensitivity of measurement concerning the COPM could not be addressed. There could also be bias in this sampling group as all of these individuals had the motivation and determination to seek out and participate in a community-based program, also all participants had been apart of some form of traditional rehabilitation during their recovery process, which again could add bias to the participation pool and results.

## Conclusion

This study sought to answer three research questions and found that for adults with ABI there are significant differences between level of importance placed on occupational areas such as self-care, productivity and leisure as documented by the COPM. This study demonstrated the responsiveness of the COPM in further detailing areas of importance with a specific areas of occupation such as leisure. Finally, this study also demonstrates the responsiveness of the COPM

data when explore with other noted important outcomes such as social participation/community integration and quality of life.

The results support the use of allied healthcare professionals in meeting ABI client needs in community-based settings. Participants' average occupational performance and satisfaction scores, integration scores and QOL scores were strong, yet also represented intervention foci that would specifically address the unique needs of this population. The current study begins to provide outcome or efficacy data upon which future studies can examine the value of therapy in community-based practice to continue to guide evidence-based intervention. In addition this study demonstrates that traditional community-based intervention focused on self-care occupations, such as cooking groups, or productivity occupations, such as work related skill development, produce higher outcomes if social skills and strategies are incorporated into the intervention process. Finally, a stronger intervention emphasis on generalizing and applying skills gained in the community-based practice setting to life outside the walls of the intervention setting is relevant and necessary. There is still much work to be done in this evolving practice domain and allied healthcare professionals have the unique knowledge and skills to improve integration and participation outcomes for adults with ABI.

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