Identification of Re-assessment Intervals to Support a Measurement Based Care (MBC) approach with the interRAI Community Mental Health (CMH) Assessment

by

Svetlana Monakhova

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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ABSTRACT

Background: Mental health is a fundamental aspect of people's health and is a leading cause of disability worldwide. Ineffectively treated mental health problems could result in a shorter life expectancy as a result of death by suicide or serious health problems. These could be improved with a proper treatment plan based on results from systematic assessments. Measuring quality of care is challenging worldwide and varies among organization due to the absence of standardize instruments and lack of ability to regularly collect data within the health care settings. The potential use of the interRAI Community Mental Health (CMH) assessment, as a measurement based care (MBC) instrument, generates data that help to adjust the care planning and resource allocation based on the identified changes in the client's strengths, preferences, and need. However, further research is needed to identify the optimal re-assessment interval from the initial interRAI CMH assessment.

Objective: This thesis investigated the relationship of time between initial assessment and re-assessment with rates of change in clients' needs.

Methods: This retrospective study used secondary data from interRAI CMH assessments completed on clients in Ontario, Canada between 2007 and 2020, which are stored on the interRAI Canada server at the University of Waterloo. A variety of statistical techniques were used to identify the shortest period of re-assessment time to see the meaningful rate of changes.

Results: This study showed that DSI and PSS-Short scales are valid and reliable over time. The highest rate of change of 75.9% for the DSI was among clients who have been re-assessed within 3-6 months. On average, the rate of change for the DSI was 73.6. The most noticeable rate of change for the PSS-short scale was for clients who have been re-assessed after 6 months: 28.2%

between 6-9 months, 25.9% between 9-12 months, and 27.6% after 12 months or more. On average, the rate of change for the PSS-short was 22.7%. The most noticeable rate of change of 14.8% for the traumatic life events CAP was for clients who have been re-assessed after 12 months or more. On average, the rate of change for the traumatic life events CAP was 10.9%. The best rate of improvement (46.7%) after the initial assessment were between 6-9 months and 9-12 months. The period of time when clients worsen their initial score to 20.0% was after 12 months from the initial assessment.

Conclusion:

Through a thorough analysis of the dataset, this study confirmed that existing re-assessment period of 6 month is appropriate. Understanding the benefits of MBC, specifically the interRAI instruments, in CMH settings makes decision makers to apply standardized measurement instruments to the service delivery to improve quality of care, healthcare outcome, to achieve clients' goals at the end of the treatment, and to help clinicians to monitor clients' treatment progress and address their changes appropriately by observing the symptoms on a regular basis.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF GRAPHS

LIST OF ABBREVIATIONS

ABS	Aggressive Behaviour Scale
ACE	Adverse Childhood Experience
ADL	Activities of Daily Living
CAN	Camberwell Assessment of Need
CAP	Clinical Assessment Protocol
CAGE	Substance Use Screener
CBT	Cognitive Behaviour Therapy
CCHS	Canadian Community Health Survey
CI	Confidence Interval
CIDI	Composite Interview Diagnostic Instrument
CIHI	Canadian Institute for Health Information
CHC	Community Health Center
CMH	Community Mental Health
CKHA	Chantham Kent Health Alliance
CMHA	Canadian Mental Health Association
CPS	Cognitive Performance Scale
CTQ	Childhood Trauma Questionnaire
DSI	Depression Severity Index
DSM-5	Diagnostic and Statistical Manual of Mental Disorders
EHR	Electronic Health Record
FACE	Functional Analysis in Care Environments
HoNOS	Health of the Nation Outcome Scales
LCI	Life Chart Interview LCI
LK	Lambton Kent
MBC	Measurement Based Care
MHQI	Mental Health Quality Indicators
MSI	Mental State Indicator
NESDA	Netherlands Study of Depression and Anxiety
OCAN	Ontario Common Assessment of Need
OHT	Ontario Health Team
OR	Odds Ratio
PTSD	Post Traumatic Stress Disorder
PSS	Positive Symptom Scale
RHO	Risk of Harm to Others
SCI	Self-care Index
SOS	Severity of Self-harm
UMDNJ-UBHC	University of Medicine and Dentistry of New Jersey-University Behavioral HealthCare

1. INTRODUCTION

Mental health is not simply the absence of mental health problem. The World Health Organization defined mental health as ‘a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stress of life, can work productively and fruitfully, and is able to make a contribution to his or her community’ (World Health Organization, 2004). Undoubtedly, stress is a part of human life, and it is an important aspect of an individual’s growth and development. Management of healthy stressors helps to cope with day-to-day activities at home, school, and work. However, when stress becomes excessive, an individual could develop a mental health problem. Mental health is a fundamental aspect of people’s health and important to overall health. Mental illness is a leading cause of disability worldwide affecting one in five people in any given year and causing 50% of the population to experience a mental illness by the time they reach 40 years of age (Smetanin et al., 2011). The costs associated with a mental illness, including leaves of absence at work and school, is estimated to be double the cost of physical illness (Dewa, Chau, Dermer, 2010). People living with mental health problems are affected by different aspects of life, such as psychological, economic, and social factors. Depression is one of the most common and serious mental health conditions that affects one in ten people each year. Onset of depression could occur at any age and, usually, affects women more than men. Undiagnosed and untreated severe depression could cause having suicidal thoughts and/or the thoughts of hurting themselves. Therefore, increasing the rates of treated depression will decrease the rates of suicide (Rihmer, 2001)

Many people do not feel safe to disclose their feelings and emotions freely due to a fear of being rejected, judged, shamed, and misunderstood by others. Many believe that they will not be treated respectfully and fairly once someone knows about their mental health condition. This process is called self-stigma, where a stigmatized individual perceives social devaluation and other discriminations against them (Hegarty & Wall, 2014). Stigmatization is a problem that contributes to the individuals' unwillingness to seek help resulting in a low diagnostic rate (Wang el al., 2016).

People with more severe mental health illnesses use healthcare resources more frequently compared with people with less severe symptoms. Untreated or ineffectively treated mental health problem could result in a shorter life expectancy as a result of death by suicide or serious health problems, such as chronic pain, cancer, diabetes, or cardiovascular disease (Andrew & Rockwood, 2007). In 2019, the number of deaths caused by mental health and behavioral disorders in Canada has increased 25% (Suicide in Canada, 2019). On average, 11 people per day die by suicide every year (Statistics Canada, 2019). The World Health Organization estimates that more than 700,000 people die by suicide globally each year (World Health Organization, 2019). Those deaths could be avoided. The number of people affected by the mental health problems could be decreased with a proper timely care planning and treatment as a part of integrated mental health services approach throughout the health care system. However, when an agency does not have an opportunity to measure quality of care due to lack of standardized instruments, clients' quality of life is reduced, healthcare outcomes and goals of care are not reached, the recovery process is delayed, and medication errors rise (Andrew & Rockwood, 2007).

Ineffective treatment approaches, such as one-time screening and infrequent assessment of symptoms, should be improved system-wide in order to support positive health outcomes among clients. Clinical assessments and self-screeners are important in developing the needs for care and treatment plan. Self-screeners are essential in measuring clients' symptoms and monitor the changes during the treatment course. Both, clinicians and clients, should be involved in care planning and shared decision-making process since measuring quality of care along with the client's perspective may identify gaps in care that are not obvious for clinicians during the assessment and to deliver a more responsive and valued care leading to positive clients' outcomes (Fortney et al., 2017). Clients should have enough information to understand the illness, all available options for interventions, their effectiveness and side effects, and have the client's preferences included in the shared decision-making process (Slade et al., 2014). In the shared decision-making process, clinicians bring expertise on the problems and possible interventions to discuss potential benefits and risk of the treatment, while clients bring understanding of their goals, values, and preferences for the treatment. In mental health, empowering clients to understand and manage their own problem is crucial. This process helps to deal with clients' concerns about care due lack of information, to evaluate the effectiveness of the treatment, and to develop working relationships that are necessary to reach long-term outcomes (Drake, Cimpean, Torrey, 2009). Sometimes, due to clients' decisional incapacity, shared decisions about medications and hospitalizations are not possible. However, even clients with severe diagnosis, such as schizophrenia, are able to understand the treatment options and make rational decisions (Carpenter et al., 2000). Incorporating a shared decision process in mental healthcare along with the systematic assessments and follow-ups performed with a standardized instrument can allow clinicians to monitor clients' condition and address any changes in a timely manner. Clients' opinions, values, and preferences are necessary to identify the best treatment plan. Integrating a shared decision-making process into a regular treatment could improve quality of care and health outcomes (Drake, Deegan, Rapp, 2010). Effective collaboration between a client and a healthcare provider reduces psychological stress, encouraging for a more open and safe conversation and information sharing about the treatment (Adams & Drake, 2006). However, receiving services in multiple settings across the healthcare system puts extra pressure on clients due to frequently uncoordinated and fragmented care, where communication of healthcare providers involved in clients’ care is crucial. Therefore, there should be a shift in mental health settings toward a better care approach and toward standardized assessment tools to address the challenges of mental illness (Hirdes et al., 2020), to identify treatment gaps, and to improve clients’ quality of care and life.

2. LITERATURE REVIEW

The literature review provides the insights on community mental health settings in Canada; an overview of most common mental illnesses (e.g. depression, trauma, physical and emotional abuse); and a description of the Measurement-Based Care approach and its challenges in the community mental health settings.

2.1 Community Mental Health Settings

In Canada and many other countries, mental health care is delivered in community mental health settings as a result of a shift from inpatient mental health care settings over the last few decades. That transition was made to promote better quality of life, healthcare outcomes, and to reduce expenses associated with the long-term facility-based care. While inpatient mental health care provides treatment during crisis and requires overnight stays, community mental health care provides care for non-crisis ongoing mental health problems (Mental Health Commission of Canada, 2012). Community mental health care includes community health centers (CHC), agencies, and health clinics that provide treatment, support, and services to address mental health, addiction, and developmental needs of persons of all ages. It encompasses a population and individual approach on prevention, system provision, open access to individual and team-based services, as well as commitment to social justice by providing care to the underserved population: ethnic minorities, homeless population, immigrants, and children and youth (Thornicroft, Deb, Henderson, 2016). Community health centres serve vulnerable populations by providing social support in health education and promotion, housing, and community development programs. Even though the CHCs serve a high number of individuals with severe mental illnesses, mental health assessment tools, which help to establish patient-provider communication, are usually not used (Parikh, Lin, Lesage, 1997).

Community mental health care focuses on individuals' strength, capacities, and their recovery perspective. It depends on a collaboration of a psychiatrist, psychologist, nurses, and allied healthcare workers, such as social workers, mental health clinicians, occupational therapists, nutritionists, in order to provide mental health treatment and care for people in community, who do not require overnight stay (World Health Organization, 2008). Programs and services are provided for individuals, families, and caregivers, and may include case management, counselling and treatment, self-help and peer support, crisis services, dialectical behaviour therapy, housing services, diversion court support, eating disorders, employment services, early intervention, mental health promotion and education, and geriatric services. These programs are aimed toward prevention of mental health problems, self-managing the illness, strengthening the families and social networks to surround the people with mental health problem and to support recovery and resilience allowing them to improve quality of life, overall health and well-being. Thus, community mental health care is comprised of principles and practices to promote mental health of the population, to provide the acceptable and accessible support, services, and resources empowering people with mental health problem in their recovery process by building on their goals and strength (Thornicroft, Deb, Henderson, 2016). The demands for mental health services are increasing worldwide as a result of greater awareness and promotion in the population, and due to reduction of stigma with a greater motivation to seek support.

2.2 Common Mental Illnesses

The most common mental illnesses include anxiety and depressive disorders, schizophrenia, bipolar disorder, and substance use disorders affecting school, work, and social life of people. There is no single known cause for mental health problems. It is rather, a combination of social, economic, psychological and genetic factors that influence overall health and well-being.

The right combination of services, treatments and supports can substantially improve symptoms and quality of life of people with mental health concerns in community mental health settings (Mental Health Commission of Canada, 2016).

2.2.1 Depression

Depressive disorder is one of the most frequent diagnoses. Major depressive disorder (MDD) is associated with higher risk of developing diabetes, obesity, dementia, stroke, heart failure, and chronic pain (Luppino et al., 2010). Since it is a recurrent disorder, 50-85% of individuals usually have another episode of depression. However, there is no method to predict a recurrent episode. An individual diagnosed with depression is in a higher risk of decreasing social and physical activities, feeling guilt, hopelessness or worthlessness, having increased thoughts of self-harm and suicide (Inoue, Yamada, Kanba, 2006). Additionally, depressive disorder among elderly population decreases social and physical activities, which can in turn increase social isolation and the risk of suicide (Beck & Alford, 2009). Bertolote et al. (2003) identified that 54% of individuals who died by suicide were diagnosed with depression. Based on the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), to be diagnosed with a depressive disorder, an individual should have at least four symptoms of depression, such as changes in appetite or weight, decrease in social and physical activities, feeling sleepy, tired, guilt, having thought of or a plan of suicide, as well as, to undergo a physical examination, a comprehensive functional status assessment, a complete review of family history, and current and past medical history (Espinoza & Kaufman, 2014). There are many depression scales to identify the symptoms of depression and to monitor them during the treatment. Therefore, it is very important to include a regular comprehensive screening assessment in the psychiatric interview and follow-up appointments.

Despite the services that community mental health settings have to offer, many individuals, who have major depression, have not accessed those services. Based on the Kohn et al.'s, (2004) study on service utilization rates for major depression in community-based settings, on average, 56% of individuals suffering from major depression worldwide do not seek help. An individual's predisposition to use services depends on one's attitude toward the services themselves, demographic characteristics, such as gender and age, social factors, such as education, family, and living situation. Additionally, the utilization of the services depends on severity of depression, as well as the frequency and duration of depressive episodes. Therefore, individuals, who access services, may identify that their condition is more severe than individuals, who do not access services (Magaard et al., 2017).

Depressive and anxiety disorders often presented as a chronic condition affecting the quality of life and wellbeing of the individuals. Differentiating these two disorders is a very important criterion in clinical practice. Clinical factors, such as severity, duration of an episode, and an individual's comorbid conditions, are very strong predictors of the disorders become chronic (Spijker et al., 2002). Volkert et al. (2013), in their community-based meta-analysis, found that among people aged 50 years and older the prevalence of major depression was 3%, and the prevalence of a lifetime major depression was 17%. This study suggests that older population experiences the symptoms and carries the disease in their later years causing a risk of re-occurrence of the depressive episodes and comorbidity to other conditions.

Romans, Cohen, Forte (2011) studied the geographic distribution of depression rates in Canada. They reported that people living in rural area have lower rates of depression compared to the people from urban areas. People from urban areas showed more adverse living circumstances and greater life stress. The study also identified that 18% to 20% of psychiatric morbidity among women in urban and rural areas were accounted for poor physical health. Additionally, Canadian-born participants have higher rates of depression compared to immigrants due to ‘healthy immigrant’ effect since immigrants should have good physical and mental health in order to immigrate to Canada.

Knoll & MacLennan’s study (2017) reviewed the lifetime and 12 months prevalence of major depressive disorder (MDD) of the Canadian population based on the results from the Canadian Community Health Survey (CCHS) in 2012. The lifetime prevalence rate of MDD was 11%, which comparable to the survey results received in 2002 (Patten et al., 2006). The 12 months prevalence rate of MDD in Canada was 5%. The highest 12 months prevalence rate of MDD was among individuals 15 to 24 years of age, which is 7%. Among individuals 25 to 65 years of age, the 12 months prevalence rate of MDD was 5%, and 2% for individuals 65 years of age and older. (Findlay, 2017). Additionally, the study identified that the lifetime prevalence rate of MDD among females (14%) is 1.8 times higher than males (8.4%). Approximately the same ratio was identified for the 12 months prevalence rate of MDD. It is 1.6 times higher among females (5.8%) than among males (3.6%). Moreover, the study has showed a strong association between MDD and social support, negative childhood experiences, and life satisfaction.

In a systematic literature review, Gleeson et al., (2018) found that older populations in the community had lower depression rates between 14% and 23% compared to those living in residential facilities, who has the depression rate between 32% (Anstey et al., 2007) and 64% (Arvaniti et al., 2005). However, Damian et al., (2010), using a validated tool to identify mental health problems, reported a depression rate for individuals living in nursing homes between 32% and 48%. This literature review has suggested that there is a risk of developing mental health problems between independent living in community and residential home care during the transition period that has psychological and social impacts.

Szczerbińska, Hirdes, Zyczkowska's study (2012) reviewed the MEDLINE and Psych-info literature from 1993 to 2004. The study identified that the prevalence of MDD rates among older populations living in community was from 0.9% to 9.4% and from 14% to 42% among those living in nursing homes. Older populations, depending on the severity of illness, sometimes have problems identifying their symptoms and needs. Therefore, the undertreatment of depression symptoms is a major concern that affects the quality of care in any settings. The use of the interRAI assessment instruments, which were used in this study, helped to identify the symptoms of depression as a part of the assessment.

Xiang & An's study (2015) identified that 15% of older adults living in community settings have unmet needs for assistance with activities of daily living (ADL) leading toward depressive symptoms and physical disability. Among older adults with more severe symptoms of depression 37% have reported unmet needs for 9 (nine) to 12 ADLs as compared to 18% of older adults without symptoms of depression. A higher rate of unmet needs among older adults with depression is linked with higher rates of hospitalization, admission to nursing homes, and lower quality of life. Additionally, depressive symptoms, such as social isolation and passivity, could discourage older adults from sharing their needs, feelings, and willingness for self-care causing self-neglect (Edege & Osborn, 2010). Therefore, addressing the depression symptoms among adults improves quality of life later in life.

The Netherlands Study of Depression and Anxiety (NESDA) is a cohort study that examined a two-year course of depressive and anxiety disorders with a total of 1456 individuals aged 18 to 65 years from community, primary, and secondary care settings. Of the total number of participants, 1209 have had a two-year follow up and were diagnosed having depressive disorders, anxiety disorders, and comorbid depressive and anxiety disorders at baseline using the Composite Interview Diagnostic Instrument (CIDI) and Life Chart Interview (LCI). Each month, life events were recalled. After that, the presence of the symptoms of depression and anxiety, along with the severity, were measured. The remission of a disorder was considered with absence of symptoms of both, anxiety and depression, for three consecutive months. The re-occurrence of symptoms was defined as having at least one month of mild severity episode during the follow-up. The study showed that 80% individuals with depression remitted with the average remission time of 6 (six) months, while 22% of individuals developed a re-occurrence episode. The results for anxiety disorders showed that only 59% of individuals have remitted with the average remission time of 16 months. The re-occurrence rate was comparable with depression. This study implied its importance in simple clinical characteristics that provide good tool for course prediction and in the individualized care approaches with appropriate treatment strategies (Penninx et al., 2011). Not achieving a desired remission of depression could lead to its regular re-occurrence, increased comorbidity, functional impairment, and decreased quality of life (McIntyre, Fallu, Konarski, 2006).

Mattisson et al., 2007; Riihimaki et al., 2011; Yiend et al., 2009 studies found that time between depression episodes could wary from several months to many years with a relapse time of two years. However, to provide a better time span and understand the treatments strategies, these studies should have longer follow-up periods, which is very rare and costly to perform.

Psychotherapeutic treatments, such as Cognitive Behaviour Therapy (CBT) are very effective in the treatment of depression. In 2007, Vittengl et al. (2007) studied the effect of CBT on reducing the relapse time of depression. Their meta-analysis showed that 29% of the individuals, who completed the CBT course, experienced a relapse within the first year, and 54% of the individuals did so within the second year. These results are better than among individuals, who had a course of antidepressant medication instead, where 60% of them relapsed within the same follow-up period. Additionally, Vittengl et al. (2007) noticed that if a CBT therapist's observations were not monitored during the follow-up period, the relapse time has increased to 48% as compared to 25% when the observations were monitored. Therefore, analyzing the findings from regular assessments plays a big role in individuals' relapse time of depression and their treatment strategies.

Manber et al. (2008) studied chronic depression and identified that individuals, who have a combination of medication, such as antidepressants, and psychotherapy interventions during the 12 weeks study, have shown full remission faster than individuals receiving either one of the interventions. Along with these treatment interventions, Manber et al. explored other potential predictors of remission, such as demographics, first onset of depression, social relationships, and early childhood adversity; however, the combination of the interventions, targeting the symptoms of depression, was identified as the main chronic depression predictor of remission.

Many social and behavioural studies shown the association between traumatic life events in childhood and adolescence and negative health outcomes in adulthood, such as behavioural problems, living environment, depression, anxiety, poor self-esteem, suicidality, and substance use (Simpson & Miller, 2002). The Adverse Childhood Experience (ACE) study showed a strong relationship between childhood adverse events and poor adult well-being (Felitti et al., 1998). ACEs have been linked to long-term risks for severe mental and physical illness. Overall, 64% of the study population reported experiencing at least one childhood adverse event, and 38% experienced two or more childhood adverse events. The study showed that ACEs were associated with various health outcome in adulthood, including cardiovascular disease, chronic obstructive pulmonary disease, depression, obesity, substance use, and suicide attempts. The average number of childhood adverse events among females was higher than among males. Females and males have experienced different type of aversive events, such as sexual, emotional, and physical abuse, neglect, subsequent out-of-home placement, and parental substance abuse. The impact of childhood adverse events is relevant for later outcomes, such as a criminal justice and a mental health service delivery system (Stinson, Quinn, Levenson, 2016).

2.2.2 Post-Traumatic Stress Disorder (PTSD)

Post-Traumatic Stress Disorder (PTSD) is an intense public health problem, and this is a common co-morbid disorder among individuals with psychiatric disorders. PTSD involves repeated and intrusive memories associated with trauma, avoidance of the situations that remind about past traumatic events, reduced concentration, and irritability (Yehuda, 2002). Most of the times, individuals diagnosed with PTSD have a comorbid diagnosis in mental health, physical health conditions, chronic pain, reduced quality of life, increased symptoms of depression, and suicidal behavior (Stein et al., 2005). It affects from 25% to 30% of the individuals seeking help in the community mental health settings. Many of those individuals feel ongoing fear for their safety. The lifetime prevalence of PTSD is about 8% and is higher in women (10-14%) than in men (5-6%) (Mathias, Hirdes, Pittman, 2010). Individuals with prior trauma experience, who developed PTSD, may have reduced life opportunities and chronic medical conditions. However, PTSD could be the most preventable of mental health conditions since it develops due to a trauma exposure (Kessler, 2000). Preventing trauma-related events by involving communities, families, and public health will establish successful policies and approaches in the healthcare system.

The study by Weili et al. (2013) suggests that high rates of trauma exposure among individuals with severe mental illness, such as schizophrenia, bipolar and depressive disorders, increase prevalence of PTSD. The study population included 15,000 clients with severe mental illness at the University of Medicine and Dentistry of New Jersey-University Behavioral HealthCare (UMDNJ-UBHC). Individuals with severe mental illness reported from 34% to 53% of child abuse and from 43% to 81% reported lifetime victimization. The most traumatic life events are exposure to childhood sexual violence, physical abuse, sudden or unexpected death (natural, accident, suicide or homicide) of a loved one (O'Hare & Sherrer, 2011). The study identified that, on average, an individual experience 7 (seven) traumatic life events in their lifetimes. A high number of exposures to traumatic life events is associated with a high risk of developing PTSD symptoms among individuals with severe mental illness (Weili et al., 2013). Mathias, Hirdes, Pittman (2010) demonstrated that mood disorders, schizophrenia, and substance use were common comorbid conditions among individuals who experienced traumatic life events.

2.3 Challenges of Mental Health in Community Mental Health Settings

Services are often provided among multiple agencies that do not use the same standardized assessment tools, which poses challenges to the quality of care, incur unnecessary and inadequate re-assessments, and leads to unnecessary repetition of health problems. This places more burden on clients and caregivers who already face great challenges.

Rossiter et al. (2015) study analyzed the childhood trauma using Childhood Trauma Questionnaire (CTQ) and a review of the lifetime clinical notes of 129 adults attending community mental health services. This study showed big differences between results from the CTQ and the clinical notes review. Childhood trauma event was reported in 77% of the participants using the

CTQ as compared to only 38% reported in the clinical notes. The biggest difference in the results between the CTQ and the review of clinical notes were identified in documenting emotional neglect (62% vs. 13%), physical neglect (48% vs. 5%), and childhood sexual abuse (25% vs 9%). The study demonstrated substantial under-reporting in the clinical notes. On the other hand, the prevalence of physical abuse was identified similarly in both, the clinical notes and the CTQ, suggesting that physical abuse is the least stigmatizing type of childhood trauma. There may be few reasons why clinical notes may miss the important mental health history, including a lack of training and a lack of enquiry from clinicians due to fear of traumatizing the clients by bringing back memories of the adverse events. Additionally, clients may not have yet developed a trusted relationship with their clinicians and not ready to disclose the information. This study showed that childhood trauma is an under-recognized problem associated with psychopathology and increased mental health problem for individuals throughout their adult life. The use of a standardized questionnaire should be highly considered when performing a comprehensive mental health history of the clients (Rossiter et al., 2015).

Due to limited health care funding allocated for mental health services, not everyone who needs mental health care has access to it. Community-based services, such as psychotherapy, counselling, and peer-support, are not included in the Canada Health Act (1984) and do not receive an adequate share of healthcare funding. In 2012, 1.6 million Canadians had unmet mental health care need due to long wait-times to publicly available services or no opportunity to see not publicly funded services (Sunderland, Findlay, 2013). On average, individuals with mental health problem have a 10-year shorter life expectancy. People with chronic mental health needs have higher rates of emergency department use, have more contact with police, and need more social services than the general population (Chesney, Goodwin, Fazel, 2014). These secondary service costs can pose a substantial burden on public expenditures. It is crucial for Canadians to have access to well-funded and coordinated community mental health supports when and where they need them since the personal and economic costs are too high for untreated mental illness (Ending the Health Care Disparity in Canada, 2018).

Community mental health settings do not have integrated data collection and reporting strategy (CIHI, 2017). Canadian Institute for Health Information (CIHI) only accepts data submission for individuals receiving care for their mental health in hospitals since mental health services in the community are not considered essential or medically necessary in the Canada Health Act (Health Ontario, 2021) or the provincial health insurance plan (Government of Ontario, 2021). This reduces the effectiveness of the community mental health settings since there is no evaluation of their clinical needs and outcomes of treatments. Clinicians in community mental health settings support heavy caseloads of individuals with complex needs, while primary care providers, who are not trained mental health clinicians, support non-complex individuals. Therefore, clinical tools providing feedback on progress of clients' treatment is essential to improve clinical outcomes and identify clients who are not progressing as expected and prevent deterioration (Connolly Gibbons et al., 2015). Connolly Gibbons et al. (2015) study showed that 36% of clients, whose clinicians were using clinical tools to understand the progress of the treatment of depression, improved their condition as compared with 13% of clients, when clinicians were not using any clinical tools during the treatment of depression.

In many healthcare settings, clinicians use home-grown intake forms with a combination of clinical scale to assess singular problems like cognition or depression. This process is not standardized since the data are not linked with any other agencies. Additionally, longitudinal information is not easily available, problems tracked with different forms may not be identified, no consistency in measuring instruments means there is no validity in any performances suggested by the measurement. This can lead to multiple re-assessments across the healthcare settings. Community mental health settings need standardized clinical tools across the settings to improve the effectiveness of treatment and help adjusting the care treatment in a timely manner (Hirdes et al., 2020).

Mental illness should be treated and prevented in community healthcare settings, where interventions are associated with reduction of stigma and discriminations (Lund et al., 2011). Therefore, individuals with mental illness and their caregivers should see the wide range of services offered to be accessible and acceptable, where clinicians practice individuals' goals for recovery and support their accomplishments. However, community mental health settings lack appropriate resources, service coordination, and collaboration between service providers forcing clients to navigate through a complex and fragmented system decreasing quality of life and healthcare overall. Lack of multi-sectional collaboration causes complications in a referral process, which have led to unnecessary delays in mental health care since clients wait too long to be seen. Therefore, while on the waitlist for care, clients should be regularly re-assessed and supported by referring physicians to monitor their condition and mental health status to reduce adverse events (Goldner, Jones, Fang, 2011). Additionally, making a right diagnosis may be a complex process during clients' initial assessment or interviews since symptoms are being self-reported without a standardize assessment tool. The use of a standardize assessment tool contributes to ability to improve and measure quality of care, prioritization of resource allocation, service and discharge planning, and client safety across continuum of care (Krystal, State, 2014). Tran et al.'s study found that 55% of discharges from the inpatient psychiatry went back to the community mental health settings to receive further services. The use of a standardized assessment tool at discharge, interRAI Mental Health (MH), was beneficial to understand the overall population health and to improve quality of care. This study also showed that clients, who return to the community mental health services, have a less chance of re-admission to the inpatient facility. Also, this study has showed that sharing meaningful information from the standardized clinical assessments after the discharge plays an important role in integrating mental health care system (Tran et al., 2020).

A newly created model of care, Ontario Health Teams (OHTs), focuses on improvement of outcome and experiences for clients, access to mental health care services. This model also aims to make them more integrated throughout the health care system while ensuring seamless transitions throughout healthcare providers in the community for vulnerable clients with chronic and complex health conditions. A team of healthcare providers should work together to support a full continuum of care to make sure clients get the care they need (Ontario Health Teams, 2019). Additionally, flawless information exchange among healthcare providers is critical for clients' healthcare outcomes and effective care treatment plans since it reduces the healthcare fragmentation and provides a complete picture of clients' conditions. Without a timely shared information, a client's decline in their condition could be missed, tests could be repeated, and referrals to emergency departments could be increased (Nova, Zarrin, Heckman, 2020).

To address the gap of clinical data among health care providers, OHTs should have a standard set of quality indicators and reporting standards. Without these data, it is very complicated to create processes and outcome quality indicators to evaluate mental health services and population quality of care. This gap leaves the effectiveness of the services unidentified (Perlman et al., 2013). Measuring quality of care is challenging worldwide and varies among organization due to the absence of standardize instruments and lack of ability to regularly collect data within the health care settings that could potentially impede continuous clients' quality improvement. To address these issues, measurement-based care has been introduced to integrate a regular measurement of clients' outcome into their treatment. Measurement-based care should become a part of the treatment process and organizational culture in order to improve service delivery, clients' satisfaction, and quality of care (Trivedi et al., 2006).

2.4 Measurement-Based Care

The term measurement-based care (MBC) was first defined by Trivedi et al. (2006) as 'the routine measurement of symptoms and side effects at each treatment visit and the use of treatment manual describing when and how to modify medication doses based on these measures'. Aboraya et al. (2018) defined MBC in psychiatry as 'the use of validated clinical measurement instruments to objectify the assessment, treatment, and clinical outcomes, including efficacy, safety, tolerability, functioning, and quality of life, in patients with psychiatric disorders'. Fortney et al. (2017) defined MBC as 'the systematic administration of symptom rating scales and use of the results to drive clinical decision making at the level of the individual patient'. However, further research is necessary to address a gap in literature since it is not clear what Fortney et al. means by "systematic" assessment and no evidence showing that a re-assessment should be done at each treatment visit, as per Trivedi et al. (2006). The common ground from these definitions is that MBC is a routine process to make sure that clients' progress is being monitored and assessed regularly using standardized measures during the treatment to adjust a care plan as necessary. Therefore, there is evidence that MBC can improve clients' quality of care and life by a systematic use of self-report instruments, which support collaborative treatment decision-making by effectively monitoring and sharing clients' response to changes over the course of treatment with all healthcare providers involved in care (Wray et al., 2018). Without a thorough review of the scores, MBC will not be efficient. It is not enough just to measure. The results should be reviewed to identify changes and to make sure the treatment plan is still appropriate. Further, MBC improves client-provider communication in the treatment process and increases client's engagement and clinician efficiency. A review of responses over multiple sessions can allow clients to see their progress and engage in the care more actively (Wray et al., 2018). Traditional self-reported assessment tools that help in diagnosis and treatment monitoring are good for the system performance evaluation. MBC is also used to establish population-level benchmarks for mental health symptoms, determine health insurance reimbursement, and enable data sharing among different healthcare providers (Kilbourne et al., 2018). Incorporating MBC into the client's treatment plan improves quality of care coordination and their engagement in the treatment process.

The use of MBC instead of the usual care has been reported to be associated with symptoms reduction among clients with anxiety, depression, and bipolar disorder (Roy-Byrne et al., 2010, Simon et al., 2006, Bauer et al., 2006), as well as, showed improvement in clinicians' decision-making process and individualized treatment (Scott & Lewis, 2015, Hatfeld & Ogles, 2007). Adding MBC as part of the clinical process can result in substantial improvement in clients' psychological disturbance, interpersonal problems, social role functioning, and quality of life (Lambert et al., 2003). MBC is a valuable tool that improves collaboration among healthcare providers within and across organizations. MBC helps to avoid misinterpretation and different variation of client's outcomes and warns clinicians if there is no improvement in client's condition advising them to adjust the existing treatment plan. Otherwise, clients may drop out of care due to not getting appropriate results over the treatment course. In addition, clients with depressive symptoms, who used self-reported instruments and were involved in the care process, have gained better understanding of their symptoms and experience with depression (Scott & Lewis, 2015).

Additionally, MBC enhances the accuracy of healthcare providers' judgment by getting an objective assessment of clients' treatment progress. On organizational level, the use of MBC plays a big role to inform funding decisions and serves as a performance indicator. However, while MBC improves effectiveness, accuracy, and reliability of symptom assessment, it is not intended to be a replacement for clinical judgment (Harding et al., 2011).

2.5 Problems with Measurement-Based Care

Despite the strong evidence of MBC's benefits, the number of health care systems in mental health practice, who use MBC as a standard of care for service planning and quality improvement, is still limited. This is due to insufficient training in quality improvement, the amount of time it takes to complete an assessment, and clinicians' misgivings about MBC (Wray et al., 2018, Valenstein, 2009). Most measures have been used in clinical trials and research, but less routinely in clinical settings (Hatfeld & Ogles, 2007). Hatfield's study showed that only 37 percent of clinicians used some form of outcome measurements, and the remaining majority did not use any outcome measure during the care because of 'lack of time' or a lack of consistency among clinicians on what instruments to use due to the number of available instruments. Additionally, clinicians' impressions are considered more important than self-reported scores in the assessment. Therefore, the result is limited ability to compare among clients, clinicians, and organizations (Aboraya et al., 2018).

Since MBC is mostly based on the clients' retrospective experience during the past week, rather than tracking daily experiences, the results might be biased and difficult to understand a true client's changes overtime. On the other hand, with more frequent assessments, clients start to memorize the answers from the last assessment and repeat those over time jeopardizing the treatment by failing to provide real information. Further, due to long-standing stigma around mental health, clients can feel exhausted by repetitive data collection. Therefore, clinicians should be careful to not over administer the assessments to avoid these risks. Mental health providers, who only rely on clinical interviews, which are focused on clients' experiences, disregard the use of standardized instruments in their care, while it is being a standard for non-mental health care in treatment of hypertension, diabetes, cancer, and cardiac care depression (Scott & Lewis, 2015). Without standardized instruments in the mental health care, clients' outcomes from clinical assessments and interviews are being interpreted by individual clinicians, who may be inconsistent in their interpretations (Paterson, 2008).

Additionally, simply recording the presence or absence of a problem is not enough to measure a change. To develop a routine outcome measures using MBC, the assessments should clearly distinct the measurement of severity and the measurement of change. In the acute services, the indicators of severity and change will affect each other since a change in severity tends to improve client's mental and physical functioning. However, this is not usually a case with more severe and chronic conditions, where some impairments (ex. cognitive impairment) improve slowly while clients' quality of life improves during the treatment. (Clifford et al., 1999).

Clients in community mental health settings often have complex challenges and completing self-report measures may not be possible or be a good fit for clients with multiple diagnosis. Frequent re-assessments can put great stress on clients and their caregivers. Therefore, further research is needed to delineate the best frequency of administration and review of measures (Scott & Lewis, 2015). Clients receiving care in multiple agencies have risk of discontinuity of care if clinically relevant information is not shared between agencies (Hirdes et al., 2008). Another common problem with MBC is that outcomes are usually based on the scores from self-reported instruments focused on a single problem (e.g., depression, anxiety), which may not represent a true and a complete picture of the clients' conditions. Therefore, an assessment, which focuses not only on psychiatric symptoms, but also takes 'a broader perspective to address issues like growth, development, and aging; physical health and disability; social relationships; economic resources; housing; substance use; involvement with criminal justice; stigma; and recovery' is necessary to be adopted by the mental health system (Hirdes et al., 2020).

2.6 Common Mental Health Assessments

The use of common standardized assessment tools enables access to standardized information for better treatment planning (by sharing the information across the healthcare system), operational improvements to support delivery of better healthcare to clients in the community mental health settings. An assessment is an ongoing process of actively gathering client's information that is valuable for service delivery. The assessment system should support 'close integration between a standardized assessment protocol, at treatment plan constructed in light of the assessment, and a definition of the outcome goals within a standardized system that permits monitoring of change in relation to service elements provided to patients' (Fonagy, 1999). There are four most common standardized assessments used in the community mental health settings in the adult population: the Ontario Common Assessment of Need (OCAN), the Health of the Nation Outcome Scales (HoNOS), the Functional Analysis in Care Environments (FACE), and interRAI Community Mental Health (CMH) Assessments, which will be reviewed separately.

The Ontario Common Assessment of Need (OCAN) is a standardized assessment used in the community mental health sector that is intended for recovery-oriented planning, establishing, and attaining the clients' goals and tracking the changes in clients' needs over time. The OCAN assessment is based on the Camberwell Assessment of Need (CAN), which was created in 1990s to provide clients' comprehensive assessment of clinical and social needs. The CAN is a screening tool that helps to identify clients’ needs that are not necessarily noticeable by their caregivers. The OCAN assessment involves conversation between clients and clinicians about their needs, strengths, and actions since both, clinician and a client complete the assessment. It is important to recognize that both parties might have different opinion on either presence or absence of needs (Wennstrom, 2008). There are three types of OCAN assessment: Core OCAN that includes consumer information summary (demographics, psychiatric emergency visits, and diagnosis) and mental health functional centre use, which detects where the clients receive services; Core + Self-assessment OCAN that includes the Core OCAN, plus consumer self-assessment (questions are not mandatory supporting only the needs identified) about the clients’ needs in areas of living accommodations, childcare, transportation, physical health, culture, spirituality, food security, and future hopes; and Full OCAN that includes the consumer self-assessment, consumer information, the mental health functional centre use, and the staff assessment, which includes a summary of referrals to address client’s unmet needs identified in the self-assessment (Hitchcox, 2022). Identifying clients’ needs in the consumer self-assessment gives the clients a choice of what they would like to focus on. However, only identifying the needs that a client is comfortable discussing and that are important to them can lead to missing other needs to be addressed during the treatment, which affect overall client’s condition. If a client receives services in multiple functional centres, only one Core OCAN should be completed by an OCAN Lead. The OCAN assessment is done every six months, at discharge, or if there is a meaningful change in client’s condition to demonstrate the clients’ progress over time and to make sure no more services are required (Overview of Core OCAN Components, 2022.). There are four levels in which of OCAN data is used: individual level, organizational level, regional level, and provincial level. Individual level outlines individuals’ services and program to improve needs and to show changes over time. The organizational level enables discussion between service provider teams, outlines clients' information regarding met and unmet needs, and initiates quality improvement initiatives. The regional level provides clients' socio-demographic information and cross-sectoral overview to help system planning in mental health and addictions areas. The provincial level identifies gaps in service and needs for specific population, generates system performance indicators, and monitors provincial standards for service compliance (Hitchcox, 2022)

Based on an evaluation of OCAN in indigenous populations, clients shared frustration with some questions in the self-assessment, which are coded as 'No Need', 'Met Need', and 'Unmet Need' since they do not directly answer the questions. Therefore, clinicians must rephrase the questions for the clients. Even though OCAN covers 24 domains, it is missing domains/questions about history of abuse and experience of discrimination and/or racism (Sutherland & Maar, 2010). Dubrin et al. (2020) reviewed the use of OCAN in the Early Psychosis Intervention program in Ontario. This review showed that clients reported more unmet needs than staff in the following domains: physical health (20% vs 11%), psychological distress (35% vs 30%), intimate relationships (17% vs 12%), money (21% vs 10%), and benefits (17% vs 11%). However, the drug use domain was an exception, where clients identified less unmet need than staff (7% vs 14%). Overall, the rate of agreement between clients and staff ranged from 55%-95%. Additionally, Gibbson, Bedard, Mack's study (2005) identified that many mental health clients have undetected and unmet needs at the re-assessment. The findings suggest that a strong relationship between a clinician and a client improves the outcome and client's quality of life. Both parties should have open conversation and full agreement on care plan.

The Health of the Nation Outcome Scales (HoNOS) is a clinician rated instrument examining mental and social functioning of the mental health clients in 12 domains: overactive, aggressive, disruptive or agitated behaviour; non-accidental self-injury; problem drinking or drug taking; cognitive problems; physical illness or disability problems; problems associated with hallucinations and delusions; problems with depressed mood; other mental and behavioural problems; problems with relationships; problems with activities of daily living; problems with living conditions, problems with occupation and activities (Pirkis et al., 2005). HoNOS was developed in U.K. to improve the health and social functioning of clients receiving in-patient and community psychiatry services. This instrument is validated and widely used in U.K., Europe, Australia, New Zealand, but not in Canada. There are three assessments covering all ages: children and adolescents (HoNOSCA), working-age adults (HoNOS), and older people (HoNOS65+). Along with the CAN assessment, HoNOS assessments are used to measure outcomes by measuring changes in clients' health status (Slade et al., 1999). Each domain in HoNOS assessment is scored from 0 (zero) to 4 (four) with the total score in a range from 0 (zero) to 48. The assessment is completed at admission and discharge in inpatient and ambulatory public mental health sector. Audin et al.'s (2001) study suggested that the instrument does not represent a sufficient range of problems presented for psychotherapy clients since it only identifies one main problem rather than all client's presenting problems that need attention. The items on post-traumatic stress disorders and self-esteem are not included in the assessment. Additionally, Pirkis et al. (2005) observed that the assessment failed to represent factors on culture, poverty, abuse, safety and risk, bereavement, and medication compliance. The study also suggested that HoNOS is very limited in identifying clinically meaningful change. Out of 12 domains, only three domains (problems with depressed mood, problems with relationships, and other mental and behavioral problems) had showed good response rate indicating that this assessment is not appropriate for an out-patient psychotherapy population.

The Functional Analysis in Care Environments (FACE) measurement system (used mostly in U.K.) includes structured risk assessment tools designed to integrate clinical and management information. The FACE is a multidimensional set of six axes or domains focusing on a client's psychological and physical well-being, ADLs and life skills, interpersonal relationships, social circumstances, family, and informal caregivers (Clifford, 1999). Since these domains are comprehensive and generic, they could be used for assessment and outcome measurement. These tools are used for care planning and coordination, as well as, resource utilization. (Clifford et al., 1999). FACE is targeted toward the needs of the care group, such as health and social care, mental health, risk, learning disabilities, young people, substance misuse, mental capacity, telecare, and person-held record. FACE outcome measures include measures of health and social well-being, quality of life, patient-reported outcomes, and personal goal achievement. The FACE Core Assessment is used in the adult mental health services and includes 37 items covering the six domains of the FACE assessment. Additionally, the tool rates clients' problems on their quality of life and functioning in the past month with the scale ranging from 'no impact' to 'overwhelming impact' (FACE Assessment Tools, 2022).

2.7 Addressing the MBC Problem with interRAI Instruments

To assess clients with complex needs, clinicians need to have high quality reliable and efficient assessment tools, which cover a wide range of symptoms, clinically relevant in decision making process, and easily accessible across clinical settings. Using a common tool, clinicians can work with clients to identify their strengths, preferences, and needs in order to create appropriate care plans that could be shared with other clinicians. This process is known as a shared care plan. Such tools should have several traits in common, including use of consistent terminology across all settings, shared conceptual basis to support care planning with clinical emphasis on clients' strength and needs rather than diagnosis alone, care planning protocols to inform the care planning process, and consistent data collection and assessment methodology (Hirdes et al., 2020). Since mental health clients require treatment from multiple service providers with different approaches to care and service delivery framework, service integration and care coordination can become problematic. Therefore, standardized assessments must transition with clients across multiple healthcare settings removing boundaries between healthcare settings to enable better care planning and to identify needs of complex clients in a timely manner (Gray et al., 2009). With the right tool that is fully integrated right into the electronic health record (EHR), clinicians can have a better opportunity to record the measurement outcome and calculate the scale scores more efficiently allowing the scale comparison over time and do more thorough analyses of clients' condition (Aboraya et al., 2018). Therefore, mental health outcomes need to be assessed regularly and MBC should become a part of the treatment in health care systems.

interRAI is an international, not-for-profit network that develops comprehensive and person-centered assessments for use in multiple health care settings. These assessments are well-suited for a MBC-based approach to service provision since they have full spectrum of psychometric properties, easy to use, add value to the decision-making process about treatment with clinically relevant information. interRAI was founded in 1990 with an initial focus on geriatric research, but over time it broadened its scope to include individuals at risk of all ages. The interRAI instruments designed to provide severity of a client's condition, but also initiate a clinical response through embedded algorithms and care planning guidelines. The interRAI suite of instruments now includes over 20 comprehensive assessments and screeners that could be used by clinicians and non-regulated health professionals (with appropriate training), and supplementary self-reported assessments to measure patient experience, patient outcome, quality of care, and quality of life among individuals of all ages with complex needs. For more than 20 years, interRAI network has been developing and successfully implementing the use of interRAI instruments internationally to assess and address all individuals' mental health needs using comprehensive and supplementary assessments and screeners (Hirdes et al., 2020), and to arrange a comprehensive mental health system covering community mental health, long-term care settings, mobile crisis teams, inpatient and emergency psychiatry (Hirdes et al., 2008). The interRAI instruments use the same language and share common clinical emphasis, data elements, and care planning protocols, which help clinicians to enhance individuals' care planning and outcome measurement, resource allocation, quality improvement, policy analysis, evaluation, and research. The instruments are aimed toward a holistic view of individuals' strengths, preferences, and needs with the goal to improve quality of care and system performance (Hirdes et al., 2020).

As an assessment approach relevant to MBC, the interRAI assessments are person-centered and support shared decision-making; however, being clinical assessments, they examine factors beyond psychiatric symptoms and focus on examination of outcome of care and not on improving approaches of care. These longitudinal assessments combine a comprehensive, multidisciplinary evaluation of individuals' strengths, preferences, and needs using Clinical Assessment Protocols (CAPs) that allow tracking individuals' progress overtime, trigger a clinical response, which improves decision making and support the recovery goals (Mathias, Hirdes, Pittman, 2010). Each of these assessments have been tested to assure their validity, reliability, and comprehensiveness. The overall performance of the instruments showed significant reliability according to conventional cut-offs for interpreting the kappa statistic. The interRAI items are reliable across care settings, making them applicable for cross domain applications as part of an integrated health information system (Hirdes et al., 2008). Additionally, they can be used as a single integrated assessment system applied across care settings to individuals of any age (Hirdes et al., 2020) allowing the transition across different agencies and services without a need unnecessarily to re-do the assessment. Therefore, these assessments enable better triage and care planning based on the clients' needs. Additionally, proper analysis of data collected from these assessments could be used in care planning, decision making, and outcome monitoring (Hirdes et al., 2020).

Improving quality of care and life of mental health clients is a team effort that requires collaboration from different providers across the continuum of care. Adoption of the interRAI assessments in the community mental health settings as a standardized assessment tool establishes a base for quality measures and provide strategies to quality improvement. These assessments are systematically administered and allow longitudinal data collection for thorough analysis of the rate of changes in the population over time with the expected trajectory of clinical change, which is improvement (Hirdes et al., 2020).

2.8 interRAI Community Mental Health (CMH) Assessment

The interRAI Community Mental Health (CMH) is a standardized assessment system used by clinicians in community mental health settings, including case management services and assertive community treatment programs for clients aged 18 years and older. This assessment instrument includes 20 domain areas, while focusing on clients' needs, strength and preferences: identification information, intake and initial history, mental state indicators, substance use or excessive behaviour, harm to self and others, behaviour, cognition, function status, communication and vision, health conditions, stress and trauma, medications, service utilization and treatments, nutritional status, social relations, employment, education and finances, environmental assessment, diagnostic information, and discharge. The interRAI CMH has a list of embedded scales for outcome measurements, such as aggressive behaviour scale (ABS), activities of daily living (ADL), CAGE-substance use screener, mania scale, cognitive performance scale (CPS), depression severity index (DSI), pain, positive symptoms scale (PSS), risk of harm to others (RHO), self-care index (SCI), positive symptoms scale (PSS) – short version, and severity of self-harm (SOS). These scales are used to systematically monitor the response to treatment and recovery from illness, which could be examined longitudinally. The main goal of the assessment is to identify clients' needs and applicable interventions for care planning based on the triggered Clinical Assessment Protocols (CAPs) (interRAI Community Mental Health, 2017). CAPs are designed for clinicians to better understand the client's key problems, suggest evidence-based interventions based on the findings in the assessment to support a recovery plan and to examine possible treatment options in community-based settings. The CAPs' categories triggered by the interRAI CMH are safety, traumatic life events, social life, economic issues, autonomy, and health promotion. These CAPs enable a proper care plan development based on clients' strengths and needs to resolve existing and potential problems and to decrease the risk of decline. Additionally, the care plan created by a clinician with input from a client based on the CAPs proposed interventions is an essential communication tool to improve the effects of mental health symptoms. Through the use of CAPs, clinicians can develop a multidimensional view of client's condition and life experiences since the CAPs triggered show clients' quality of life implications and represent a wide range of conditions that have direct impact on their life. However, the CAPs are not designed to explain on how the symptoms and conditions should be managed. They are designed to provide valuable information to clinicians to develop a focused and individualized care plan (Martin et al., 2009) and to provide guidelines for investigation and evidence-based interventions that support recovery of identified problems (Mathias, Hirdes, Pittman, 2010).

The assessment is used at intake and discharge, and every six months, or when there is a significant change in a client's condition and re-assessment is necessary to modify an existing care plan. In addition, re-assessments can help with the organizational quality indicators (since they are based on non-admission longitudinal data), program planning and resource allocation (Hirdes et al., 2020). Regular re-assessments are necessary to get outcome information and to evaluate the effectiveness of a treatment plan. Further research is necessary to identify if the existing six-month period for re-assessment is appropriate or it should be modified. Frequent re-assessments could monitor higher rate of changes allowing more straightforward analysis, but also could increase the assessment burden and cause some frustration among clinicians and clients. Since the interRAI CMH assessment is fully compatible with the interRAI Mental Health (MH) for inpatient psychiatry (the CMH includes 405 items with 330 items being common between CMH and MH instruments), linking interRAI MH data at discharge with interRAI CMH data can help agencies to compare quality indicators for the inpatient episode with when the client returned to the community. On average, a clinician requires an hour to complete an assessment, but this time may vary due to lack of access to information based on clients' ability to provide it (Hirdes et al., 2020).

Quality of care and clients' outcomes cannot be improved if they cannot be measured. Well-developed quality indicators support efficiency and enhancement of a service delivery and accountability for funding (Hermann et al., 2000). Process indicators are used for benchmarking quality of care and focus on problems, such as safety, accessibility, appropriateness and timeliness of treatment and services (Hall & Siegel, 2005). Outcome indicators are used together with process indicators to identify the effectiveness of service delivery and whether the clients have improved their symptoms. These indicators can also help with clients' care plan monitoring and adjustments. However, these indicators rely on availability of clinical data that are common among healthcare providers, and mainly focus on symptoms and functioning, and missing assessing clients' quality of life, which is very important in their recovery process (Kilbourne et al., 2018). The interRAI Mental Health Quality Indicators (MHQI) is a set of 35 indicators developed based on the RAI-MH assessment and include emotional, behaviour, physical functioning, cognitive patters, nutrition or eating, sexual violence, and accidents (Perlman et al., 2013). Linking RAI-MH discharge data with the interRAI CMH data allows to benchmark MHQI related to clinical outcomes during the inpatient episode and over time as a client returns to living in community (Hirdes et al., 2008).

3. RESEARCH FOCUS

For this research, transitions in care needs were analyzed for the rate of changes in severity of illness indicators: DSI, PSS, and traumatic life events CAP. A history of abuse variable was created based on the history of abuse or a new onset of abuse during treatment. The history of abuse variable included individual items in the assessment, such as: serious incident, death of a family member, lived in a war zone, witnessed severe accident, victim of crime, sexual or physical assault, emotional abuse, fearful of family member, concerns for safety. The traumatic life events CAP was evaluated if it was newly triggered or resolved after the initial assessment. The scores were analyzed for an improvement or failure to improve after the re-assessment. The DSI is a scale that ranges from 0 (zero) to 15, where score of 3 (three) and more indicates a possible depression and score of 7 (seven) and more indicates a more severe depression. This score is based on a combination of symptoms: sad or pained facial expressions, made negative statements, self-depreciation, expressions of guild or shame, and hopelessness (Perlman et al., 2013). The PSS assesses the presence of hallucinations, command hallucinations, delusions, and abnormal thought processes. The scale ranges from 0 (zero) to 12 with higher score indicating higher level of psychotic symptoms. The traumatic life events CAP identifies clients with immediate safety needs and who require ongoing support due to prior traumatic life events (Hirdes et al., 2011). There are two triggered levels for the CAP. Individuals, who triggered CAP because they have experienced one or more traumatic life event in their lives that provoked sense of horror or intense fear (referred to here as level 1). The clinical focus here is on reduction of the impact of prior traumatic events on the persons' life. A more acute concern is for persons, who triggered the CAP, because they are fearful of others or they have experienced one or more traumatic life events, such as sexual, physical, and/or emotional abuse, criminal victimization in the last 7 days (referred to here as level

2). In this case, the clinical response is driven by immediate concern for their safety. Individuals, who have not triggered the CAP, have not experienced the specific traumatic life events, or who do not report experiencing intense fear or horror when they occurred. This CAP helps targeting interventions at the individual level and provides an evidence-based framework to identify the needs at the population level (Mathias, Hirdes, Pittman, 2010).

To measure the changes in care needs after the re-assessment, the following level of improvements was calculated based on the rate of change between the initial assessment and re-assessment: no change and change (positive or negative). The 'no change' level means clients do not seem to have an improvement since the initial and re-assessment scored the same on the scales of interest. The 'change' level means the clients have changed their initial score on 1 (one) point either positive or negative. Additionally, associations between scales were analyzed to understand the nature of symptoms and clients' condition using logistic regression.

3.1 Study Rationale

The potential use of the interRAI CMH assessment, as an MBC instrument, generates data that help to get meaningful understanding of the health of the population, to adjust the care planning based on the identified changes, to track changes in clients' condition on personal level, and to allow proper resource allocation. These data may be aggregated at the population level to see the rate of changes as a basis for quality initiatives to evaluate performance on the organizational level. This research was needed to identify the optimal re-assessment interval after the initial interRAI CMH assessment.

3.2 Objectives

This thesis investigated the relationship of time between initial assessment and re-assessment with clients' rate of changes. The specific objectives were to:

1. Determine if the re-assessment period of six-month of the interRAI CMH tool is sufficient to identify the meaningful clinical changes in PSS and DSI scales.
2. Determine if the traumatic life events CAP was triggered or resolved after the re-assessment period of six-month of the interRAI CMH tool.
3. Identify the shortest period of time from the initial assessments and re-assessments when clients showed meaningful clinical changes in PSS and DSI scales.
4. Identify the shortest period of time from the initial assessments and re-assessments when traumatic life events CAPs were triggered or resolved.

3.3 Hypothesis

The current re-assessment period of six-month of the interRAI CMH tool is sufficient to see meaningful clinical changes in clients' condition.

3.4 Data source and study design

This retrospective study used secondary data from interRAI CMH assessments that are stored on the interRAI Canada server at the University of Waterloo. The assessments completed on clients in community mental health settings in Ontario and Newfoundland, Canada between 2007 and 2020 were analyzed to answer objectives one to four. Therefore, no new participants were recruited. The timeframe between initial assessment and re-assessment for each client in the study sample were compared and analyzed to find an appropriate rate of re-assessment that matches the trajectory of change.

3.5 Study Sample

The study sample included 1,373 clients 18 years and older, who have been seen by a clinician between 2007 and 2020, and who have been re-assessed at least once using the interRAI CMH tool. Therefore, each client must have at least two CMH assessments done. Clients, who did not have a re-assessment after the initial assessment, were excluded from the study. Overall, the study sample is large enough to represent a population in the community mental health settings in Ontario. Analyzing longitudinal data from 2007 allowed to see the differences in rate of changes for clients overtime based on age, sex, and diagnosis. Figure 1 represents the inclusion criteria for the sample. Overall, CMH database includes 5,424 client assessments in community mental health settings. From that sample, duplicate assessments have been excluded. Furthermore, clients who have only one assessment (n=4,051) were excluded. The final sample of 1,373 clients (with at least one re-assessment after the initial CMH assessment) were then reviewed.

Characteristics of the study sample are presented in Table 1. The mean age of the sample is 39.4 years (SD=16.5). The majority of the sample were females (59%). Most were single (58%), and one quarter of clients were married. The most common provisional psychiatric diagnoses were mood disorders (40.7%), anxiety disorders (30.7), schizophrenia (14.7%), and substance use disorders (10.2%). Additionally, 46.9% of the sample had prior lifetime psychiatric admissions. There was a significant difference in the substance use between different age groups ($p<0.0001$). And, there was a significant difference in the mood disorders between different age groups ($p<=0.04$).

Figure 1. *Flow Diagram of Study Sample (N=1,373)*

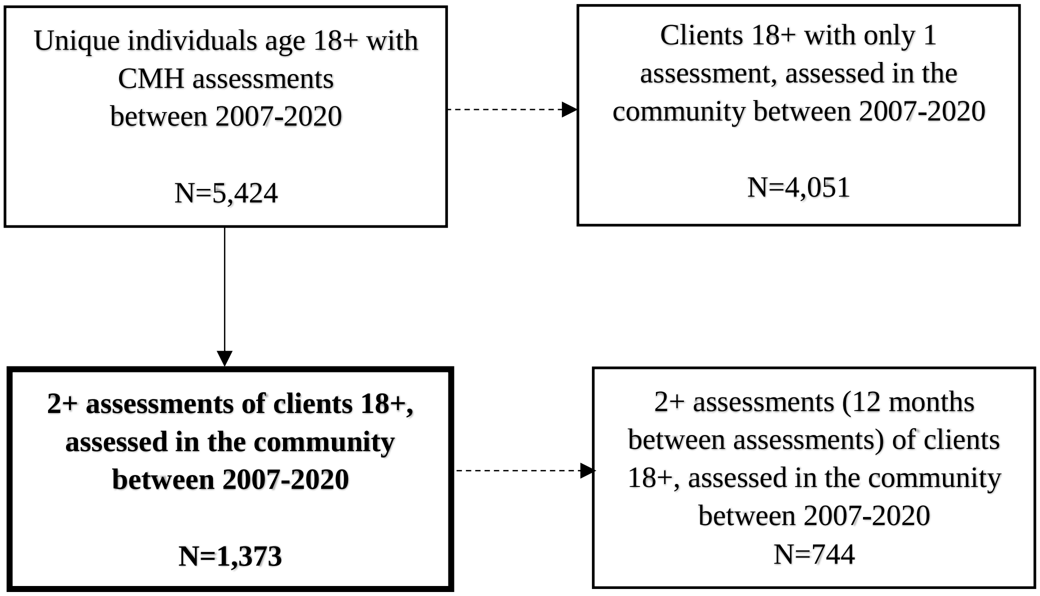

Table 1. *Study Sample Characteristics of Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*

Characteristics	*18-44* *% (n)*	*45-64* *% (n)*	*65+* *% (n)*	*All Ages* *% (n)*	***Chi-square***	***P-value***
Female	58.3 (525)	59.8 (220)	66.3 (63)	59.3 (808)	2.32	0.31
Marital Status					25.19	<.0001
Single	61.3 (555)	51.4 (189)	52.1 (50)	58.0 (794)		
Married	20.8 (188)	31.5 (116)	36.5 (35)	24.7 (339)		
Missing	18.0 (163)	17.1 (63)	11.5 (11)	17.3 (237)		
Diagnosis						
Schizophrenia	13.9 (126)	15.22 (56)	20.8 (20)	14.7 (202)	3.40	0.18
Substance Use	12.4 (112)	7.6 (28)	0.0 (0)	10.2 (140)	18.20	<.0001
Mood Disorder	38.3 (347)	44.8 (165)	46.9 (45)	40.7 (557)	6.29	0.04
Anxiety	31.2 (283)	28.3 (104)	34.4 (33)	30.7 (420)	1.76	0.41
Prior Lifetime Psychiatric Admissions	46.2 (413)	49.7 (181)	42.6 (40)	46.9 (634)	2.08	0.35

3.6 Variables

Multiple interRAI CMH items were analyzed to measure the rate of change in the following scales: Depressive Severity Index (DSI) and Positive Symptoms Scale (PSS)-Short. The rate of change (RoC), a dependent variable, was calculated and grouped into a binary format for logistic regression modeling: 0 – No change and 1 – Change. The change at the re-assessment scores was considered when there is a one-point absolute difference (positive or negative) from the initial assessment. Absolute changes were of interest because both, improvement and worsening of symptoms, are relevant to clinical decision-making. The change in a triggered traumatic life event CAP was considered if the CAP score has changed (improved or worsen) compared with the initial assessment. Change in the scales and CAP were considered as dependent variables, which depend on the frequency of the re-assessments: every three months, six months, nine months, or 12 months after the initial assessment.

To understand the sample characteristics, independent variables reviewed in the study were time between assessment, age, sex, and diagnosis (schizophrenia, anxiety disorders, substance-related disorder, and mood disorders), which were coded using DSM-IV provisional diagnostic category and determined by a psychiatrist or a physician as factors contributing to the clients' condition.

3.7 Analytical Plan

This research considered descriptive analysis of the dataset using frequency tables to understand the characteristics of the sample, chi-square analysis was used to investigate the relationship between independent (predictor) variables and each dependent (outcome) variable, and a logistic model to identify the best period of re-assessment time to see the meaningful rate of changes.

For the research hypothesis, frequency tables and multivariable logistic regression models were created to investigate: the differences in scale scores and CAPs triggered at fixed time intervals: three, six, nine, and 12 and more months; and, to predict a probability of change of scores and CAP (improve or worsen) with time frame as a co-variance. Analysis of adjusted odds ratio helped to understand the probability of relationships between independent and dependent variables. In addition, differences in mean scale scores were examined for follow-up period of varying length.

4. RESULTS

4.1 Descriptive Statistic

At the baseline, 81.2% of clients had symptoms of depression (scored 3 and above on the DSI) and 61.1% of clients in this group were females (Table 2). About 70% of clients were 18 to 44 years old. Along with having depression, 9.1% of clients had schizophrenia, 10.2% of clients had problems with substance use, and 42.5% of clients had mood disorders (Table 3).

Table 3 shows the associations of scale scores and clinical items over time by provisional psychiatric diagnoses. Mood disorder is highly associated with the DSI score, and the presence of the mood disorder is based on the DSI score. For example, Table 3 shows that about 42% of those with a mood disorder diagnosis have DSI scores of 3+. By comparison, only about 9% of clients with schizophrenia have DSI scores of 3+. On the other hand, clients with a schizophrenia are most likely to have scores on the positive symptoms scale of 3+. Traumatic life events and history of abuse were comparable among persons with schizophrenia and substance use, but much higher among those with mood disorders. The presence of the DSI at the initial assessment and re-assessment/discharge is represented in Tables 4 and 5. Only 7.4% of the study population did not have any symptoms of depression (scored 0): 6.4% of females and 8.9% of males. There was a significant difference in the DSI between different age groups ($p<0.0001$). About 83% of females have moderate or worse symptoms of depression compared to 78.5% of males. Females are less likely to have no symptoms of depression and more likely to have moderate (scored 3 to 6) to severe symptoms of depression (scored 7+). Older clients are more likely to have no symptoms of depression. However, females are also less likely to have no symptoms of depression within each age group compared to males. Middle aged and older clients are less likely to have severe symptoms of depression compared to younger clients (18 to 44 years old). In both genders, less difference was noticed between middle and old aged clients.

At the reassessment, 17.5% of the sample did not have symptoms of depression. There was a 9.6% absolute increase in those with no symptoms in females and 11% absolute increase in males (Table 5). All age groups had increased percentage with no symptoms of depression. The highest percentage increase for males with no symptoms of depression was among middle aged clients (2.5 times relative increase) and in females among young clients (2.8 times relative increase). Additionally, both genders improved with respect to severe symptoms of depression (scored 7 to 15). There was a 16.2% absolute reduction in males and 11% absolute reduction in females. Overall, improvements in severe symptoms of depression were noticed in all age groups. Among males with severe symptoms of depression, there was 19.2% absolute reduction in younger clients compared with 9.7% and 11% absolute reduction in middle aged and older clients respectively. In females with severe symptoms of depression, there was 9.5% absolute reduction in younger clients, and 15.9% and 6% absolute reduction in middle aged and older clients respectively.

The mean value of DSI score at initial assessment was 7.6 (SD=4.6) compared with 6.1 (SD=4.8) at the re-assessment. The highest rate of change of 75.9% for the DSI was among clients who have been re-assessed within 3-6 months. On average, the rate of change for the DSI was 73.6%. The size of absolute changes in the DSI Score by follow-up period is shown in Graph 1. Graph 2 shows patterns of improvement and worsening of DSI scores with different follow-up periods. The period of time when clients improved their initial score the most (52.6%) was between 3-6 months. The period of time when clients had the greatest worsening of their initial score to 31.9% was between 9-12 months.

In addition to examining changes in score values, it is important to consider the reliability of scores over time. The Cronbach's alpha test of reliability for the initial and re-assessment of DSI score showed good reliability for the scale at both time periods. A high α coefficient of 0.79 at initial assessment and 0.85 at the re-assessment shows that items in the scale shared covariance and measured the same underlying concept. Five items in the scale measured different things, but together, they measure underlying concept of depression. During five different time intervals, the Cronbach's alpha test varied from 0.78-0.79.

T-tests were used in order to test the difference in DSI scores between those with mood disorders over time. The initial t-test (t-value=-3.34; p=0.0009) between the DSI showed that clients with a baseline mood disorder diagnosis had significantly higher DSI score at initial assessment compared with clients without mood disorder (mean of 8.0 vs 7.2, respectively). However, on reassessment these differences became less significant (t-value=-2.26 at p=0.024) and smaller in size (mean=6.4 vs 5.8, respectively).

Table 2. *Distribution of interRAI Scales by Gender at Initial Assessment and Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*

Scale	***Initial Assessment***			***Re-Assessment***		
	Male % (n)	***Female % (n)***	***Total % (n)***	***Male % (n)***	***Female % (n)***	***Total % (n)***
DSI (Scored 3+)	38.9 (424)	61.1 (662)	81.2 (1086)	38.2 (350)	61.8 (565)	68.7 (915)
PSS-Short (Scored 3+)	54.5 (126)	45.5 (105)	17.5 (231)	50.6 (90)	48.4 (88)	13.4 (178)
Traumatic Life Events (Level 1+)	27.6 (110)	72.4 (288)	31.9 (398)	27.5 (117)	72.5 (308)	32.8 (425)
History of Abuse	37.2 (332)	62.8 (560)	71.1 (892)	36.2 (215)	63.8 (379)	46.6 (594)

Note: DSI = Depressive Severity Index; PSS =Positive Symptoms Scale; Includes level 1 and 2 for Traumatic Life Events Clinical Assessment Protocol (CAP), and Any History of Abuse;

Table 3. *Distribution of interRAI Scales by Diagnosis at Initial Assessment and Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*

Scale	***Initial Assessment***			***Re-Assessment***		
	Schizophrenia % (n)	***Substance Use % (n)***	***Mood Disorder % (n)***	***Schizophrenia % (n)***	***Substance Use % (n)***	***Mood Disorder % (n)***
DSI (Scored 3+)	9.1 (99)	10.2 (112)	42.5 (466)	9.0 (83)	10.8 (100)	42.0 (387)
PSS–Short(Scored 3+)	42.9 (100)	18.5 (43)	30.5 (71)	36.7 (66)	16.7 (30)	29.4 (53)
Traumatic Life Events (Level 1+)	9.8 (39)	11.3 (45)	43.0 (172)	8.9 (38)	12.1 (52)	42.7 (183)
History of Abuse	18.7 (91)	18.2 (89)	76.2 (372)	17.1 (55)	19.3 (62)	77.6 (250)

Note: DSI = Depressive Severity Index; PSS =Positive Symptoms Scale; Includes level 1 and 2 for Traumatic Life Events Clinical Assessment Protocol (CAP), and Any History of Abuse;

Table 4. *Distribution of Depressive Severity Index (DSI) at the Initial Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*

Score	***Initial Assessment***[1]								
	Male				**Female**				**Total**
	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	**% (n)**
0 points	7.8 (28)	9.5 (14)	20.0 (6)	8.9 (48)	4.4 (23)	9.2 (20)	12.7 (8)	6.4 (51)	7.4 (99)
1-2 points	10.2 (37)	16.3 (24)	23.3 (7)	12.6 (68)	7.9 (41)	12.8 (28)	25.4 (16)	10.6 (85)	11.4 (153)
3-6 points	17.7 (64)	29.3 (44)	13.3 (4)	20.8 (112)	26.1 (135)	26.2 (57)	30.2 (19)	26.4 (211)	24.1 (323)
7-15 points	64.4 (233)	44.2 (65)	43.3 (13)	57.7 (311)	61.6 (319)	51.8 (113)	31.8 (20)	56.6 (452)	57.1 (763)

Table 5. *Distribution of Depressive Severity Index (DSI) at the Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*

Score	***Re-Assessment*** [2]								
	Male				**Female**				**Total**
	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	**% (n)**
0 points	18.0 (65)	23.5 (34)	25.8 (8)	19.9 (107)	12.3 (63)	21.3 (47)	27.4 (17)	16.0 (127)	17.5 (234)
1-2 points	14.1 (51)	16.6 (24)	16.1 (5)	14.9 (80)	11.3 (58)	14.6 (32)	22.6 (14)	13.1 (104)	13.8 (184)
3-6 points	22.7 (82)	52.5 (37)	25.8 (8)	23.7 (127)	24.3 (125)	28.2 (62)	24.2 (15)	25.4 (202)	24.7 (329)
7-15 points	45.2 (361)	34.5 (50)	32.3 (10)	41.5 (223)	52.1 (268)	35.9 (79)	25.8 (16)	45.6 (363)	44.0 (586)

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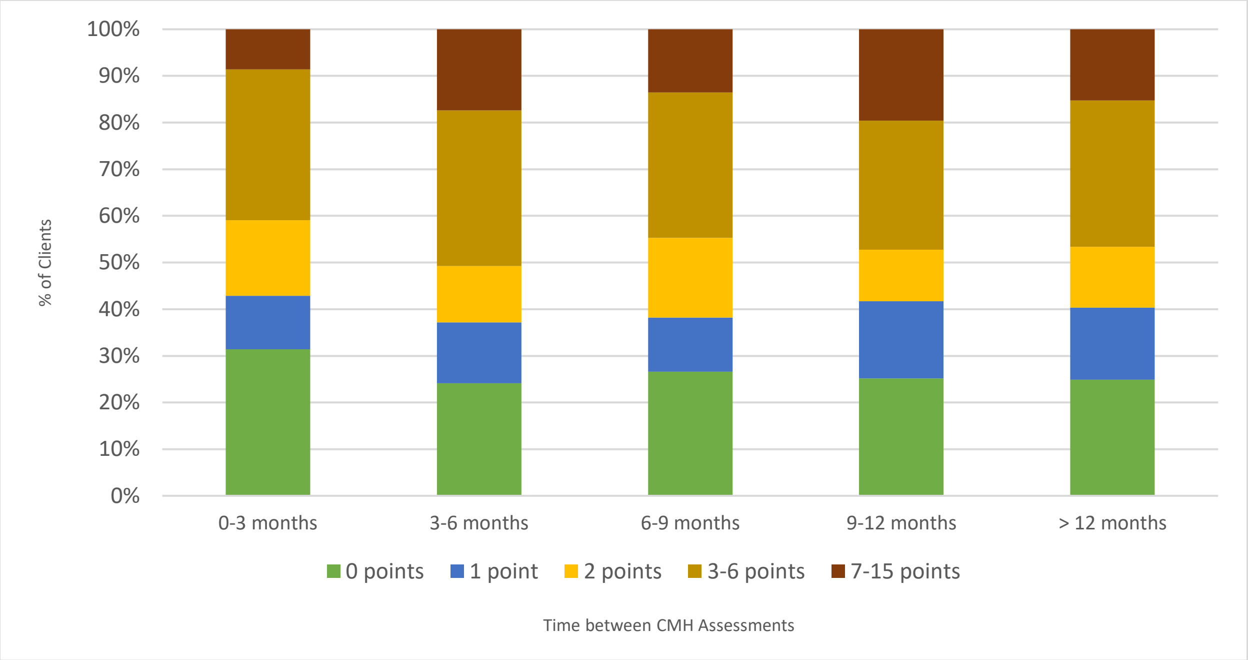
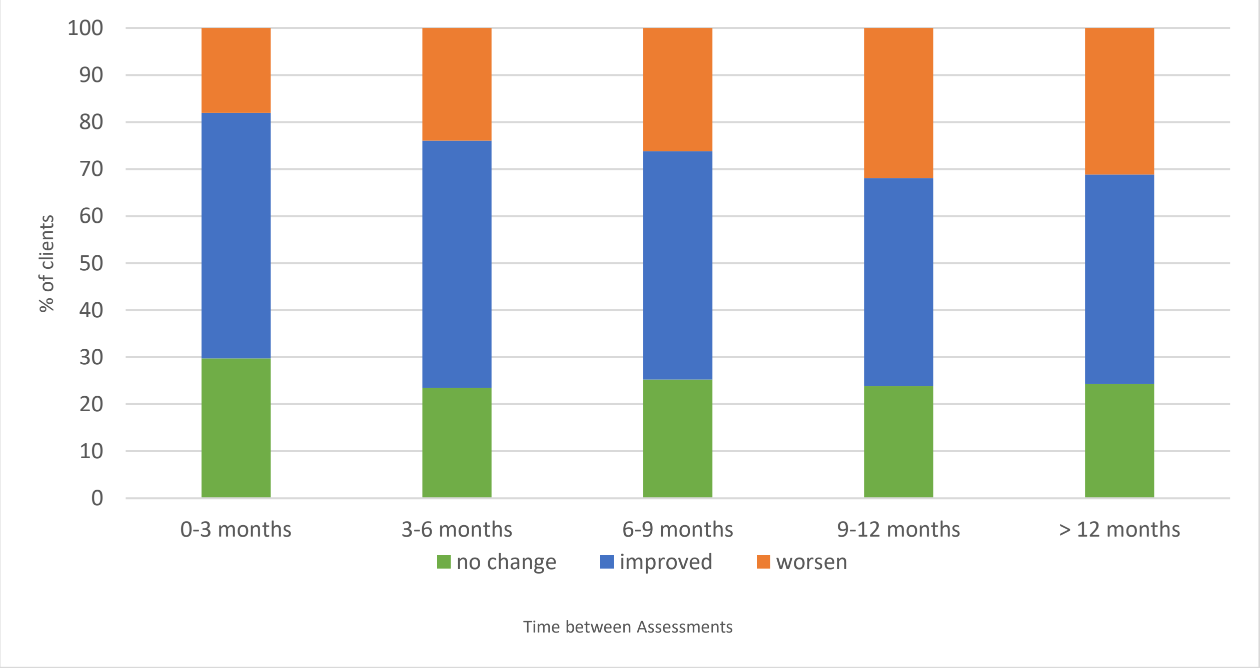
[1] Male subpopulation: 67% (362) from 18-44 years old; 27% (147) from 45-64 years old; and 6% (30) 65+ years old. Female subpopulation: 65% (518) from 18-44 years old; 28% (218) from 45-64 years old; and 8% (62) 65+ years old. Missing Frequency =35; Chi-square=53.47; p-value<0.0001

[2] Missing Frequency =40; Chi-square=34.97; p-value<0.0001

Graph 1. *Absolute Rate of Changes in the Depressive Severity Index (DSI) Scores Over Time for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*



Graph 2. *Rate of Changes in the Depressive Severity Index (DSI) Score over Time for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*



A second clinical indicator of interest is change in psychosis over time. The distributions of the PSS scale at the initial assessment and re-assessment/discharge is represented in Tables 6 and 7, respectively. At the initial assessment, 17.5% of clients indicated had symptoms of psychosis (scored 3 and above on the Positive Symptoms Scale) (Table 2). In this group, 45.5% were females. Table 6 shows that 76.2% were clients from 18 to 44 years of age. There were no symptoms of psychosis in 69.2% of the study population (Table 6), but there were fewer males with no symptoms (61.2%) compared with females (74.3%). There was a significant difference in the symptoms of psychosis between different age groups (p=0.009). Females are more likely to have no psychotic symptoms and less likely to have higher level of psychotic symptoms in each age group than males. In both genders, middle aged (45 to 64 years old) clients have a higher percentage of not having psychotic symptoms and lower percentage of having severe psychotic symptoms compared with younger (18 to 44 years old) clients. Older clients have no severe psychotic symptoms in both genders.

At the re-assessment, 13.4% of clients indicated symptoms of moderate or worse psychosis (Table 2), which is a 4.1% absolute reduction compared with the initial assessment. 74.1% of clients did not have psychotic symptoms at follow-up (Table 6). Both genders had increased percentages of having no psychotic symptoms (6.7% absolute increase in males and 4.3% absolute increase in females). All age groups had an increased percentage of having no psychotic symptoms as well. The highest percentage increase with no psychotic symptoms was among older aged clients (12.5% absolute increase in males and 4.9% absolute increase in females). Additionally, both genders had improved the percentage of higher psychotic symptoms. However, the improvements were better among males within each age group (7.1% absolute increase compared with 2.3% absolute increase among females). Younger females had smaller percentage of higher psychotic symptoms compare to younger males.

The mean value of PSS-short at initial assessment was 1.1 (SD=2.1) compared with a mean value at the re-assessment of 0.8 (SD=1.9). The most noticeable rate of change for the PSS-short scale was for clients who have been re-assessed after 6 months (28.2% between 6-9 months, 25.9% between 9-12 months, and 27.6% after 12 months or more). On average, the rate of change for the PSS-short was 22.7%. The absolute changes in PSS-short scores over time are shown in Graph 3. The period when clients most improved their initial score to 20.9% was within 6-9 months from the initial assessment. The period when clients worsened to the greatest degree (14.3%) was after 12 months from the initial assessment. The changes in the PSS-short scores are represented in the Graph 4.

Additionally, the Cronbach's alpha values for the PSS-short in the initial and re-assessment showed good reliability. An α coefficient of 0.74 at initial assessment and 0.72 at the re-assessment showed that items in the scale shared covariance and measured the same underlying concept. The scale includes four items that collectively measure overall symptoms of psychosis. During five different follow-up time intervals, the Cronbach's alpha test was varied from 0.67-0.82. This suggests that the scale reliability was stable over time.

There were clear differences in PSS-short scores in the initial assessment based on a provision schizophrenia diagnosis (t-value=-16.33, p<0.0001). Those with a schizophrenia diagnosis have mean PSS-short scores of 3.2 compared with 0.7 on those without that diagnosis. These differences diminished over time, but the t-value at the re-assessment remain significant when comparing PSS-short scores for those with and without a schizophrenia diagnosis (t-value=-13.23, p<0.0001). Mean scores dropped to 2.3 and 0.6, respectively.

Table 6. *Distribution of Positive Symptoms Scale (PSS)–Short Score at the Initial Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*

Score	***Initial Assessment[3]***								
	Male				**Female**				**Total**
	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	% (n)
0 points	59.6 (212)	67.8 (97)	50.0 (15)	61.2 (324)	73.6 (376)	78.1 (168)	67.2 (41)	74.3 (585)	69.2 (909)
1-2 points	14.3 (51)	14.0 (20)	26.7 (8)	14.9 (79)	11.7 (60)	12.1 (26)	18.0 (11)	12.3 (97)	13.3 (176)
3-6 points	21.1 (75)	15.4 (22)	23.3 (7)	19.7 (104)	10.2 (52)	7.4 (16)	14.8 (9)	9.8 (77)	13.8 (181)
7-12 points	5.1 (18)	2.8 (4)	0.0 (0)	4.2 (22)	4.5 (23)	2.3 (5)	0.0 (0)	3.6 (28)	3.7 (50)

Table 7. *Distribution of Positive Symptoms Scale (PSS)–Short Score at the Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*

Score	***Re-Assessment[4]***								
	Male				**Female**				**Total**
	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	% (n)
0 points	65.9 (236)	74 (108)	62.5 (20)	67.9 (364)	77.7 (398)	81.4 (179)	72.1 (44)	78.6 (621)	74.1 (985)
1-2 points	16.8 (60)	11.0 (16)	18.8 (6)	15.3 (82)	10.2 (52)	9.6 (21)	18.0 (11)	10.6 (84)	12.4 (166)
3-6 points	14.0 (50)	13.7 (20)	18.8 (6)	14.2 (76)	9.2 (47)	6.8 (15)	9.8 (6)	8.6 (68)	10.9 (144)
7-12 points	3.4 (12)	1.4 (2)	0.0 (0)	2.6 (14)	2.9 (15)	2.3 (5)	0.0 (0)	2.5 (20)	2.5 (34)

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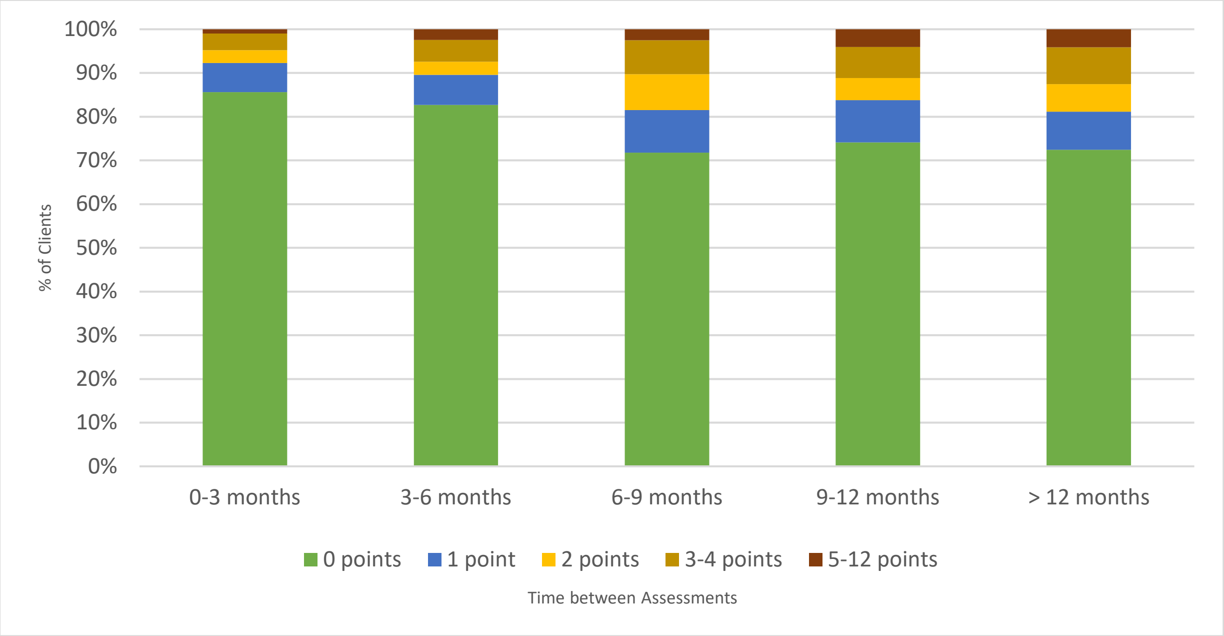
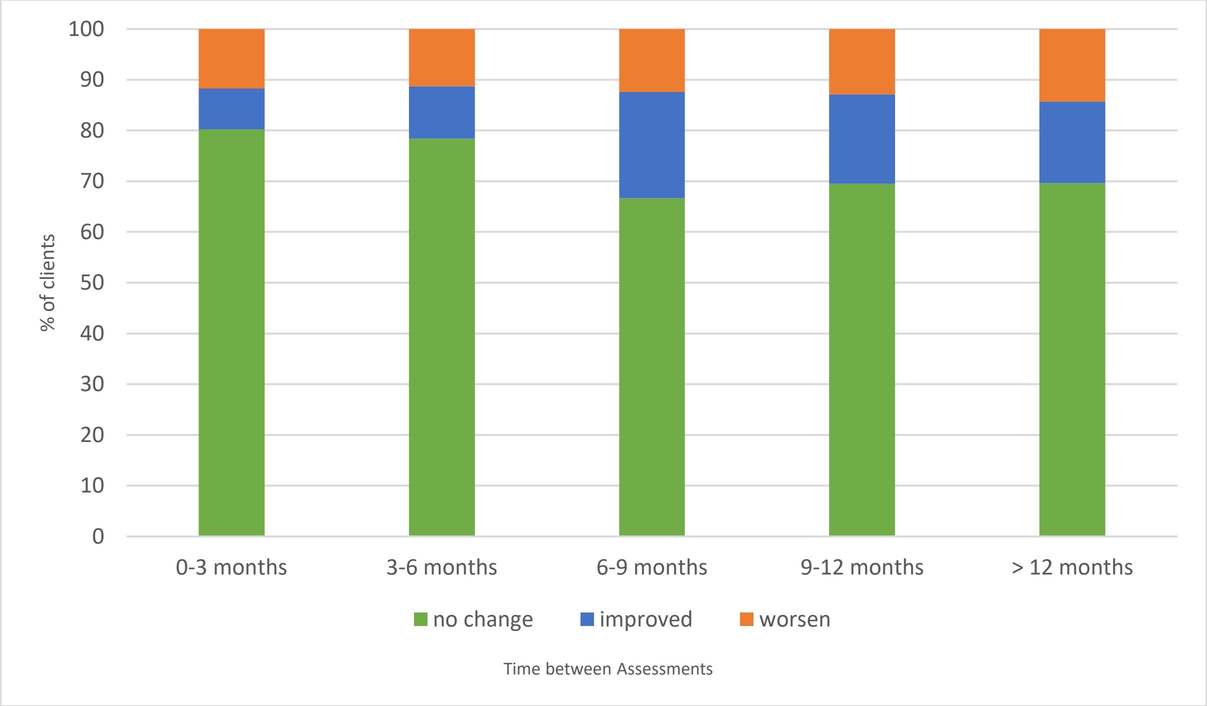
[3] Missing Frequency =57; Chi-square=17.18; p-value=0.009

[4] Missing Frequency =44; Chi-square=10.32; p-value=0.11

Graph 3. *Absolute Rate of Changes in the Positive Symptoms Scale (PSS)–Short Score Over Time for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*



Graph 4. *Rate of Changes in the Positive Symptoms Scale (PSS)–Short Score Over Time for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*



The rate of the traumatic life events CAP being triggered at the initial assessment and re-assessment/discharge is shown in Tables 8 and 9. At the baseline, this CAP triggered 31.9% of clients (Table 2). Of those triggering the CAP, 72.4% were females, and 68.5% of clients were from 18 to 44 years of age. There was a significant difference in triggering the traumatic life events CAP between different age groups (initial assessment and re-assessment p=0.002). Females are less likely to have no traumatic life events and more likely to have prior traumatic life events or to be currently abused compared with males. Younger and middle-aged clients have very similar percentage of not having traumatic life events in both genders. Additionally, younger and middle-aged clients are similar in rates of being abused or having prior traumatic life events affecting their life than older clients.

At the reassessment, there were almost no improvements in both genders. Older males had higher percentage of not having traumatic life events compared to older females (3.4% absolute increase in males and 4.8% absolute reduction in females). Females showed that they were still experiencing abuse while males showed almost no improvements (11.4% absolute increase in female and 0.2% increase in males). Older females had higher percentage of being abused compared with older males (4.7% absolute increase in females and 3.3% absolute reduction in males). The majority of clients who did *not* trigger the CAP, were males (77.4%). This matches with the Mathias, Hirdes, Pittman's (2010) findings that the not-triggered group was predominantly male (60%). Additionally, mood disorder was a common primary diagnosis among clients who triggered the CAP (Table 3).

The most noticeable rate of change (14.8%) for the traumatic life events CAP was for clients who have been re-assessed after 12 months or more. On average, the rate of change for the traumatic life events CAP was 10.9%. The changes in traumatic life events score over time are shown in Graph 5. The best rate of improvement after the initial assessment was between 3-6 months (5.6%) and 9-12 months (7.6%). The period of time when clients worsened their initial score the most (17.6%) was after 12 months from the initial assessment. The change in the traumatic life events CAP is represented in the Graph 6. Along with the PSS-short scale, this CAP requires time to see the improvement in the rate of changes. Clients are being affected by the traumatic life events over prolonged periods and do not improve at the rates noted for the DSI score.

Table 8. *Distribution of Traumatic Life Events Clinical Assessment Protocol (CAP) by Triggering Levels at the Initial Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*

Level	***Initial Assessment[5]***								
	Male				**Female**				**Total % (n)**
	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	
Not triggered	76.9 (250)	78.3 (108)	83.3 (25)	77.7 (383)	59.5 (287)	59.3 (124)	88.1 (52)	61.8 (463)	68.1 (846)
Level 1	12.9 (42)	18.1 (25)	13.3 (4)	14.4 (71)	23.0 (111)	20.6 (43)	10.2 (6)	21.3 (160)	18.6 (231)
Level 2	10.2 (33)	3.6 (5)	3.3 (1)	7.9 (39)	17.4 (84)	20.1 (42)	1.7 (1)	6.9 (127)	13.3 (166)

Table 9. *Distribution of Traumatic Life Events Clinical Assessment Protocol (CAP) by Triggering Levels at the Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*

Score	***Re-Assessment[6]***								
	Male				**Female**				**Total % (n)**
	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	
Not triggered	76.1 (264)	78.7 (111)	86.7 (26)	77.4 (401)	57.9 (293)	60.1 (128)	83.3 (50)	60.5 (471)	67.2 (872)
Level 1	14.7 (51)	18.4 (26)	10.0 (3)	15.4 (80)	23.5 (119)	23.0 (49)	13.3 (8)	22.6 (176)	19.8 (256)
Level 2	9.2 (32)	2.8 (4)	3.3 (1)	7.1 (37)	18.6 (94)	16.9 (36)	3.3 (2)	17.0 (132)	13.0 (168)

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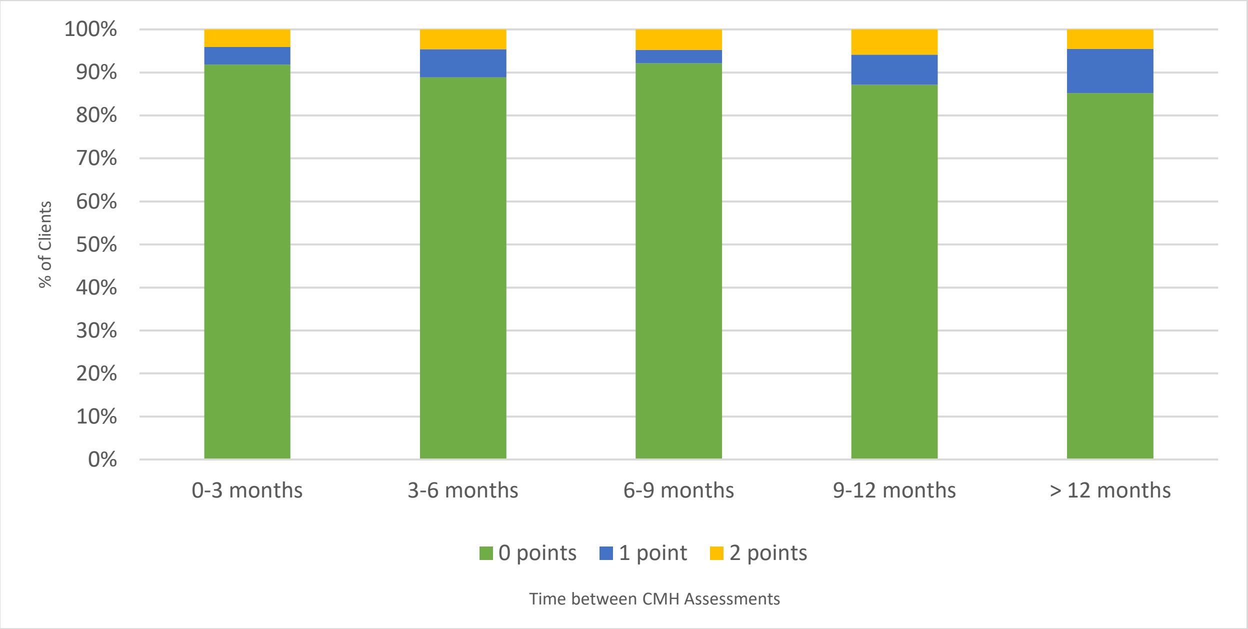
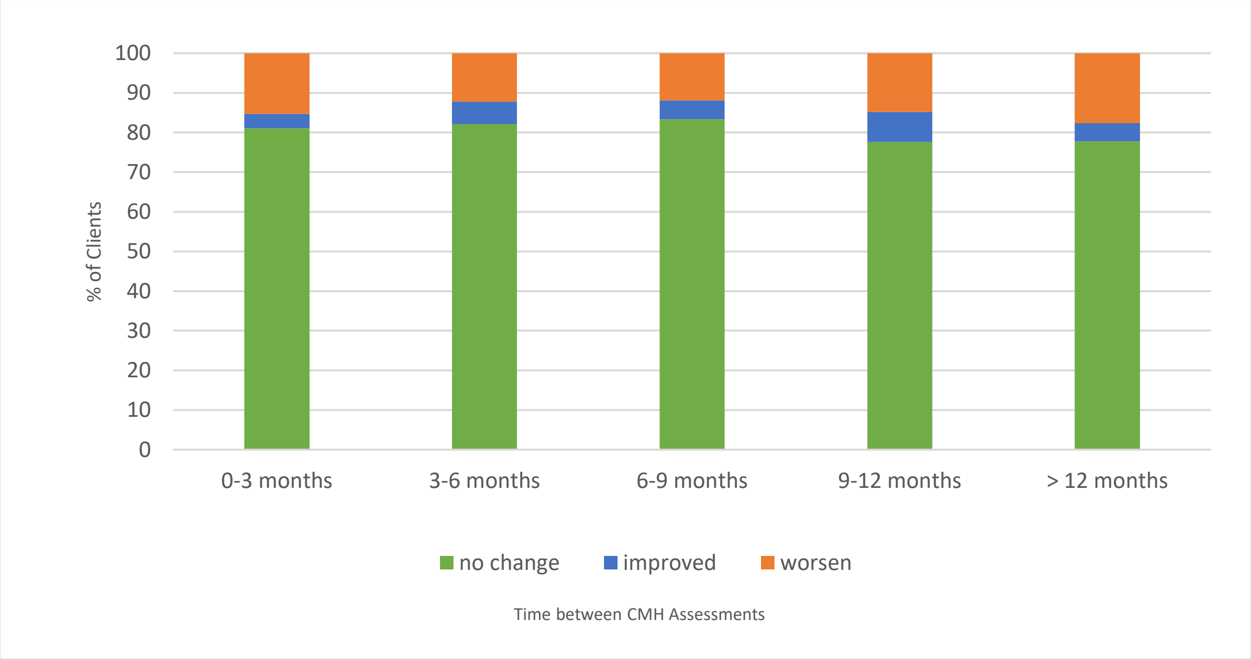
[5] *Missing Frequency =130; Chi-square=17.06; p-value=0.002

[6] *Missing Frequency =77; Chi-square=15.88; p-value=0.003

Graph 5. *Absolute Rate of Changes in the Traumatic Life Events Clinical Assessment Protocol (CAP) Score Over Time for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*



Graph 6. *Rate of Changes in the Traumatic Life Events Clinical Assessment Protocol (CAP) Score Over Time for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*



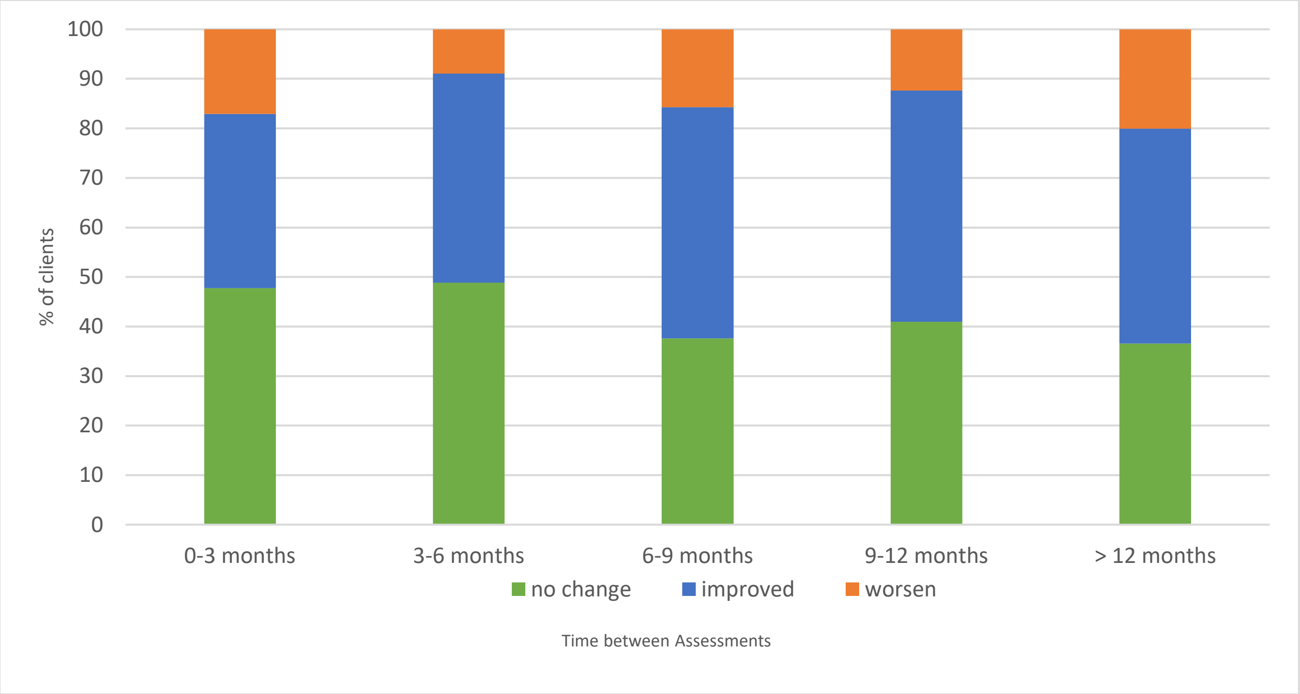
A history of physical, emotional or sexual abuse was identified at the initial assessment and re-assessment/discharge: presence of any time of abuse prior the treatment, new onset of abuse, and ongoing abuse during the treatment (within last 30 days before the re-assessment). The presence of history of abuse at the initial assessment and re-assessment/discharge is represented in Table 10. 71.1% of clients had a history of some type of abuse (Table 2) and of those clients 62.8% were females and 68.3% of clients were from 18 to 44 years of age There was a significant difference in the history of abuse between different age groups ($p<0.0001$). The likelihood of having history of abuse decreases with age, where clients 65 years of age and older were most likely do not have history of abuse. Among clients, who had no history of abuse before starting the treatment, 12.3% had new onset of abuse during the treatment. In addition, 61.1% of clients who had any history of abuse continued to experience abuse during the treatment. Mood disorder was the most common diagnosis among clients with history of abuse (76.2%). (Table 3).

The best rate of improvements in abuse (46.7%) after the initial assessment were between 6-9 months and 9-12 months. The period of time when clients worsen their initial score to 20.0% was after 12 months from the initial assessment. The change in the abuse variable over time is represented in the Graph 7.

Table 10. *Percent of Clients in Study Sample (N=1,373) Who Indicated a Presence of Any History of Abuse at the Initial Assessment and Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario*

Assessment Type[7]	***Male***				***Female***			
	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)	18-44 % (n)	45-64 % (n)	65+ % (n)	All Ages % (n)
Initial *	70.5 (236)	61.6 (85)	37.9 (11)	66.1 (332)	76.7 (372)	76.6 (157)	49.2 (29)	74.5 (558)
Re-assessment **	41.7 (146)	42.5 (59)	33.3 (10)	41.4 (215)	52.4 (254)	50.5 (105)	31.7 (19)	50.2 (378)

Graph 7. *Rate of Changes in the History of Abuse Variable Over Time for Clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*



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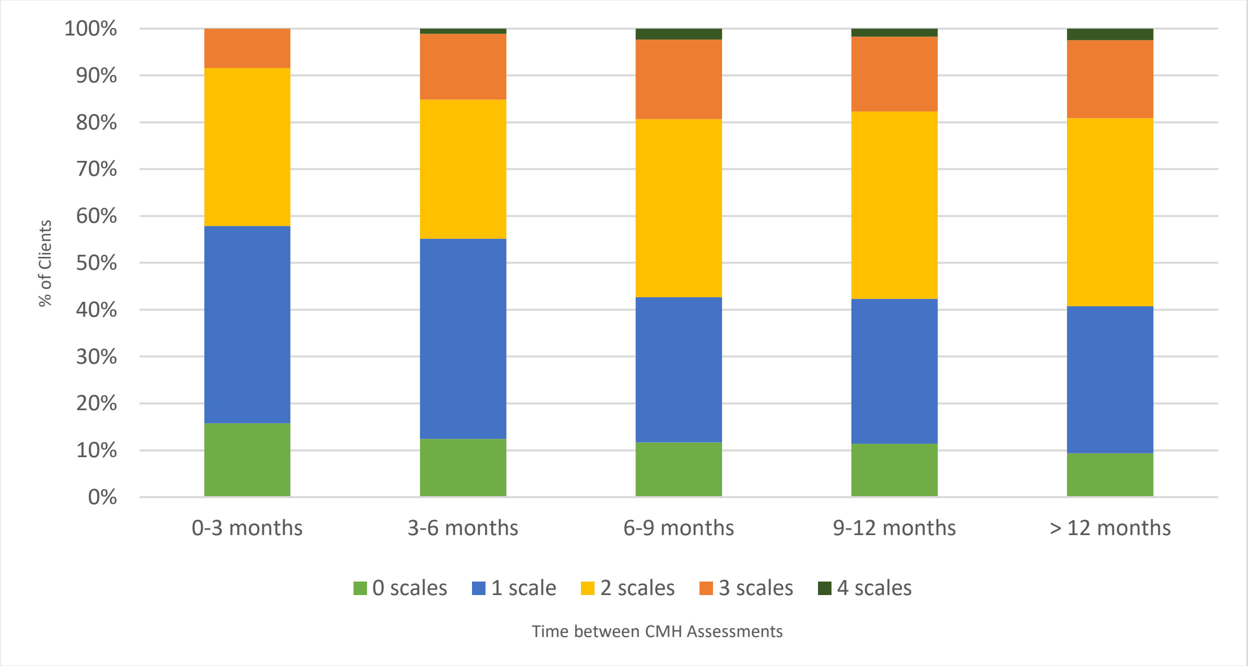
[7] *Initial Assessment represents any prior history of abuse: Missing Frequency=115; Chi-square=30.48; p-value <0.0001
**Re-assessment represents history of abuse in the last 30 days: Missing Frequency=94; Chi-square=7.44; p-value=0.02

Overall, the period of time when clients had the highest rate of changes in all four variables (2.3%) was within 6-9 months and after12 months from the initial assessment. The period of time when clients had the highest rate of changes in three out of four variables (16.9%) was within 6-9 months from the initial assessment. The period of time when clients had the highest rate of changes in two out of four variables (40.1%) was after 9 months from the initial assessment. Finally, the period of time when clients had the highest rate of changes in one out of four variables (42.7%) was within 3-6 months from the initial assessment. The rate of changes in the study outcomes over time are shown in Graph 8.

Graph 8. *Rate of Changes in Score Among Four Study Outcomes Over Time for clients in Community Mental Health (CMH) Settings in Ontario (N=1,373)*



Note: Four study outcomes: Depressive Severity Index (DSI), Positive Symptoms Scale (PSS) – Short, Traumatic Life Events Clinical Assessment Protocol (CAP), and History of Abuse

Of the four outcomes considered here, the DSI showed the highest rate of changes at re-assessment. About 25% of the clients with symptoms of depression did not improve compared with 47% of clients who improved at the-re-assessment. The PSS-Short and traumatic life events CAP were not that variable compared with the DSI. It takes more time to see changes in either of the scales and there was a significant difference in the psychosis symptoms between different timeframes (p=0.03). 13% of clients with psychotic symptoms did not improve compared with 16% of the clients who improved their score at the re-assessment. There was no significant difference in the traumatic life events CAP between different timeframes (p=0.3). 15% of clients with traumatic life events did not improve compared with 5% of clients who improved at the re-assessment. There was a significant difference in the abuse variable between different timeframes (p=0.001). 16% of clients were abused within 30 days before the re-assessment and/or worsen their score. 44% of clients improved at the re-assessment.

4.2 Multivariate Logistic Regression

To further investigate the changes in the DSI and PSS-Short scales among different agencies in CMH settings, four variables were created to track improvement and worsening of the scores among clients who had their re-assessment from 3 to 8 months after the initial assessment. The regional differences of DSI and PSS-Short scales are shown in Table 11. To track improvements among clients, an improved variable for two scales, DSI and PSS-Short, was created. This subsample is based on clients who have potential to improve at the re-assessment meaning they did not score 0 at the initial assessment. A worsen variable for the same scales tracks any negative changes from the initial score at the re-assessment. Among all different regions, the scales showed good improvement rates. Both results showed that the differences for the DSI – improved/worsen, and PSS-Short-worsen variables were significant (with p-value relaxed to <0.1

due to a small sample size). On average, 50% of clients in all regions, who could improve after the initial assessment, improved their score at the re-assessment for both scales. However, the CMH Pilot sites and Lambton-Kent (LK) Canadian Mental Health Association (CMHA) have higher percent of clients, who got worse after the re-assessment, in both scales.

Table 11. *Regional Differences of Depressive Severity Index (DSI) and Positive Symptoms Scale (PSS)-Short for 3 to 8 Months Re-Assessment Period for Clients in Community Mental Health (CMH) Settings in Ontario (N=724)*

Scale/Score	***Improved*** ***% (n)***	***Worsened*** ***% (n)***
DSI		
CKHA	71.3 (67)	17.3 (19)
LK	53.8 (43)	31.4 (27)
Pilot	51.3 (184)	23.5 (124)
p-value	0.002	0.07
PSS-Short		
CKHA	62.5 (10)	4.6 (5)
LK	57.7 (15)	11.6 (10)
Pilot	46.9 (129)	14.0 (74)
p-value	0.29	0.02

Note: DSI = Depressive Severity Index; PSS =Positive Symptoms Scale; CKHA = Chantham Kent Health Alliance; LK = Lambton Kent; Sample Population: CKHA = 110; LK=86; Pilot=528.

Additionally, multivariate logistic regression models were used to analyze the effect of independent variables on the main outcome, which is improving or worsening of the symptoms for DSI and PSS-Short scales. Independent variables that were selected for these models were the same as for the descriptive analysis above: age, sex, and diagnosis. Given the small sample sizes only a limited number of covariates was used. The variables were tested in the models and only significant ones were selected in the final models. Any variables that were insignificant during the testing were removed from the models. The p-value for these models were selected as p<0.1 due to a small sample size.

First, a multivariate logistic regression model predicting improvement and worsening of the scores for DSI and PSS-short scales was analyzed with age and sex independent variables adjusted in the model. In the DSI-improved model, neither age nor sex were significant at the re-reassessment (Table 12). In the PSS-improved model, the results for clients above 65 years of age or females were significant at the re-assessment (Table 14). In the both, DSI and PSS-Short, worsening model, being female was significant (p=0.05 and p=0.01 respectfully), meaning, females will most likely worsen their scores at the re-assessment (Table 13 and 15).

Table 12. *Multivariate Logistic Regression Model Predicting Improvement of the Depressive Severity Index (DSI) Score Adjusted for Age and Sex at Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=353)*

Variable	***Group Level***	***Parameter Estimate (SE)***	***OR (95% CI)***	***p-value***
Age Group	18-44 (ref)	-	-	-
	45-64	0.35 (0.24)	1.41 (0.89-2.24)	0.14
	65+	-0.16 (0.31)	0.85 (0.46-1.55)	0.59
Sex	Male (ref)	-	-	-
	Female	-0.08 (0.21)	0.92 (0.6-1.41)	0.71

Note. SE = standard error; OR = odds ratio; CI = confidence interval; ref = reference group.

Table 13. *Multivariate Logistic Regression Model Predicting Worsening of the Depressive Severity Index (DSI) Score Adjusted for Age and Sex at Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=521)*

Variable	***Group Level***	***Parameter Estimate (SE)***	***OR (95% CI)***	***p-value***
Age Group	18-44 (ref)	-	-	-
	45-64	0.13 (0.23)	1.14 (0.72-1.8)	0.57
	65+	0.23 (0.28)	1.25 (0.73-2.16)	0.42
Sex	Male (ref)	-	-	-
	Female	-0.42 (0.21)	0.66 (0.44-0.99)	0.05

Note. SE = standard error; OR = odds ratio; CI = confidence interval; ref = reference group.

Table 14. *Multivariate Logistic Regression Model Predicting Improvement of the Positive Symptoms Scale (PSS)-Short Score Adjusted for Age and Sex at Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=269)*

Variable	***Group Level***	***Parameter Estimate (SE)***	***OR (95% CI)***	***p-value***
Age Group	18-44 (ref)	-	-	-
	45-64	-0.15 (0.27)	0.89 (0.53-1.51)	0.67
	65+	-0.79 (0.39)	1.46 (0.21-0.97)	0.04
Sex	Male (ref)	-	-	-
	Female	-0.52 (0.25)	0.59 (0.36-0.98)	0.04

Note. SE = standard error; OR = odds ratio; CI = confidence interval; ref = reference group.

Table 15. *Multivariate Logistic Regression Model Predicting Worsening of the Positive Symptoms Scale (PSS)-Short Score Adjusted for Age and Sex at Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=521)*

Variable	***Group Level***	***Parameter Estimate (SE)***	***OR (95% CI)***	***p-value***
Age Group	18-44 (ref)	-	-	-
	45-64	0.01 (0.28)	1.01 (0.59-1.74)	0.96
	65+	0.51 (0.37)	1.66 (0.8-3.43)	0.17
Sex	Male (ref)	-	-	-
	Female	0.67 (0.26)	1.95 (1.16-3.27)	0.01

Note. SE = standard error; OR = odds ratio; CI = confidence interval; ref = reference group.

The next model was adjusted for age, sex, and psychiatric diagnosis. Due to a small sample size, the model has a limited power. With a larger sample size, the differences in the model may be explained by clients' characteristics. This could be a future possibility for additional research. During the analysis, models were adjusted for schizophrenia, substance use, anxiety and mood disorders as a potential approach for risk adjustments. Adjustments for age, sex, and diagnosis had some impact on the outcome.

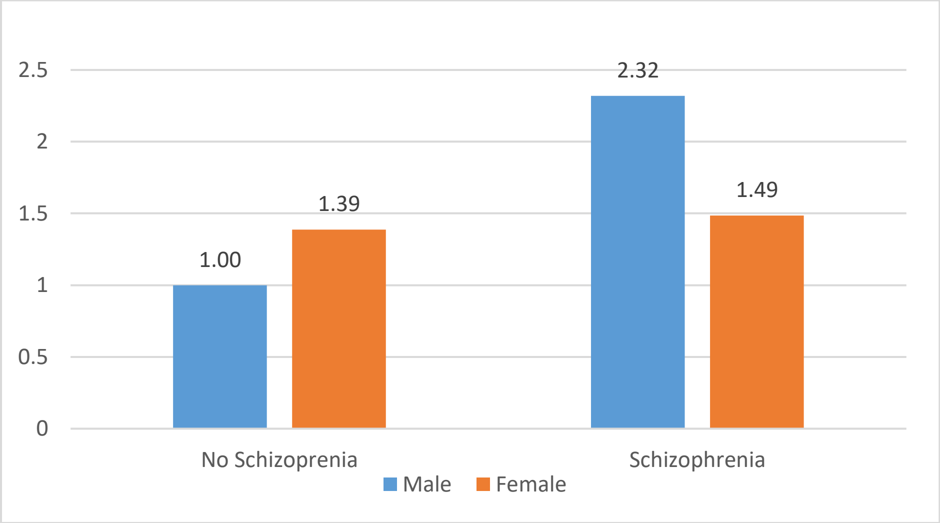
In the DSI-improvement model, only diagnosis of schizophrenia and age (middle-aged group) were significant in predicting improvement of the symptoms. Next, an interaction term for schizophrenia and sex was added to the model and this interaction was significant. For females diagnosed with schizophrenia, improvement in the DSI score at re-assessment had almost no difference compare to males diagnosed with schizophrenia. Males with schizophrenia have 2.32 times higher chance in improving the DSI score at the-reassessment compared with females with schizophrenia. Females without schizophrenia are more likely to improve in depression symptoms compare to males without schizophrenia. However, with schizophrenia, males are more likely to improve their DSI score at re-assessment. This final model was adjusted for only these variables and results are presented in Table 16. Adjusted Odds of DSI-improvement are presented in Graph 9. Adjustments for age, sex, and diagnosis in the DSI-worsening model had no impact on the outcome.

Table 16. *Multivariate Logistic Regression Model Predicting Improvement of the Depressive Severity Index (DSI) Score Adjusted for Age, Sex, and Psychiatric Diagnosis at Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (n=342)*

Variable	***Group Level***	***Parameter Estimate (SE)***	***Chi-square***	***p-value***
Age Group	18-44 (ref)	-	-	-
	45-64	0.41 (0.24)	2.94	0.09
	65+	-0.05 (0.34)	0.02	0.89
Schizophrenia	0 (ref)	-	-	-
	1	0.84 (0.33)	6.42	0.01
Schizophrenia * Sex	1	-0.77 (0.46)	2.84	0.09

Note. SE = standard error; OR = odds ratio; CI = confidence interval; ref = reference group. For Odds Ratios see Graph 10.

Graph 9. *Adjusted Odds of Depressive Severity Index Improvement in the Multivariate Logistic Regression Model Adjusted for Schizophrenia and Sex at the Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=342)*



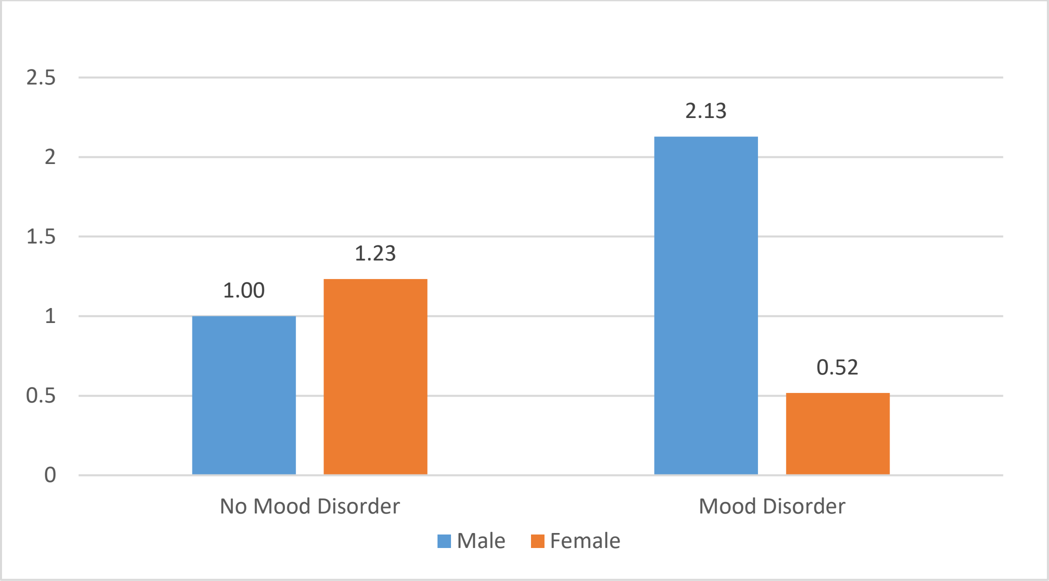
In the PSS-improvement model, diagnosis of mood disorder was significant in predicting improvement of the score. Next, a mood disorder*sex interaction was added to the model and this interaction was significant. Females diagnosed with mood disorders have much lower odds of improvement in PSS-short score at re-assessment compared to males. Males with mood disorders have 2.13 times higher chance in improving the PSS-Short score at the-reassessment compare to females with mood disorders. The final model was adjusted for only these variable and results are presented in Table 17. Adjusted Odds of PSS-Short-improvement are presented in Graph 9.

Table 17. *Multivariate Logistic Regression Model Predicting Improvement of the Positive Symptoms Scale (PSS)-Short Score Adjusted for Sex and Mood Disorder at Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=257)*

Variable	***Group Level***	***Parameter Estimate (SE)***	***Chi-Square***	***p-value***
Sex	Male (ref)	-	-	-
	Female	0.21 (0.4)	0.28	0.6
Mood Disorder	0 (ref)	-	-	-
	1	0.76 (0.36)	4.39	0.04
Mood Disorder * Sex	1	-1.62 (0.55)	8.87	0.003

Note. SE = standard error; OR = odds ratio; CI = confidence interval; ref = reference group. For Odds Ratios see Graph 10.

Graph 10. *Adjusted Odds of Positive Symptoms Scale (PSS)-Short Improvement in the Multivariate Logistic Regression Model Adjusted for Mood Disorder and Sex at Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=257)*



In the PSS-worsening model, diagnosis of schizophrenia and being female were significant in predicting worsening of the score at re-assessment (p=0.04 and p=0.03 respectfully). This final model was adjusted for only these variables and results are presented in Table 18.

Table 18. *Multivariate Logistic Regression Model Predicting Improvement of the Positive Symptoms Scale (PSS)-Short Score Adjusted for Sex and Mood Disorder at Re-Assessment for Clients in Community Mental Health (CMH) Settings in Ontario (N=257)*

Variable	***Group Level***	***Parameter Estimate (SE)***	***OR (95% CI)***	***p-value***
Sex	Male (ref)	-	-	-
	Female	0.59 (0.28)	1.81 (1.06-3.1)	0.03
Schizophrenia	0 (ref)	-	-	-
	1	-0.55 (0.27)	0.58 (0.34-0.98)	0.04

Note. SE = standard error; OR = odds ratio; CI = confidence interval; ref = reference group.

5. DISCUSSION

The main objective of this study was to determine if the re-assessment period of six-month of the interRAI CMH tool is appropriate to identify the meaningful clinical changes in four major outcomes of interest for clients in CMH settings: PSS-Short and DSI scales, Traumatic Life Events CAP, and the history of abuse. The other objectives of the study were to identify the shortest period of time from the initial assessment and re-assessment when clients showed meaningful clinical changes in the DSI, PSS-Short, and the Traumatic Life Events CAP.

To understand the rate of change overtime, data from different community mental health agencies in Ontario and Newfoundland were analyzed using descriptive and bivariate statistical procedures. The four major outcomes (DSI, PSS-Short, traumatic life events CAP, and history of abuse) that were chosen for this research are most common among clients in CMH settings and are most likely to have noticeable adverse effects to quality of life and recovery. Luppino et al.'s (2010) study showed that MDD is associated with higher risk of developing diabetes, obesity, dementia, stroke, heart failure, and chronic pain. Among elderly population, it decreases social and physical activities, which can in turn increase social isolation and the risk of suicide (Beck & Alford, 2009). Additionally, PTSD is a common co-morbid disorder among individuals with psychiatric disorders. Also, high rates of trauma exposure among individuals with severe mental illness, such as schizophrenia, bipolar and depressive disorders, increase prevalence of PTSD (Weili et al., 2013). However, these outcomes could be modified with good quality care.

This study considered improvement and worsening of symptoms, the need for care planning interventions, and experience of adverse life events to illustrate different aspects of clinical care in CMH settings using standardized assessment tool, interRAI CMH. One of the main uses of the MBC is to track changes in symptoms over the time of treatment to improve quality of care (Aboraya et al., 2018). The MBC approach focuses on these steps: 1. identify risk; 2. intervene; 3. track outcomes; 4. adjust intervention. With the use of the interRAI CMH assessment, these steps are achievable. Using the interRAI CMH, at the initial assessment, clinicians identify the risk and create a care plan to address them. With regular re-assessments, interRAI CMH tracks the changes, so clinicians are able to adjust the care plan according to the new changes. This allows timely attention to client's conditions preventing possible adverse outcomes.

The DSI, PSS-Short scale, and traumatic life events CAP showed a good ability to detect changes over time. In all of these scales, the rate of changes varied. The meaningful clinical changes for the DSI score were noticeable within first three months after the initial assessments. However, clients with symptoms of psychosis need more time to improve compared to clients with symptoms of depression, which improve more rapidly. The integrated scales and the CAP in the interRAI CMH assessment are intended to provide guidelines for clinicians to support clients' improvement process during the treatment. Additionally, on the organizational side, the rate of changes is a great key performance indicator (KPI) for quality initiative in the CMH settings to detect changes over time. Using MBC, standardized benchmarking could be done across CMH agencies.

According to the System for Classification of In-Patient Psychiatry (SCIPP), clients with mood disorders and psychotic/affective symptoms are the second most expensive response group to treatment in in-patient psychiatry. The SCIPP explains about 26% of variance in daily resource use among adult psychiatric clients (Hirdes et al., 2020). The multivariate regression analysis showed that females diagnosed with mood disorders are much less to improve their PSS score at re-assessment compared to males. It may indicate that females are more treatment resistant, while males having mood disorder can be better oriented on the problem and get the treatment showing improvement with a more complicated condition. This finding could be an indication of complexity and an indication that PSS-short scale could be related to different aspects of psychosis, such as a more severe depression, bipolar disorder, or schizophrenia.

Another finding of this study is very close to the findings of Mathias, Hirdes, Pittman study's (2010) that 25% to 30% of the individuals in the community seek help in the PTSD. In this study, 32% of this study population had triggered traumatic life events CAP at the baseline. The prevalence of PTSD is higher among females than in males, as in this study. Their study demonstrated that mood disorders, schizophrenia, and substance use were common comorbid conditions among individuals who experienced traumatic life events. Additionally, the clients with depressive symptoms have a higher prevalence of traumatic life events, which cause lower improvement rates. In fact, mood disorder was a primary diagnosis among clients, who triggered the CAP: 10% of clients had schizophrenia, 11% of clients were problems with substance use, and 43% of clients had mood disorders.

To make sure the measures of the study are robust over time, and that changes are real rather than measurement artefacts, psychometric properties, reliability, and validity were tested at the different reassessment periods based on the comparisons of symptoms with diagnoses over time. As a result, the DSI and PSS-short scales performed well in both regards: high alpha values and good convergent validity with diagnosis.

Additionally, the research tested magnitude of change between age, sex, and diagnostic groups to understand the differences of mental health needs. While improvement and decline happen, it is not the same in all subgroups. Clinical characteristics were similar across 18 to 44 years old age groups: clients in this group have higher rates of depression, substance use, symptoms of psychosis, experience with traumatic life events, and having history of abuse.

However, older clients, from 45 to 64 and over 65 years of age, have higher rates of schizophrenia, mood disorders, and anxiety, which could be a result of later onset of the disorders or a delay in accessing care in the community mental settings. This should be accounted for in a further research whether those differences should be considered for a risk adjustment in quality indicator (QI) development or whether they are evidence of quality differences for clinical subgroups.

To find and confirm the best re-assessment intervals, the research considered variety of factors, such as an assessment burden on clients, responsiveness to change, and a need to detect changes or events that pose imminent risk of harm to clients (e.g., abuse, elevated suicide risk, or self-harm). Based on the interRAI recommendations, clients are to be reassessed at discharge, every six months, or when there is a significant change in a client's condition, and a re-assessment is necessary to modify an existing care plan in a timely manner. Therefore, a re-assessment at any other times could cause burden on clients and affect their responsiveness to change since they may memorize the answers if the re-assessment happens too soon and more often. To value limited clinical resources in CMH settings, the time spent in treatment or interventions should be balanced with the time spent on assessments, which is a vital part of the clinical practice and should not be seen as something unrelated to a high quality care.

The evidence from the data analysis suggests that a 6-month structured re-assessment cycle is optimal for CMH settings. A subset of items could be used between assessments to track symptoms improvement more frequently. However, the full re-assessment is justified at 6 months since waiting for 12 months is too long given the high degree of change in DSI scale and the occurrence of events that are threat to client safety (e.g. abuse). Doing it sooner than 6 months may not be enough time to see meaningful clinical changes since some scales, like PSS, require more time to address the care outcome. The research showed that the best time to see improvements and rate of changes in the DSI scale was between 3-6 months after the initial assessment, where 76% of clients have improved their symptoms within 3-6 months. These results were close to the NESDA cohort study, where 80% of individuals with depression remitted within 6 months (Penninx et al., 2011). The Weili et al.'s (2013) study confirmed that individuals with severe mental illness reported from 43% to 81% reported lifetime victimization. In this study, about 71% of clients showed history of abuse during their lifetime, which falls in the Weili et al.'s study range.

These Mental Health Quality Indicators show potential for use as quality indicators because there are clinically meaningful rate of change over time, and there is evidence of variations in outcomes among agencies. Further implementation of interRAI CMH assessment in CMH settings is required to have more longitudinal data to develop QI for CMH as it is done for clients in the inpatient settings.

5.1 Implications for clinical practice

The findings from this study have several implications for clinical practice. The interRAI CMH is a comprehensive, valid and reliable, inter-disciplinary instrument. Multiple scales of the assessment could be considered a valuable predictor of a clinical outcome and be a good choice to assess psychiatric symptoms in CMH settings. Using the scales and CAPs from the assessment, agencies can address most common mental health illnesses among clients more efficiently.

Using the interRAI CMH assessment, the majority of the clients in this study showed good improvement rate for DSI within 3-6 months while symptoms of psychosis and effect of traumatic life events require longer time for recovery. On the other hand, there may not be adequate attention paid to protecting clients from ongoing abuse since some clients have experienced new onset of abuse and some were still being abused during the treatment. Acknowledging and addressing these problems during the regular clients' visits are necessary for better quality of life and treatment outcomes. The DSI on its own can be a valuable quality indicator to track changes over time. However, further research may be necessary to identify the adequate rate of changes and criteria to classify clients in remission. Simple reduction of symptoms may not be enough to reveal clinically significant recovery.

To improve quality of care, the re-assessment needs to be done routinely or when significant changes occurred. Utilization of the interRAI CMH assessment can support clinicians with choosing appropriate treatment course and interventions for their clients by providing quantifiable clinical measurements of needs and outcomes. The interRAI CMH can be used as a part of the MBC strategy and could supplement with more frequent use of mental state indicator (MSI); however, additional research is needed to identify the most appropriate re-assessment time for this assessment, as well as, to make sure that valuable treatment time is not spent just doing assessments affecting the course of treatment.

5.2 Implications for policies

As mentioned earlier, there is no known singular cause for mental health problems, rather, a combination of multiple factors that influence overall health and well-being. The right combination of services, treatments, and supports can substantially improve symptoms and quality of life of people with mental health concerns in community mental health settings (Mental Health Commission of Canada, 2016). However, regular monitoring of the symptoms is required to achieve good results. Additionally, information exchange among healthcare providers is critical in reduction the healthcare fragmentation. Without a timely shared information, a client's decline in their condition could be missed, tests could be repeated, and referrals to emergency departments could be increased (Nova, Zarrin, Heckman, 2020). With OHT implementation, their focus should be towards addressing the gap of clinical data among health care providers. Having these data available will support creation of common processes and outcome quality indicators to evaluate mental health services and population quality of care. (Perlman et al., 2013).

When implementing interRAI CMH or other systems, the re-assessment cycle should be 6 months. The interRAI CMH outcomes have a potential for outcome-based QIs in the performance measurement system. There should be an appropriate resource allocation to ensure CMH system addresses issues that go beyond symptom control (e.g. abuse). Agencies implementing the MBC in their services need to make sure they have adequate staffing and sufficient training in place. CIHI should reconsider their reporting principals and start accepting interRAI data from CMH agencies using interRAI CMH assessments in their daily practice. Having standardized data across the sector allows focusing on improving psychiatric symptoms among clients, which could lead to less economic burden and better health outcome for clients in CMH settings.

As shown in multiple studies (Roy-Byrne et al., 2010, Simon et al., 2006, Bauer et al., 2006), the use of MBC is associated with symptoms reduction among clients with mental health illnesses, as well as, improves a decision making process and individualized treatment (Scott & Lewis, 2015, Hatfeld & Ogles, 2007). Additionally, the use of MBC gives an opportunity to compare outcome data from different provider/provinces/countries to standard clinical practices on a regular basis. There is no known benchmarking for the rate of improvements in depressive symptoms. Therefore, implementing a standardized assessment tool is necessary to succeed in this process. The interRAI CMH assessment could be used for outcome measures, QI management, resource allocation, and decision-making tool. Any agencies using the interRAI Mental Health in in-patient psychiatry settings should implement the interRAI CMH to allow clinicians to follow up after discharge and share the information with clinicians in CMH settings who will look after the clients' care in the community.

5.3 Implications for research

To develop CMH QIs and risk adjusters for improvement and decline, larger longitudinal data sets are required. This will allow an evaluation of long-term outcomes across agencies. The use of interRAI CMH will help with effective comparison of the data across CMH sector. This study was done in Ontario, Canada; therefore, a cross-national comparison would be useful to be able to compare the outcomes outside of Canadian CMH settings. Links with service and cost data could help with studies to establish rates of changes in response to service provision. Additionally, interRAI should consider development of a brief MSI set that could be used more frequently. This could include tracking symptoms using complementary self-report tools and allowing timely care plan adjustments to changes in client's condition.

6. STRENGTH AND LIMITATIONS

The advantage of this study is its sample size. Without a robust sample, it is hard to draw accurate conclusions. Data quality of the sample is further enhanced with the use of the interRAI CMH assessment. The use of the common language and scoring mechanism across mental health settings allowed direct comparison in clients' treatment outcomes. Otherwise, it would be next to impossible to compare clinical characteristics using different scales and tools. Therefore, the interRAI CMH assessment allowed this study to have strong foundation for this research. Another strength of this study was that it included different independent variables and analyzed their effect on the main study outcome. The scales and CAPs of the interRAI CMH be predictors of the outcome on their own since they contain valid and reliable multiple indicators.

The potential limitation of the study was that clients might have different diagnosis that could affect the rate of changes and quality of care. To mitigate this, clients were grouped by diagnosis categories, such as psychiatric diagnosis, intellectual disability, medical diagnoses, and DSM-IV provisional diagnostic categories. This study was not able to identify the clinicians' caseload to understand their workload. A heavy workload could lead to a reduced attention to clients' condition, could result in frequent emergency department visits instead of supporting clients in the community, and increased time between visits to identify changes in clients' condition and adjust a care plan if necessary. The limited number of articles outlined the benefits of MBC were American, and the number of healthcare agencies using the measurement instruments in their care may not be relevant to Ontario due to different available instruments and differences in healthcare delivery.

In terms of research, limited information could be located about the rates of change in a specific period of time in the population from a clinical perspective in CMH settings. Additionally, this study did not have enough evidence to support the idea that more frequent re-assessments using the mental state indicator (MSI) would improve overall rates of change for clients due to data quality of the MSI dataset from CMHA Lambton-Kent. Once this agency identifies clear guidelines on how to use the MSI internally between the CMH assessments, another studies could be designed to establish this connection.

7. CONTRIBUTION

The proposed study addressed a gap in the literature about the time of re-assessment to correctly identify the rate of changes in the population health, specifically, the quality of care and healthcare outcome. Through a thorough analysis of the dataset, this study confirmed that existing re-assessment period of 6 month is appropriate. Understanding the benefits of MBC, specifically the interRAI instruments, in CMH settings makes decision makers to apply standardized measurement instruments to the service delivery to improve quality of care, healthcare outcome, to achieve clients' goals at the end of the treatment, and to help clinicians to monitor clients' treatment progress and address their changes appropriately by observing the symptoms on a regular basis. Using MBC during the treatment course improves clinician-client collaboration, coordinates a better care, and enhances decision making process.

REFERENCES

Aboraya, A. et al. (2018). Measurement-based Care in Psychiatry-Past, Present, and Future. *Innovations in clinical neuroscience, 15*(11-12), 13–26.

Adams, J. R. & Drake, R. E. (2006). Shared decision-making and evidence-based practice. *Community Mental Health Journal, 42*(1), p. 87–105.

Andrew, M.K., Rockwood, K. (2007). Psychiatric illness in relation to frailty in community-dwelling elderly people without dementia: a report from the Canadian Study of Health and Aging. *Can J Aging.* 26(1), p. 33-38. doi: 10.3138/8774-758w-702q-2531

Anstey, K. J., et al. (2007). Prevalence and risk factors for depression in a longitudinal population-based study including individuals in the community and residential care. *American Journal of Geriatric Psychiatry*, 15(*6*), p. 497–505.

Arvaniti, A. et al. (2005). Mental health problems in the elderly in residential care in Greece – A pilot study. *Aging & Mental Health*, 9(*2*), p. 142–145.

Audin, K. et al. (2001). Value of HoNOS in assessing patient change in NHS psychotherapy and psychological treatment services. *British Journal of Psychiatry*, 178, p. 561-566.

Bauer, M.S. et al. (2006). Collaborative care for bipolar disorder: Part II. Impact on clinical outcome, function, and costs. *Psychiatr Serv.* 57, p. 937–945.

Beck, A.T., Alford, B.A. (2009) *Depression: causes and treatment*. 2nd ed. Philadelphia: University of Pennsylvania Press; p. 405.

Bertolote, J. M. et al. (2003). Suicide and mental disorders: do we know enough? *British Journal of Psychiatry*, 183, p. 382–383.

Canadian Institute for Health Information. (2017). *Community mental health and addiction information: a snapshot of data collection and reporting in Canada*. Ottawa, ON: CIHI.

Carpenter W. et al. (2000). Decisional capacity for informed r consent in schizophrenia research. *Arch Gen Psychiatry.* 57, p. 33–538.

Connolly Gibbons, M.B. et al. (2015). The effectiveness of clinical feedback on the treatment of depression in the community mental health system. *Journal of Consulting and Clinical Psychology*, 83(*4*), p. 749-759.

Clifford, P. (1999). The FACE Recording and Measurement System: A scientific approach to person-based information. *Bulletin of the Menninger Clinic*, 63(*3*), p. 305

Chesney E, Goodwin GM, Fazel S. (2014). Risks of all-cause and suicide mortality in mental disorders: a meta-review. *World Psychiatry*, 13, p. 153-60.

Dewa, C.S., Chau, N., Dermer, S. (2010). Examining the comparative incidence and costs of physical and mental health-related disabilities in an employed population. *J Occup Environ Med*. 52 (*7*), p. 758–762.

Drake, R. E., Cimpean, D., Torrey, W. C. (2009). Shared decision making in mental health: prospects for personalized medicine. Dialogues in clinical neuroscience, 11(4), 455–463. https://doi.org/10.31887/DCNS.2009.11.4/redrake

Drake, R.E., Deegan, P.E., Rapp, C. (2010). The promise of shared decision making in mental health. *Psychiatric Rehabilitation Journal*, 34 (*1*), p. 7-13.

Durbin, J. et al. (2020). Using the Ontario Common Assessment of Need to inform quality improvement in community mental health and addictions programs: Learning from Early

Psychosis Intervention Programs. *Centre for Addiction and Mental Health*: Toronto, Ontario. Internet: https://kmb.camh.ca/eenet/sites/default/files/2018/OCAN%20report_FINAL%20March%202020.pdf

Egede, L.E., Osborn, C.Y. (2010). Role of motivation in the relationship between depression, self-care, and glycemic control in adults with type 2 diabetes. *The Diabetes Educator*, 36(*2*), p. 276–283.

Ending the Health Care Disparity in Canada. (2018). Canadian Mental Health Association. Internet: https://cmha.ca/wp-content/uploads/2018/09/CMHA-Parity-Paper-Full-Report-EN.pdf

Espinoza, R., Kaufman, A.H. (2014). Diagnosis and treatment of late-life depression. *Psychiatr Times*,31(*10*), p.18.

FACE Assessment Tools. (2022). FACE Recording & Measurement System. Internet: https://www.ciosummits.com/media/pdf/solution_spotlight/face_assessment-tools.pdf

Felitti, V. J. et al. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) study. *American Journal of Preventative Medicine*, 14(*4*), p. 245–258.

Findlay, L. (2017). Depression and suicidal ideation among Canadians aged 15 to 24. *Statistic Canada*. Health Reports, 28 (*1*), p. 3-11.

Fonagy, P. (1999). Process and outcome in mental health care delivery: A model approach to treatment evaluation. *Bulletin of the Menninger Clinic*, Sociology Collection, 63(*3*), p. 288

Fortney, J.C. et al. (2017). A Tipping Point for Measurement-Based Care. *Psychiatric Services.* 68, p. 178-188.

Gibbson, C., Bedard, M., Mack, G. (2005). A comparison of client and mental health worker assessment of needs and unmet needs. *Journal of Behavioral Health Services & Research*, *32*(1), p.95-104.

Goldner, E.M., Jones, W., Fang, M.L. (2011). Access to and waiting time for psychiatrist services in a Canadian urban area: a study in real time. *Can J Psychiatry*. *56*(8), p. 474-480.

Government of Ontario. (2021). *What OHIP covers?* https://www.ontario.ca/page/what-ohip-covers#section-9

Hall, D., Siegel, B. (2005). Taking the measure of measures: Quality data initiatives and the challenge of effective and efficient dat*a. J AHIMA*, 76, p. 42–46.

Harding, K.J. et al. (2011). Measurement-based care in psychiatric practice: a policy framework for implementation. *Journal of Clinical Psychiatry*. 72, p.1136–1143.

Hatfeld, D.R., Ogles, B.M. (2007). Why some clinicians use outcome measures and others do not. *Adm Policy Ment Health.* 34, p. 283–291.

Hegarty, D., Wall, M. (2014). Prevalence of stigmatization and poor self-esteem in chronic pain patients. *Journal of Pain & Relief*, 3(*2*), p. 3–6.

Hermann, R.C. et al. (2000). Quality measures for mental health care: results from a national inventory. *Med Care Res Rev.* 57, p.136–154.

Hirdes, J.P. et al. (2008). Reliability of the interRAI suite of assessment instruments: a 12-country study of an integrated health information system. *BMC Health Services Research*. 8, p 277–288.

Hirdes, J.P. et al. (2011). interRAI Mental Health Clinical Assessment Protocols (CAPs). Version 9.1. *interRAI Electronic Standard Edition*. Rockport, Massachusetts, USA.

Hirdes, J. P. et al. (2020). The interRAI Suite of Mental Health Assessment Instruments: An Integrated System for the Continuum of Care. *Frontiers in Psychiatry*. 10, p. 926. [doi:10.3389/fpsyt.2019.00926].

Hitchcox, J. (2022). OCAN: a tool for clients, service providers and system planners. Canadian Mental Health Association, Ontario. Internet: https://network.cmha.ca/ocan-a-tool-for-clients-service-providers-and-system-planners/

Inoue, Y., Yamada K., Kanba, S. (2006). Deficit in theory of mind is a risk for relapse of major depression. *Journal of Affective Disorders,* 95, p. 125 – 127.

interRAI Community Mental Health. (2017). *interRAI*. Retrieved on April 5, 2021 from: https://www.interrai.org/community-mental-health.html

Kessler, R. C. (2000). Posttraumatic stress disorder: The burden to the individual and to society. *Journal of Clinical Psychiatry*, 61(*5*), p. 4–12.

Kilbourne, A.M. et al. (2018). Measuring and improving the quality of mental health care: a global perspective. *World Psychiatty, 17*, p. 30-38.

Kohn, R. et al. (2004). The treatment gap in mental health care. *Bulletin of the World Health Organization*. 2004; 82(*11*), p. 858-866.

Krystal, J.H., State, M.W. (2014*).* Psychiatric disorders: Diagnosis to therapy. *Cell*. *157*(1), p. 201-214.

Lambert M.J. et al. (2003). Is It time for clinicians to routinely track patient outcome? A meta-analysis. *Clinical Psychology: Science and Practice*. *10*(3), p. 288–301. http://dx.doi.org/10.1093/clipsy.bpg025

Lund, C. et al. (2011). Poverty and mental disorders: breaking the cycle in low-income and middle-income countries. *Lancet,* 378, p. 1502-1514.

Luppino, F.S. et al. (2010) Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies. *Arch Gen Psychiatry*, 67(*3*), p.220–229.

Magaard, J.L. et al. (2017). Factors associated with help-seeking behaviour among individuals with major depression: A systematic review. *PloS One*, 12(*5*), p.

Manber, R., et al. (2008). Faster remission of chronic depression with combined psychotherapy and medication than with each therapy alone. *Journal of Consulting and Clinical Psychology,* 76 (*3*), p. 459 – 467.

Martin, L. et al. (2009). Validating the mental health assessment protocols (MHAPs) in the resident assessment instrument mental health (RAI-MH). *Journal of psychiatric and mental health nursing*. *16*(7), p. 646-653.

Mathias, K., Hirdes, J.P., Pittman D. (2010). A care planning strategy for traumatic life events in community mental health and inpatient psychiatry based on the interRAI assessment instruments. *Community Mental Health Journal,* 46(*6*), p. 621-627.

Mattisson, C. et al. (2007).The long-term course of depressive disorders in the Lund by Study. *Psychol. Med.,* 37, p. 883–891.

McIntyre, R. S., Fallu, A., Konarski, J.Z. (2006). Measurable outcome in psychiatric disorders: Remission as marker of wellness. *Clinical Therapeutics,* 28(*11*), p. 1882 - 1891.

Mental Health Commission of Canada. (2016). *Making the Case for Investing in Mental Health in Canada*. p. 7-9. Retrieved from https://www.mentalhealthcommission.ca/sites/default/files/2016-06/Investing_in_Mental_Health_FINAL_Version_ENG.pdf

Mental Health Commission of Canada. (2012). *Changing directions, changing lives: The mental health strategy for Canada.* Retrieved on May 11, 2021 from https://www.mentalhealthcommission.ca/sites/default/files/MHStrategy_Strategy_ENG.pdf

Nova, A.A., Zarrin, A., Heckman, G.A.W. (2020). Physician Views on the Resident Assessment Instrument for Home Care Information Exchange. *J Am Med Dir Assoc*. 21(*3*), p. 428-429.

O'Hare, T., Sherrer, M. (2011). Subjective distress associated with sudden loss in clients with severe mental illness. *Community Mental Health Journal*, 47, p. 646–653.

Ontario Health Teams: Introduction and Overview. (2019). Ontario Health. Retrieved on May 11, 2021 from https://health.gov.on.ca/en/pro/programs/connectedcare/oht/docs/oht_intro_webinar_en.pdf

Overview of Core OCAN Components. (2022). Community Care Information Management. Internet: https://training-ax-iar.ccim.on.ca//ViewDocument.aspx?referenceID=11562c8b-5709-4d31-b30e-ac96fb431514

Parikh SV, Lin E, Lesage AD. (1997). Mental health treatment in Ontario: selected comparisons between the primary care and specialty sectors. *Can J Psychiatry*, 42(9), p. 929-934.

Paterson, B. el al. (2008). Managing the risk of suicide in acute psychiatric inpatients: a clinical judgement analysis of staff predictions of imminent suicide risk. *JMH. 17*(4), p. 410–423.

Patten, S. B., et al. (2006). Descriptive epidemiology of major depression in Canada. Canadian *Journal of Psychiatry/Revue Canadienne de Psychiatrie,* 51, p. 84 –90.

Penninx, B.W.J.H et al. (2011). Two-year course of depressive and anxiety disorders: Results from the Netherlands Study of Depression and Anxiety (NESDA). *Journal of Affective Disorders*, 133, p. 76–85.

Perlman, C.M., et al. (2013). Development of mental health quality indicators (MHQIs) for inpatient psychiatry based on the interRAI mental health assessment. *BMC Health Services Research. 13*(15). Internet: http://www.biomedcentral.com/1472-6963/13/15

Pirkis, J. et al. (2005). Review of the psychometric properties of the Health of Nations Outcome Scales (HoNOS) family of measures. *BioMed Central. Health and Quality of Life Outcomes, 76*(3).

Riihimaki, K.A., et al. (2011). Five-year outcome of major depressive disorder in primary healthcare. *Psychol. Med.*, 7, p. 1–11.

Rihmer, Z. (2001). Can better recognition and treatment of depression reduce suicide rates? A brief review. *European Psychiatry*, 16 (*7*), p. 406-409.

Romans, S., Cohen, M., Forte, T. (2011). Rates of depression and anxiety in urban and rural Canada. *Soc Psychiatry Psychiatr Epidemiol,* 46, p. 567–575.

Rossiter, A. et al. (2015) Childhood trauma levels in individuals attending adult mental health services: An evaluation of clinical records and structured measurement of childhood trauma. *Child Abuse & Neglect,* 44, p. 36-45.

Roy-Byrne, P. et al. (2010). Delivery of evidence-based treatment for multiple anxiety disorders in primary care: a randomized controlled trial. *JAMA*. 303, p.1921–1928.

Scott, K., Lewis, C.C. (2015). Using Measurement-Based Care to Enhance Any Treatment. *Cognitive Behavior Practice*. *22*(1), p. 49–59.

Simon, G.E. et al. (2006). Long-term effectiveness and cost of a systematic care program for bipolar disorder. *Arch Gen Psychiatry*. 63, p. 500–508.

Simpson, T., Miller, W. (2002). Concomitance between childhood sexual and physical abuse and substance use problems: A review. *Clinical Psychology Review*, 22(*1*), p. 27–77.

Slade, M., Amering, M., Farkas, M. et al. (2014). Uses and abuses of recovery: implementing recovery-oriented practices in mental health systems. *World Psychiatry*. 13, p. 12-20.

Slade, M. et al. (1999). Routine clinical outcome measures for patients with severe mental illness: CANSAS and HoNOS. *Br. J. Psychiatry*, *174*(5), p. 404-408.

Smetanin P. et al. (2011). The life and economic impact of major mental illnesses in Canada. RiskAnalytica, on behalf of the *Mental Health Commission of Canada*.

Spijker, J. (2002). Duration of major depressive episodes in the general population: results from The Netherlands Mental Health Survey and Incidence Study (NEMESIS). *Br. J. Psychiatry*, 181, p. 208–213.

Statistics Canada. Table 13-10-0143-01 Deaths, by cause, Chapter V: Mental and behavioural disorders (F00 to F99)

Stein, M. B, et al. (2005). Functional impact and health utility of anxiety disorders in primary care outpatients. *Med Care*, 43, p. 1164–1170.

Stinson, J.D., Quinn, M.A., Levenson, J.S. (2016). The impact of trauma on the onset of mental health symptoms, aggression, and criminal behavior in an inpatient psychiatric sample. *Child Abuse & Neglect*, 61, p. 13–22.

Suicide in Canada: Key statistics. (2019). *Government of Canada*. Internet: https://www.canada.ca/en/public-health/services/publications/healthy-living/suicide-canada-key-statistics-infographic.html

Sunderland, A., Findlay, L.C. (2013). Perceived Need for Mental Health Care in Canada: Results from the 2012 Canadian Community Health Survey – Mental Health. *Statistics Canada Health Reports 2.9*. Internet: https://www150.statcan.gc.ca/n1/pub/82-003-x/2013009/article/11863-eng.htm

Sutherland, M., Maar, M. (2010). Evaluation Report of the OCAN Implementation in Aboriginal Mental Health Programs. Internet: https://silo.tips/download/evaluation-of-the-ontario-common-assessment-of-need-ocan-in-aboriginal-mental-he#

Szczerbińska K, Hirdes JP, Życzkowska J. (2012). Good news and bad news: depressive symptoms decline and undertreatment increases with age in home care and institutional settings. *The American Journal of Geriatric Psychiatry*. *20*(12), p. 1045-1056.

Thornicroft, G., Deb, T., Henderson, C. (2016). Community Mental Health Care Worldwide: current status and further developments. *World Psychiatry,* 15, p. 276-286.

Tran, N. et al. (2020). *Mental Health Care transition from inpatient psychiatry to community settings: Patterns from Waterloo-Wellington, Ontario, Canada*. Journal Submission.

Trivedi, M.H. et al. (2006). Evaluation of outcomes with citalopram for depression using measurement-based care in STAR*D: implications for clinical practice. *Am J Psychiatry.* 163, p. 28–40.

Valenstein, M. et al. (2009). Implementing Standardized Assessments in Clinical Care: now's the time. *Psychiatr Serv*. 60(*10*), p.1372–13755. Internet: https://doi.org/10.1176/ps.2009.60.10.1372.

Vittengl, J.R. et al. (2007). Reducing relapse and recurrence in unipolar depression: a comparative meta-analysis of cognitive-behavioral therapy's effects. *J.Consult. Clin. Psychol.,* 75, p. 475–488.

Volkert, J. et al. (2013). The prevalence of mental disorders in older people in Western countries - a meta-analysis. *Ageing Res Rev*,12(*1*), p. 339-353.

Wang, K. et al. (2016). Emotional clarity as a buffer in the association between perceived mental illness stigma and suicide risk. *Stigma and Health,* 1(*4*), p. 252–262.

Weili, L., et al. (2013). Public Mental Health Clients with Severe Mental Illness and Probable Posttraumatic Stress Disorder: Trauma Exposure and Correlates of Symptom Severity. *Journal of Traumatic Stress*, 26, p. 266-273.

Wennstrom, E. (2008). The Camberwell Assessment of Needs as an Outcome Measure in Community Mental Health Care. *Digital Comprehensive Summaries of Uppsala Dissertations form the Faculty of Medicine*, 10, p. 55.

World Health Organization. (2004). *Promoting mental health: concepts, emerging evidence, practice (summary report).* Internet: https://www.who.int/publications-detail-redirect/9241562943

World Health Organization. (2008). *Policies and practices for mental health in Europe: meeting the challenges*. Internet: New WHO report Policies and practices for mental health in Europe - meeting the challenges

World Health Organization. (2019). *Suicide worldwide in 2019. Global Health Estimates*. Internet: Suicide worldwide in 2019 (who.int)

Wray et al. (2018). Enhancing Implementation of Measurement-Based Mental Health Care in Primary Care: a mixed-method randomized effectiveness evaluation of implementation facilitation. *BMC Health Services Research.* 18:753

Xiang, X. & An, R. (2015). The impact of cognitive impairment and comorbid depression on disability, health care utilization, and costs. *Psychiatric Services*, 66(*11*), p. 1245–p.1248.

Yehuda, R. (2002). Post-traumatic stress disorder. *N Engl J Med*, 346, p. 108–114.

Yiend, J. et al. (2009). Long term outcome of primary care depression. *J. Affect. Disord.*, 118, p. 79–86.