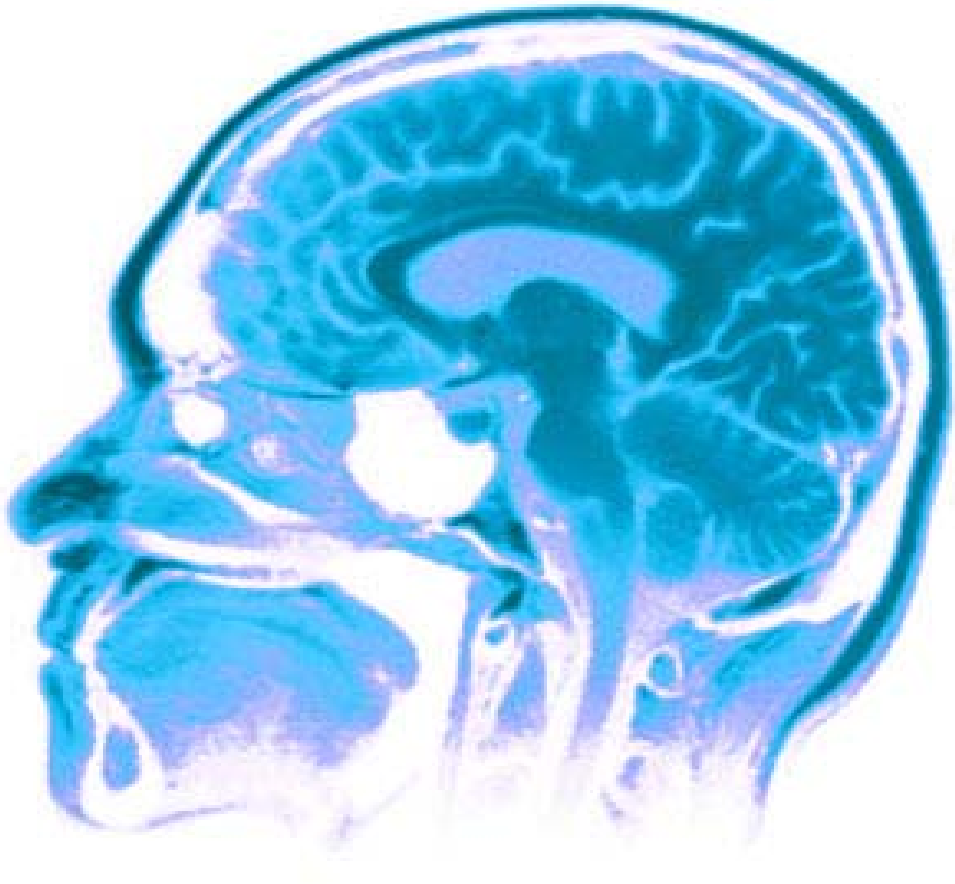
Screening Drug and Alcohol participants for mild cognitive impairment: why, how and does it matter?



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June 2012

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HETI HEALTH EDUCATION & TRAINING INSTITUTE RURAL DIRECTORATE

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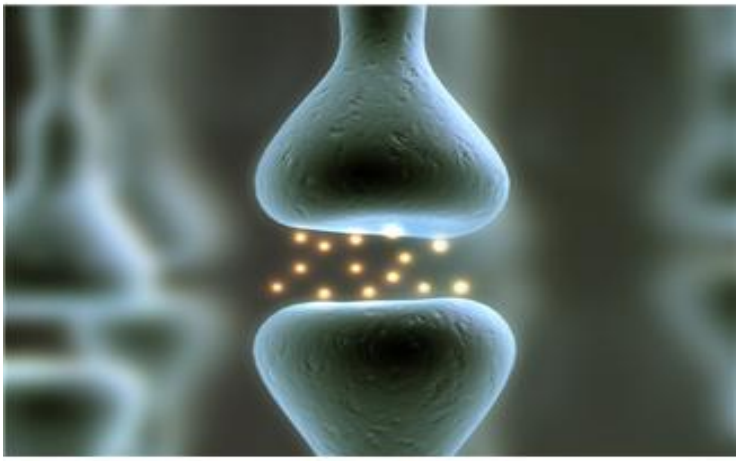


Acknowledgements

This journey would not have been possible without the support, infrastructure and skills afforded by the HETI program and its dedicated staff. At the forefront of leading by example and with integrity is Emma Webster. The opportunity to take a clinical issue and be given time to investigate its relevance with support is truly a clinical luxury. David Schmidt's humour and care was welcoming, his time and 'tips' greatly appreciated.

At a closer level and with vigour that exhausts me but instils in me a belief that at the end of the day a participant's story and their care is held in our hands is my manager, Michelle Daly. She is living proof that we must 'act' not only with care but with skill, knowledge and in a manner aligned to our clinical and personal values, she role models this daily to our team.

To my MERIT colleagues: how much knowledge can one small team have? Your capacity to front up day in, day out and believe in change and in our participants moves me. For the constant chatter, questions and interest, thank you, without your referrals I would not have met my data deadline. I am consistently proud to be associated with you.

To Kevin Roberts the MERIT state-wide data-base manager, who assisted with electronic collection of data, his patience and relationship with his skill base is impressive, his humour whilst flaky was an appreciated interlude.

Cathy Nilon, you are everything and more a truly passionate librarian should be.

To Shelia Keane for her realism and mentoring my research journey especially in writing up the final report, waving a large stick and keeping me 'on track'.

Gerry Williams for his drug and alcohol lenses that remains clear from years of time in the field, thank you.

Denise Hughes – your relationship with end note is to be fully admired, I am grateful for your time.

Steve (yes you Shan's hubby) it was dark, it was late, it was raining but you were the man! Generosity beyond the call!

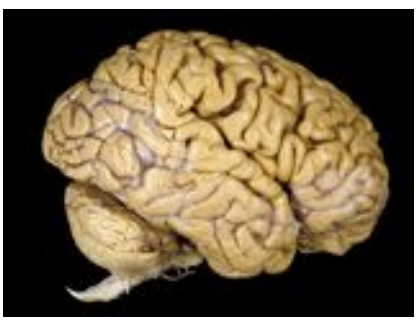
For the previous, current and future HETI participants, special reference to my breakfast buddy Shelley, thank you for your 'breaky' chats, having someone to 'freak out' with was welcomed. Having a friend with aligned values is an unexpected blessing.

To Dr Steve Kermode and Taylor Harchak, thank you for your statistical analysis and patience in attempting to drag me into your world of numbers. Taylor, this was a foreign world to me, your skill and persistence enabled me to experience something new and meaningful, and of course without you it would have been near impossible.

For my life partner (words aren't enough) and children (I have nowhere to hide with you two!), allowing me the time to have this ride, being the heartbeat of my world, for without you nothing is as sweet…I'm back.

Lastly to participants in this study, thank you for your trust and interest. I hold the hope that this may have an impact somewhere, in improving yours or someone else's life. For your capacity to desire change, to seize the opportunity and to get back up when you get knocked down.

Kate



Abbreviations

AD	Alzheimer's disease
AOD	Alcohol and Other Drugs
HREC	Human Research Ethics Committee
K-10	Kessler 10
MCI	Mild Cognitive Impairment
MERIT	Magistrates' Early Referral into Treatment
MoCA	Montreal Cognitive Assessment Tool
OPA	Office of the Public Advocate
OTP	Opioid Treatment Program
RTCQ	Readiness To Change Questionnaire
SF-12	The Medical Outcomes Study Short Form 12 Health Survey

Abstract

Research Question:

The research question for this project is two-fold: 1. What is the relationship between abstinence and mild cognitive impairment (MCI)? and 2. What is the relationship between abstinence and quality of life?

Aim:

Pre and post screening with The Montreal Cognitive Assessment Tool (MoCA) was used to investigate the type and amount of change in cognition and substance using behaviour in a Court mandated, illicit drug using sample. Focus on abstinence verses non-abstinence was the foundation for statistical analysis regarding physical and mental health and well-being as well as any potential changes in cognition. This report details the background of why screening is important for this client group, why the MoCA meets this need as a screening tool, and if abstinence has any influence on MCI and quality of life.

Background:

Mild cognitive impairment can be subtle in presentation, thus rarely detected in the clinical setting. At the same time cognitive testing in the drug and alcohol field has not been a standard part of an initial assessment. Historically, screening tools for MCI in the drug and alcohol field have been time consuming, usually requiring specialist implementation, scoring and interpretation. The impact of MCI for substance using participants can be mismatching of treatment services and approaches as well as difficulty in retaining participants in treatment.

Methods:

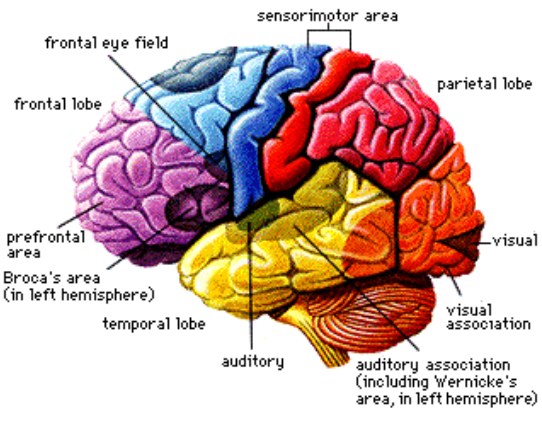
This study used the MoCA to screen 77 participants at week two and week eight of a 12 week Court mandated case management program: Magistrates Early Referral Into Treatment (MERIT). Particular focus was on participants who were abstinent at re-test, to ascertain if abstinence contributed to improvement in cognition. In addition, psychometric instruments administered at the beginning and completion of MERIT treatment were compared to ascertain if there were any changes of significance in physical and mental health outcomes in relation to cognition and abstinence.

Results:

A significant number of participants at re-test improved their MoCA scores whether they were abstinent or not at re-test ($p=<0.01$). The abstinent participants at re-test showed larger increments of improvement on their MoCA scores ($t(46)=3.06$, $p=0.01$). Other significant results showed an inverse correlation between quality of life (mental and physical health) and psychological distress measurements ($r=-0.65$, $p=<0.01$) indicating that as psychological distress decreased, physical and mental health score improved. There was no statistically significant relationship between quality of life measures and abstinence.

Conclusion:

Results from this study indicate that: 1. The MoCA is a worthwhile time efficient and valid tool for use in alcohol and other drug (AOD) assessments and 2. Retaining participants in a structured treatment has mental and physical health benefits independent of abstinence status.



Executive Summary

Core messages

- **Cognitive impairment and loss of associated capacity has serious functional consequences for drug and alcohol participants.**

The National Drug Strategy 2010-2015 for the Office of the Public Advocate (OPA) states that brain damage from alcohol and drug misuse has consequences that can adversely affect an individual's life. Such consequences involve all domains of a person's life and their relationships (self, others and the community they exist within). Evidence states that associated treatment services and Government policy makers should address screening, diagnosis and treatment in an attempt to deal with this under resourced and not fully understood area [1, 2].

- **Screening for mild cognitive impairment (MCI) with drug and alcohol participants can lead to better treatment outcomes.**

If a client's cognitive functioning is screened at an appropriate time in their treatment, then treatment can be better planned, meet individual needs and set achievable goals. The end results are better health outcomes, improved retention in treatment and the opportunity for substance using participants to increase self- efficacy. Issues relating to self-efficacy involve completing a treatment intervention, and having increased attachment to their treatment plan as goals are achievable and therefore meaningful to them [3].
In a health care system where key performance indicators are closely linked to funding it is vital that treatment agencies (especially those that are time limited) get maximum benefit for clients. Screening for MCI can provide the basis for referral and further diagnostic testing. It is time to address why routine screening is not part of a comprehensive initial drug and alcohol assessment, especially when validated and time efficient tools like the MoCA exist.

- **Case management and remaining in structured treatment correlates with cognitive improvement.**

Clients are more likely to stay in treatment if their goals are achievable and realistic in accordance with their cognitive capacity [3, 4]. Effective case management necessitates thorough assessment, individual case planning, interventions, review, evaluation and aftercare. This study found that by remaining in structured treatment and completing the tasks within their treatment plan, even non-abstinent participants improved their re-test scores on the MoCA. Scores relating to psychological distress (K-10), physical health / well-being (SF 12) and readiness to change (RTCQ) were collected at entry and exit of the MERIT treatment episode. Significant correlations were found (see below) from these indicators supporting clients that remain in treatment long enough secure improved health indicators, one of which is abstinence. Upon entry to the MERIT treatment episode, 98% of the study sample were not abstinent, at the end of the treatment episode 63% were abstinent. The relationship between the K-10 score and the SF12 was inverse-negatively correlated at r=-0.65, p=<0.01, indicating that as psychological distress decreased (K-10 score) mental health function improved (SF 12 score).

- **The MoCA is a useful screening tool for drug and alcohol participants.**

The MoCA was originally subjected to validation studies involving comparison groups of patients with Alzheimer's disease (AD), patients with MCI and normal elderly controls. Sensitivity was found to be high for identifying both AD and MCI patients (100% and 90% respectively). The specificity of the MoCA was 87%[5]. There are multiple studies outlining administration in a vast range of other fields including Huntington's disease, HIV, Parkinson's disease, tumours and vascular disease [1, 5, 6, 7, 8]. There is only one study in the drug and alcohol field, undertaken in 2009 and that study had an extremely narrow client group (cocaine primary in-patients). This study is the first to use the MoCA in a general substance using population and has proven easy to administer, accurate and beneficial to case planning and treatment outcome [6].

- **All drug and alcohol clinicians are capable of using the MoCA.**

The availability, ease of implementation, and simplified administration rules makes the MoCA an ideal screening tool in multidisciplinary teams. Administration of the MoCA takes less than ten minutes and can be interpreted immediately. The instrument is available free, and is downloadable from the internet (http://www.mocatest.org/moca).

- **Abstinence is a primary goal if the participant is willing and capable but is not necessary for positive change.**

The Magistrates Early Referral Into Treatment (MERIT) program operates within NSW Health and adheres to departmental policy under the harm minimisation framework. Therefore, while abstinence is a primary goal of treatment, it is not the only criterion for good outcomes. In this study, the abstinent group had the greatest amount of increase in change; however, the non-abstinent group also improved their cognitive functioning [9].

Context:

The subtle presentation of mild cognitive impairment makes accurate clinical screening difficult. In the Drug and Alcohol field screening for MCI is not routinely undertaken. The impact of MCI on substance using client's ability to change can be substantial. Substance using clients are often subjected to moral judgement solely because of their drug use and if they then fail to comply with a treatment program, they are often considered unmotivated or lacking in 'willpower'. However, if they are viewed as suffering from a relapsing brain condition (i.e. drug dependence), all avenues can then be investigated to assist in determining their ability to make positive changes. One of these investigations is to assess cognition, and match treatment accordingly, based on the clients known (not assumed) strengths and limitations [3].

The MERIT program operates in the NSW Court system. MERIT is a court based, pre-sentence diversion program under which arrested defendants with illicit drug use problems undertake treatment and rehabilitation. While on the program, defendants are expected to fulfil treatment objectives designed to match individual needs in an attempt to elicit personal change and improve physical and mental health. MERIT is a case management program that has a minimum treatment episode of twelve weeks. MERIT has an element of client coercion due to the Court's expectations, with treatment being time pressured as well as time limited. It is essential that the best fit for treatment matching is achieved promptly. Any treatment plan is often underpinned by a participant's willingness and capabilities, which can be affected by reduced cognitive ability [10].

Approach / Study design:

A before and after experimental study design was applied to evaluate the impact of remaining in structured treatment (MERIT) at two different points along the MERIT treatment episode. Initial testing (week two) and re-testing (week eight) was undertaken using the MoCA. At re-test there was focus on whether a client was abstinent or not, what the MoCA retest score was and how this matched or did not match with their quality of life measurements (see below).

Psychometric indicators that are routinely collected at entry and exit of MERIT: scales of physical, mental health and well-being (SF-12), psychological distress (Kessler-10) were extracted from this sample's health file to quantify differences. Participants for this study were 77 Court endorsed adult clients who undertook treatment with the Northern NSW Local Health District MERIT service. Data collection took place between December 2010 and December 2011.

Results:

At re-test 9% of the abstinent group were affected with MCI and 58% of the non-abstinent group were affected with MCI. All participants at re-test improved their scores on the MoCA, even participants who were not abstinent. The non-abstinent participants improved their scores but did not reach levels consistent with normal cognition. Participants who were abstinent at re-test improved the most. The difference between the means of the abstinent at re-test group and non-abstinent at re-test group was found to be statistically significant using an independent t-test $t(46) = 3.06$, $p = 0.01$).

Correlations were significant in that, as psychological distress decreased, general health and well-being improved. Significant negative correlations were found between psychological distress and general health and well-being. Causality was difficult to ascertain, as cofounders like case manager participant relationship; individualised treatment plans and the effect of retention in treatment were not measured. These cofounders potentially impacted on client changes and outcomes. There was no statistically significant relationship between quality of life measures and abstinence.

Introduction

In the 1980's, the then US first lady, Nancy Reagan, coined and championed the phrase "Just say NO" as part of the "War on Drugs" campaign. The aim was to discourage children from engaging in recreational drug use by offering various ways of saying no. Eventually, the "Just Say No" theme was expanded to issues pertaining to violence and premarital sex. This slogan has provided a reference point through humour (due to its simple and unrealistic view) to explore the role of abstinence in drug and alcohol dependence. Abstinence can offer a clear baseline to gauge improvement and change [11]. However not unlike substance dependence itself the treatments and approaches are not that simple, nor encapsulated into one stock standard criteria. The principle of harm minimisation has formed the basis of the National Drug Strategy since 1985 in Australia. This principle offers a wider expanse of treatment options based on accepting relapse, reduction and continued using as a part of a chronic, complex, relapsing condition. Therefore the cycle of change underpins clinical management of participants as it incorporates lapse, continued use and abstinence as part of the change journey [12].

Treatment approaches in the drug and alcohol field throughout Australia rely on standard assessments and individualised case planning, although the details of this process vary widely between services. Often through case discussion or reviews in the clinical domain, participants are defined through their complexities and labels that do not assist in treatment interventions. Cognitive function is one such area, with labels such as 'brain damaged' which has been used to describe what a participant cannot do or their limitations. Another frequently used label is 'personality disorder', which may in fact be applied to individuals with MCI. Such labelling sets up an immediate 'bound to fail' attitude for both clinician and clients, as clinicians are less likely to investigate (screen for MCI) and clients are often unable to meet expectations regarding change. Cognitive limitations are only clear when there is a baseline, usually obtained through screening, referral and appropriate testing. Screening as a starting point can offer an understanding of the client's capabilities exposing their limitations and strengths thus providing a clear clinical map for treatment planning [4].

Mild Cognitive Impairment (MCI) is a broad term defining a state where memory function is compromised, and that can have an increased risk of developing dementia [13]. Criteria for diagnosis has been hindered by the broad components involved, thus the prevalence and incidence rates can vary greatly. What is known however is that people with MCI develop dementia at a rate of 10-15% in comparison to healthy controls at 1-2% per year [13]. MCI has been explained as being a decline that is greater than expected for an individual's age and level of education, but does not noticeably affect functions of daily living [14, 15]. Nonetheless, there is merging evidence about the definition being clinically meaningful as sufferers are the group that is neither 'demented' nor 'normal'. Round (2003) [16] states this group requires an increase in detection efforts first and foremost in screening, followed (if necessary) with testing and imaging.

Cognitive impairments may contribute to drug misuse and addiction in at least two ways. Cognitive impairments may increase the likelihood of drug-seeking behaviour through various kinds of cognitive deficits including, for example, failures of impulse control, planning and learning mechanisms. Cognitive impairments also may interfere with users' capacity to assimilate and participate in rehabilitation programs that often have an educative and cognitive emphasis [17].

There is a belief that MCI consistently remains undetected, with estimates for missed presentations as high as 90% [19]. The high level of missed detection may be in part due to the subtle clinical changes, or it may reflect the lack of routine screening by Drug and Alcohol clinicians. In substance using clients the presence of MCI is further complicated by the symptoms of MCI overlapping with other conditions such as those associated with somatic and psychiatric disorders. Therefore it is difficult to distinguish between traumatic brain injury (for example motor vehicle accidents) and non-traumatic brain injury (for example substance use induced) [18, 19, 20].

Drug and alcohol clients with cognitive impairment are different to their non- affected counterparts in several ways. They have poorer treatment outcomes, withdraw early from treatment and often display risk factors other than drug and alcohol use itself [6, 21]. In addition, cognitively intact and impaired clients travel different paths of recovery, with therapeutic change mechanisms operating differently for impaired clients [22]. Lastly the cognitive impairment and loss of capacity associated with brain damage and drug misuse have serious functional consequences which can limit the affected individual's capabilities, recovery and relationships. With the advent of evidence based treatment interventions such as cognitive behavioural therapies there is mounting pressure to ensure that a client can actively engage in such interventions. This may not always be the case if the client is cognitively impaired [2, 3, 21, 23].

There is debate surrounding what is the time frame of abstinence that could allow for a client's cognition to revert to pre-using health, if this is indeed possible. It has been asked by clinicians [11, 15] if there are forms of substance induced impairments that are transitory in nature and whether abstinence can mean a full or partial recovery. Variables like gender, substance type, frequency of use, mode of use and duration of use can individually or collectively alter a person's recovery process. Most substance dependent people rarely use one substance in isolation; most often poly-substance use and mode of use (oral, intravenous and/or inhalation for example) can complicate diagnosing acute intoxication or withdrawal. The additional layer of personality presentation [24], a person's family of origin and childhood history, genetics and exposure to trauma, and effects of events such as illness, abuse or the death of a loved one [25] further complicates the clinical picture.

There is a body of evidence regarding alcohol related brain impairment [26, 27, 28]. The legality and social acceptance of the use of this substance has allowed research and evidence to be gathered easily and widely. However the substantive evidence for illicit substance related cognitive impairment is less conclusive, due to the complexity and purity of drug types and neural pathways involved [17]. Most of the neurotransmitters in the brain affected by illicit drugs exert their effects through relatively diffuse patterns of innervation across the whole of the forebrain and wider cortical areas. This is not simple but rather complex in how it unfolds [29]. The chronic use of illicit drugs may be associated with a generalized profile of neuropsychological deficit. There are important differences in the patterns of distribution associated with various neurotransmitter systems, coupled with corresponding differences in the distributions of various receptor subtypes. In addition to whatever general cognitive deficits may be associated with chronic drug misuse, there may be subtle differences associated with the abuse of different classes of drugs that have distinctive modes of actions [17, 29, 30].

Discriminating between normal ageing and MCI in the clinical setting is a difficult task, and requires a sequential approach with screening as the starting point. Previously the screening tool most commonly used for the substance using population was the Mini Mental State Examination (MMSE). There was no routine application procedure or protocol in the drug and alcohol field in the North Coast Area Health Service, application was at the discretion of the individual clinician. The MMSE has shown not to be sensitive to the areas of cognitive functioning that substance using clients routinely present with (predominantly frontal lobe change) thus a normal score on the MMSE was often seen in an affected client [31, 32, 33].

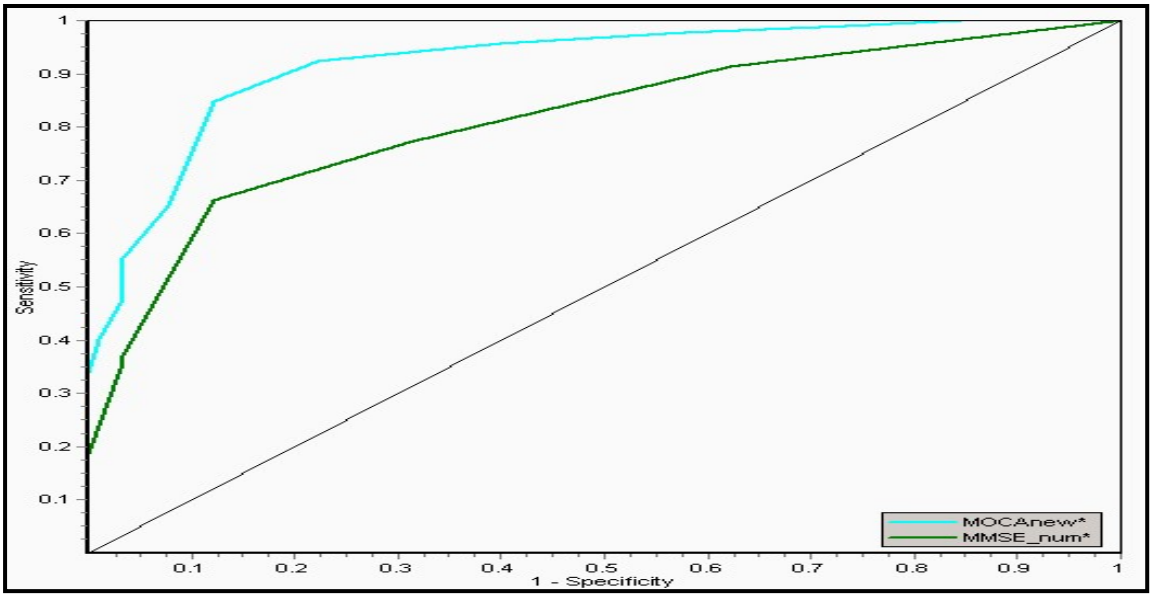
More recently in 1997, the Montreal Cognitive Assessment tool (MoCA) was designed and then validated in 2005 as providing additional information compared to the MMSE. The MoCA has high sensitivity and specificity for detecting MCI with participants who perform in the normal range on the MMSE [1, 34, 35, 36, 37, 38, 39, 40, 41, 42].

Table 1: Sensitivity and Specificity differences between MoCA and MMSE: Nasreddine: 2012.

Sensitivity and Specificity (%) MoCA and MMSE

Cut-off	≥ 26	< 26	< 26
Group (n)	Normal controls (90)	Mild Cognitive Impairment (94)	Alzheimer Disease (93)
MoCA	87	90	100
MMSE	100	18	78

Figure 1: ROC curves showing MoCA superiority to MMSE in distinguishing Normal Controls from MCI: Nasreddine: 2012.



The MoCA is a clinician administered, interactive tool (both verbal recall and drawing exercises are part of the test) and scores can range from 0 to 30 points. Scores of 26 or above are considered normal, and 25 and lower indicates MCI. Unlike the MMSE the MOCA is free and can be administered by most relevant health clinicians, does not require interpretation by a psychologist and has a clinically achievable time frame for administering (approximately ten minutes). The scoring guide has been adjusted to cater for clients with differing levels of education (literacy and numeracy), is currently available in ten languages and dialects as well as having been adapted to use in the visually impaired population [37, 43]. It is therefore pertinent to ask what place does the MoCA have in routine drug and alcohol assessment, and what could it add to treatment planning with relevance to a diversion program like MERIT?

Smith [40], Luis [41] and recently Coen [42] raise concerns about the MoCA and its recommended cut-off score (as mentioned above) having low specificity at ruling out amnesic or multi-domain MCI. Countering this however is Copersino (2009)[6] who makes particular reference to the cut-off threshold for AOD research participants. They concluded that the original MoCA threshold was deemed appropriate for the AODs population to effectively rule out the potential for false positive scores.

MERIT was developed as a result of the NSW Drug Summit in 1999. It was based on the Victorian program: Court Referral and Evaluation for Drug Intervention and Treatment (CREDIT), but has been adapted to suit NSW law and Court practice guidelines. The MERIT program assesses people facing NSW local Courts with offences that may or may not relate to their drug and alcohol use. Entry to the program is voluntary for offenders over 18 years of age and does not require pleas being entered. MERIT staff assess suitability of a client to undertake treatment and Magistrates determine eligibility legally to endorse

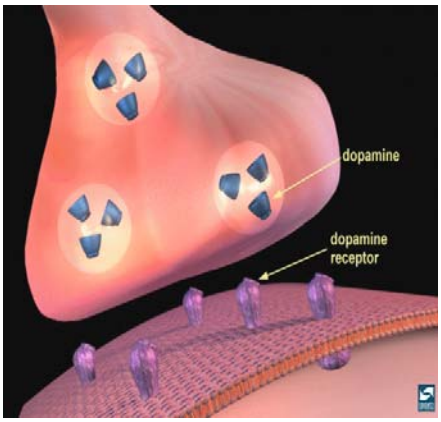
participation. An offender cannot proceed with treatment unless they have been granted endorsement by the Court's Magistrate. The MERIT case manager provides a written assessment to the Magistrate indicating the nature of the offender's drug use, their motivation for treatment and what treatment options are suitable. During participation in MERIT clients are case managed, matched to treatment and referred to appropriate services such as withdrawal management, residential rehabilitation, opioid treatment program (OTP) maintenance, out-patient consultation, counselling, pathology services for supervised urine drug screening and other medical, health and welfare services. This scheme aims to help break the drugs-crime cycle through coordinated care and strategic partnerships between health services and the criminal justice system in order to achieve positive health and social outcomes [44].

Various forms of acquired brain injury and impaired cognition have long associations with increased impulsivity and offending behaviour [45]. There are studies that outline increased incidence of violent offending within groups of brain injured individuals, particularly where their injury involves frontal lobe functions [46, 47]. Brennan (2000) [48] found increased rates of offending, particularly violent offending, within a community sample of individuals with acquired brain injury. MERIT's core business is working with recidivist offenders, trying to achieve outcomes that are meaningful to the participant and Court. Overarching this process is a 'tight' time frame clinically, thus paramount to this process is seeking a clear pathway to unravel such complexities. The relationship between drug and alcohol use and increased rates of offending behaviour, and the overlap between presentations of substance dependence or misuse and cognitive impairment or acquired brain injury makes it difficult in many cases to clearly identify the relative weight of causal factors [49].

It is worth noting here that harm minimisation and abstinence approaches are not necessarily mutually exclusive. From a harm minimisation perspective the goals of treatment are framed as a hierarchy of desirable outcomes with abstinence from illicit drug use at the top followed by a number of less desirable outcomes [50]. In other words, if abstinence is not feasible then a range of other options that have positive consequences for the user and the community is possible. Such an approach, acknowledges that benefits such as reductions in crime and improved social functioning can flow from this. Evaluation remains an integral part of state-wide MERIT services with the inclusion of entry and exit indicators (psychometric screening tools) that aim to measure changes in emotional, physical and mental health. Standard clinical practice has these instruments administered at the beginning and end of a participant's treatment episode with MERIT [9].

A literature search and review was undertaken using:
1. The Montreal Cognitive Assessment (MoCA) website [51]. This site provided all studies that the MoCA has been used in including validation studies, normative data and references to source pertinent journal articles.
2. Through the Clinical Information Access Portal (CIAP) the following search engines were searched: Medline, Pub med and PsychINFO. E-Journals through Lismore Base Hospital Library were accessed where available.

Key words and search terms were: Drug and alcohol disorders, Montreal Cognitive Assessment tool, mild cognitive impairment, drug and alcohol assessment, drug and alcohol treatment / interventions, case management, cognition and substance use, drug and alcohol treatment implications, abstinence and the role in diversion programs, Court mandated treatment for drug and alcohol offenders. Only papers published in English were reviewed and determined relevant to this study. All relevant abstracts proceeded to obtaining full text articles. It became evident early there was a gap in the use of the MoCA in the drug and alcohol field, with the only study citing its use being a Harvard study [6]. This study was conducted in an in-patient setting concentrating on cocaine primary participants.



The study design - To measure initial and retest scores at different time intervals meant a pre and post-test Quasi-Experimental study design was undertaken.

In answering the research questions:

1. What is the relationship between abstinence and mild cognitive impairment (MCI)?
2. What is the relationship between abstinence and quality of life?

The aims were to determine if there is a significant relationship between abstinence and cognition, and abstinence and quality of life. Specifically they are:

- To identify differences between cognition (MoCA) scores at two different time intervals, the beginning (week two) and week eight of a MERIT treatment episode.
- To identify differences between quality of life measurements at the same time interval, during the same treatment episode.
- Identify if abstinence has any measurable and significant relationship or correlation to the MoCA and quality of life measure scores.

This research is important as firstly, it is an attempt to remove any moral judgements that often see drug and alcohol clients further marginalised. Secondly, it may provide clarity for treatment planning and hope for the client that change, however small, can improve their daily life. Lastly, it may assist in the participant being informed of their capabilities and their limitations so they will be well equipped for whatever future endeavours they undertake.

Clinical work requires preparation and planning. In an ever increasing busy field like that of the drug and alcohol field where assessments bring more questions than answers, clinicians must find a way to methodically work through a check-list that is clear, concise and meaningful. The MoCA can be regarded as one more tool to assist clinicians to be well prepared, as Miguel de Cervantes stated "Forewarned, forearmed; to be prepared is half the victory."

Methods

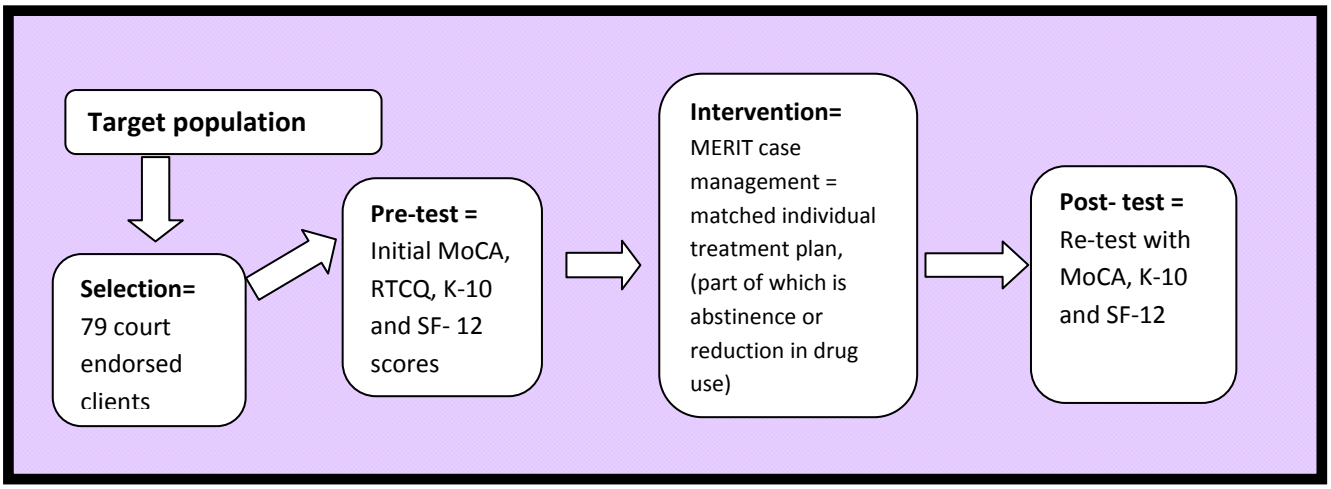


Figure 2: Study design

As MERIT is a time limited Court diversion program external pressure from the Court overarches the client's treatment episode in that any positive or negative changes (as perceived by the Court) could determine their sentence outcome. Abstinence in the Court or legal domain is considered a measurable indicator of change. It is an indicator that is easily verified through urine drug screen testing. While it is acknowledged to be only one indicator, it appears to carry weight by both Court and client [52]. There was no initial expectation that a person entering MERIT would already be abstinent. In fact, the opposite was expected, so a before and after study seemed the natural progression.

This quasi-experimental study was interested in initial scores for the MoCA and initial standardised entry psychometric instruments K-10 and SF12 scores compared with re-test scores for the MoCA, K-10 and SF-12. At re-test there was a comparison between abstinent participant scores and the non-abstinent participant scores.

Participants

The study population consisted of participants aged 18 years or over who were Court endorsed to undertake treatment with the Northern NSW Local Health District MERIT service. Data collection took place between December, 2010 and December, 2011. Inclusion was offered by the way of a verbal interview with their allocated case manager, information sheet (Appendix 1) and consent form (Appendix 2) were provided and completed. Sample size for adequate statistical power for this study was determined as 45 using the application 'G*Power' and for a matched pairs t-test design [53]. A significance level of 0.05, a one-tailed test of significance, a power of 0.8 and a moderate effect size of 0.5 were chosen for this purpose.

Instruments

The MERIT Program is a state-wide evaluated program that collects numerous data at entry and exit for program evaluation purposes. Participants consented to information being extracted from the electronic data base and client file. In addition, a screening tool for MCI, the MoCA, was introduced and an additional component and adjustments were made by the state-wide database manager to use the electronic database to collate initial and re-test scores as per the MoCA domains (Appendix 3)

The MoCA tool was administered at week two on MERIT and re-administered at week eight, whether the participant was abstinent or not. Initial test scores were not given until after the re-test, at this time both scores were explained to the participant and the difference discussed. The MoCA took approximately ten minutes to administer and did not interfere with the existing case management structure as appointments were tagged onto the end or beginning of a set appointment that was already made with their case manager.

The outcome variable was cognitive function as indicated by the MoCA screening score. Other variables collected included primary and secondary drug type and abstinence which was confirmed by self-report, urine drug screening 24 hours prior to testing, breathalyser application and clinical assessment at time of screening. Routinely collected data including K-10, Readiness to change questionnaire (RTCQ), SF -12 questionnaire scores and demographic variables such as living arrangement, primary source of income, educational level, ethnicity, age, gender, program status and primary substance of concern were also collected.

The primary substances of concern were identified through a drug and alcohol assessment (conducted by the case manager undertaking the initial AOD assessment), confirmed by urine drug screen, matched with participants self-report. A scale called the severity of dependence scale (SDS) was utilized to determine level of dependence on that substance..

The RTCQ [54] was originally designed for clients with drug and alcohol problems who might not be aware of having a problem. Items were initially chosen to represent a specific stage of change according to the Prochaska and Di Clemente model [55]. The RTCQ aims to assess three of the stages of change: Pre-contemplation (P), Contemplation (C) and Action (A).

The K-10 is a simple, reliable and validated measure of psychological distress and administered as a means to monitor progress following treatment for common mental health disorders such as anxiety and depression. High scores indicate a greater likelihood of mental disorder and a need for ongoing further assessment and more intensive treatment. Increments exist regarding scoring, with 30-50 being the criteria where a participant is likely to have a mental disorder. The Northern NSW MERIT program clinical site procedure dictates further assessment where the score is over 30. A clinical decision is made whether it is then appropriate to undertake a suicide risk assessment with the client [56].

The Medical Outcomes Study Short Form 12 Health Survey (SF-12) was developed in the United States from the twelve questions of the SF-36, which make up the MCS (Mental Component Summary) and PCS (Physical Component Summary), in order to provide a shorter measure health status. The SF-36 has been validated in different Australian populations [57]. Scores range from 0 to 100, where a zero score indicates the lowest level of health measured by the scales and 100 indicates the

highest level of health. Scores greater than 50 represent above average health status, whereas people with a score of 40 function at a level lower than 84% of the population (one standard deviation) and people with a score less than 30 function at a level lower than approximately 98% of the population (two standard deviations) [57]. The RTCQ, K-10 and SF-12 are routinely collected at entry, and the K-10 and SF-12 at exit to determine levels of change after case management / treatment intervention. These quality of life indicators therefore could be considered a by-product *and* motivation in relationship to a client's substance use.

Administration of the MoCA:

Two staff were responsible for administering all MoCA instruments. The same two staff members checked each other's scoring on all MoCA's undertaken. Using the same two staff to administer and re-check scores reduced any potential for scorer or tester bias.

Administration of the RTCQ, K-10 and SF-12:

MERIT case managers were present whilst their client (the research participant) answered these questionnaires (see Appendix 4, 5 and 6), primarily to assist if the questions were not fully understood, as well as to navigate clients with limited literacy skills.

Data analysis

Data were summarised and analysed using the SPSS (1999) [58] statistical package and Graph-Pad software (2005) [59]. Descriptive statistics for the scale variables and frequency tables for the nominal variables were produced. In this study all scale variables were discrete data from the overall initial and retest MoCA scores. As there were domains within the MoCA, these were considered individual item scores adding up to an overall score. Nominal variables included the demographic characteristics, types of drugs used and the presence of abstinence at completion.

Sub-group comparisons were done using t-tests for independent samples, with a two-tailed test of significance. These compared the means of all scale variables (Instrument scores) across the sub-groups in each of the continuous variables where only two sub-groups were present. The sub groups were abstinence at re-test, age, K-10 at entry and exit, SF 12 scores at entry and exit. . In this study the K-10, SF-12 and MoCA are treated as continuous variables.

Changes in scores on all scale variables for individual participants were examined by t-tests for matched pairs as part of the before and after test design of the study. Relationships between individual scale variables were examined using Pearson's Correlation. Only results significant at $p \leq 0.05$ are reported in this paper.

In addition, One-way Analysis of Variance was used to compare the means of all scale variables across nominal variables where three or more sub-groups were present. Significant results at $p<0.05$ are reported in this paper. Chi Square was undertaken to affirm if there was a relationship of significance between MCI and abstinence.

Ethics approval was granted by the North Coast Area Health Human Research Ethics Committee in November, 2010 (reference number 497N0).

Results

Seventy nine participants consented to take part in the study, with one participant declining involvement and one excluded (due to pre-existing brain injury). In addition one participant was excluded from the re-test sample as medically unwell at the time. The mean age of all participants was 34 years, ranging from 18 to 59 years and a standard deviation of 10.46. Both excluded participants were eliminated from the study due to the potential to yield false negative re-test scores. The majority of the sample was male, which concurs with males being over represented in the criminal justice system [60]. See Table 2 for further demographic profiling of the sample's participants.

Figure 3: Participant pathway through the study

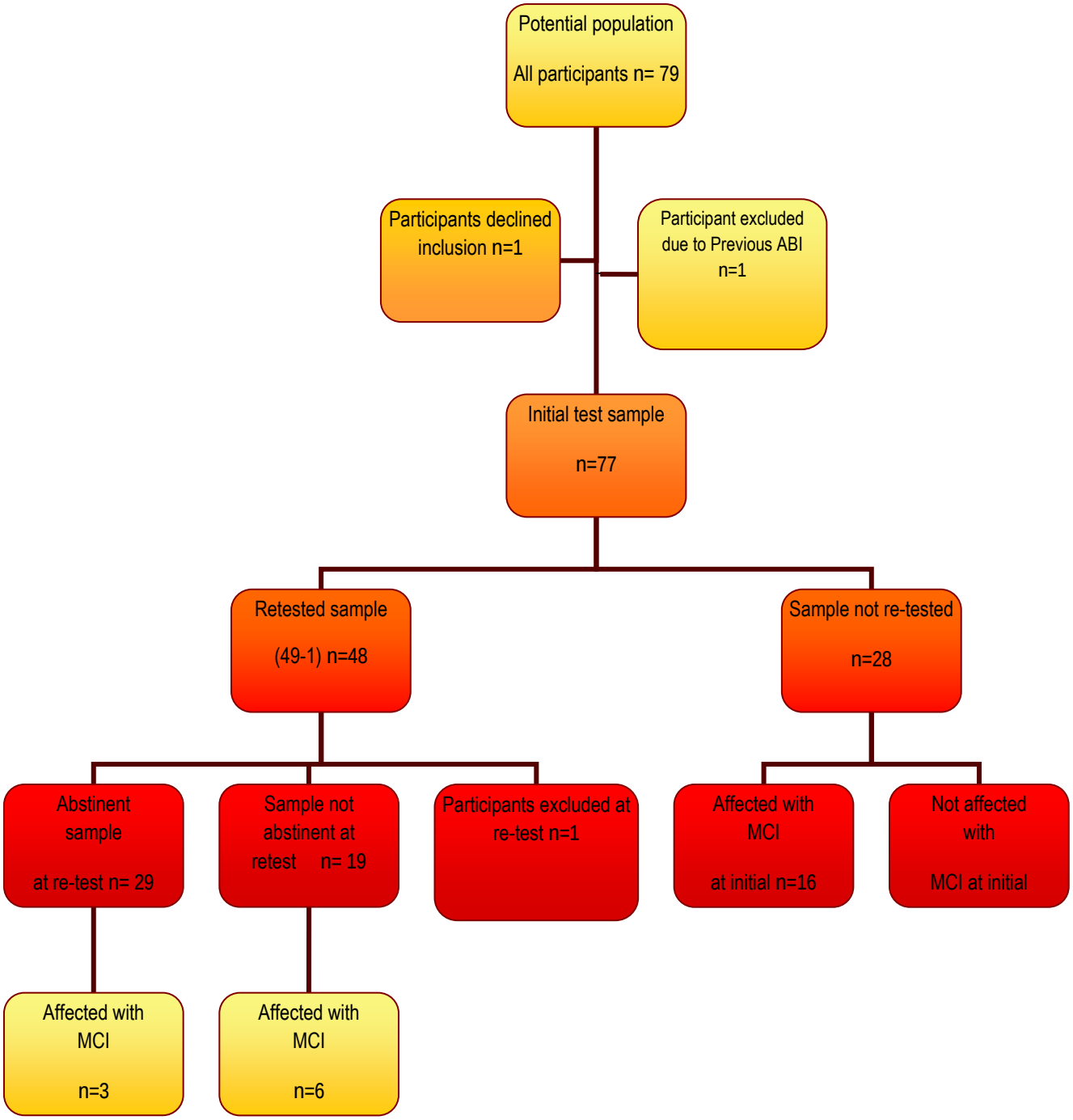


Table 2: Selected demographic details of participants (n=77)

Demographic characteristics

Age	Participant Count	(%)
19-28	25	(32%)
29-40	35	(46%)
41-60	17	(22%)
Gender		
Male	69	(90%)
Female	8	(10%)
Ethnicity		
Aboriginal	13	(17%)
Non-Aboriginal	64	(83%)
Living arrangement		
Alone	16	(21%)
Alone with children	3	(4%)
Spouse partner and children	4	(5%)
Spouse/partner	12	(17%)
Spouse/partner and parents	15	(19%)
Spouse/partner and friends	11	(14%)
Friends/parents/relatives	4	(5%)
Other relatives	11	(14%)
Other	1	(1%)
Education level		
Year 10 or less	53	(69%)
Year 11 or 12	20	(26%)
TAFE	1	(1.%)
Tertiary	1	(1%)
Other	2	(3%)
Principle income		
Temporary benefit	42	(55%)
Disability support pension (or other	26	(34%)
pension)	4	(5%)
Full time employment	2	(3%)
Part time employment	1	(1%)
No income	1	(1%)
Other	1	(1%)

Cannabis was the most common primary substance used by this sample, with just under 60%, (n=46) fitting into this category. The second and third most common substances were amphetamines (15% n=12) and heroin (6% n=5). The primary substances of concern were identified through a drug and alcohol assessment, confirmed by urine drug screen, matched with participant's self-report and severity of dependence scale. Figure 4 demonstrates the primary substance of concern of a participant, collected upon entry into MERIT.

Figure 4: Primary substance of use on entry to MERIT

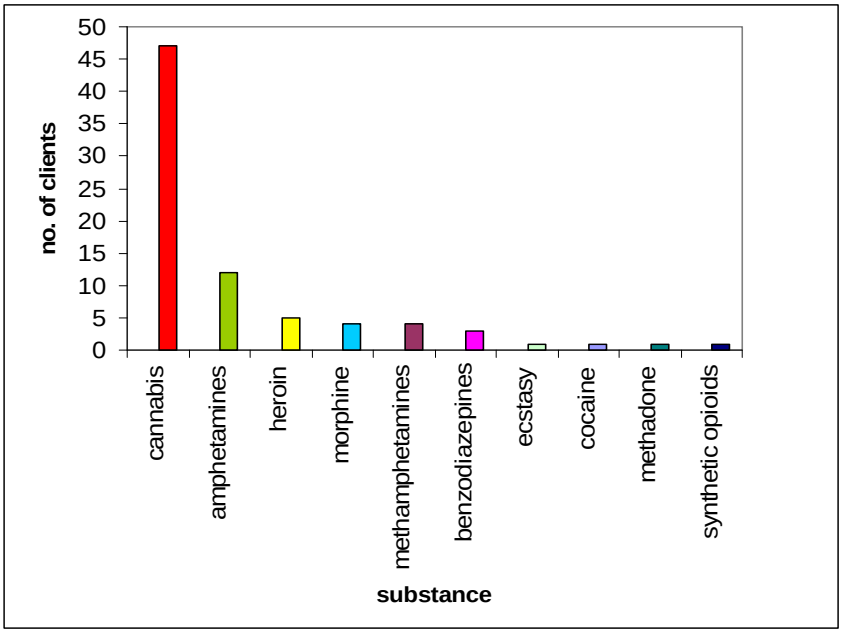


Table 3 outlines the readiness to change questionnaire results that were administered at commencement of the treatment episode. Half of the sample (50.6% n=40) was in the action stage of change. The ANOVA found a statistically significant effect between RTCQ score groups for initial delayed recall score (a domain of the MoCA where participants are asked to retrieve words previously given to them). Statistically significant differences were found between RTCQ groups A and P (t = 3.16, p < 0.01) [45] and between C and P (t = 2.62, p = 0.02) [(19)]. Based on their RTCQ score, those in the P group had a worse delayed recall than either those in the C group or the A group.

A Pearson's correlation matrix was tabulated for all MoCA sub-scale scores, and at re-test there were a range of statistically significant positive inter-correlations in excess of r=0.75. However, one of these inter-correlations was strong and negative. The relationship between the K-10 score and SF-12 score was inverse – negatively correlated at r=-0.65 with p<0.01. This shows that as the K-10 score decreased (psychological distress) the SF12 score for mental health increased (MH function improved).

Table 3: RTCQ- Stage of change at Entry to MERIT (n=77)

	Participant Count	Percentage %
Action stage (A)	39	51%
Contemplation stage (C)	21	27%
Pre-contemplation stage (P)	6	8%
Did not undertake the RTCQ	11	14%

Table 4: Paired t-tests results for the difference in outcomes between MoCA and quality of life indicators at entry and exit from the MERIT program.

Outcome	Entry to program Mean (sd)	Exit from program Mean (sd)	t (df)	p
SF12 physical	45.72 (1.80)	48.40 (1.68)	-1.36 (37)	0.18
SF12 mental	35.27 (1.77)	49.72 (1.57)	-6.66 (37)	<0.01
K-10	27.08 (1.36)	18.37 (1.00)	6.46 (37)	< 0.01
MoCA scores	24.67 (2.69)	27.23 (2.09)	-6.35 (47)	<0.01

The differences from initial testing to re-testing for the MoCA, K-10 and SF-12 (MHS) were all statistically significant as represented in table 3. These three indicators overlap clinically as psychological distress reduces (K-10), mental health indicators (SF-12) positively increase as do cognitive re-test scores (MoCA).

Abstinence/ MoCA Scores: Consistent with assessing the type of participants in this study (criminal offenders) during active substance use, the majority of the initial sample was not abstinent (99%). In the re-test sample (n=48), 29 (60%) were abstinent and 19 (40%) were not abstinent. Of the abstinent re-test sample (n=29), 9.0% (n=3) were affected with MCI and 91% (n=26) were not affected with MCI as per the MoCA scores. Of the non-abstinent re-test sample (n=19), 11 (58%) were affected with MCI and 8 (42%) were not affected for MCI as per the MoCA scores.

The re-test group scores were also statistically significantly higher (p=.001) with the mean score rising from 24.41 (*sd* =2.72) to 27.90 (*sd*= 1.70) with a standard deviation of this difference 1.02, in the abstinent group. The mean score of the abstinent group at re-test was 27.90, *sd* = 1.70 and the mean score for the non-abstinent group at retest was 26.21, *sd* = 2.25. The difference between the means of the abstinent at re-test group and non-abstinent at re-test group was found to be statistically significant using an independent t-test (t (46) = 3.06, p = 0.01)

Table 5: Independent t-test showing differences in means of abstinent verse non-abstinent sample at re-test.

Non-Abstinent	Obs	Mean	Std deviation	95% CI
Abstinent	19	1.16	2.50	-0.05 to 2.36
t(46)=-3.06,p<0.01	29	3.48	2.63	2.48 to 4.48

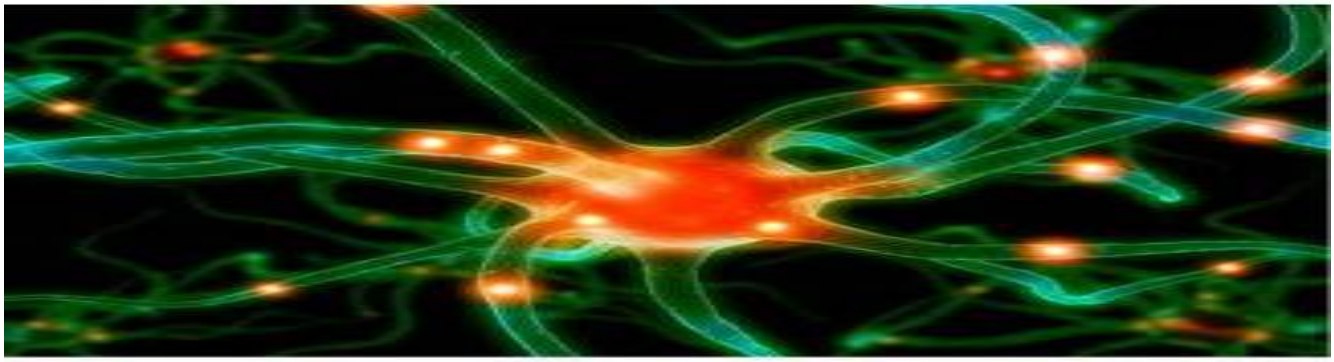


Table 6: The counts and column totals of the proportion of participants at re-test with MCI.

Abstinent	With MCI	Not affected for MCI	Total
False	8	11	19
	72.73	29.73	39.58
True	3	26	29
	27.27	70.27	60.42
TOTAL	11	37	48
	100.00	100.00	100.00

At re-test, 70% of participants who were abstinent were not affected with MCI. The overall largest increment of improvement was the re-test abstinent group. The group who was not abstinent still showed improvement on their MoCA scores for cognitive screening at re-test, however only 26% of participants improved their score at re-test into not affected category 26>. There were improvements in 37% of participants although they remained in the affected category (<25) and the remainder of the group had no changes or scored worse than at initial test.

Abstinence / quality of life measures: Independent t-tests were used to analyse the K-10 and SF-12 relationship with abstinence, there were no statistically significant results (see Table 6).

Table 6:

Difference in K-10 scores:	
Abstinent: mean = -9.57, sd = 6.08, 95% ci = -12.34 to -6.80	
Not abstinent mean = -7.65, sd = 10.56, 95% ci = -13.08 to -2.22	t (36) = 0.70, p = 0.49
Difference in SF-12 (physical health scores):	
Abstinent: mean = 3.26, sd = 10.28, 95% ci = -1.41 to 7.94	
Not abstinent: mean = 1.96, sd = 14.49, 95% ci = -5.49 to 9.42	t (36) = -0.32, p = 0.75
Difference in SF-12 (mental health) scores:	
Abstinent: mean = 15.96, sd = 11.28, 95% ci = 10.83 to 21.10	
Not abstinent: mean = 12.59, sd = 15.73, 95% ci = 4.50 to 20.68	t (36) = -0.77, p = 0.45

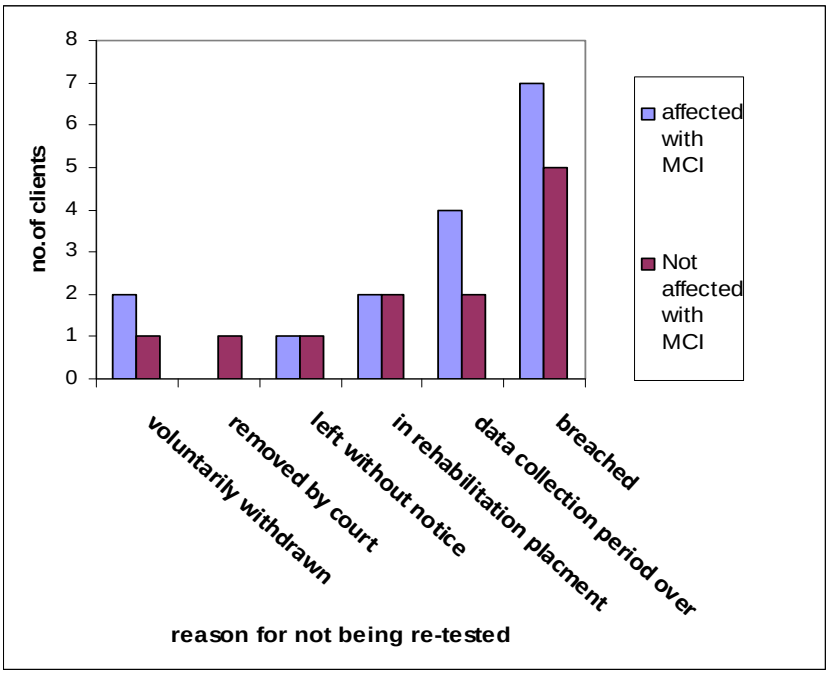
Table 7: Associations between MoCA scores and abstinence at initial and re-test.

Change in MoCA between test and re-test	FALSE	TRUE	TOTAL
Affected for MCI at initial and re-test	7	5	12
	4.8	7.3	12.0
Unaffected for MCI at initial and re-test	5	4	9
	3.6	5.4	9.0
Improved from affected for MCI at initial to unaffected at re-test	5	20	25
	9.9	15.1	25.0
Declined from not affected for MIC at initial to affected at re-test	2	0	2
	0.8	1.2	2.0
Total	19	29	48
Fisher's exact =0.02	20	30	48

Table 7 shows abstinence at re-test verses change in MCI from initial to re-test. Counts are shown with expected values in this table instead of column percentages. The fisher's exact p-value was 0.02.

A fisher's exact chi square was performed showing there was a statistical significant relationship between substance abstinence and MCI: findings were 25% of those with MCI were abstinent while in the group without MCI 70% were abstinent. The relative risk of having MCI is 0.36 when abstinent compared to using drugs ("p= 0.02 : FET").

Figure 5:
Highlights the MCI status at initial screen with the MoCA and reasons why participants did not proceed to being re-tested. The largest proportion of participants not available for re-test was the group that was breached (removed by Court for non-compliance) with over half of these participants in this group in the affected range for MCI.



Discussion

The purpose of this study is to identify whether abstinence from illicit substances improved cognition, and to solidify the MoCA as an instrument that could have a place in the AOD clinical domain. In undertaking this study it was not envisaged that screening for MCI and quality of life indicators would have such a close relationship. This study however showed a clear relationship between treatment retention and better physical and mental health outcomes. This study showed that there is a relationship between abstinence and cognitive performance. Those whose cognition improved were more likely to be abstinent at re-test and those who did not improve on cognition were more likely to not be abstinent.

Over half the sample (54%) in this study scored in the affected range for MCI at initial testing. This may give the impression that the prevalence of MCI in this sample is high. However, differing evidence on the severity of cognitive impairment in the initial period of abstinence suggests that the period of one to three weeks of abstinence is an inappropriate or sensitive time for testing cognition, irrelevant of instrument used. Prevalence testing in this time frame could be skewed by the fact that substance withdrawal and associated signs and symptoms can make cognition look worse than it actually is [4, 6, 24]. Therefore it is the re-test score of the abstinent sample that offers the most genuine prevalence percentage, due to participants being past the three week time frame for testing cognition. Such a percentage in any clinical setting supports the assertion that clinicians are missing the subtle presentations of MCI if validated screening tools are not being used. Clinically for an index of suspicion to be raised, more obvious signs of MCI would need to be present, however this is not usually the case. Unless appropriate questioning or screening tools are administered the nuances associated with MCI can be missed as would have been the case clinically with this sample if not for this research.

This study provides new evidence, as well as supports previous evidence that MCI is easy to miss clinically. The evidence suggested in this study's results is the prevalence of MCI in the abstinent re-test sample, which was 19.2%. This supports the conclusions of previously discussed literature that AOD clinicians are missing clients affected with MCI due to not screening. The additional interesting clinical question is "if the subtle presentations for MCI are being missed due to lack of screening then what are the associated behaviours being mislabelled as?" This question is relevant in that there is a clinical ripple effect if accurate screening for MCI is not undertaken initially. Drug and alcohol treatment providers infrequently assess cognitive ability independent of suspected organic impairment in contrast to their mental health counterparts who routinely make use of measure of cognitive ability as a part of initial assessments. In addition to influencing response to treatment, cognitive ability also may influence the extent to which clients become engaged in treatment [3].

Of clinical interest it is worth noting that 16% of the sample identified as Aboriginal. An Australian Institute of Health and Welfare report in 2010 noted that the proportion of AOD treatment episodes of participants who identified as Aboriginal or Torres Strait Islander in NSW was 11% and nationally 13% [61]. In addition it reflects Indigenous people being overrepresented in the criminal justice system [60]. This point has relevance as AOD staff in gaols are few in numbers therefore any screening tool that can expediate their already time pressured work could be of great benefit. The MoCA can be a useful tool for this type of AOD work in a correctional setting as it has good validity for socioeconomically disadvantaged clients and poorly educated marginalised groups [61].

The major finding from this study was that abstinence improved cognitive function. Results indicate that time in structured treatment achieves improvement in non-abstinent participants as well, but a greater and more significant improvement for those who achieve abstinence. On the basis of these results it is probably worth considering that abstinence alone is not the key factor in achieving improvement in cognitive function but when combined with retention in treatment, greater and more significant improvements can be seen.

It is noteworthy that treatment readiness has been found an effective measure of treatment engagement. Similarly, more positive expectations about the future has been shown to be associated with more positive treatment outcomes, suggesting that those people with lower cognitive ability may be at risk for poorer treatment outcomes than those with higher cognitive ability [4]. 'Pre-contemplators' delayed recall scores at initial test yielded significantly lower scores on the MoCA than the other 'action' and 'contemplator' groups. Over 70% of the initial screened sample was in the action or contemplation stage for change. The 'pre-contemplators' reflect a small percentage which in turn supports the type of client that is directed into diversion programs. It is common that offenders directed into Court diversion programs are repeat offenders and usually have tried some form of AOD treatment in the past [44].

It is difficult to anticipate what the re-test scores of the group who were only initially screened may have been. What is known is that over half of this group scored in the affected range for MCI. Perhaps limited cognition contributed to some of this group's exit early from structured treatment [21]. This initial screening MoCA score could provide an additional mechanism of identifying those in need of additional support.

The relationship between the K-10 score and SF-12 score for mental health was inverse and negatively correlated at r=-0.726. This indicates that as SF-12 MH re-test scores increased, K-10 re-test scores decreased. This finding has clinical significance in that it confirms the overall aim of a case management program like MERIT. Being able to clearly identify that as emotional health improves psychological distress decreases. This decrease means that a participant has greater potential to address issues that may have contributed to poor health and high emotional stress, like drug and alcohol use and its associated lifestyle.

The role of abstinence in the facilitation of cognitive repair is not well understood. Initial improvement may be rapid following cessation, and continue in the following weeks, months or years. The rate and amount of improvement reached will vary with

the type of processing involved, and the age of the individual, as well as other traumatic brain injury. Other factors thought to mediate cognitive recovery relate to general health and environmental factors, like nutrition and exposure to social and cognitive stimulation [11, 21, 24]. Results in this study however provide further support to existing literature outlining the brain's plasticity and ability in some cases to self- repair when drug and alcohol use ceases [30]. In addition it is fair to acknowledge that whilst there is no statistically significant relationship with abstinence and quality of life measures, there are so many other variables not measured in this study, such as individualised case planning, clinician and client therapeutic relationship and the role of reduced use rather than abstinence.

Limitations

Unmeasured variables (as mentioned above) and others like personality traits, resilience, emotional intelligence and previous capabilities regarding change process could have impacted on the outcome variable. A major variable that was difficult to measure was the impact of the different way treatment was delivered within the MERIT structure. It was not within the scope of this study to examine all of these variables.

Using the same MoCA instrument for an initial and re-test study could mean that repeated testing could lead to a learning effect. Designers of this instrument have acknowledged this and validated two alternative English versions of the MoCA and two French versions. Suitable alternative versions were not available for use at the time this study commenced, although studies have shown that re-test validity was acceptable [2, 3].

Many studies suggest that impaired cognition is related to poorer treatment outcomes. This study acknowledges that a limitation may be the unknown baseline measurement of cognitive ability before a person's drug and alcohol use. Without having such a starting point means that it could be more difficult to pinpoint causal inferences.

Strengths

Generalisability can be considered high, as all but one of the potential sample agreed to participate in this study. Other strengths were reaching the power sample for numbers of participants and the fact that established and validated instruments were used. Applicability to other MERIT services and community drug and alcohol settings would be high regardless of rurality.

Future scope:

Replication of this study in an in-patient rehabilitation setting may have certain benefits. Firstly, a live-in sample means that all participants at re-test would be abstinent due to regular urine drug screening and expulsion if found not to be abstinent. Secondly, as most rehabilitation settings have a minimum treatment time of three months and maximum of seven to nine months, the time of initial testing could be beyond the sensitive early abstinence time previously discussed. This allows for a greater amount of initial abstinent time therefore provides a clearer baseline measurement. Having a re-test time that could be delayed longer not only provides a greater period of abstinence but should also cull out MCI that is transitory in nature.

All MERIT participants showed improvements in cognition as a result of completing their treatment episode. These improvements were noted regardless of abstinence, however being abstinent and completing treatment showed the greatest health benefits.

This study has implications for practise within the AOD field, even a short timed framed program like MERIT, as referral and aftercare are integral parts of case management. Screening for MCI after the first three weeks following abstinence could be pivotal for treatment outcomes not only for accurate screening results but for treatment planning and referral. Identifying MCI will inform treatment planning and outcomes regarding change at all levels, not just drug and alcohol use. Part of knowing an individual's capabilities and limitations means that achievable goals can be incorporated into daily life which will increase a client's chance for abstinence to be achieved and quality of life to improve.

Conclusions

There are two areas where clinicians in the drug and alcohol field could make use of a screening instrument like the MoCA. Firstly with non-abstinent participants, the provision of a baseline score could be used to guide the clinician in treatment planning for that time. Secondly, a score of a non-abstinent participant could be used as a motivational tool to shift drug and alcohol patterns, whether it is reduction or abstinence.

Understanding and using the participant's capability is paramount for change, assisting the participant to develop a relationship with the 'self' around change and it's complex role in addiction is layered but can be life changing for the participant and fulfilling for the clinician.

Finally, instruments like the Kessler-10 and SF-12 are worthwhile tools to assist in measuring change. Changes in quality of life scores from these instruments are often more tangible to a participant than a numerical score. Evidence based tools are important in navigating a field like the AOD field as all too often clients relapse partially because they are either unaware, unfamiliar or unhappy with their change process.

MCI is an area that is not well documented or researched in the AOD field yet sufferer's descriptions of poor memory, forgetfulness, being dumb or damaged is a recurrent theme in the client's narrative. The MoCA can provide a concrete, positive motivator for a client group that is notoriously difficult to motivate. The MoCA also provides the clinician with a starting point for investigating MCI, with such ease it could be administered on all AOD clients at the appropriate time. Screening for MCI therefore can assist in the client's story being backed up by an evidence based intervention. This coupled with a genuine commitment for client's to 'feel better' the AOD clinician now has a clearer map for clinical practice than ever before.

Recommendations

Screening for MCI should be an integral part of the drug and alcohol initial assessment. In order to implement screening as routine practice, all staff in the drug and alcohol field require training regarding;

1. What is the MoCA and why it could benefit AOD clients
2. What are the benefits of applying the MoCA for clients and clinicians?
3. How to administer and score the MoCA
4. What is required when MCI is identified?

The recommendations outlined are not only achievable but have the potential to enhance the AOD assessment, improve the clinician skill base and most importantly represent a client group that traditionally are treated as 'less than'.

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Appendix 1

CETI
CLINICAL EDUCATION & TRAINING INSTITUTE
RURAL DIVISION

Screening for
Mild Cognitive Impairment- Using the MoCA
Information sheet

Principal Researcher: Kate Willock (Senior Case Manager) MERIT program Lismore,
Tel: 66207650
Associate Researcher: Michelle Daly (Acting MERIT Manager)
Data Supervisor: Dr. Stephen Kermode (Associate Professor in Health Sciences, Southern Cross University, Lismore)

You are invited to take part in a study about alcohol and other drugs and how they affect your thinking. Your information is valuable in helping us understand how to prevent illness and promote wellbeing. As well as this written information about the study, a MERIT staff member will describe the study and answer your questions. If you agree to participate in this study you will be asked to complete a brief 10 minute questionnaire in the company of a MERIT staff member in week 2. This will be used as a baseline. The questionnaire will be done again in week 8 of your time on MERIT. The name of the questionnaire is the Montreal Cognitive Assessment Tool; you will hear it called the 'MoCA'. After doing the second questionnaire the MERIT worker will discuss all results with you. If the questionnaire shows there is a need for further follow up or testing you will be offered referral to a general practitioner.

We also ask your consent to include in this study some information such as age, gender, main drug of concern and other health-related information. This will not be any extra work for you as you have already provided this information at the MERIT assessment, the first long appointment you had with a MERIT staff member face-to-face. Such information could prove valuable in working out what helps your thinking improve, or what areas MERIT could assist better with.

Any of your information used for the purpose of this study will remain confidential. Names will not be used in the study and a number will identify people. There is a plan that the results of this study will be published in a relevant journal. In any publication, information will be provided in such a way that you cannot be identified.

Whether you decide to participate or not, your decision will not affect your treatment with North Coast Area Health Services now or in the future. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without prejudice. If you decide to participate in the survey you will be required to complete the consent form.

The NCAHS Human Research Ethics Committee has approved this research project. Any complaints or concerns about this research project may be made to the NCAHS Human Research Ethics Committee through the Research Ethics Officer as follows: Research Ethics Officer NCAHS Human Research Ethics Committee PO Box 126 Port Macquarie NSW 2444 Tel:(02) 6588 2941 Fax:(02) 6588 2942 Email: EthicsNCAHS@ncahs.health.nsw.gov.au
The Research team consists of Kate Willock, Michelle Daly, Kevin Roberts and Dr Stephen Kermode.

Appendix 2

CETI
CLINICAL EDUCATION & TRAINING INSTITUTE
RURAL DIVISION

Screening for Mild Cognitive Impairment-Using the MoCA.

Consent Form

We are looking for your consent to participate in this research.
Please remember your decision to participate is voluntary; you do not have to consent if you do not wish to participate. If you decide not to participate you do not have to give a reason.

I would like to volunteer to be part of the project looking at how alcohol and drugs can affect thinking.
I understand that this means:

- I have read the information sheet and understand the purpose of the research and any benefits and risks have been explained to me by the researcher.
- I am aware that the research will involve completing the same questionnaire twice: One as soon as I am given permission from the Court to start MERIT (week 2) and another in week 8 of my time on MERIT.
- I give permission for the research team to have access to some of the information I provided when I was assessed for MERIT such as age, gender, drug use and treatment and my general health.
- I understand that as part of the study any information collected about me as well as my personal details is confidential and that neither my name nor any other identifying information will be published.
- I understand that I am free to withdraw from the study at any time. If I wish to withdraw I should contact any of the research team to let them know. If I withdraw this will not affect my relationship with the researchers or with the MERIT program, and will not affect any health care treatment that I receive now or in the future.
- I have read and understood the written explanation provided to me on the participant information sheet and have been given this sheet to keep.
- I can lodge a complaint about the research project by writing to the NCAHS Human Research Ethics Committee PO BOX 126 Port Macquarie NSW 2444 or phoning Tel: 02 6588 2941
- I can contact Kate Willock or Michelle Daly on 66207650 at any time (business hours) if I have questions to ask or comments to make.
- I will receive a summary report on the results of the findings of this project if I request it

I have read the information above and agree to participate in the study

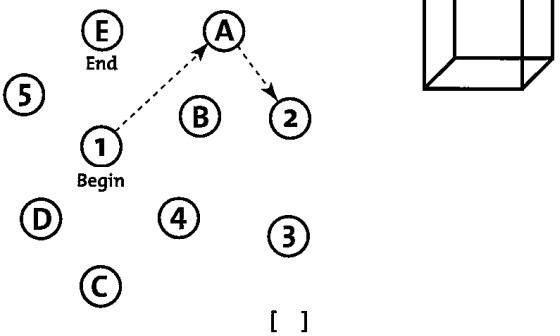
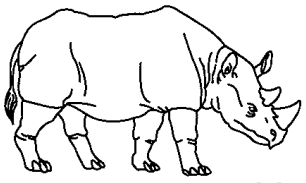
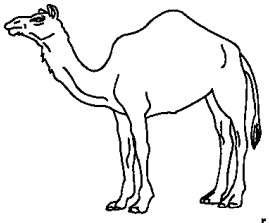
Name:_____

Signature:_____Date:_____

Appendix 3

MONTREAL COGNITIVE ASSESSMENT (MOCA)

NAME :
Education : Date of birth :
Sex : DATE :

		POINTS
VISUOSPATIAL / EXECUTIVE	 [ ] Copy cube [ ]	Draw CLOCK (Ten past eleven) (3 points) [ ] Contour [ ] Numbers [ ] Hands	__/5
NAMING	 [ ]  [ ]  [ ]	__/3
MEMORY	Read list of words, subject must repeat them. Do 2 trials. Do a recall after 5 minutes.		FACE	VELVET	CHURCH	DAISY	RED	No points
		1st trial						
		2nd trial						
ATTENTION	Read list of digits (1 digit/ sec.). Subject has to repeat them in the forward order [ ] 2 1 8 5 4 Subject has to repeat them in the backward order [ ] 7 4 2	__/2
	Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors [ ] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B	__/1
	Serial 7 subtraction starting at 100 [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65 4 or 5 correct subtractions: **3 pts**, 2 or 3 correct: **2 pts**, 1 correct: **1 pt**, 0 correct: **0 pt**	__/3
LANGUAGE	Repeat : I only know that John is the one to help today. [ ] The cat always hid under the couch when dogs were in the room. [ ]	__/2
	Fluency / Name maximum number of words in one minute that begin with the letter F [ ] ____ (N ≥ 11 words)	__/1
ABSTRACTION	Similarity between e.g. banana - orange = fruit [ ] train – bicycle [ ] watch - ruler	__/2
DELAYED RECALL	Has to recall words WITH NO CUE	FACE [ ]	VELVET [ ]	CHURCH [ ]	DAISY [ ]	RED [ ]	Points for UNCUED recall only	__/5
Optional	Category cue							
	Multiple choice cue							
ORIENTATION	[ ] Date [ ] Month [ ] Year [ ] Day [ ] Place [ ] City	__/6

© Z.Nasreddine MD Version 7.0 www.mocatest.org Normal ≥ 26 / 30

TOTAL __/30
Add 1 point if ≤ 12 yr edu

Administered by: _____

Appendix 4

READINESS TO CHANGE QUESTIONNAIRE *NAME:*

The following questionnaire is designed to identify how you personally feel about your drug using right now. Please read each of the questions below carefully, and then decide whether you agree or disagree with the statements. Please tick the answer of your choice to each question. Your answers are completely private and confidential.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Official Use only
1. I don't think I use drugs too much.	☐	☐	☐	☐	☐	P
2. I am trying to use drugs less than I used to.	☐	☐	☐	☐	☐	A
3. I enjoy my drug using, but sometimes I use too much.	☐	☐	☐	☐	☐	C
4. Sometimes I think I should cut down my drug using.	☐	☐	☐	☐	☐	C
5. It's a waste of time thinking about my drug using.	☐	☐	☐	☐	☐	P
6. I have just recently changed my drug using habits.	☐	☐	☐	☐	☐	A
7. Anyone can talk about wanting to do something about drug using, but I am actually doing something about it.	☐	☐	☐	☐	☐	A
8. I am at a stage where I should think about using less drugs.	☐	☐	☐	☐	☐	C
9. My drug using is a problem sometimes.	☐	☐	☐	☐	☐	C
10. There is no need for me to think about changing my drug using.	☐	☐	☐	☐	☐	P
11. I am actually changing my drug using habits right now.	☐	☐	☐	☐	☐	A
12. Using less drugs would be pointless for me.	☐	☐	☐	☐	☐	P

Scoring the Readiness to Changes Questionnaire
Quick Method

The Precontemplation items are numbers 1, 5, 10 and 12, the Action items are 2, 6, 7 and 11. All items are to be scored on a 5 point rating scale ranging from Contemplation items are 3, 4, 8 and 9:

-2	Strongly disagree
-1	Disagree
0	Unsure
+1	Agree
+2	Strongly Agree

To calculate the score for each scale, simply add the item score for the scale in question. The range of each scale is –8 through 0 to +8. A negative scale scores reflects an overall disagreement with items measuring the stage of change, whereas a positive score represents overall agreement. The highest scale score represents the Stage of Change Designation.

Note: If two scale scores are equal, then the scale farther along the continuum of change (precontemplation – Contemplation – Action) represents the subject's Stage of Change Designation. For example, if a subject scores 6 on the Precontemplation scale, 6 on the Contemplation scale and –2 on the Action scale, then the subject is assigned to the contemplation stage.

Note that positive scores on the Precontemplation scale signify a *lack* of readiness to change. To obtain a score for Precontemplation which represents the subject's degree of readiness to change, directly comparable to scores on the Contemplation and Acton scales, simply reverse the sign of the Precontemplation scores (see below).

If one of the four items on the scale is missing, the subject's score for that scale should be pro-rated (ie. Multiplied by 1.33). If two or more items are missing, the scale score cannot be calculated. In this case the Stage of Change Designation will be invalid.

Scale Score		Readiness to Change		
Pre Contemplation		Precontemplation		(Reverse score)
Contemplation Score		Contemplation		(Same Score)
Action Score		Action		(Same Score)
Stage of Change Designation (P, C or A)				

NB. For the refined method of Stage allocation, see User's Manual (revised version).

Appendix 5

Psychological Adjustment: Kessler-10 Please Circle Numbers

Please circle appropriate column for each question

In the past 4 weeks...	None of the time	A little of the time	Some of the time	Most of the time	All of the time
1. How often have you felt tired for no good reason?	1	2	3	4	5
2. How often have you felt nervous?	1	2	3	4	5
3. How often have you felt so nervous that nothing could calm you?	1	2	3	4	5
4. How often have you felt hopeless?	1	2	3	4	5
5. How often have you felt restless or fidgety?	1	2	3	4	5
6. How often have you felt so restless that you cold not sit still?	1	2	3	4	5
7. How often have you felt depressed?	1	2	3	4	5
8. How often have you felt that everything was an effort?	1	2	3	4	5
9. How often have you felt so sad that nothing could cheer you up?	1	2	3	4	5
10. How often have you felt worthless?	1	2	3	4	5

Total	

Appendix 6

Physical/Mental Health: SF-12

Your Health and Well-Being

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

For each of the following questions, please select the one response that best describes your answer.

1. In general, would you say your health is:

Excellent…..…….	1
Very Good……..……	2
Good……..	3
Fair……..	4
Poor ……...…….	5

The following two questions are about activities you might do during a typical day. Does YOUR HEALTH NOW LIMIT YOU in these activities? If so, how much?

2. MODERATE ACTIVITIES, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf:

Yes, Limited A Lot……	1
Yes, Limited A Little….	2
No, Not Limited At All..	3

3. Climbing SEVERAL flights of stairs:

Yes, Limited A Lot……	1
Yes, Limited A Little….	2
No, Not Limited At All..	3

During the PAST 4 WEEKS have you had any of the following problems with your work or other regular activities AS A RESULT OF YOUR PHYSICAL HEALTH?

4. ACCOMPLISHED LESS than you would like:

Yes ……..…….	1
No ……..	2

5. Were limited in the KIND of work or other activities:

Yes ……..…….	1
No ……..	2

During the PAST 4 WEEKS, were you limited in the kind of work you do or other regular activities AS A RESULT OF ANY EMOTIONAL PROBLEMS such as feeling depressed or anxious?

6. ACCOMPLISHED LESS than you would like:

Yes ……..……	1
No …….……..	2

7. Didn't do work or other activities as CAREFULLY as usual:

Yes ……..……	1
No …….……..	2

8. During the PAST 4 WEEKS, how much did PAIN interfere with your normal work including both work outside the home and housework?

Not At All …….	1
A Little Bit …….	2
Moderately …….	3
Quite A Bit ……...……	4
Extremely …….	5

The next three questions are about how you feel and how things have been DURING THE PAST 4 WEEKS.

For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the PAST 4 WEEKS –

9. Have you felt calm and peaceful?

All of the Time……..	1
Most of the Time……..	2
A Good Bit of the Time	3
Some of the Time…….	4
A Little of the Time…..	5
None of the Time…….	6

10. Did you have a lot of energy?

All of the Time……..	1
Most of the Time……..	2
A Good Bit of the Time	3
Some of the Time…….	4
A Little of the Time…..	5
None of the Time…….	6

11. Have you felt downhearted and blue?

All of the Time……..	1
Most of the Time……..	2
A Good Bit of the Time	3
Some of the Time…….	4
A Little of the Time…...	5
None of the Time…….	6

12. During the PAST 4 WEEKS, how much of the time has your PHYSICAL HEALTH OR EMOTIONAL PROBLEMS interfered with your social activities like visiting with friends, relatives, etc.?

All of the Time……..	1
Most of the Time……..	2
Some of the Time…….	3
A Little of the Time…...	4
None of the Time…….	5