Cognitive function and traumatic brain injury in refugees and asylum-seekers attending mental health services – a preliminary study

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Dedicated in loving memory to my father, Alastair.

Your star shines on.

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Validity of the translated and modified Mini-Mental State Examination within South, East, and South East Asian countries

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SUMMARY

Objective: Approximately 16 million people with dementia live in low-economy countries; however, most cognitive screens have been developed in Western societies. This review considers studies that have validated the Mini-Mental State Examination (MMSE), the most commonly used cognitive screen, in native languages spoken in Asia, and explores its validity for illiterate or poorly-educated individuals.

Methods: Studies included in the review were identified by searching electronic databases (Ovid MEDLINE, EMBASE, PsycINFO and Web of Science), reviewing the reference lists of included articles and hand-searching a key journal. Included were studies that attempted to validate the MMSE in South, East and South East Asia. Eligible studies were rated for methodological quality using a rating scale devised for this review.

Results: Nine studies were eligible for inclusion; their quality was rated as high for 3, moderate for 4, and low for 2 studies. The MMSE was translated and validated in 5 languages across 6 countries. Cut-offs for impairment ranged from 17-24, which yielded wide-ranging sensitivity (83.87-100%) and specificity (60.6-100%).

Conclusion: Translations of the MMSE are valid and reliable to screen for cognitive impairment; however, these results cannot be generalised due to limited reporting on the severity of dementia. There were mixed results regarding the validity of the MMSE to detect cognitive impairment in illiterate or poorly-educated people.

Keywords: Systematic review, MMSE, translation, validity, South East Asia

INTRODUCTION

Cognitive impairment ranges in severity, can occur at any point in a person's lifetime, and can result in difficulties remembering, learning new concepts, concentrating, or making decisions about everyday life. Mild cognitive impairment (MCI) is defined as the objective and subjective decline in cognition and function, which is greater than expected for an individual's age and level of education. An individual with MCI does not meet the criteria for a diagnosis of dementia (Peterson, 2004). There are multiple causes of cognitive impairment, including acquired and traumatic brain injuries (TBI), strokes, diabetes, hypertension, and the ageing process itself (Manly *et al.,* 2005). Every year, approximately 10 million people are affected by a TBI. The World Health Organisation states that by 2020, TBIs will become the biggest cause of death and disabilities worldwide (Hyder *et al.*, 2007). Severe cognitive impairment results in more profound difficulties, which include a diagnosis of dementia.

It is recommended that for all patients presenting with cognitive complaints, a brief cognitive screen is administered to assess the presence and severity of any memory or cognitive deficits (Jacova *et al.,* 2007). There are a number of screening measures which aim to highlight genuine cognitive impairment. Cullen *et al.* (2007) highlight that the following six core domains should be covered in a screening tool: attention/working memory, new verbal learning/recall, expressive language, visual construction, executive function, and abstract reasoning. High sensitivity (the proportion of people with cognitive impairment with a positive result), and high specificity (the proportion of people without cognitive impairment with a negative result; Cullen *et al.,* 2007) are important to establish the validity of a screening measure (O'Bryant *et al.,* 2008). However, the diagnostic utility of a particular person's score is represented by the screen's predictive values. Positive

predictive values (PPV) represent the probability that a person who has scored below the cut-off in a hypothetical population is actually cognitively impaired, while negative predictive values (NPV) represent the probability that a person who has scored above the cut-off is not cognitively impaired (O'Bryant *et al.,* 2008).

Clinical surveys indicate that there is no single cognitive screen adequate for all purposes; however, the Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975) is most commonly used in practice (Shulman *et al.,* 2006). Benefits of the MMSE, and other measures such as the Addenbrooke's Cognitive Examination-Revised (ACE-R; Moishi *et al.,* 2006) and the Montreal Cognitive Assessment (MoCA; Nasreddine *et al.,* 2005) include their brevity (8–16 minutes to administer) and minimal training requirements for the administrator.

There are many screening measures for cognitive impairment. However, most of these have been developed in Western societies (Chui & Lam, 2007), and few are validated in the populations in which they are subsequently used (Cullen *et al.,* 2007). Steis and Schrauf (2009) reviewed twenty translations and adaptations of the MMSE worldwide, highlighting the breadth of its use and the importance of education and literacy. However, their review did not discuss the validity of these studies (see Appendix 1.1 for critique).

When using screening measures in populations other than the population in which it was developed and validated, it is important to focus on the methods of translating the measure into another language and validating this translated scale (Auer *et al.,* 2000). During translation, linguistic and cultural differences should be investigated (Chui & Lam, 2007), and translators should be aware of the underlying concepts of the scale, and make

adjustments accordingly (Auer *et al.,* 2000). Auer *et al.* (2000) highlight that simple translation mistakes can lead to misinterpretation of results. To assure linguistic accuracy of a translation, a professional translator or bilingual expert should undertake the translation, with a different translator performing a back-translation into the original language, and both parties analysing any discrepancies. Furthermore, as the MMSE is influenced by literacy and education (Weiss *et al.,* 1995), it is imperative that researchers modify the MMSE to ensure its applicability in illiterate and poorly-educated populations.

Initially, this review intended to explore the validity of the MMSE, ACE and MoCA in non-Western countries. However, as the search revealed thirty-eight potentially relevant articles, the research questions were amended to focus on the MMSE, being the most widely used measure (Shulman *et al.,* 2006). The geographical regions of South, East and South East Asia (United Nations Statistics Division, 2013) were selected as this accounted for two-thirds of the identified MMSE validation studies.

While there are many screening measures for cognitive impairment, most have been developed in Western societies (Chui & Lam, 2007), and few are validated in the populations in which they are subsequently used (Cullen *et al.,* 2007). Therefore, it is important that screening measures differentiating individuals who are cognitively impaired from those who are not, are validated in non-Western societies (Xu *et al.,* 2003). This review aimed to identify studies that have validated translated versions of the MMSE in native languages spoken in South, East and South East Asia, and explore the validity of the MMSE for illiterate or poorly-educated individuals.

Research questions

1. To what extent is the MMSE validated in native languages spoken in South, East and South East Asia?

2. To what extent is the MMSE validated for illiterate or poorly-educated individuals in these countries?

METHODS

Search strategy

Relevant studies were identified by searching the following electronic databases:

- Ovid MEDLINE(R) In-Process and Other Non-Indexed Citations (1946-31.10.13)

- EMBASE 1947 – Present, updated daily (1947-31.10.13)

- PsycINFO (1987-31.10.13)

- Web of Science (1990-31.10.13)

The following terms were entered in text-word searches in the above databases:

- (neuropsychol* test* OR psycholog* test* OR psychometric* OR neuropsychol* assessment* OR psycholog* assessment* OR cognit* assessment* OR cognit* test* OR psychometric* assessment* OR psychometric* test* OR screening assessment* OR screening tool*)

- (Mini mental state exam OR MMSE OR Mini mental state OR Addenbrooke*s Cognitive Examination OR Addenbrooke*s Cognitive Examination Revised OR Addenbrooke*s Cognitive Examination III OR ACE OR ACE-R OR ACE-III OR The Montreal Cognitive Assessment* OR MoCA)

- (valid* OR reliab* OR validation stud* OR cross-cultural valid*)

- (cross-cultural comparison* OR cross-cultural diversit* OR cross-cultural difference* OR cross-cultural psycholog* OR cross-cultural neuropsychol* OR ethnic group*)

The four text-word searches were then combined using the Boolean operator AND.

These databases were searched using the same terms, matched to the database thesaurus:

- Ovid MEDLINE(R) In-Process and Other Non-Indexed Citations (1946-31.10.13)

- EMBASE 1947 – Present, updated daily (1947-31.10.13)

- PsycINFO (1987-31.10.13)

In addition, the reference lists of included articles were searched, as was the contents page from the key journal *International Journal of Geriatric Psychiatry* from 2009-2013. This journal was chosen as it published four of the nine articles included in this review.

The above search strategy was developed by the researcher (see Appendix 1.2 for more detail). The researcher made decisions to include and exclude studies based on the following selection criteria.

Selection criteria

Studies identified by the search were then screened for relevance. Studies were eligible for inclusion if they met the following criteria:

- Participants aged >17 years

- Title and abstract in English

- Validated a translated version of the MMSE

- Related to cognitive impairment for any neurological diagnosis

- Conducted in the participant's native language

- Conducted in South, East and South East Asia

Studies were excluded if they were unpublished dissertation articles or conference abstracts.

Mini-Mental State Examination

The MMSE is a widely used, valid and reliable screen for cognitive impairment in adults aged between 18 and 85 (Folstein *et al.,* 1975). It includes eleven questions and assesses attention/working memory, new verbal learning/recall, expressive language, visual construction and executive function. The maximum score is 30. In American patients under 60 with at least eight years education, a cut-off above 23 has been recommended as indicating normal function, with scores of 0-23 indicating cognitive impairment (Anthony *et al.,* 1982). However, in an Irish community sample aged over 65 years, with a range of 0-14+ years of education, a cut-off above 22 was found to be optimal (Cullen *et al.,* 2005).

Assessment of methodological criteria

The author devised a rating scale to assess the quality of the studies. The scale was based on the Standards for Reporting Diagnostic Accuracy checklist (STARD; Bossuyt *et al.,* 2004) which was designed to help readers judge the potential for bias in a study and appraise the generalisability of findings. The structure of the STARD checklist was adhered to; the title/abstract, introduction, methods, results and discussion of each article were assessed. Some items were removed and others added to ensure translation and cultural adaptation, cut-offs, sensitivity and specificity were assessed. In this review,

sensitivity and specificity have been described as good (90-100%), adequate (70-89%) and poor (<69%).

The rating scale had twenty-seven items, of which twenty had a maximum score of one, and seven had a maximum score of two, resulting in a maximum score of thirty-four (Appendix 1.3). To review the scale's reliability, another Trainee Clinical Psychologist second-rated five articles. Of the five papers rated, there was no difference on two and a difference of one point on three (Appendix 1.4/1.5). Overall, agreement was high (92%); disagreements were resolved by discussion.

RESULTS

Search results

After removing duplicates, 163 potentially relevant references were identified. Of these, 125 were deemed ineligible on the basis of title and/or abstract. Thirty-eight original articles were obtained. Due to the number of articles, the research question was refined to focus on the MMSE within South, East and South East Asia, which excluded a further sixteen papers. Twenty-two papers were read in full to determine relevance. Of these, nine studies were included which explored the validity of the MMSE within the specified geographical regions. Figure 1 illustrates the selection process.

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┌────────────────────────────────────────────────────────────────────┐
│                              N=218                                   │
│  potentially relevant references identified from electronic          │
│  databases (N=199) and hand search (N=19); eligible for              │
│  screening by title/abstract                                         │
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                          ┌─────────────────────────────────┐
                          ┊              N=55               ┊
                          ┊  references excluded as          ┊
                          ┊  duplicates                      ┊
                          └─────────────────────────────────┘

                          ┌─────────────────────────────────┐
                          ┊              N=125              ┊
                          ┊  references excluded after       ┊
                          ┊  screening by title (N=120) or   ┊
                          ┊  abstract (N=5)                  ┊
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│                              N=38                                    │
│              potentially relevant references                        │
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                          ┊              N=16               ┊
                          ┊  references excluded after       ┊
                          ┊  revising research question (not ┊
                          ┊  using the MMSE (N=12) or        ┊
                          ┊  outside specified geographic    ┊
                          ┊  region (N=4))                   ┊
                          └─────────────────────────────────┘

┌────────────────────────────────────────────────────────────────────┐
│                              N=22                                    │
│   potentially relevant references; eligible for screening by        │
│   full text                                                          │
└────────────────────────────────────────────────────────────────────┘

                          ┌─────────────────────────────────┐
                          ┊              N=13               ┊
                          ┊  references excluded after       ┊
                          ┊  screening by full-text          ┊
                          └─────────────────────────────────┘

┌────────────────────────────────────────────────────────────────────┐
│                              N=9                                     │
│     relevant references; eligible for data extraction               │
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Figure 1. Flowchart of the selection process

Study characteristics

The validation of the MMSE in various rural and urban populations in South, East and South East Asian countries was examined in nine articles (Table 1). All the studies included in the review focussed on dementia. Adaptations of each modified MMSE are detailed in Appendix 1.6. Five of the nine studies were mindful of poorly-educated individuals when modifying the MMSE.

Methodological Quality Rating

The quality of the studies ranged from 52.94–88.24%. High quality articles were rated as greater than 74%; moderate quality as 60-74%; and low quality as less than 59%. Three papers were rated as high quality (Ibrahim *et al.,* 2009; Ansari *et al.,* 2010; de Silva & Gunatilake, 2002), four as moderate quality (Chui *et al.,* 1994; Katzman *et al.,* 1988; Sahadevan *et al.,* 2000; Xu *et al.,* 2003), and two as low quality (Park, Park, & Ko, 1991; Zarina *et al.,* 2007). Effect sizes were not reported in any study; where there was sufficient data, effect sizes were calculated.

Table 1. Demographics table

Authors and country	Quality rating	Language	Number of participants	Healthy controls	Patients with Dementia	Age range *(years)*	Gender *(Female)*	Education	Cut-offs *(< number indicates cognitive impairment)*	Sensitivity	Specificity	Effect Size (Cohen's D)
Ibrahim *et al.* (2009), Malaysia	88.24%	Malay	300	227	73*	57-75	45.80%	Primary: 55.67%; Secondary: 36.33%; Tertiary: 6.33%; Unknown 0.67%.	22	88.5%	75.3%	-2.19
Ansari *et al.* (2010), Iran	82.35%	Persian	113	100	13 (*severe cognitive impairment*)	18-81	55.75%	Uneducated: 4% Educated: 96%	23	98%	100%.	-6.22
de Silva & Gunatilake (2002), Sri Lanka	79.41%	Sinhalese English	380 (31 demented)	Community sample*		65+ (M=68.2; SD=7.17)	66.90%	Illiterate: 5.5%; No formal education 11.6%; < 6 years education: 54.2%.	20	100%	84.6%	Insufficient data to calculate effect size
Chiu *et al.* (1994), China	67.75%	Cantonese	190	111	79 (*moderate-severe dementia*)	60-93 (M=75.1; SD=7.1)	77.37%	Illiterate: 46.3%; Mean=3.5 years school (SD=7.9).	20	97.5%	97.3%	Insufficient data to calculate effect size
Katzman *et al.* (1988), China	67.75%	Chinese	5055	Community sample*		55+	56.28%	Uneducated: 26.7%	18	68.9%	86.6%	Insufficient data to calculate effect size
								Informal/Primary: 36.65%	21	75%.	74.4%.	
								Middle school+: 36.15%	24	100%	71.4%.	
								Unknown: 0.5%.				

* dementia severity not stated
Effect Sizes (difference in scores between two groups)

Table 1. Demographics table (continued).

Authors and country	Quality rating	Language	Number of participants	Healthy controls	Patients with Dementia	Age range *(years)*	Gender *(Female)*	Education	Cut-offs *(< number indicates cognitive impairment)*		Sensitivity	Specificity	Effect Size (Cohen's D)
Sahadevan et al. (2000), Singapore	67.75%	Mandarin Hokkien Teochew English	246	151	95 *Mild: 60%; Moderate: 34.7%; Severe: 5.3%. (Alzheimer's: 50.5%; Vascular dementia: 49.5%)*	60+	57.32%	0-6 years = 60.16% >6 years = 39.84%	*Total MMSE score of 28 - unadjusted cut-offs*				-2.87
									60-74 yrs, 0-6 yrs educated: 21		94%	93%	
									60-74 yrs, >6 yrs educated: 24		93%	87%	
									75 yrs+, 0-6 yrs educated: 19		94%	92%	
									75 yrs+, >6 yrs educated: 23		100%	88%	
Xu et al. (2003), China	64.71%	Chinese	370 (93 demented)	Hospital visitors (number not stated)	Neurology outpatients (number not stated)**	60-89 (M=70.23; SD=6.76)	42.70%	Illiterate: 20% Formal education: 0-10 years (M=4.38, SD=2.80)	Illiterate: 21 Literate: 23		Illiterate: 84.85% Literate: 81.67% Overall: 83.87%	Illiterate: 73.17% Literate: 86.44% Overall: 84.48%	-2.03
Park et al. (1991), Korea	58.82%	Korean	406 (359 recruited, of which, 113 demented)	Psychiatric clinics (N=177), patient's families (N=101), residential home elderly (N=128)*		60+ (M=67.4; SD=5.9)	57.40%	No education: 53.48% Educated: 46.52%	24		92%	91.5%	Insufficient data to calculate effect size
Zarina et al. (2007), Malaysia	52.94%	Malay	185	Residential home elderly*		60+	48.10%	Majority poorly-educated.	17		97.5%	60.6%	Insufficient data to calculate effect size

* dementia severity not stated   **patients with incapacitating dementia excluded from study and patients with severe dementia excluded when calculating cut-offs
Effect Sizes (difference in scores between two groups)

Ibrahim *et al.* (2009) - 88.24%

This study validated the MMSE in an elderly Malaysian population between 2004-2007. Two groups, dementia and neurology outpatients and healthy controls, were matched on age, gender and education, and assessed on the Malay MMSE (M-MMSE). The MMSE was translated and back-translated; minimal adaptations were made. Ibrahim *et al.* compared the M-MMSE-7 (serial 7s) with the M-MMSE-3 (serial 3s) and the M-MMSE-S (spell 'world' backwards). This summary focuses on the M-MMSE-7. A significant difference in M-MMSE-7 performance between genders was found, with healthy male controls performing significantly better than females. This resulted in differing cut-offs calculated for males (24) and females (20). However, when accounting for education, the gender difference only persisted in patients with primary or lower education.

The PPV indicates that a person in this population scoring <22 has a 53.7% chance of having dementia, while the NPV indicates that a person scoring ≥22 has a 95.5% chance of not having dementia. The severity of dementia was not specified, therefore, the implication of dementia severity on cut-offs could not be examined. Ibrahim *et al.* advise that educational levels should be ascertained prior to administering the M-MMSE-7. Ibrahim *et al.* imply that the M-MMSE-7 is a valid and reliable screening tool for dementia within this population.

Ansari *et al.* (2010) – 82.35%

This pilot study validated the MMSE within a Persian-speaking community in Iran. Two groups, patients with Alzheimer's disease (severe cognitive impairment) and healthy controls were assessed on the Persian MMSE (P-MMSE). The MMSE was translated and

back-translated into Persian and externally evaluated for accuracy and cultural appropriateness; minimal adaptations were made. As age increased, P-MMSE scores decreased (Pearson's correlation, r=-0.77; p<0.001). This correlation was significant for each group (r=-0.60; p<0.001 control group; r=-0.67; p=0.01 Alzheimer's group). There was a significant correlation between P-MMSE scores and educational level (Spearman's rho, r=0.46; p<0.001) and this remained significant within groups (r=0.65; p<0.001 control group; r=0.64; p=0.02 Alzheimer's group). There was no significant difference in P-MMSE performance between genders in all participants and within groups.

Ansari *et al.* state that their cut-off of 23 should be considered with caution as they compare extreme groups (healthy versus dementia). As a result, this cut-off may not generalise to those with mild cognitive impairment. Ansari *et al.* found the P-MMSE to validly discriminate for cognitive impairment in the Persian-speaking community. They highlight that a study with a larger sample size would be necessary to further investigate validity and reliability.

de Silva and Gunatilake (2002) – 79.41%

This study validated the MMSE in an elderly Sinhalese speaking Sri Lankan population. This semi-urban community sample consisted of randomly selected participants aged over 65. The MMSE was translated and back-translated and the accuracy and cultural appropriateness of the translation was externally assessed. Several aspects of the MMSE were modified, including modification for illiterate participants; 71.3% of the sample were either illiterate or had 0-6 years of education. A subsection of the sample, 33 participants scoring <18, and 24 randomly selected participants scoring ≥18 completed the Cambridge Cognitive Score, a component of the Cambridge Mental Disorders of the Elderly

Examination (Roth *et al.,* 1986). Cut-offs did not consider the effect of gender or education. The severity of dementia was not specified, therefore, the implication of dementia severity on cut-offs could not be examined. The authors stated that the population characteristics of the participants are representative of the general Sri Lankan population. They conclude that the Sinhalese MMSE is a useful and sensitive instrument to screen for dementia in Sri Lanka.

Moderate quality articles

Chui *et al.* (1994) – 67.65%

This preliminary study explored the reliability and validity of the MMSE in Hong-Kong. Two groups, demented in- or outpatients referred to a psychiatric unit and healthy controls were assessed on the Cantonese MMSE (C-MMSE). The MMSE was translated and back-translated, with several modifications made to ensure cultural appropriateness and guard against poor education. Cut-offs did not consider the effect of gender. Chui *et al.* stated that high illiteracy (46.3%) made it challenging to analyse C-MMSE performance according to education. The reliability of the measure was assessed through test re-test reliability (α=0.78). The canonical correlation, to assess the ability of the C-MMSE to discriminate between normal and demented subjects was 0.94. The discriminant function correctly classified 94.9% of cases in the demented group and 100% of cases in the normal group. Since the dementia group consisted of patients with moderate-severe dementia, results may not generalise to patients with early or mild dementia. The C-MMSE was found to have good reliability and validity to detect cognitive impairment in the Hong-Kong elderly.

<u>Katzman *et al.* (1988) – 67.75%</u>

This study reports findings of a dementia screening survey in Shanghai. The probability sample consisted of community-dwelling individuals aged over 55. The MMSE was translated and back-translated, with several modifications made to ensure cultural appropriateness and guard against poor education. To ascertain whether the Chinese MMSE (CMMS) cut-offs provided sufficient sensitivity and specificity to discriminate between demented and healthy individuals, a sub-sample (N=190) underwent clinical and neuropsychological examinations to obtain diagnoses to compare with CMMS scores. Cut-offs took into consideration education but not gender. Katzman *et al.* highlighted lower CMMS scores among uneducated women than men, which may reflect greater isolation in these women. As age increased, CMMS performance decreased. Limitations include not specifying the dialect of Chinese used or the severity of dementia. Katzman *et al.* concluded that while the CMMS is useful for the general population, further research is necessary to assess cognitive impairment in individuals with no formal education.

<u>Sahadevan *et al.* (2000) – 67.75%</u>

This study explored the validity of the MMSE to detect cognitive impairment associated with dementia in elderly Chinese Singaporeans. The sample consisted of two groups, out-patients with dementia and healthy controls. The Chinese MMSE (CMMSE) was developed by Katzman *et al.* (1988). Sahadevan *et al.* did not describe methods of translating the MMSE. They described modifying the CMMSE; one question was omitted and two questions were combined which reduced the total score to 28. The CMMSE was compared against the translated Abbreviated Mental Test (AMT; Hodkinson, 1972). Specific CMMSE cut-offs were adjusted for age and education, but not for gender. However, by adjusting cut-offs for age and education, the four groups included fewer

subjects. There was no statistically significant difference in the diagnostic accuracy of the CMMSE and the AMT, which may be associated with participants' low education. As 60% of the dementia group had mild dementia, they contend that cut-offs are particularly relevant for the detection of mild dementia. Sahadevan *et al.* believe that the CMMSE validly identified cognitive impairment in an elderly Chinese cohort in Singapore.

Xu *et al.* (2003) – 64.71%

This study adapted the MMSE for dementia screening among illiterate or poorly-educated elderly Chinese. Participants were neurology outpatients or hospital visitors. No details were given regarding the methods of translating the MMSE. Several modifications were made to ensure cultural appropriateness and guard against poor education. In addition to the Chinese MMSE (CAMSE), subjects underwent a comprehensive clinical evaluation. Cut-offs took education into consideration, but not gender. A sub-sample (N=32: N=10 demented; N=22 non-demented) were re-tested on the CAMSE. The test re-test reliability of CAMSE scores after 4-6 weeks was satisfactory (Shearman's rho, r=0.75; p<0.01). The PPV indicates that a person in this population scoring below cut-off has a 61% chance of having dementia, while the NPV indicates that a person scoring above cut-off has a 94% chance of not having dementia. As participants were not followed longitudinally, it is possible that those diagnosed as 'normal' may have developed dementia shortly after their examination. Nevertheless, Xu *et al.* concluded that the CAMSE can be used to screen for dementia in the Chinese elderly, regardless of literacy skills.

Low quality articles

Park *et al.* (1991) – 58.82%

This study was written up in two parts (Park & Kwon, 1990; Park *et al.,* 1991) and detailed the development of the Korean MMSE (MMSE-K), its cut-offs and diagnostic validity. The study took place between September and December 1989. Psychiatric patients, their families, and elderly residential home residents were recruited. The psychiatric patients had a number of diagnoses: the most common were dementia (N=62) and major depression (N=37). Following a brief psychiatric interview and evaluation of their daily activities, family members were deemed "mentally healthy enough". Participants from the residential home were assessed on the Cambridge Examination for Mental Disorders of the Elderly (Roth *et al.,* 1986). While the three groups underwent difference evaluation procedures, Park *et al.* highlight that DSM-III-R criteria (American Psychiatric Association, 1987) were used to diagnose dementia or non-dementia. No details were given regarding the methods of translating the MMSE. Cut-offs did not consider the effect of gender or education. The demented patients were significantly older than the non-demented. The heterogeneous sample and different evaluation procedures of each group are limitations. Park *et al.* concluded that the MMSE-K should be used as a screening tool as opposed to a definite diagnostic tool.

Zarina *et al.* (2007) – 52.94%

This study aimed to validate the MMSE for the Malaysian elderly (M-MMSE). The sample consisted of residential home residents. The MMSE was translated and back-translated into Malay and was externally assessed for accuracy and cultural appropriateness, with minimal adaptations made. The M-MMSE was validated against the Clock Drawing Test (e.g., Juby, Tench, & Baker, 2002). Cut-offs did not consider the effect of gender or education.

Zarina *et al.* refer to a number of tables throughout their article which they do not include. The reviewer was unable to obtain this information from the authors which meant that statistics provided were not contextualised.

Synthesis of reviewed articles

The MMSE has been translated and validated in five languages in South, East and South East Asia (four into Chinese dialects, two into Malay, and one into Persian, Korean and Sinhalese), across six countries. Numbers of participants per study ranged from 113-5055. Five studies used dementia patients versus healthy controls. Although effect sizes were not provided in any article, it was possible to calculate them for four studies. These effect sizes were all large, indicating large differences in the performance of healthy participants compared to people with dementia. Methods of translation were provided in seven studies; with three stating that translation involved external validation of accuracy and cultural appropriateness. MMSE cut-offs ranged from 17-24. Seven studies reported the overall sensitivity and specificity, which ranged from 83.87-100% and 60.6-100% respectively. However, only three studies specified the severity of dementia (mild, moderate-severe, severe) in their sample, with two studies reporting predictive values. One study provided different cut-offs for males and females. Five studies considered education on test performance.

With respect to gender differences, six articles, did not explore the effect of gender on performance. Of the three studies which discussed this, one study found there was no gender difference on MMSE scores, while two studies found a gender difference. Ibrahim *et al.* (2009) found that healthy males performed significantly better than healthy females, although when education was accounted for, a gender difference was present only the

lowest education group. Katzman *et al.*(1988) found a similar finding, in which uneducated women scored lower on the MMSE than their male counterparts.

Validating the MMSE for poorly-educated individuals

This review also explored to what extent the MMSE is valid for illiterate or poorly-educated individuals. All studies mentioned educational levels; some used crude measures of education ('educated' or 'uneducated'), while others provided a detailed breakdown of educational attainment. For non-educated participants, Park *et al.* (1991) adjusted MMSE scores; one point was added to scores for orientation in time and language function, and two points were added to the serial-seven task (Appendix 1.5). Three studies provided adjusted MMSE cut-offs according to education, however, one study used a total MMSE score of 28 as opposed to 30 so cannot be compared to the others (Sahadevan *et al.,* 2000). Cut-offs for participants who were illiterate or had no education were 18 and 20, while cut-offs for those classified as literate and had attended up to 10 years of school ranged from 21-24 (Katzman *et al.,* 1988; Xu *et al.,* 2003). With respect to modification of the MMSE, five studies modified the writing and reading task to guard against impaired performance due to poor education.

Xu *et al.* (2003) reported no significant differences between literate and illiterate demented subjects on the CAMSE total scores, or on any of the individual item test scores (p>0.05). However, for the non-demented subjects, literate subjects had higher CAMSE total scores and serial-seven subtractions than illiterate subjects (p<0.001 for both). Katzman *et al.* (1988) concluded that while the CMMS is useful for the general population, further research is required to assess cognitive impairment in individuals with no formal education due to the significant increase in low scores and the different error pattern.

DISCUSSION

This is the first review to evaluate studies which have translated and validated the MMSE in native languages within South, East and South East Asia. As two-thirds of people diagnosed with dementia live in low-economy countries (Chui & Lam, 2007), it is unsurprising that the studies identified assessed the validity of the MMSE to screen for cognitive impairment and dementia. The nine studies included in the review were published between 1988-2010 and administered the MMSE to a total of 7,198 participants.

The first research question explored to what extent the MMSE is valid in native languages spoken in South, East and South East Asia. The authors of the reviewed articles found the MMSE to be a valid and reliable screening tool for cognitive impairment and dementia in the populations in which they were tested. However, as only three studies specified the severity of dementia within their sample, the context in which these modified versions of the MMSE are useful remains unclear. One study stated the utility of the MMSE as a sensitive tool for mild dementia (Sahadevan *et al.,* 2000). Within Western samples, the MMSE has been found to have reduced clinical utility when assessing mild cognitive decline (Tombaugh & McIntyre, 1992).

The second research question explored to what extent MMSE is valid for illiterate or poorly-educated individuals. Of the three studies which reported specific cut-offs with respect to education, results were mixed as to validity of the MMSE to detect cognitive impairment. Xu *et al.* (2003) found that only the serial-seven subtractions significantly differentiated the performance of literate and illiterate participants. Katzman *et al.* (1988) suggest that illiteracy had a marked effect on CMMS scores, in particular on the reading, drawing and serial-seven items. They question the MMSE's validity in poorly-educated

individuals, arguing that for uneducated individuals, low MMSE scores do not automatically infer cognitive impairment. They advocate for the development of new screening tools designed for individuals with poor education.

In this review, cut-offs ranged from 17-24 for participants who were illiterate, to those who had completed tertiary education. However, for participants who completed at least middle school education (Katzman *et al.,* 1988), or between 0-10 years of formal education (Xu *et al.,* 2003), cut-offs of 24 and 23 were reported respectively. This is largely consistent with Western patients where a cut-off of 24 has been reported for those with at least 8 years of education (Anthony *et al.,* 1982), and 23 for those with a wider range of educational attainment (Cullen *et al.,* 2005). The range of cut-offs highlight the need to interpret the MMSE score in the context of the population in which it is being used. Scazufca *et al.* (2009) found that although the MMSE adequately screened older Brazilian adults with low education, there were extremely high levels of misclassification for illiterate individuals. Interestingly, only one study in this review distinguished cut-offs for literate and illiterate participants (Xu *et al.,* 2003). It may be possible that grouping illiterate and poorly-educated participants masks the variance on MMSE performance.

When a tool is translated and modified for cultural accuracy and poor education, translators should have a detailed understanding of the underlying concepts of the scale (Auer *et al.,* 2000) and explore whether the modified tool sufficiently measures the constructs of the original tool. In the current review, Xu *et al.* (2003) omitted the writing item, while Park *et al.* (1991) omitted the reading and writing items. Both these language items were replaced with a comprehension and judgement item. While it may be contended that constructs measured by the original MMSE were altered, it arguably adds the domain of abstract

reasoning, which Cullen *et al.* (2007) highlight is a core domain within any cognitive screen. 'No ifs ands or buts' is an abstract sentence with a series of conditional and conjunctive words that is more difficult to comprehend due to the absence of nouns and verbs. Modification details were given for eight of the nine studies. Four studies simply translated this phrase; the other four used alliterations or other phrases. However, as this phrase is linguistically irregular (Folstein, 1998), the direct translation of this phrase into other languages is problematic (Werner *et al.,* 1999). Moreover, using alliterations and other phrases may assess a different domain. Therefore the validity of this item is questioned.

Limitations of the included studies

Ibrahim *et al.* (2010) and Katzman *et al.* (1988) report lower MMSE scores for uneducated woman, as compared to their male counterparts. However, possible gender-education-performance interactions were not explored in any other study. Adopting a single cut-off based on education and performance could be disadvantageous; it may hide possible gender differences, which would be clinically relevant. Additionally, as only three studies specified the severity of the dementia, it is harder to interpret and contextualise results.

Strengths and Limitations of the current review

The systematic search strategy and the high inter-rater reliability between raters are strengths of the current review. While the rating scale developed specifically for this review was based on a validated measure (Bossuyt *et al.,* 2004); its validity has not been established.

Future research

Future research should explicitly detail how translation and cultural adaptation of the MMSE impacts on the psychometric properties of the new measure. This will enable better comparison of the new measure, to other translated measures, and the original MMSE. Future studies should recruit a more inclusive control group, including patients whose clinical presentation may be suggestive of dementia (Sahadevan *et al.,* 2000). Planning for future research may be challenging given the wide range of cut-offs (17-24) determined by literacy, education, age and gender. Additional research should focus on the validity of the MMSE for individuals who are illiterate, as well as exploring interactions between gender, education and performance.

CONCLUSION

While there is consensus that the translated and culturally modified MMSE is valid and reliable when screening for cognitive impairment and dementia in the populations in which it was administered, the limited reporting of dementia severity leads to difficulty generalising these findings. There were mixed results regarding the validity of the MMSE to detect cognitive impairment in illiterate or poorly-educated individuals. The differences in the modification of the MMSE across studies make it challenging to draw conclusions relating to whether the psychometric properties of the original MMSE remain. Future research should highlight this whilst exploring whether the MMSE can validly screen for cognitive impairment and dementia in illiterate and poorly-educated individuals, in addition to exploring gender-education interactions.

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Cognitive function and traumatic brain injury in refugees and asylum-seekers attending mental health services – a preliminary study

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PLAIN ENGLISH SUMMARY

Background: An estimated 10 million people are affected by a traumatic brain injury (TBI) annually (e.g., a blow to the head). After a severe TBI, difficulties with memory, thinking skills, carrying out daily tasks and managing emotions can occur. Refugees and asylum-seekers fleeing persecution have often experienced torture, loss of consciousness (LoC), and are at a greater risk of TBI. However, there is an overlap in symptoms associated with TBI and mental health difficulties. This overlap, as well as differences in language and education, means that assessing memory and thinking skills in this population is complex.

Methods: This preliminary study investigated whether thinking skills are worse in refugees and asylum-seekers who report a severe TBI compared to those who do not, and explored differences in thinking skills in refugees and asylum-seekers attending mental health services compared to Western controls. Twenty-five participants were recruited from the current caseload of the NHS Compass Trauma Service. Groups with 'severe TBI' (14 participants) and 'non-TBI' (11 participants) were compared. Groups were similar in age, gender and education. Participants were excluded from both groups if they had known sensory loss or substance abuse. All participants completed one assessment which explored their thinking skills, mood and memory.

Results and Conclusion: Refugees and asylum-seekers who self-reported a severe TBI did not have greater difficulties with thinking skills than those without a history of TBI. The sample as a whole performed significantly worse than scores from Western controls. This preliminary study highlights the value of exploring thinking skills of refugees and asylum-seekers, as this can, on a case-by-case basis, inform the practice of mental health clinicians and GPs. Furthermore, a greater understanding of the thinking skills of this population can make a valuable contribution to the asylum-seeking process.

ABSTRACT

Objective: Every year, an estimated 10 million people suffer a traumatic brain injury (TBI; Hyder, Wunderlich, Puvanachandra, Gururaj, & Kobusingye, 2007). Refugees and asylum-seekers fleeing persecution have often experienced war and torture and are at a greater risk of TBI (Priebe & Esmaili, 1997). Following a TBI, cognitive, behavioural and psychosocial difficulties can significantly impact on independence (Cohen, 2001). This preliminary study investigated whether cognitive function is poorer in refugees and asylum-seekers who report a severe TBI, compared to those who do not. The study also compared cognitive performance in refugees and asylum-seekers attending mental health services with Western controls from normative data. Assessing the cognitive performance of this group against Western expectations is important, to inform the clinical work as well as UK asylum law and policy.

Methods: The study employed a between-subjects design, comparing 14 refugees and asylum-seekers with a self-report of one or more severe TBIs and 11 without a history of TBI. Participants attended for one assessment session and completed the Colour Trails Test (CTT; D'Elia, Satz, Uchiyama, & White, 1996) as well as other cognitive tests. Where necessary, an interpreter was present.

Results: Refugees and asylum-seekers who self-reported a history of severe TBI were not more cognitively impaired on the CTT than those without TBI. The combined groups performed significantly worse on the CTT compared to normative data.

Conclusions: This preliminary study suggests that refugees and asylum-seekers attending mental health services are performing much poorer cognitively than healthy Western counterparts. This highlights the value of assessing cognition in this complex group, as on a case-by-case basis, results informed the practice of mental health clinicians and GPs. Furthermore, these results raise issues about the expectations placed on cognitively impaired individuals throughout the asylum process if these expectations are based on experience of cognitive function typical of that represented by Western norms. Additional research may instigate policy-makers to make adjustments to the asylum process to better acknowledge mental health and cognitive impairment.

Keywords: TBI, refugees, cross-cultural neuropsychology, cognition, Colour Trails Test

INTRODUCTION

An estimated 10 million people are affected by a traumatic brain injury (TBI) each year. According to the World Health Organisation, by 2020 TBIs will become the biggest cause of death and disabilities worldwide (Hyder, Wunderlich, Puvanachandra, Gururaj, & Kobusingye, 2007). There is a higher incidence of TBI in low- and middle-income countries; for example, injuries following road traffic accidents (RTAs) are higher within sub-Saharan Africa (170 per 100,000) compared with the global rate (106 per 100,000; Hyder et al., 2007). In Western populations, severe TBIs predominantly arise due to blunt trauma to the head, such as concussion, RTAs, falls or assaults (de Sousa, McDonald, & Rushby, 2012). In addition, refugees and asylum-seekers[1] who have fled persecution, violence, armed conflict, or detention have commonly been involved in events where they are physically injured, tortured, lose consciousness and are at risk of TBI (Priebe & Esmaili, 1997). While international human rights and humanitarian law consistently prohibit torture under any circumstances (Istanbul Protocol, 2004), torture and ill-treatment occur in half of the world's countries (Amnesty International, 2005).

Rasmussen (1990) found that 75% of 200 torture survivors reported neurological symptoms at the time of the torture, with 64% complaining of neurological symptoms on examination, and loss of consciousness (LoC) occurring in nearly 20%. An NHS Greater Glasgow and Clyde (NHSGG&C) Compass Trauma Service (Compass) audit in 2013 revealed that 58% of 43 service-users (refugees and asylum-seekers), self-reported LoC following one or more TBI (Craig, Doherty, & McMillan, 2014).

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[1]The term 'asylum-seeker' is someone who has fled persecution and has formally applied for asylum in another country and is still awaiting a decision. The term 'refugee' is someone whose asylum application has

Following a TBI, cognitive, behavioural and psychosocial difficulties can reduce independence (Cohen, 2001). Deficits in attention, speed of processing and memory are common (Cicerone, Levin, Malec, Stuss, & Whyte, 2006). Impaired executive function (e.g. planning, monitoring, switching, activating, and inhibition) is associated with controlling emotion, cognition and action, disrupting education, work, home functioning and social relationships (Stuss & Levine, 2002). Long-lasting disability following hospital admission for TBI has been shown to be common in adults for at least 12-14 years after injury (McMillan, Teasdale, & Stewart, 2012).

Mental health difficulties can impair everyday functioning and performance on neuropsychological assessments. High levels of anxiety can result in attention deficits, memory failure, slowness, and scrambled or blocked words and thoughts (Bennett-Levy, Klein-Boonschate, Batchelor, McCarter, & Walton, 1994), while depression, if severe, can impair memory (Lezak, Howieson, Bigler, & Tranel, 2012). A systematic review exploring the prevalence of severe mental health disorders in 7000 refugees resettled in Western countries, found that refugees were 10 times more likely to have post-traumatic stress disorder (PTSD) than age-matched Western controls (Fazel, Wheeler, & Denesh, 2005). Furthermore, when comparing refugees with and without PTSD, post-traumatic symptoms were associated with executive memory impairment and automatic processing problems (Kanagaratnam & Asbjørnsen, 2007). Mollica et al. (2009) found TBI to be strongly related to psychiatric morbidity in survivors of political violence; when comparing Vietnamese ex-political detainees who had been resettled in the United States (US), those with a history of TBI showed higher rates of depression than those without TBI.

There is significant overlap in symptoms associated with TBI and mental health difficulties, including depression and PTSD (Weinstein, Fucetola, & Mollica, 2001). Rasmussen (1990) suggests that factors other than TBI, including torture, may be fundamental in developing acute and long-lasting neurological symptoms. This highlights the challenges of interpreting neuropsychological assessments and the high risk of misdiagnosing patients, in particular for refugees with complex presentations and histories (Weinstein et al., 2001).

When asylum-seekers ask for protection in another country, they need to describe what has happened to them that makes them fearful to return (Herlihy, Jobson, & Turner, 2012). Asylum-seekers are often survivors of torture and can be reluctant to tell their story as this may trigger the reliving of traumatic memories (Gangsei & Deutsch, 2007). However, those seeking asylum in the United Kingdom are required to present accurate information, which they are expected to repeat coherently and consistently (Wilson-Shaw, Pistrang, & Herlihy, 2012). While poor credibility is frequently cited as grounds for refusal of asylum applications (Cohen, 2001), it may be that some asylum-seekers simply cannot remember information because of their trauma and torture histories, including TBI (Rasmussen, 1990). Moreover, given the high incidence of TBI in low and middle income countries (Hyder et al., 2007), and the wide-ranging and long-lasting impact of TBI, it is important to consider cognitive function and how to assess this in culturally diverse populations, what this means for those working with this vulnerable group and for the asylum-seeking process itself. Additionally, it may be that there are differences between the cognitive abilities of refugees and asylum-seekers with mental health difficulties, and people of a similar age from Western countries. If so, this could lead to a mismatch between expectation and reality that could have implications for the way in which clinicians work

with this population, and that are relevant to the assessment of credibility in asylum applications (Wilson-Shaw et al., 2012).

Psychological assessment of ethnic minorities poses a challenge to the validity and reliability of tests which often require translation and adaptation for language and culture (Robertson, Liner, & Heaton, 2009). The educational background of some ethnic minorities may not match the skills being assessed in standard Western neuropsychological assessments (Brandt, 2007). Walker, Batchelor, Shores and Jones (2010) found that on several Wechsler Adult Intelligence Scale-Third edition subtests (WAIS-III; Wechsler, 1997) culturally diverse individuals with a moderate-severe TBI who had been educated in English performed significantly better than those educated in languages other than in English. This highlights the complex issues which occur when assessing cognitive function in a culturally diverse group with varying educational backgrounds (Artiola i Fortuny & Mullaney, 1998). Consideration must be given to both educational and cultural factors when interpreting assessments (Lezak et al., 2012).

In addition to tests not being culture-fair, errors in the administration, scoring and interpretation of tests can occur if interpreters are used to translate during assessment (Iverson, 2000). Casas et al. (2012) revealed that using an interpreter for verbally-mediated WAIS-III subtests (Vocabulary and Similarities) increases variability in scores. This trend did not occur for non-verbal subtests (Block Design and Matrix Reasoning). The lack of research exploring TBIs within refugee and asylum-seeker populations appears to be disproportionate to the high prevalence of self-reported TBI (e.g., Craig et al., 2014). It is therefore important to investigate whether cognitive function is poorer in those self-reporting TBI, compared to those who do not. It is also important, to explore whether

cognitive function in refugees and asylum-seekers with mental health difficulties is poorer than that of age and education-matched healthy Western counterparts because of potential assumptions about cognitive function and credibility in asylum applications.

Aims

This preliminary study compares cognitive function in refugees and asylum-seekers with and without a self-reported history of severe TBI on the Colour Trails Test (CTT; D'Elia, Satz, Uchiyama, & White, 1996), an adapted and culture-fair test of executive functioning based on the Trail Making Test, a widely used measure in TBI research (TMT; Reitan & Wolfson, 1993). Supplementary analysis explored the difference between groups on other cognitive assessments: the Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975), the WHO/UCLA Auditory Verbal Learning Test (Maj et al., 1993) and the WAIS-III Symbol Search (Wechsler, 1997). As this is the first study of its kind, these additional measures further contextualised results.

A further aim was to explore differences in cognitive function using the CTT, in refugees and asylum-seekers attending mental health services, compared to normative data on healthy Western controls. Supplementary analysis explored the difference in performance between the combined sample and normative data on the other cognitive assessments administered. There has been limited research on this topic, and findings on any difference in performance on the CTT may and serve a wider function. If asylum-seekers with mental health difficulties are more cognitively impaired, yet are expected to perform as well as individuals of a similar age from Western countries when recalling their experiences during the asylum-seeking process, this could lead to decisions being taken, based on erroneous assumptions as to cognitive abilities.

Hypotheses

1. Refugees and asylum-seekers who self-report a history of severe TBI are significantly more impaired on the CTT than those without a history of TBI.

2. Refugees and asylum-seekers attending mental health services are significantly more impaired on the CTT than the best available normative data using Western controls.

METHODS

Ethical Approval

Approval was obtained from the West of Scotland Research Ethics Committee and NHSGG&C Research and Development Directorate (Appendices 2.1-2.3). A minor amendment was submitted and accepted (Appendices 2.4-2.5).

Design

This preliminary study employed a between-subjects design, comparing participants who self-reported one or more severe TBIs and those without a history of TBI. By nature of being seen within Compass, all participants had moderate-severe mental health difficulties. Groups were matched for age, gender and education.

Participants

Sixty-three potential Compass clients met the inclusion criteria for the TBI (N=31) or the non-TBI group (N=32). Compass is a specialist trauma service for refugees and asylum-seekers in NHSGG&C. Between October 2013 and May 2014, 25 participants were recruited into the two groups (TBI N=14; non-TBI N=11). Figure 1 details the recruitment flowchart.
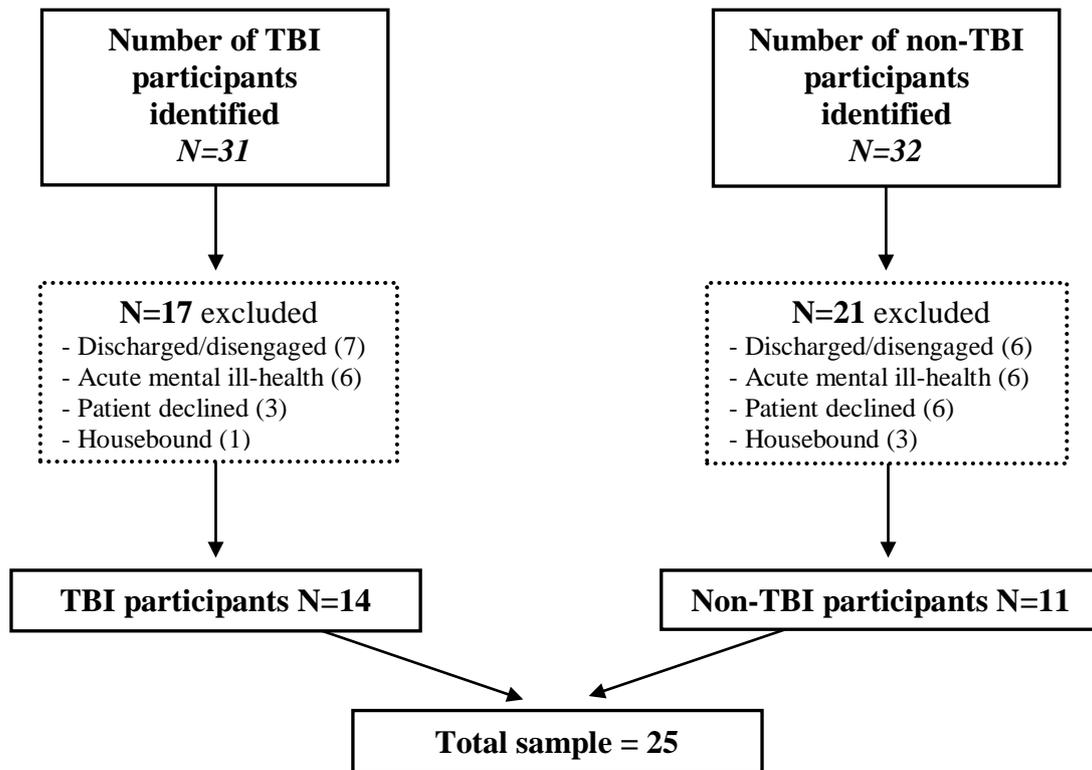
Figure 1: Recruitment Flowchart

Eligibility Criteria

Individuals met criteria for the TBI group if they self-reported a severe TBI and LoC of 30 minutes or more (following the Mayo Classification System; Malec et al., 2007). Participants were also included in the TBI group if, based on their self-report, it was likely that they had lost consciousness for longer than 30 minutes. Individuals in the control group had no history of TBI or LoC. Participants were aged between 18-65 and involved with Compass at the time of assessment. Individuals were excluded if they had known sensory loss or substance abuse.

Recruitment and research procedure

Compass clients were routinely screened for a possible TBI by their clinician (Appendix 2.6). If participants met the inclusion criteria for either group, their clinician briefly

introduced the study and enquired whether they were interested in learning more. Clients who expressed an interest were introduced to the researcher who provided information about the study and obtained written consent (Appendices 2.7-2.8). For 12 potential participants, clinicians judged it would be inappropriate to approach their clients due to acute mental ill-health. Participants attended for one 30-80 minute session and completed measures of mood and cognitive function. When necessary, an interpreter was present. Participants were given an honorarium of £4 for participating. Twenty-two participants completed the Clinical Outcomes in Routine Examination (CORE; Sperlinger, 2002), a self-report measure assessing emotional disturbance (well-being, problems, functioning and risk) prior to or following the assessment.

Measures given during the assessment (in order of administration)

Patient Health Questionnaire-4 (PHQ-4)

The PHQ-4 is a four-item screen for depression and anxiety over the past two weeks (Kroneke, Spitzer, Williams, & Löwe, 2009). It consists of a two-item measure of depression (PHQ-2) and a two-item measure of anxiety (GAD-2). Scores range from 0-12. 0-2 is categorised as 'normal', 3-5 as 'mild', 6-8 as 'moderate' and 9-12 as 'severe'. The PHQ-4 is a valid and reliable ultra-brief measure of anxiety and depression within Germany and the US (Kroneke et al., 2009; Löwe et al., 2010). Factor analysis confirmed that the PHQ-4 comprised of two discrete factors (depression and anxiety) which explained 84% of the total variance (Kroneke et al., 2009).

Mini Mental State Exam (MMSE)

The MMSE is a valid, reliable and widely used to screen for cognitive impairment in adults aged between 18-85 (Folstein et al., 1975). It includes eleven questions and assesses attention/working memory, new verbal learning/recall, expressive language, visual construction and executive function. The maximum score is 30. In Western patients with at least eight years of education, a score of 0-23 indicates cognitive impairment (Anthony, LeResche, Niaz, von Korff, & Folstein, 1982). While the MMSE is influenced by literacy and education (Weiss, Reed, Kligman, & Abyad, 1995), it remains the most commonly used screening measure (Shulman et al., 2006).

WHO/UCLA Auditory Verbal Learning Test (AVLT)

This modified version of the Rey Auditory Verbal Learning Test (RAVLT, Rey, 1941) aims to enhance cultural fairness (Maj et al., 1993). The test items consist of five categories: body parts, animals, tools, household objects, and transportation vehicles, assumed to have 'universal familiarity'. Participants are verbally presented with a list of 15 unrelated words repeated over five trials and are asked to repeat them. In the current study, the list of words was pre-recorded in the language used in the assessment, to ensure standardisation between each trial. Maj et al. (1993) recruited participants in Thailand, Zaire (now Democratic Republic of Congo (DRC)), Germany, and Italy, and found that this modified AVLT had fewer cultural influences than the RAVLT. No data was found on the test-retest reliability.

Symbol Search (SS)

The WAIS-III SS is a speed of processing test (Wechsler, 1997). Each item contains two target symbols and a search group composed of five symbols. Participants must identify

whether or not there are any target symbols in the search group. The SS has yielded statistically significant differences in performance in patients with mild TBI, moderate-severe TBI and demographically matched controls, demonstrating satisfactory criterion validity (Donders, Tulsky, & Zhu, 2001). The SS has good test-retest reliability (0.77; Silva, 2008).

Colour Trails Test (CTT)

The CTT is culture-fair test of executive functioning (D'Elia et al., 1996) based on the TMT (Reitan & Wolfson, 1993). To minimise cultural bias, no letters are used, and along with verbal instructions, CTT instructions are presented nonverbally with visual cues. For CTT1, participants rapidly connect circles numbered 1-25 in sequence. For CTT2, participants rapidly connect numbered circles in sequence, but alternate between pink and yellow circles. Maj et al. (1993) recruited participants in Thailand, Zaire (now DRC), Germany, and Italy, and found that while there were no significant cultural differences between the CTT1 and TMT-A, the CTT2 had less cultural influences than the TMT-B. The test-retest reliability was 0.64 (CTT1) and 0.79 (CTT2; D'Elia et al., 1996).

Sample size estimation

G*Power (v.3.1.5. Faul, Erdfelder, Lang, & Buchner, 2007) was used to estimate sample size for the hypothesis that participants who self-reported severe TBI would be more cognitively impaired on the CTT. With a large effect size (Cohen's d=1), α=0.05 and a Power of 80%, using t-test analysis, 34 participants (17 TBI and 17 non-TBI) were required. This calculation was supported by Ruffolo, Guilmette and Willis (2000) who found that individuals with moderate-severe TBI took significantly longer to complete TMT-B compared to healthy controls.

Statistical analysis

Statistical analysis was undertaken using IBM SPSS version 19. Data were tested for normality of distribution by visually inspecting histograms and box-pots. Non-parametric tests were used if assumptions of normal distribution and homogeneity of variance were violated. Descriptive statistical analysis explored the variance between groups on the dependent variables. A t-test explored differences in age between groups. A Fisher's Exact test explored differences in gender and level of education across the two groups.[2] Mann-Whitney U tests explored differences between groups on the measures of mood (CORE and PHQ-4).

Hypothesis 1: As parametric assumptions were violated, an independent sample Mann-Whitney U test explored the differences between the TBI and non-TBI groups on the CTT. This test was repeated during supplementary analysis on the other cognitive assessments (MMSE, AVLT, and SS).

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[2] A Fisher's Exact Test was chosen as opposed to a Pearson's Chi-squared statistic as the latter assumes that the data has expected frequencies above 5, and the data in this study violated that assumption.

Hypothesis 2: In order to compare the combined sample with the normative data, the study sample's raw scores were transformed into Z-scores. For this calculation, it was assumed that the normative data was normally distributed, and therefore the mean would equal the median. As the distribution of Z-scores were not normally distributed, a One-Sample Wilcoxon Signed Rank Test explored differences between the combined sample and the normative group on the CTT. This test was repeated during supplementary analysis on the additional cognitive tests.

RESULTS

Participants

There was no significant difference in age between TBI and non-TBI groups ($t(23)=0.74$, $p=0.47$). A two-tailed Fischer's Exact Test indicated no significant differences in the proportion of males and females between groups ($p=0.70$), or in the proportion of participants who attended primary education or lower, or secondary education or higher ($p=0.66$; Table 1).

Scores did not significantly differ between groups on the CORE ($U=53.0$, $z=-0.46$, $p=0.64$, $r=-0.10$) or PHQ-4 ($U=52.0$, $z=-1.39$, $p=0.16$, $r=-0.28$; Table 1). On the CORE, 19 participants (86.36%) scored above the clinical cut-off (1.19), indicating clinical threshold (in primary care). On the PHQ-4, 17 participants (68%) had severe anxiety and depression.

Table 1. Participant demographics and descriptive analysis

		TBI N=14	Non-TBI N=11	Overall N=25
Age (*years*)**; M (SD)**		36.86 (7.61) (range 22-52)	34.64 (7.35) (range 25-51)	35.88 (7.43) (range 22-52)
Gender; N (%)	Male	6 (42.9)	6 (54.5)	12 (48)
	Female	8 (57.1)	5 (45.4)	13 (52)
Education; N (%)	Primary or lower	4 (28.57)	2 (18.2)	6 (24)
	Secondary or higher	10 (71.43)	9 (81.8)	19 (76)
Geographical Region; N (%)	Africa	9 (64.3)	4 (36.4)	13 (52)
	Asia	1 (7.1)	4 (36.4)	5 (20)
	Middle East	4 (28.6)	3 (27.3)	7 (28)
Status; N (%)	Refugee	8 (57.1)	4 (36.4)	12 (48)
	Asylum-seeker	6 (42.9)	7 (36.6)	13 (52)
Interpreter required; N (%)	Yes	6 (42.9)	9 (81.8)	15 (60)
	No	8 (57.1)	2 (18.2)	10 (40)
Length of assessment (*minutes*)**; M (SD)**		44.07 (14.10) (range 30-80)	39.55 (4.93) (range 33-47)	42.08 (11.09) (range 30-80)
PHQ-4 (*0-12*)**; Median (Q1; Q3)**		10 (8.75; 11)	9 (6; 11)	10 (7.5; 11)
CORE (*clinical cut-off ≥1.19*)**; Median (Q1; Q3)**		(*N=12*) 2.18 (1.60; 2.58)	(*N=10*) 2.05 (1.65; 2.46)	(*N=22*) 2.15 (1.65; 2.48)

Of those reporting TBI (Table 2; Appendix 2.9), 12 lost consciousness for 30 minutes to 3 months (median=1.5 hours). Two could not provide an estimate of LoC duration; these individuals sustained multiple TBIs and severe TBI was assumed. The time since TBI ranged from 4-26 years (M=14.71, SD=8.19). Three clients with severe TBI were HIV positive.

Table 2. TBI characteristics

		Cause of TBI N (%)			
		Beatings/torture	Falls	Multiple causes of TBIs	Total
When TBI occurred N (%)	Childhood	1 (7.1)	3 (21.4)	2 (14.3)	6 (42.9)
	Adulthood	6 (42.9)	1 (7.1)	0 (0)	7 (50)
	Both	0 (0)	0 (0)	1 (7.1)	1 (7.1)
	Total	7 (50)	4 (28.6)	3 (21.4)	14 (100)

The clinical vignettes in Table 3 illustrate the overlap in performance between the two groups, and provide examples of participants with cognitive impairment (#4: (non-TBI) and #5 (TBI)) and participants with good cognitive functioning (#8 (TBI), #9 (non-TBI)). Following the assessments, a participant's relative strengths and weaknesses, as well as recommendations were shared with their clinician and GP, enabling them to comprehensively formulate their client's difficulties, which informed interventions.

Table 3. Clinical vignettes

Participant 4 (non-TBI)
A 35 year-old West African asylum-seeker with secondary education reported no history of TBI. His PHQ-4 score (9, 4SD below mean) indicated severe anxiety and depression. He performed poorly on the CTT1 (92 seconds, 4SD below mean) and CTT2 (206 seconds, 4SD below mean), indicating impaired executive functioning. His poor performance on the AVLT (Trail V=8, 4SD below mean), and SS (scaled score=2, 2.5SD below mean), indicated short-term memory difficulties and slow speed of processing. He performed well on the MMSE (28, 0SD).

Participant 5 (TBI)
A 43 year-old Middle-Eastern refugee with secondary education said that when he was 25, police repeatedly hit him on his head with truncheons over a period of a few days, resulting in LoC of 3 months, during which he was hospitalised. His PHQ-4 score (9, 3.5SD below mean) indicated severe anxiety and depression. He performed poorly on the CTT1 (157 seconds, 9SD below mean) and CTT2 (181 seconds, 3SD below mean), indicating impaired executive functioning. His poor performance on the MMSE (17, 6SD below mean), AVLT (Trail V=8, 4SD below mean), and SS (scaled score=2, 2.5SD below mean), indicated impaired cognition, short-term memory difficulties and slow speed of processing.

Participant 8 (TBI)
A 32 year-old West African asylum-seeker with secondary school education explained that between the ages of 20-27, she lost consciousness more than 40 times as a result of domestic violence. She was unsure of the exact length of LoC, however, she reported going to hospital on some occasions. Her PHQ-4 score (7, 2.5SD below mean) indicated moderate anxiety and depression. She performed well on the CTT1 (50 seconds, 1SD above mean) and CTT2 (93 seconds, 0SD), indicating good executive functioning. She performed well on the MMSE (29, 0SD), and SS (scaled score=8, 0.5SD below mean), indicating good general cognitive function and speed of processing. Her performance on the AVLT (Trail V=8, 4SD below mean), indicated some difficulty with short-term memory.

Participant 9 (non-TBI)
A 29 year-old Middle Eastern refugee with tertiary education reported no history of TBI. Her PHQ-4 score (10, 4SD below mean) indicated severe anxiety and depression. Her performance on the CTT1 (54 seconds, 2SD below mean) and CTT2 (81 seconds, 0.5SD above mean), indicated good executive functioning. Her performance on the MMSE (28, 1.5SD below mean), AVLT (Trail V=15, 1SD above mean) and SS (scaled score=7, 1SD below mean), indicated good general cognitive function, short-term memory and speed of processing.

Hypothesis 1: **Refugees and asylum-seekers who self-report a history of severe TBI are significantly more impaired on the CTT than those without a history of TBI.**

Group differences were not found on the CTT (CTT1: U=64.5, z=-0.32, p=0.75, r=-0.07; CTT2: U=64, z=-0.35, p=0.73, r=-0.07) and effect sizes were small (Cohen, 1988; Table 4).

Table 4. Comparing TBI and non-TBI groups on CTT and additional tests

	TBI N=14	Non-TBI N=11
	Median (Q1; Q3)	
CTT1 *(seconds)*	81.5 (49.75; 161.75)	65 (56.25; 79.5)
CTT2 *(seconds)*	158 (99.75; 281)	151 (130.5; 191.5)
MMSE *(0-30)*	23 (20; 27)	27.5 (25; 28)
AVLT *(total correct words; 0-75)*	38 (33.5; 41.50)	38.5 (30; 43)
AVLT Trial V *(0-15)*	10.5 (7.75; 11)	9 (8; 11)
Symbol Search *(raw score 0-60)*	18 (6.75; 24)	18.5 (12; 23)
Symbol Search *(scaled score 1-19)*	5 (1; 7.25)	5 (3; 7)

Supplementary analysis:

Group differences were not found on the MMSE (U=106.5, z=1.63, p=0.10, r=0.33), on the number of correctly recalled words on the AVLT (Total: U=75, z=-0.11, p=0.91, r=-0.02; Trial V: U=69, z =-0.44, p=0.67, r=-0.09), or on the SS (raw score: U=82, z=0.28, p=0.78, r=0.16; scaled score: U=79.5, z=0.14, p=0.89, r=0.03; Table 4). The MMSE yielded a moderate effect size, and on other cognitive tests, effect sizes were small (Cohen, 1988).

Hypothesis 2: **Refugees and asylum-seekers attending mental health services are significantly more impaired on the CTT than the best available normative data using Western controls.**

Combined groups took significantly longer to complete the CTT than the normative sample (Table 5; CTT1: T=300, p<0.001, r=0.87; CTT2: T=293, p<0.001, r=0.83), indicating greater cognitive impairment. Effect sizes were large (Cohen, 1988). Details of the normative samples are given in Table 6.

Table 5. Comparing sample and normative data on CTT and additional tests

	Overall sample N=25	Normative data
	Median (Q1; Q3)	
CTT1 *(seconds)*	65 (50.75; 102.5)	37.12 (35.55; 40.81)
CTT2 *(seconds)*	154 (106; 192.5)	83.83 (83.83; 93.99)
MMSE *(0-30)*	25 (21; 28)	29 (27; 29)
AVLT *(total correct words; 0-75)[3]*	38 (31; 42.5)	-
AVLT Trial V *(0-15)*	10 (8; 11)	13.33 (12.77; 13.53)
SS *(raw score 0-60)[4]*	18 (8; 23.5)	-
SS *(scaled score 1-19)*	5 (2; 7)	10 (10; 10)

Supplementary analysis:

Scores for combined groups were significantly lower than the normative group on the MMSE (T=0.00, p<0.001, r=0.82), AVLT Trial V (T=6, p<0.001, r=0.84), and SS scaled scores (T=2, p<0.001, r=0.87; Tables 5 and 6). This suggests significantly poorer general cognitive function, memory and slower speed of processing in the combined sample, compared with the normative data.

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[3]AVLT normative data did not provide data on overall scores, therefore no analysis was possible.

[4] The SS only provided normative data for scaled scores, not raw scores.

Table 6. Normative data for comparison with the study sample

	CTT *(D'Elia et al., 1996)*	MMSE *(Crum, Anthony, Bassett, & Folstein, 1993)*	AVLT **(Trial V)** *(Pontón et al., 1996)*	SS *(Wechsler, 1997)*
Sample Size	1,528	18,571	300	332
Location/ ethnicity	Healthy Americans (N=1054 Caucasian; N=182 African American; N=292 Hispanic)	Healthy Americans	Healthy Hispanics (American residents)[5]	Healthy British residents
Age range (years)	18-89	18-85+	16-75	16-80
Factors linking sample and norms	Age, education	Age, education	Age, education, gender	Age[6]

DISCUSSION

Main findings

This preliminary study explored cognitive function in refugees and asylum-seekers attending mental health services. Refugees and asylum-seekers who self-reported a history of severe TBI were not more cognitively impaired on the CTT than those without a history of TBI. However, the combined sample performed significantly worse on the CTT compared to the normative sample, indicating greater cognitive impairment; effect sizes were large. The supplementary analysis on the additional cognitive tests mirrored the results of the CTT.

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[5]Hispanic normative data used as no available normative data for the AVLT using Western individuals.

[6]Normative data included adults with a range of education, socio-economic statuses, from five ethnicities.

There was no significant difference between groups on the CTT, effect sizes were small, and performance varied greatly within the groups. A number of factors that are associated with cognitive impairment are common in this population (e.g., HIV and moderate-severe mental health difficulties including PTSD; Fazel et al., 2005) in addition to TBI and this may have affected test performance for both groups. These factors may have reduced the effect size of any difference between the groups due to TBI. This suggests that the CTT may have been underpowered or not sensitive enough to identify differences in cognitive impairment associated with TBI.

The normative samples comprised of Americans (CTT, MMSE), Hispanic-Americans (AVLT) and Britons (SS). This range of normative data, along with cultural differences between the study sample and normative data challenges the validity of comparing these two groups. However, the current findings strongly suggest that refugees and asylum-seekers living in Scotland and attending mental health services are performing much poorer cognitively than healthy Western counterparts. At present, despite the stark differences in performance, cognitively impaired asylum-seekers might be erroneously compared to Western individuals of a similar age with a similar number of years of education. Being able to highlight this difference in performance may avoid erroneous comparisons and inform those working with refugees and asylum-seekers. Further research on this issue may act as a catalyst for lawyers and policy-makers to think about adjustments to the asylum-seeking process to reflect the cognitive impairment of the individuals concerned.[7]

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[7] See Wilson-Shaw et al., (2012) for analysis as to the importance of psychologically informed assessment of asylum claims,

With a clinical focus, the vignettes illustrate an overlap between test performance in the TBI and non-TBI groups. This highlights the value of assessing cognitive function in refugees and asylum-seekers who present with complex mental health difficulties, to inform formulation and intervention. In the current study, strengths, weaknesses and recommendations were shared with the participants' clinician and GP to help inform their work with the client. This proved a useful way of disseminating the results, on an individual basis.

Strengths

This is the first study to explore the impact of TBI on cognitive function in refugees and asylum-seekers and to compare this with the best available Western normative data. The study successfully overcame barriers in terms of accessing this hard-to-reach population by recruiting 74% of the estimated sample size, as well as using interpreters during cognitive testing. The results tap into a potentially unmet need in this population, both for those with and without a history of TBI, as cognitive function of refugees and asylum-seekers in this study was significantly poorer than in Western normative controls. Furthermore, current findings can inform the training of professionals who seldom come into contact with this population, helping them to consider how to communicate effectively, pace sessions, and enhance the retention of information.

Limitations

Rasmussen (1990) suggests that factors other than TBI, including torture, may play a vital role in developing acute and long-lasting neurological symptoms. In the current study, histories of torture, excluding TBI, were not explored. History of torture, alongside ongoing severe mental health difficulties may be another plausible explanation as to why

both groups performed poorly on the CTT and additional measures. History of TBI was based on retrospective self-report of LoC and no corroborative information was available. Despite relying solely on self-report, retrospective post-traumatic amnesia is thought to be the most useful indicator of TBI severity (McMillan, Jongen & Greenwood, 1996). However, this method was not used here, because recalling events that occurred at the time of and following the injury can trigger trauma memories, and this may have caused further distress to this vulnerable group. A further limitation of the current study is the practical difficulty of including a third comparison group, consisting of refugee and asylum-seekers without mental health difficulties; however, this was beyond the scope of the current research.

While every effort was made to select culture-fair tests, some tests may not have been valid within this population. Neuropsychological tests often assess skills which are emphasised and valued in Western education (Weinstein et al., 2001). This increases the risk of diagnostic errors, as well as unsuitable recommendations for intervention (Walker et al., 2010).

Previous research

When comparing the current results to previous studies, refugees and asylum-seekers in the current study who reported a history of TBI took longer to complete the CTT1 (M=123.36 seconds, SD=121.70) and CTT2 (M=220.42 seconds, SD=174.80) than two comparison groups. D'Elia et al. (1996) found that 63 American patients with a TBI took an average of 52.41 seconds (SD=31.56) and 92.61 seconds (SD=43.02) to complete the CTT1 and CTT2 respectively. Their sample included 42% with severe TBI, and had an average age of 33.33 years (SD=15.01). Additionally, Chan (2010) found that 30 Hong Kong adults with

an acquired brain injury (17 stroke, 9 TBI, 4 anoxic brain injury) took an average of 47.23 seconds (SD not reported in article) and 98.35 seconds (SD=41.04) to complete the CTT1 and CTT2 respectively. Chan's sample had an average age of 57.97 years (SD=18.05), with an average education of 14.11 years (SD=3.48). These findings illustrate that even in other populations with differing severity of acquired brain injury, the current study sample demonstrated a more extreme performance and larger deviations from the mean.

However, there is significant overlap in symptoms associated with TBI and mental health difficulties, including depression and PTSD (Weinstein et al., 2001). In the current study, there was considerable overlap in performance between groups on the measures of mood, executive function, memory, and speed of processing. This overlap, small sample size, and possible confounding variables (language, culture, use of interpreter, physical health conditions potentially impairing cognitive function (e.g. HIV, anaemia)) lead to challenges in interpreting the results. However, the current findings echo Weinstein et al.'s (2001) caution as to the high risk of misdiagnosing refugees, given their complex and varied presentations. The nature of patients attending the complex trauma service, combined with high PHQ-4 and CORE scores for both groups, indicate the presence of post-traumatic symptoms, which are associated with executive memory impairment and automatic processing problems (Kanagaratnam & Asbjørnsen, 2007). This may help to explain overall poor performance on the neuropsychological assessment.

Future research

There are a limited number of neuropsychological assessments validated or developed within different cultures, which results in ongoing challenges for research exploring non-Western refugee populations (Kanagaratnam & Asbjørnsen, 2007). Future research should

undertake to assess the validity, and collate normative data of the CTT within non-Western refugee populations. Normative data for Western individuals with mental health difficulties is also needed, as this would be useful to compare with the current study. In addition, it is recommended that a future study gathers data from an appropriate control group, for example, refugees and asylum-seekers without mental health difficulties, who can be matched with the study sample in terms og age, gender, nationality, and level of education. This data could then be compared with the current study data to explore whether there were any differences between the two groups. Finally, as torture histories have been found to impact on neurological symptoms (Rasmussen, 1990), future research should ascertain participants' torture histories, in addition to any possible TBIs, as this may further contextualise results.

CONCLUSION

In this preliminary study, refugees and asylum-seekers who self-reported severe TBI were not more cognitively impaired than those who did not report a history of TBI. However, the sample as a whole performed significantly worse on cognitive tests than the best available normative data. As two-thirds of the sample had severe anxiety and depression, and given the large overlap in performance between groups, interpreting the results requires caution. However, as demonstrated by the clinical vignettes, a brief cognitive assessment for refugees and asylum-seekers could, on a case-by-case basis, inform the practice of mental health clinicians and GPs. This preliminary study highlights the value of exploring cognitive function in refugees and asylum-seekers. It raises issues about expectations about cognitive performance throughout the asylum process (namely reliable and detailed recall of events), that may not take into account the effects of TBI and

psychological trauma. Further research on the issue may instigate policy-makers and lawyers to make adjustments to the asylum process to better acknowledge mental health and cognitive impairment.

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CHAPTER 3: ADVANCED CLINICAL PRACTICE I

REFLECTIVE ACCOUNT

"Reflections on communicating with clients in dyadic, triadic and group therapeutic encounters"

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ABSTRACT

Effective communication is essential for the provision of high-quality services and care (NHS Greater Glasgow & Clyde (NHSGG&C), 2012), and is integral to the work of a Clinical Psychologist. Throughout my training, I have developed skills in communicating information in sensitive manner. With over 150 languages other than English spoken in Scotland, staff in NHS Scotland are required to work effectively with interpreters to meet the needs of these clients (Health Scotland, 2008). This reflective account will consider the development of my communication skills throughout each year of my training. Firstly, I consider my initial dyadic therapeutic encounter. Secondly, I explore my first experience of working with an interpreter. Thirdly, I reflect on how I have developed skills to communicate effectively when working with interpreters with individual clients and in group settings. I draw on two models; Stoltenberg, McNeill and Delworth's (1998) Integrated Developmental Model of Supervision and Kolb's Learning Cycle (1984) to help me structure my reflections. Finally, I consider the process of writing this reflective account, acknowledge the impact of this process on my clinical work, and provide a critique of my experience of applying these two models.

"Research and evaluation within the NHS: reflections on conducting research as a trainee and upon qualification"

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ABSTRACT

The Health and Care Professions Council's (HCPC) Standards of Proficiency for Practitioner Psychologists (2012), states that Clinical Psychologists are expected to draw on, critically evaluate, and apply research. This is in addition to initiating, designing, developing and conducting psychological research and service evaluations. In this reflective account, I will consider Milne and Paxton's (1988) compartmentalisation of the scientist-practitioner model, reflecting on my experiences being an 'empirical clinician', 'evaluative scientist', and 'clinical scientist'. I will also consider the term 'reflective-scientist-practitioner' and reflect on how Clinical Psychologists can contribute to both evidence-based practice and practice-based evidence. Within my reflections, I will draw on Boud, Keogh and Walker's (1985) Model of Reflection, detailing the process of turning experience into learning. My reflections will focus on my audit and research experiences during training. Finally, within the reflective review, I will anticipate possible opportunities and barriers when utilising my research skills as a qualified Clinical Psychologist, acknowledging that the modal publication rate for Clinical Psychologists is zero (Norcross, Karpiak, & Santoro, 2005). I will also critique my experience drawing on these models.

Appendix 1.1. Critique of Steis and Schrauf's (2009) paper

Steis & Schrauf (2009): A review of translations and adaptations of the Mini-Mental State Examination in languages other than English and Spanish

Steis and Schrauf (2009) reviewed twenty articles published between 1988-2007 which translated and adapted the MMSE into languages other than English and Spanish. Overall the review included articles translating the MMSE into 15 languages. In their methodology, the authors specified their search strategy including the databases searched and search terms. The authors emphasised the importance of linguistic and cultural differences in the population being studied compared to the population where the original measure was developed. However, they do not detail the process of developing their cross-cultural assessment framework. The authors themselves refer to their 10-point scale as a "rudimentary framework", and it was insufficient in helping the reader judge the potential for bias in each study. Furthermore, their review could be strengthened if it outlined the validity, or lack thereof, of each translated MMSE to facilitate the reader's appraisal of study. Finally, the review did not compare differences in the methods of translations or adaptations of the MMSE across the different studies, which could have been a useful addition.

Appendix 1.2. Search Strategy

The researcher developed the search strategy following with discussions with her research supervisor and A Librarian at the University of Glasgow. Search terms were identified through reading various related subjects and agreed with the research supervisor prior to running the final systematic review searches in the selected databases. The decision to include or exclude any studies was based on the inclusion and exclusion criteria.

Appendix 1.3. Quality Rating Scale

		Rating Scale for papers validating the MMSE in Southern, Eastern and South East Asian Countries	
		Author and title of article:	
		Item	**Score**
1	**Title/Abstract/ Keywords**	Does title, abstract and/or keywords use the words Mini-Mental State Examination (MMSE) and validity?	/1
2	**Introduction**	Does introduction state research questions and aims (e.g., validating the MMSE in a certain population?)	/1
3	**Methods**	Did the research team include researchers from a similar cultural background?	/1
4	*Participants*	Study population: Are inclusion (score 1) an exclusion criteria (score 1) specified?	/2
5		Is the settings and location where data were collected specified?	/1
6		Is general location of subjects dwelling reported? (e.g. rural/urban/semi-urban)	/1
7		Participant recruitment: Sample representative of population (score 2), sample potentially representative/no clear bias (score 1), specialist or biased sample or unclear (e.g. students; score 0)?	/2
8		Were subjects with a range of educational backgrounds tested?	/1
9		Are subject's language fluency reported?	/1
10	*Test methods*	Was the MMSE used in the study validated against another measure or against a control group? (score 1 for either/both)	/1
11		Did an appropriately trained person administer the MMSE provided?	/1
12	*Translation*	Was the measure forward translated (score 1) and back-translated (score 1)?	/2
13		Was the translated measure externally verified for accuracy (score 1) and cultural appropriateness (score 1)?	/2
14	*Statistical methods*	Was the modified measure piloted/field tested prior to being used in the research?	/1
15		Does the paper detail modifications made to the MMSE? Reported in detail, or stated that no modifications were made (score 2), reported briefly (score 1), not reported at all (score 0)	/2
16		Are methods for calculating or comparing optimal cut-off points reported?	/1
17	*Ethics/Consent*	Is patient consent reported?	/1
18		Is Ethical approval obtained or protocol approved by University/external body?	/1
19	**Results**	Are beginning and end dates of recruitment reported?	/1
20	*Test results and estimates*	Are clinical and demographic characteristics of the study population (e.g. sample size, age, gender, education background, healthy vs. clinical population, co-morbidity etc) reported? Reported in detail (score 2), semi-reported (score 1), not reported (score 0)	/2
21		Was specificity of the measure reported?	/1
22		Was sensitivity of the measure reported?	/1
23		Were cut-offs provided?	/1
24		Did cut-offs take into consideration education/literacy (score 1), and gender? (score 1 - also score 1 if no gender cut-offs reported but article stated that there were no gender differences)	/2
25		Has the reliability of the measure been tested through test re-rest reliability?	/1
26	**Discussion**	Does article discuss the clinical applicability of the study findings?	/1
27		Was article published in a peer-reviewed journal?	/1
		Total score	/34
		Percentage	

Appendix 1.4. Table of inter-rater reliability

	Ibrahim *et al.* (2009)		Ansari *et al.* (2010)		Chiu *et al.* (1997)		Katzman *et al.* (1988)		Zarina *et al.* (2007)	
	Rater 1	Rater 2	Rater 1	Rater 2	Rater 1	Rater 2	Rater 1	Rater 2	Rater 1	Rater 2
1	1	1	1	1	1	1	0	0	1	1
2	1	1	1	1	1	1	1	0	1	1
3	1	1	1	1	1	1	1	1	1	1
4	2	2	2	2	0	0	0	1	0	0
5	1	1	1	1	1	1	1	1	1	1
6	1	1	0	0	0	0	1	1	1	1
7	1	2	0	1	1	1	2	2	0	0
8	1	1	1	0	1	1	1	1	0	0
9	1	1	1	1	0	0	0	0	0	0
10	1	1	1	1	1	1	1	1	1	1
11	1	0	1	1	1	1	1	1	0	0
12	2	2	2	2	2	2	2	2	2	2
13	0	0	2	2	0	0	0	0	2	2
14	0	0	1	1	1	1	1	1	0	0
15	2	2	2	2	2	2	2	2	1	2
16	1	1	1	1	1	0	1	1	1	1
17	1	1	1	1	1	1	0	0	0	0
18	1	1	1	1	0	0	0	0	0	0
19	1	1	0	0	0	0	0	0	0	0
20	2	2	2	2	2	2	2	2	1	1
21	1	1	1	1	1	1	1	1	1	1
22	1	1	1	1	1	1	1	1	1	1
23	1	1	1	1	1	1	1	1	1	1
24	2	2	1	1	0	0	1	2	0	0
25	0	0	0	0	1	1	0	0	0	0
26	1	1	1	1	1	1	1	1	1	1
27	1	1	1	1	1	1	1	1	0	0
Total	**29**	**29**	**28**	**28**	**23**	**22**	**23**	**24**	**17**	**18**
Rating	85.29%	85.29%	82.35%	82.35%	67.65%	64.71%	67.65%	70.59%	50.00%	52.94%

Question	Maximum score	Ibrahim *et al.* (2009)	Ansari *et al.* (2010)	Silva & Gunatilake (2002)	Chui *et al.* (1994)	Katzman *et al.* (1988)	Sahadevan *et al.* (2000).	Xu *et al.* (2003)	Park *et al.* (1991)	Zarina *et al.* (2007)
1. Does title, abstract and/or keywords use the words Mini-Mental State Examination/ MMSE and validity?	1	1	1	1	1	0	0	0	1	1
2. Does introduction state research questions and aims (e.g., validating the MMSE in a certain population?)	1	1	1	1	1	0	1	1	1	1
3. Did the research team include researchers from a similar cultural background?	1	1	1	1	1	1	1	1	1	1
4. Study population: Are inclusion (score 1) an exclusion criteria (score 1) specified?	2	2	2	2	0	1	2	2	1	0
5. Is the settings and location where data were collected specified?	1	1	1	1	1	1	1	1	1	1
6. Is general location of subjects dwelling reported? (e.g. rural/urban/semi-urban)	1	1	0	1	0	1	1	1	1	1
7. Participant recruitment: Sample representative of population (score 2), sample potentially representative/no clear bias (score 1), specialist or biased sample or unclear (e.g. students; score 0)?	2	2	0	2	1	2	2	1	0	0
8. Were subjects with a range of educational backgrounds tested?	1	1	1	1	1	1	1	1	1	0
9. Are subject's language fluency reported?	1	1	1	1	0	0	0	0	0	0
10. Was the MMSE used in the study validated against another measure or against a control group? (score 1 for either/both)	1	1	1	1	1	1	1	1	1	1
11. Did an appropriately trained person administer the MMSE provided?	1	1	1	1	1	1	0	1	1	0
12. Was the measure forward translated (score 1) and back-translated (score 1)?	2	2	2	2	2	2	2	0	0	2
13. Was the translated measure externally verified for accuracy (score 1) and cultural appropriateness	2	0	2	2	0	0	0	0	0	2

(score 1)?										
14. Was the modified measure piloted/field tested prior to being used in the research?	1	0	1	0	1	1	0	0	0	0
15. Does the paper detail modifications made to the MMSE? Reported in detail, or stated that no modifications were made (score 2), reported briefly (score 1), not reported at all (score 0)	2	2	2	2	2	2	2	2	2	2
16. Are methods for calculating or comparing optimal cut-off points reported?	1	1	1	1	1	1	1	1	1	1
17. Is patient consent reported?	1	1	1	0	1	0	0	0	0	0
18. Is Ethical approval obtained or protocol approved by University/external body?	1	1	1	0	0	0	0	1	0	0
19. Are beginning and end dates of recruitment reported?	1	1	0	0	0	0	0	0	1	0
20. Are clinical and demographic characteristics of the study population (e.g. sample size, age, gender, education background, healthy vs. clinical population, co-morbidity etc) reported? Reported in detail (score 2), semi-reported (score 1), not reported (score 0)	2	2	2	2				2	2	1
21. Was specificity of the measure reported?	1	1	1	1				1	1	1
22. Was sensitivity of the measure reported?	1	1	1	1				1	1	1
23. Were cut-offs provided?	1	1	1	1				1	1	1
24. Did cut-offs take into consideration education/literacy (score 1), and gender? (score 1 - also score 1 if no gender cut-offs reported but article stated that there were no gender differences)	2	2	1	0				1	0	0
25. Has the reliability of the measure been tested through test re-rest reliability?	1	0	0	0				1	0	0
26. Does article discuss the clinical applicability of the study findings?	1	1	1	1				0	1	1
27. Was article published in a peer-reviewed journal?	1	1	1	1	1	1	1	1	1	0
	Total = 34	30 88.24%	28 82.35%	27 79.41%	23 67.65%	23 67.65%	23 67.65%	22 64.71%	20 58.82%	18 52.94%

Appendix 1.6. Adaptations to the MMSE

English version of MMSE	Ibrahim *et al.* (2009). Malaysia, Malay	Ansari *et al.* (2010), Iran, Persian	Silva & Gunatilake (2002). Sri Lanka, Sinhalese, English	Chui *et al.* (1994). Hong Kong, Cantonese	Katzman *et al.* (1988). China, Chinese	Sahadevan *et al.* (2000). Singapore, Mandarin, Hokkien, Teochew, English *total score of 28*	Xu *et al.* (2003). China, Chinese	Park *et al.* (1991). Korea, Korean *used corrected not raw scores for total*	Zarina *et al.* (2007). Malaysia, Bahasa Malay
Orientation to time: What is the year? Season? Month of the year? Day of the week? Date?			*Orientation to time:* Date, day, month, year, time of day (which replaced season)		*Orientation to time:* original retained	*Orientation to time:* omitted season question due to equatorial climate.	*Orientation to time:* Lunar and Roman calendar systems accepted. Season changed to 'time of day' - 'morning, afternoon, evening' or time in 'hours and minutes'.	*Orientation to time:* Lunar calendar responses were accepted. *(1 point is added to non-educated who did not achieve a full score in orientation to time)*	*Orientation to time:* adaptation to season question as deemed unsuitable due to climate.
Orientation to place: What is the state? County? City/town? Building? Floor of the building?			*Orientation to place:* Country, town, street, place, floor		*Orientation to place:* original retained	*Orientation to place:* As Singapore has no cities/counties the items "Which town/ county/district..." replaced with "In which estate are we?"	*Orientation to place:* adapted to 'country, province, city or county.	*Orientation to place:* Name this place (asked to city residents), type of place (e.g. market/ school/hospital/ home)	
Registration (& recall): Apple, penny, table		*Registration (& recall):* Apple, table, rial	*Registration (& recall):* Orange, table, rupee		*Registration (& recall):* Rose, ball, key		*Registration (& recall):* Apple, table, axe	*Registration (& recall):* immediate recall of three named objects	
Attention & calculation: Serial 7s (participant subtract serial 7s from 100)		*Attention & calculation:* Serial 5s and serial 7s (only serial 7s kept in final score)	*Attention & calculation:* For subject with <5 years formal education, serial 3 test given	*Attention & calculation:* Serial 7s	*Attention & calculation:* Serial 7s		*Attention & calculation:* Serial 7s	*Attention & calculation:* Serial 7s *(1 or 2 points added for non-educated people who did not achieve a full score)*	
Spelling backwards: (Spell WORLD forward and backwards)				*Spelling backwards:* Reverse 5 digits			**Spelling backwards:** spell 5 Chinese characters backwards (metal, wood, water, fire, & earth'. Sequence known to elderly. (*omitted in scoring)	*Speaking backwards:* "all Korea beautiful!"	

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Appendix 1.6. Adaptations to the MMSE (continued).

English version of MMSE	Ibrahim *et al.* (2009). Malaysia, Malay	Ansari *et al.* (2010), Iran, Persian	Silva & Gunatilake (2002). Sri Lanka, Sinhalese, English	Chui *et al.* (1994). Hong Kong, Cantonese	Katzman *et al.* (1988). China, Chinese	Sahadevan *et al.* (2000). Singapore, Mandarin, Hokkien, Teochew, English	Xu *et al.* (2003). China, Chinese	Park *et al.* (1991). Korea, Korean *used corrected not raw scores for total*	Zarina *et al.* (2007). Malaysia, Bahasa Malay
Naming: Pen/ pencil, watch			*Naming:* Pencil, watch		*Naming:* Pencil, watch		*Naming:* button, watch	*Naming:* pencil and watch	
Repetition: "No ifs, ands, or buts"	*Repetition:* "no ifs, ands, or buts" translated into Malay.	*Repetition:* "no if, and, or but" translated into Persian.	*Repetition:* "no ifs ands or buts" translated into Sinhalese.	*Repetition:* Cantonese alliteration: "Uncle buys fish intestine".	*Repetition:* Chinese alliteration: "forty-four stone lions".		*Repetition:* "no ifs, ands, or buts" translated into Chinese	*Repetition:* Korean phrase: "a boss of a sauce factory"	*Repetition:* "past, present and forever" translated into Malay
Comprehension: 3-stage command: take paper in right hand, fold it in half and put it on the table			*Comprehension:* 3-stage command: take paper in right hand, fold it in half and put it on the table		*Comprehension:* 3-stage command.			*Language:* 3-stage command	
Reading: Read and follow a written command: "Close your eyes"			*Language comprehension:* Illiterate subjects asked to follow a verbal command not a written one "Close your eyes".	*Reading:* Original phrase is a Chinese death connotation, replaced with "clap your hands"	*Reading:* Original phrase a Chinese death connotation, replaced with "please raise your hands"		*Following commands:* Observing and imitating the posture shown by a cartoon of a man crossing his arms across his chest.	*Comprehension & judgement:* Asked "Why do people wash their clothes?"	
Writing: please write a sentence			*Sentence construction:* for illiterate subjects, please say a complete sentence.	*Writing:* "Please say a sentence", to guard against inability to write due to lack education.	*Writing:* "Please say a sentence", to guard against inability to write as a result of lack education.		*Sentence construction:* Asked "If you did not know my name how would you find out my name?"	*Comprehension and judgement:* Asked "How can you give an identity card back to the owner if you find it on the street?"	
Drawing: copy two intersecting pentagons			*Drawing:* copy two intersecting pentagons		*Drawing:* copy two intersecting pentagons		*Drawing:* copy a figure (choose either pencil or chalk)	*Drawing:* draw two intersecting pentagons	

Appendix 1.7. Author guidelines for the International Journal of Geriatric Psychiatry

Author Guidelines

1. AIMS & SCOPE

The rapidly increasing world population of aged people has led to a growing need to focus attention on the problems of mental disorder in late life. The aim of the *International Journal of Geriatric Psychiatry* is to communicate the results of original research in the causes, treatment and care of all forms of mental disorder which affect the elderly. The Journal is of interest to psychiatrists, psychologists, social scientists, nurses and others engaged in therapeutic professions, together with general neurobiological researchers.

The Journal provides an international perspective on the important issue of geriatric psychiatry, and contributions are published from countries throughout the world. Topics covered include epidemiology of mental disorders in old age, clinical aetiological research, post-mortem pathological and neurochemical studies, treatment trials and evaluation of geriatric psychiatry services.

Further information about the Journal, including links to the online sample copy and contents pages, can be found on the Journal homepage .

2. MANUSCRIPT CATEGORIES

The *International Journal of Geriatric Psychiatry* invites the following types of submission:

Research Articles

Research Articles are the Journal's primary mode of scientific communication. Peer-review of Research Articles will be handled by the most appropriate Editor. Research Articles must not exceed **3500** words of body text, and are limited to 6 figures/tables.

Review Articles

Review Articles will typically be solicited by the Editors. Authors who wish to submit an unsolicited review should first contact one of the Editors to determine its suitability for publication in the Journal. All reviews will be peer-reviewed. Reviews must not exceed **4500** words of body text, and are limited to 6 figures/tables and 150 references.

3. MANUSCRIPT SUBMISSION

All submissions should be made online at the *International Journal of Geriatric Psychiatry* **ScholarOne Manuscripts** site— http://mc.manuscriptcentral.com/gps . New users should first create an account. Once a user is logged onto the site, submissions should be made via the Author Centre.

4. MANUSCRIPT PREPARATION

Manuscripts must be written in English.

Text should be supplied in a format compatible with Microsoft Word for Windows (PC). Charts and tables are considered textual and should also be supplied in a format compatible with Word. All figures (illustrations, diagrams, photographs) should be supplied in jpg, tiff or eps format.

All manuscripts must be typed in 12pt font and in double space with margins of at least 2.5 cm. Manuscripts must comply with the word limits defined in section 2, and include:

Title Page

The first page of the manuscript should contain the following information:
- the title of the paper
- a running head not exceeding 50 characters
- 2–6 article keywords **and** up to 4 key points
- names of authors
- names of the institutions at which the research was conducted
- name, address, telephone and fax number, and email address of corresponding author
- the name(s) of any sponsor(s) of the research contained in the paper, along with grant number(s)
- the word count of the body text

Structured Abstracts

Authors submitting Research and Review Articles should note that structured abstracts (maximum 250 words) are required. The structured abstract should adopt the format: Objective, Methods, Results, Conclusions. (Authors of Reviews may use Design instead of Method.) Abstracts should contain no citation to other published work. Letters to the Editor do not require abstracts.

Text

This should in general, but not necessarily, be divided into sections with the headings: Introduction, Methods, Results, Discussion, Conclusion.

Research Letters and Correspondence should be formatted in one continuous section.

Tables and Figures

Tables and figures should not be inserted in the appropriate place in the text but should be included at the end of the paper, each on a separate page. Tables and figures should be referred to in text as follows: Figure 1, Figure 2; Table 1, Table 2. The place at which a table or figure is to be inserted in the printed text should be indicated clearly on a manuscript. Each table and/or figure must have a legend that explains its purpose without reference to the text.

Any figure submitted as a colour original will appear in colour in the Journal's online edition free of charge. Colour figures will be printed in the Journal on the condition that authors contribute to the associated costs: **£350** for the first page; **£150** for each subsequent page thereafter. Corresponding authors will be invoiced post-publication.

References

References should be in 'Harvard' format, i.e, names and dates in brackets in the text (Jones, 2000; Smith and Jones, 2001; Jones *et al*., 2002), and the full reference listed at the end of the paper, in alphabetical order by first author, as follows:

Porteus SD. 1959. *The Maze Tests and Clinical Psychology*. Pacific Books: Palo Alto.

Rabbitt PMA. 1982. How do old people know what to do next? In *Aging and Cognitive Processes*, Craik FIM, Trehub S (eds). Plenum Press: New York; 79–98.

Chou K-L, Chi I. 2004. Combined effect of vision and hearing impairment on depression in elderly Chinese. *Int J Geriatr Psychiatry* **19** : 825–832. DOI: 10.1002/gps.1174

(Titles of periodicals should be abbreviated according to the style used in Index Medicus.)

We recommend the use of a tool such as EndNote for reference management and formatting.

5. DECLARATION

Original Publication

Submission of a manuscript will be held to imply that it contains original unpublished work and is not being submitted for publication elsewhere at the same time. The author must supply a full statement to the Editor-in-Chief about all submissions and previous reports that might be regarded as redundant or duplicate publication of the same or very similar work.

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Authors are responsible for disclosing all financial and personal relationships between themselves and others that might bias their work. To prevent ambiguity, authors must state explicitly whether potential conflicts do or do not exist. Investigators should disclose potential conflicts to study participants and should state in the manuscript whether they have done so. Authors should describe the role of the study sponsor(s), if any, in study design, in the collection, analysis and interpretation of data, in the writing of the report and in the decision to submit the report for publication. If the supporting source had no such involvement, the authors should so state.

Ethics

When reporting experiments on human subjects, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 1983. Do not use patients' names, initials or hospital numbers, especially in illustrative material. When reporting experiments on animals, indicate whether the institution's or a national research council's guide for, or any national law on, the care and use of laboratory animals was followed. A statement describing explicitly the ethical background to the studies being reported should be included in all manuscripts in the Materials and Methods section. Ethics committee or institutional review board approval should be stated.

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Authorship

All persons designated as authors should qualify for authorship and all those who qualify should be listed. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. One or more authors should take responsibility for the integrity of the work as a whole, from inception to published article. Authorship credit should be based only on 1) substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content; 3) final approval of the version to be published. Conditions 1, 2 and 3 must all be met. Acquisition of funding, the collection of data or general supervision of the research group, by themselves, do not justify authorship. All others who contributed to the work who are not authors should be named in the Acknowledgements section.

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As a member of the Committee on Publication Ethics (COPE), adherence to these submission criteria is considered essential for publication in *International Journal of Geriatric Psychiatry*; mandatory fields are included in the online submission process to ensure this. If, at a later stage in the submission process or even after publication, a manuscript or authors are found to have disregarded these criteria, it is the duty of the Editor-in-Chief to report this to COPE. COPE may recommend that action may be taken, including but not exclusive to, informing the authors' professional regulatory body and/or institution of such a dereliction.
The website for COPE may be accessed at: http://www.publicationethics.org.uk

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Appendix 2.1. Ethics Committee Provisional Favourable Opinion

WoSRES
West of Scotland Research Ethics Service

NHS
GREATER GLASGOW
and Clyde

West of Scotland REC 4
Ground Floor, Tennent Building
Western Infirmary

Professor Thomas McMillan
Professor of Clinical Neuropsychology
University of Glasgow
Gartnavel Royal Hospital
Administration Building Trust HQ, 1st
floor
1055 Great Western Road
Glasgow
G12 0XH

38 Church Street
Glasgow
G11 6NT
www.nhsggc.org.uk

Date	7 August 2013
Direct line	0141-211-1722
Fax	0141-211-1847
e-mail	evelyn.jackson@ggc.scot.nhs.uk

Dear Professor McMillan

Study Title:	Cognitive function and head injury in asylum-seekers who access mental health services
REC reference:	13/WS/0200
IRAS project ID:	131500

The Research Ethics Committee reviewed the above application at the meeting held on 2 August 2013. The Committee thank you and Ms Christie for attending to discuss the application.

Documents reviewed

The documents reviewed at the meeting were:

Document	Version	Date
REC application	-	03 July 2013
Protocol	2	01 July 2013
Investigator CV	-	08 July 2013
Participant Information Sheet	2	01 July 2013
Participant Consent Form	1	06 June 2013
GP/Consultant Information Sheets	1	24 June 2013
Other: Sharon Docherty CV - student supervisor	-	28 June 2013
Other: Zara Christie CV - student	-	08 July 2013
Other: Letter from service	RM/MS	01 July 2013
Questionnaire: Validated - Mini-Mental State Examination	-	-
Questionnaire: Validated - Patient Health Questionnaire -4	-	-
Questionnaire: Validated - WHO/UCLA Auditory Verbal Learning Test	-	-
Questionnaire: Validated WAIS-III Symbol Search	-	-

Questionnaire: Validated - Colors Trails 1, Form A	-	-
Questionnaire: Validated - Color Trails 2, Form A	-	-

Provisional opinion

Ethical issues raised by the Committee in private discussion, together with responses given by the researcher when invited into the meeting:

1. The Committee asked if participants would be given a copy of the PIS in their own language.
   Ms Christie explained that they would not and that a translator would read the PIS to them.

2. The Committee noted that there appeared to be conflicting information in the PIS regarding how long potential participants would have to decide if they wished to take part in the study.
   Ms Christie explained that patients would be asked to decide whether to consent or not immediately after the translator had read the PIS to them as the translator would not always be available.

3. The Committee asked the researcher how well the content of the assessment tools would translate into another language, as some of the terms used were inherently English.
   Ms Christie explained that the tests selected for use in the study had been chosen as they had the best evidence based data for their use in this type of study. She also explained that the content or meaning of the words were not as important as the ability of the participant to repeat back words they had heard. The research team recognised this approach could have limitations.

The Committee would be content to give a favourable ethical opinion of the research, subject to receiving a complete response to the request for further information set out below.

Authority to consider your response and to confirm the Committee's final opinion has been delegated to the Chair.

Further information or clarification required

1. The Committee require to see Appendices 1 and 2, mentioned on page 13 of the Protocol, as these were not submitted with your application.

2. The Committee asked that the researcher clarify why there is no mention of comparing asylum seekers with severe TBI, against those without TBI, in the principal research question/objective stated at QA10 of the IRAS application form?

3. In the participant information sheet:

(a) Add a lay title or explain "cognitive function".
(b) Print contact details at the top of the first page.
(c) "COMPASS" should be explained.
(d) Information must be given that taking part in the study would not have a bearing or play any part in the participant's application for asylum.

(e)   The information regarding £3.50 to cover travel expenses should be removed from section headed "Possible benefits of taking part?" and placed under a more appropriate heading.

(f)   In section headed "Do I have to take part?", this should be changed to read "<u>No</u>. Now that we have described…….."

4. The Committee felt that the Consent Form was too complicated as written, and suggested that this should be simplified. The following points were notes, in particular:

(a)   The two statements pertaining to the Clinical Psychologist could be merged, as could the two statements pertaining to the GP.

(b)   Statement #4 should also explain what would happen to the data already collected if the participant should leave the study.

(c)   Contact details to be printed at the top of the page.

(d)   The following standard paragraph must be included:

I understand that sections of my medical notes may be looked at by the research team, where it is relevant to my taking part in the research, and by authorised representatives of the sponsor and NHS Greater Glasgow and Clyde, for the purposes of audit only. I give my permission for the research team to have access to my records.
(<u>If relevant</u>) I understand that anonymised information may be transferred to personnel outwith the research team for analysis.

5. The Committee suggested that, to avoid the possibility of coercion, consideration be given to whether someone who was not involved in the potential participant's care could introduce the study, rather than their clinician.

6. The Committee had doubts as to whether the sample size of 34 (2 groups of 17) would achieve the desired results, described in the application form and suggested that advice from a Statistician should be sought regarding this.

If you would find it helpful to discuss any of the matters raised above or seek further clarification from a member of the Committee, you are welcome to contact Evelyn Jackson, contact details above.

When submitting your response to the Committee, please send revised documentation where appropriate underlining or otherwise highlighting the changes you have made and giving revised version numbers and dates.

If the committee has asked for clarification or changes to any answers given in the application form, please do not submit a revised copy of the application form; these can be addressed in a covering letter to the REC.

The Committee will confirm the final ethical opinion within a maximum of 60 days from the date of initial receipt of the application, excluding the time taken by you to respond fully to the above points. A response should be submitted by no later than 06 September 2013.

Membership of the Committee

The members of the Committee who were present at the meeting are listed on the attached sheet.

Statement of compliance
The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

13/WS/0200 Please quote this number on all correspondence

Yours sincerely
Evelyn Jackson

For **Dr Brian Neilly**
Chair

    Enclosures: *List of names and professions of members who were present at the meeting*

    Copy to: *Dr Erica Packard, R&D Office, Tennent Building, Western Infirmary*

West of Scotland REC 4
Attendance at Committee meeting on 2 August 2013

Committee Members:

Name	Profession	Present	Notes
Mr Gavin Bell	Lay plus member	No	
Ms Lynda Brown	Public Health Adviser	No	
Mr Thomas Byrne	Lay plus member	No	
Ms Cristina Coelho	Senior Pharmacist Clinical Effectiveness	Yes	
Dr Claire Fang	GP	Yes	
Dr Ken James	Consultant Anaesthetist	No	
Dr Grace Lindsay	Reader	Yes	
Miss Fiona Mackelvie	Lay plus member	Yes	
Dr Angus McFadyen	Statistician (Co-opted Member)	Yes	
Mrs Karen McIntyre	Lay plus member		
Dr Brian Neilly **(Chair)**	Consultant Physician	Yes	
Mrs Linda Renfrew	Consultant Physiotherapist in MS	No	
Dr Jackie Riley	Statistician	No	
Dr Giles Roditi	Consultant Radiologist	Yes	
Dr Ihab Shaheen	Consultant Paediatric Nephrologist	Yes	
Dr Gary Tanner	Consultant Psychologist	No	
Mrs Kathleen Tuck	Lay plus member	No	
Mr Iain Wright	Lay plus member	Yes	

Also in attendance:

Name	Position (or reason for attending)
Dr Judith Godden	Scientific Adviser
Ms Evelyn Jackson	Committee Co-ordinator
Dr David Preiss	Observer

Appendix 2.2. Confirmation of Ethical Approval

WoSRES
West of Scotland Research Ethics Service

NHS
Greater Glasgow
and Clyde

West of Scotland REC 4
Ground Floor, Tennent Building
Western Infirmary

Professor Thomas McMillan   38 Church Street
Professor of Clinical   Glasgow
Neuropsychology   G11 6NT
University of Glasgow   www.nhsggc.org.uk
Gartnavel Royal Hospital
Administration Building Trust HQ,
1st floor   Date   25 September 2013
1055 Great Western Road   Direct line   0141-211-1722
Glasgow   Fax   0141-211-1847
G12 0XH   e-mail   evelyn.jackson@ggc.scot.nhs.u
                                                 k

Dear Professor McMillan

Study Title:	Cognitive function and head injury in asylum-seekers who access mental health services
REC reference:	13/WS/0200
IRAS project ID:	131500

Thank you for your letter of 31 August 2013, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

We plan to publish your research summary wording for the above study on the NRES website, together with your contact details, unless you expressly withhold permission to do so. Publication will be no earlier than three months from the date of this favourable opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to withhold permission to publish, please contact the Co-ordinator Ms Evelyn Jackson, evelyn.jackson@ggc.scot.nhs.uk.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above, research on the basis described in the application form,   protocol and supporting documentation, as revised, subject to the conditions specified below.

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

<u>Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.</u>

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
REC application	-	03 July 2013
Protocol	2	01 July 2013
Investigator CV	-	08 July 2013
Participant Information Sheet	3	07 August 2013
Participant Consent Form	2	07 August 2013
GP/Consultant Information Sheets	1	24 June 2013
Other: Sharon Docherty CV - student supervisor	-	28 June 2013
Other: Zara Christie CV - student	-	08 July 2013
Other: Letter from service	RM/MS	01 July 2013
Other: Appendix 1 - Health and Safety Issues	-	-
Other: Appendix 2 - Research Cost form	-	-
Questionnaire: Validated - Mini-Mental State Examination	-	-
Questionnaire: Validated - Patient Health Questionnaire -4	-	-
Questionnaire: Validated - WHO/UCLA Auditory Verbal	-	-

Learning Test		
Questionnaire: Validated WAIS-III Symbol Search	-	-
Questionnaire: Validated – Color Trails 1, Form A	-	-
Questionnaire: Validated - Color Trails 2, Form A	-	-
Response to Request for Further Information	-	31 August 2013

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

Further information is available at National Research Ethics Service website > After Review

13/WS/0200 Please quote this number on all correspondence

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at http://www.hra.nhs.uk/hra-training/

With the Committee's best wishes for the success of this project.

Yours sincerely

Evelyn Jackson
For **Dr Brian Neilly**
Chair

    Enclosures: "After ethical review – guidance for researchers"

    Copy to: *Dr Erica Packard, R&D Office, Tennent Building, Western Infirmary*

Appendix 2.3. NHS R&D Board Approval

NHS Greater Glasgow and Clyde

Coordinator/Administrator: Dr Erica Packard/Mrs Elaine O'Neill	**R&D Management Office**
Telephone Number: 0141 232 9448	**Western Infirmary**
E-Mail: erica.packard@ggc.scot.nhs.uk	**Tennent Institute**
Website: www.nhsggc.org.uk/r&d	**1st Floor 38 Church Street**
	Glasgow, G11 6NT,

3 October 2013

Dr Sharon Doherty
Consultant in Clinical Psychology
COMPASS, Unit 34-35
Hydepark Business Centre
60 Mollinsburn Street
Glasgow G21 4SF

NHS GG&C Board Approval

Dear Dr Doherty,

Study Title:	**Cognitive function and head injury in asylum-seekers who access mental health services.**
Principal Investigator:	**Dr Sharon Doherty**
GG&C HB site	**Community Mental Health**
Sponsor	**NHS Greater Glasgow & Clyde**
R&D reference:	**GN13NE344**
REC reference:	**13/WS/0200**
Protocol no:	**V2.0; 01 Jul 2013**

I am pleased to confirm that Greater Glasgow & Clyde Health Board is now able to grant Approval for the above study.

Conditions of Approval

1. **For Clinical Trials** as defined by the Medicines for Human Use Clinical Trial Regulations, 2004
   a. During the life span of the study GGHB requires the following information relating to this site
      i. Notification of any potential serious breaches.
      ii. Notification of any regulatory inspections.

It is your responsibility to ensure that all staff involved in the study at this site have the appropriate GCP training according to the GGHB GCP policy (www.nhsggc.org.uk/content/default.asp?page=s1411), evidence of such training to be filed in the site file.

2.   **For all studies** the following information is required during their lifespan.
        a. Recruitment Numbers on a monthly basis
        b. Any change of staff named on the original SSI form
        c. Any amendments – Substantial or Non Substantial
        d. Notification of Trial/study end including final recruitment figures
        e. Final Report & Copies of Publications/Abstracts

Please add this approval to your study file as this letter may be subject to audit and monitoring.

Your personal information will be held on a secure national web-based NHS database.

I wish you every success with this research study

Yours sincerely,

Dr Erica Packard
Research Co-ordinator

Cc: Zara Christie

WoSRES
West of Scotland Research Ethics Service

West of Scotland REC 4
Ground Floor, Tennent Building
Western Infirmary
38 Church Street
Glasgow
G11 6NT
www.nhsggc.org.uk

Professor Thomas McMillan
Professor of Clinical
Neuropsychology
University of Glasgow
Gartnavel Royal Hospital
Administration Building Trust HQ,
1st floor
1055 Great Western Road
Glasgow
G12 0XH

Date	11 November 2013
Direct line	0141-211-1722
Fax	0141-211-1847
e-mail	Wosrec4@ggc.scot.nhs.uk

Dear Professor McMillan

Study Title:	Cognitive function and head injury in asylum-seekers who access mental health services
REC reference:	13/WS/0200
Amendment number:	AM01 - Minor
Amendment date:	08 November 2013
IRAS project ID:	131500

Thank you for your letter of 08 November 2013, notifying the Committee of the following minor amendment:

Changes to the Participant Information Sheet (PIS) and Consent Form as follows:

PIS – Additional information stating that the assessment would be audio-recorded and that following the assessment this would be erased.

Consent Form – Slight change to the standard statement relating to potential audit of the research study.

The Committee does not consider this to be a "substantial amendment", as defined in the Standard Operating Procedures for Research Ethics Committees. The amendment does not therefore require an ethical opinion from the Committee and may be implemented immediately, provided that it does not affect the approval for the research given by the R&D office for the relevant NHS care organisation.

Documents received

The documents received were as follows:

Document	Version	Date
Notification of a Minor Amendment	AM01	08 November 2013
Participant Information Sheet	4	16 October 2013
Participant Consent Form	3	16 October 2013

Statement of compliance
The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

13/WS/0200 Please quote this number on all correspondence

Yours sincerely

Ms Evelyn Jackson
Committee Co-ordinator

Copy to: *Dr Erica Packard, R&D Office, Tennent Building, Western Infirmary*

Appendix 2.5. NHS R&D Board Approval following minor amendment

**Non-substantial Amendment - R&D Ref GN13NE344 Protocol V2; 01/07/13
Non-substantial Amendment dated 08/11/13**
O'Neill, Elaine

Sent: 20 November 2013 16:07
To: Doherty, Sharon
Cc: Yekta, Arash; Zara Christie

Dear Dr Doherty,

R&D Ref: GN13NE344   **Ethics Ref**: 13/WS/0200
Investigator: Dr Sharon Doherty
Project Title: Cognitive function and head injury in asylum-seekers who access mental health services.
Protocol Number: V2; 01/07/13
Amendment: Non-substantial Amendment **dated 08/11/13**
Sponsor: NHS Greater Glasgow and Clyde

I am pleased to inform you that R&D have reviewed the above study's Amendment **dated 08/11/13** and can confirm that Management Approval is still valid for this study.

Reviewed Documents:	Version	Date
Ethics Acknowledgement Letter		11 Nov 13
Notification of a minor amendment email		08 Nov 13
Participant Information Sheet	4.0	16 Oct 13
Participant Consent Form	3.0	16 Oct 13

I wish you every success with this research project.

Yours sincerely,

Research and Development
NHS Greater Glasgow & Clyde
Research & Development
Western Infirmary
1st Floor, Tennent Building
38 Church Street
Glasgow
G11 6NT

tel: 0141 232 9448
Web: www.nhsggc.org.uk/r&d

Please note that NHS GG&C R&D operate an electronic record system and that only electronic submissions are accepted.

Appendix 2.6. Head Injury Screening Form

Head Injury Screening Form – V5   **Client Study Number -** _____

Client Name: _____ Language Spoken:_____
Date of Birth: _____ Interpreter required? **Y / N**
Gender: **M / F**   Any English Language? _____
Date of assessment: _____ Length of time in UK: _____
Country of origin: _____Referral Source _____
Any Physical health problems? _____ Total CORE Score _____
_____ Clinician completing _____

☐ It was not possible / appropriate to complete screening questionnaire - Please give details:
_____

1. Have you ever had an injury causing you to be "knocked out"? For example, being hit on the head or being involved in a car accident.   - Yes / No
(*If yes, continue with further questions*)

2. How many times has this happened? (If there are multiple events an approximate number is enough).
_____(*If more than 1 – may need to complete full screening questionnaire*)

3. What was the longest time you have been knocked out for? _____

How do you know this? (Did someone tell you? Is it from the gap in your memory?)

4. When did this injury happen? _____

5. What country did the injury take place in?   _____

6. What was the cause of the injury?

7. Did you go to hospital? - Yes / No
If yes, how long did you stay in hospital?   Did you have an operation to your brain?
_____   _____

8. Have you had any contact with brain injury services in the UK?   - Yes/ No
    (*If yes, ask for details*):

9. Do you think the situation that caused injury to your head affects you now? If so, how?

(If necessary, prompt with the following examples):
For example, since the event that caused injury to your head, have you noticed any of these symptoms?

Headache	Poor sleep
Memory problems	Fits
Dizziness	Irritability
Problems concentrating	Anxiety
Fatigue	Low mood/Depression

10. Is there anything else related to these experiences that you think is important that we haven't asked about?

11. For Clinician –
Were you already aware of the event in which the head injury was sustained?   -   Yes/ No

Was this event the reason the client was referred to the service?-   Yes/ No

If client reports more than one head injury:

1. Have you ever had an injury causing you to be "knocked out" <u>since arriving in the UK? - Y / N</u>

For example, being hit on the head or being involved in a car accident.

(f yes, complete further questions. If no, questionnaire is complete.)

2. When did this injury happen?   _____

3. What was the cause of the injury?

4. Did you go to hospital? - Yes/ No

If yes, how long did you stay in hospital?   Did you have an operation to your brain?
_____   _____

5. Have you had any contact with brain injury services in the UK as a result of this injury?- Y /N
 (*If yes, ask for details*)

6. Do you think the situation that caused injury to your head affects you now? If so, how?

(If necessary, prompt with the following examples):

For example, since the event that caused injury to your head, have you noticed any of these symptoms?

Headache	Poor sleep
Memory problems	Fits
Dizziness	Irritability
Problems concentrating	Anxiety
Fatigue	Low mood/Depression

Name of Researcher: Zara Christie, Trainee Clinical Psychologist, University of Glasgow, Mental Health and Wellbeing, 1055 Great Western Road, Glasgow, G12 0XH
Email: z.christie.1@research.gla.ac.uk, Telephone Number: 0141 211 3920

Concentration, thinking skills and head injury in asylum-seekers

Information sheet

You are invited to take part in a study. We want you to understand why the study is being done and what it involves before you decide if you want to take part. Please ask me if there is anything that is not clear or if you would like more information. Please take time to decide if you want to take part or not. You do not have to make an immediate decision. Any personal information will remain confidential and stored safely in a locked filing cabinet.

Who is conducting the study?
Zara Christie, Trainee Clinical Psychologist, will conduct the study. She will be supervised by Dr Sharon Doherty (COMPASS Mental Health Service for refugees and asylum-seekers affected by trauma) and Professor Tom McMillan (University of Glasgow).

What is the purpose of the study?
This study will look at concentration and thinking skills in asylum-seekers who attend COMPASS Mental Health Service. It will explore if people have difficulties with their memory and concentration. Some people may have had a head injury, so we will look at how this impacts on memory and concentration. This study will be submitted as part of Zara Christie's Doctorate in Clinical Psychology.

Why was I invited to take part?
You are invited to take part because you attend COMPASS Mental Health Service and are aged between 18 and 65, and you may or may not have a head injury.

What will I have to do if I take part?
You will need to attend COMPASS Mental Health Service for one hour to do a number of tasks. These tasks will look at your memory, concentration and the speed that you can do certain tasks. We will provide an interpreter during the study. One task during the assessment will be audio-recorded to make sure that no information is missed. This information will be erased after the assessment. The researcher will have access to your medical notes.

Possible risks of taking part?
There are no expected risks for you during the study. If you feel upset during the study, you will be able to stop. If you feel upset after the study, please contact any staff member involved in the study.

Possible benefits of taking part?

If you agree, the information about your performance in the study will be passed onto your clinician, which may help inform the way they work with you.

Will my taking part in the study be kept confidential?

All your information will be kept confidential. During the write-up of the project, some anoymised quotations may be used. No one will be able to identify you from any quotations that may be used.

Do I have to take part?

No. Now that we have described the study, you can decide if you want to take part. You will be asked to sign a consent form to show that you agree to take part. You are free to stop the study at any time, without giving a reason. This will not affect the standard of care you receive or your future treatment.

Will taking part play a part in my application for asylum?

No, taking part in this study will not play any part in your application for asylum.

Will I get travel expenses?

Yes. You will receive £4.00 to cover travel expenses.

Who has reviewed the study?

This study has been reviewed by the West of Scotland Research Ethics Committee and by qualified staff at the Mental Health and Wellbeing at the University of Glasgow.

If you have any further questions?

If you would like more information about the study and wish to speak to someone **not** closely linked to the study, please contact:

Dr Alison Jackson, Academic Tutor, University of Glasgow
Mental Health and Wellbeing, 1055 Great Western Road, Glasgow, G12 0XH
Email: Alison.Jackson@glasgow.ac.uk, Telephone number: 0141 211 3917

If you have a complaint about any aspect of the study?

If you are unhappy about any aspect of the study and wish to make a complaint, please contact the researcher first, but the normal NHS complaint procedures are also available.

Other Investigators Contact Details:

Dr Sharon Doherty, Clinical Psychologist
COMPASS, Unit 34/35, Hydepark Business Centre,
60 Mollinsburn Street, Glasgow, G21 4SF
Email: Sharon.doherty2@ggc.scot.nhs.uk, Telephone Number: 0141 630 4985

Professor Tom McMillan, Professor of Clinical Neuropsychology, University of Glasgow
Mental Health and Wellbeing, 1055 Great Western Road, Glasgow, G12 0XH
Email: Thomas.McMillan@glasgow.ac.uk, Telephone Number: 0141 211 3938

If you have understood what the study is about and wish to take part, please complete the consent sheet. If you have any questions please feel free to ask them now.

Appendix 2.8. Consent Form *(Version 3 – 16.10.13)*

Name of Researcher: Zara Christie, Trainee Clinical Psychologist, University of Glasgow, Mental Health and Wellbeing, 1055 Great Western Road, Glasgow, G12 0XH
Email: z.christie.1@research.gla.ac.uk, Telephone Number: 0141 211 3920

Concentration, thinking skills and head injury in asylum-seekers

Consent form

Please initial the box

- I confirm that I have read and understand the information sheet dated 16.10.13 (Version 4) for the above study.

- I confirm that the researcher has answered any queries to my satisfaction.

- I understand that my participation is voluntary and that I can withdraw from the study at any time, without having to give a reason and without any consequences.

- I understand that I can withdraw my data from the study at any time, and if I do this any data that has already been collected will be destroyed.

- I understand that any information recorded in the research will remain confidential and no information that identifies me will be made publicly available.

- I consent to having the assessment audio-recorded.

- I consent to my clinician being told that I am participating in this study and being told about the results of the assessment.

- I consent to my GP being told that I am participating in this study and being told about the results of the assessment.

- I consent to the researcher accessing my mental health medical notes.

- I understand that sections of my medical notes may be looked at by the research team, where it is relevant to my taking part in the research. This research may evaluated (audited). If the research is evaluated, then authorised staff members from NHS Greater Glasgow and Clyde have permission to look at my notes. I give my permission for the research team to have access to my records.

- I consent to being a participant in the study.

_____   _____   _____
Name of Participant   Date   Signature

_____   _____   _____
Name of Witness   Date   Signature

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Appendix 2.9. Table of causes of TBIs

Female	Male
1. Told by her grandmother that she had LoC of a few hours after she collapsed and hit her head on the ground. Stayed in hospital overnight (aged 29, now 39).	3. LoC for 24 hours following repeated beatings and torture from prison guards over a two month period. Reports awareness for length of LoC as it would turn from day to night (age 28, now 31).
6. Repeated LoC due to assaults from her husband. Longest LoC was 2 weeks; she was admitted to hospital (aged 37, now 46).	5. LoC of 3 months following severe and repeated beatings with truncheons over a period of 3 days (aged 25, now 43).
8. LoC more than 40 times due to domestic violence, unsure length of LoC, went to hospital on some occasions (aged 20-27, now 32).	7. LoC when he fell off a roof (aged 4, 12; went to hospital both times), fell off a bridge (aged 13), and was in a motorbike accident (aged 13; was taken to hospital). Unsure length of LoC (now 39).
11. LoC of 3 weeks following a sexual assault, spent 1 month in hospital (aged 31, now 43).	10. LoC of 2-3 hours when fell down the stairs and spent 48 hours in hospital (aged 6, now 31).
12. LoC of 1 hour whilst being trafficked for sexual exploitation, she was drugged and hit against the wall; she did not go to hospital (aged 27, now 31).	18. LoC for longer than 30 minutes following repeated beatings to his head with a gun. On one occasion following LoC he spent one night in hospital and required stitches (aged 26, now 52). According to case notes, he was knocked of his bike and "was hospitalised with a serious head injury and a broken leg" (aged 12).
13. LoC of 30 minutes when she was hit by a motorbike; she had an injury to her frontal lobe and woke up in hospital (aged 10). She was also assaulted and hit on the back of her head, LoC of 20-30 minutes; she reported spending time in hospital (aged 15; now 36).	19. LoC longer than 30 minutes when fell into an empty swimming pool, falling on his face and knocking a tooth out. He went to hospital and was discharged the same day (aged 15, now 37).
14. LoC of 30 minutes when she walked into a wall and fell over hitting the back of her head on the floor. She spent one night in hospital (aged 14, now 22).	
21. LoC approximately <30 minutes following severe and repeated beatings from her husband (aged 13-15, now 34).	

Appendix 2.10. Author Guidelines for the Journal of the International Neuropsychological Society.

Instructions for Contributors

Aims and Scope The *Journal of the International Neuropsychological Society* is the official journal of the International Neuropsychological Society, an organization of over 4,500 international members from a variety of disciplines. The *Journal of the International Neuropsychological Society* welcomes original, creative, high quality research papers covering all areas of neuropsychology. The focus of articles may be primarily experimental, applied, or clinical. Contributions will broadly reflect the interest of all areas of neuropsychology, including but not limited to: development of cognitive processes, brain-behavior relationships, adult and pediatric neuropsychology, neurobehavioral syndromes (such as aphasia or apraxia), and the interfaces of neuropsychology with related areas such as behavioral neurology, neuropsychiatry, genetics, and cognitive neuroscience. Papers that utilize behavioral, neuroimaging, and electrophysiological measures are appropriate.

To assure maximum flexibility and to promote diverse mechanisms of scholarly communication, the following formats are available in addition to *Regular Research Articles: Brief Communications* are shorter research articles; *Rapid Communications* are intended for ''fast breaking'' new work that does not yet justify a full length article and are placed on a fast review track; *Neurobehavioral Grand Rounds* are theoretically important and unique case studies; *Critical Reviews* and *Short Reviews* are thoughtful considerations of topics of importance to neuropsychology, including associated areas, such as functional brain imaging, genetics, neuroepidemiology, and ethical issues; *Dialogues* provide a forum for publishing two distinct positions on controversial issues in a point-counterpoint format; Symposia consist of several research articles linked thematically*: Letters to the Editor* respond to recent articles in the *Journal of the International Neuropsychological Society*; and *Book Reviews. Critical Reviews, Dialogues,* and *Symposia* are typically invited by the Editor-in-Chief or an Associate Editor. *Book Reviews* are considered but are no longer solicited.

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Disclosure Potential conflicts of interest include funding sources for the reported study (e.g., a test validation study financially supported by a test publisher, a study supported by an insurance company), personal or family financial interest in a test or product or with a company that publishes a test that is being investigated in the manuscript or competes with a test that is being investigated in the manuscript. Other conflicts include employment, consultancies, stock ownership or medicolegal work. For the latter, information about whether the author's medicolegal work is largely for one side should be reported. This list of potential conflicts is not all inclusive, and it is the responsibility of each author to ensure that all of their ''potential conflicts'' are reported in the Acknowledgment section of the paper.

Disclosure pertains to all authors. It is the corresponding author's ethical responsibility to explicitly check with each of his/her co-authors to ensure that any real or apparent conflict of interest is appropriately disclosed. Authors should err on the side of full disclosure, and if authors are uncertain about what constitutes a relevant conflict, they should contact the editorial office jins@cambridge.org. The intent of this disclosure is not to prevent an author with a significant financial or other relationship from publishing their work in the *Journal of the International Neuropsychological Society*, but rather to provide readers with adequate information to form their own judgments about the work.

Compliance with institutional research standards for animal or human research (including a statement that the research was completed in accordance with the Helsinki Declaration (http://www.wma.net/en/ 30publications/10policies/b3/) should be included in the methods section of the manuscript.

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The website will automatically acknowledge receipt of the manuscript and provide a manuscript reference number. The Editor-in-Chief will assign the manuscript for review to an action editor and at least two other reviewers. Every effort will be made to provide the author with a review within 6 to 10 weeks of manuscript assignment. Rapid Communications will be reviewed within 6 weeks. If the Editor requests that revisions be made to a manuscript before publication, a maximum of 3 months will be allowed for preparation of the revision, except in unusual circumstances.

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exceed length requirements.

Regular Research Article: Maximum of 5,000 words (not including abstract, tables, figures, or references) and a 250 word abstract. Regular Research Articles are original, creative, high quality papers covering all areas of neuropsychology; focus may be experimental, applied or clinical.

Brief and Rapid Communications: Maximum of 2,500 words (not including abstract, tables, figures, or references) and a 200 word abstract, with a maximum of two tables or two figures, or one table and one figure, and 20 references. Brief and Rapid Communications are shorter research articles.

Neurobehavioral Grand Rounds: Maximum of 3,500 words with an informative literature review (not including abstract, tables, figures, or references) and a 200 word abstract. Neurobehavioral Grand Rounds are unique case studies that make a significant theoretical contribution.

Critical Review: Maximum of 7,000 words (not including abstract, tables, figures, or references) and a 250 word abstract. Critical Reviews will be considered on any important topic in neuropsychology. Quantitative meta-analyses are encouraged. Critical Reviews must be preapproved by the Editor-in-Chief.
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Letters to the Editor: Maximum of 500 words (not including table, figure, or references) with up to five references and one table or one figure. Letters to the Editor respond to recent articles in *Journal of the International Neuropsychological Society.*

Book Reviews: Maximum of 1000 words in length. Include name and affiliations, a title for the review, the author(s)/editor(s), title, publisher, date of publication, number of pages and price. For consideration, e-mail jins@cambridge.org.

Manuscript Preparation and Style The entire manuscript should be typed double-spaced throughout using a word processing program. Unless otherwise specified, the guideline for preparation of manuscripts is the Publication Manual of the American Psychological Association (6th edition) except for references with 3 or more authors (see References section). This manual may be ordered from: APA Order Dept., 750 1st St. NE, Washington, DC 20002-4242, USA.

Pages should be numbered sequentially beginning with the Title Page. The Title Page should contain the full title of the manuscript, the full names and institutional affiliations of all authors; mailing address, telephone and fax numbers, and e-mail address for the corresponding author; and the word count for the abstract and manuscript text (excluding title page, abstract, references, tables, and figures). At the top right provide a short title of up to 45 characters preceded by the lead author's last name. Example: Smith-Memory in Parkinson's Disease. This running head should be repeated at the top right of every following page.

Page 2 should include an Abstract and a list of at least six keywords or mesh terms. Note: structured abstracts must be included with papers submitted after January 1, 2014. A structured abstract must include four header labels: *Objective, Method, Results, and Conclusions.* A total of six mesh terms (http://www.nlm.nih.gov/mesh/) or keywords should be provided and should not duplicate words in the title.

The full text of the manuscript should begin on *page 3.* For scientific articles, including *Regular Research Articles, Brief Communications, Rapid Communications,* and *Symposia*, the format should include a structured Abstract, Introduction, Method, Results, and Discussion. This should be followed by Acknowledgments, References, Tables, Figure Legends, Figures, and optional Appendices and Supplemental Material.

The use of abbreviations, except those that are widely used, is strongly discouraged. They should be used only if they contribute to better comprehension of the manuscript. Acronyms should be spelled out at first mention. Metric system (SI) units should be used.

Appendices and Supplemental Materials may be submitted. Appendices include material intended for print and should be included with the manuscript file. Supplementary material will appear only online and should be submitted as a separate file.

The Acknowledgements Section should include a disclosure of conflicts of interest (see above) and all sources of financial support for the paper. In documenting financial support, please provide details of the sources of financial support for all authors, including grant numbers. For example, ''This work was supported by the National Institutes of Health (grant number XXXXXXX)''. Multiple grant numbers should be separated by a comma and space and where research was funded by more than one agency, the different agencies should be separated by a semicolon with ''and'' before the final funding agency. Grants held by different authors should be identified using the authors' initials. For example, ''This work was supported by the Wellcome Trust (A.B., grant numbers XXXX, YYYY), (C.D., grant number ZZZZ); the Natural Environment Research Council (E.F., grant number FFFF); and the National Institutes of Health (A.B., grant number GGGG), (E.F., grant number HHHH).''

Tables and Figures should be numbered in Arabic numerals. Figures should be numbered consecutively as they appear in the text. Figures should be twice their intended final size and authors should do their best to construct figures with notation and data points of sufficient size to permit legible photo reduction to one column of a two-column format.

Please upload figure(s) in either a .doc or .pdf format. There is no additional cost for publishing color figures. When uploading figures (color or black and white) they need only be a high enough resolution for the reviewers and editors to identify the information you are trying to convey.

The approximate position of each table and figure should be provided in the manuscript: [INSERT TABLE 1 HERE]. Tables and figures should be on separate pages. Tables should have short titles and all figure legends should be on separate pages.

References should be consistent with the Publication Manual of the American Psychological Association (6th Edition). In-text references should be cited as follows: ''... Given the critical role of the prefrontal cortex (PFC) in working memory (Cohen et al., 1997; Goldman-Rakic, 1987; Perlstein et al., 2003a, 2003b)...'' with multiple references in alphabetical order. Another example: ''...Cohen et al. (1994, 1997), Braver et al. (1997), and Jonides and Smith (1997) demonstrated...'' References cited in the text with two authors should list both names. References cited in the text with three, four, or five authors, list all authors at first mention; with subsequent citations, include only the first author's last name followed by et al. References cited in the text with six or more authors should list the first author et al. throughout. In the reference section, for works with up to seven authors, list all authors. For eight authors or more, list the first six, then ellipses followed by the last author's name. Examples of the APA reference style are as follows:

Online/Electronic Journal Article with DOI:
Dikmen, S., Machamer, J., Fann, J. & Temkin, N. (2010). Rates of symptom reporting following traumatic brain injury. *Journal of the International Neuropsychological Society, 16,* 401–411. doi:10.1017/ S1355617710000196

Scientific Article:
Giovannetti, T., Britnell, P., Brennan, l., Siderowf, A., Grossman, M., Libon, D.J., Seidel, G.A. (2012). Everydayaction impairment in Parkinson's disease dementia.
Journal of the International Neuropsychological Society, 18, 787–798.

Book:
Lezak, M.D., Howieson, D.B., Bigler, E.D., Tranel, D. (2012). Neuropsychological Assessment. New York: Oxford University Press.

Book Chapter:
Mahone, E.M. & Slomine, B.S. (2008). Neurodevelopmental disorders. In J.E. Morgan, & J.H. Ricker (Eds.), Textbook of Clinical Neuropsychology (pp. 105–127). New York: Taylor & Francis.

Report at a Scientific Meeting:
Weintraub, S. (2012, June). Profiles of dementia: Neuropsychological, neuroanatomical and neuropathologic phenotypes. International Neuropsychological Society, Oslo, Norway.

Manual, Diagnostic Scheme, etc.:

American Psychiatric Association (1994). Diagnostic and Statistical Manual of Mental Disorders (4th ed.). Washington, DC: American Psychiatric Association Press.

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Appendix 2.11. Major Research Project Proposal

Cognitive function and head injury in asylum-seekers who access mental health services.

Abstract

Background: Following a severe traumatic brain injury (TBI), cognitive, behavioural and psychosocial difficulties can occur (Cohen, 2001). Asylum-seekers, fleeing persecution, have commonly been exposed to experiences in which they are physically injured or tortured, thus placing them at higher risk of suffering a TBI (Pettitt, 2011). Poor credibility is frequently cited in refused asylum applications (Cohen, 2001), and it may be that some simply cannot remember information due to effects of a TBI.

Aims: To explore cognitive impairment of asylum-seekers attending mental health services and investigate whether cognitive function is worse in asylum-seekers who report a history of severe TBI compared to asylum-seekers who do not.

Methods: Through interpreters, 34 asylum-seekers accessing the COMPASS service will form a matched group design, (N=17 severe TBI, N=17 no TBI) and undergo one hour of assessment including mood screening and neuropsychological testing.

Applications: Highlight the impact of TBIs in asylum-seekers accessing mental health services, enabling the cognitive profile to be shared with those involved in their care, including GPs and specialist TBI services, thus improving equality of access to services.

Introduction

Traumatic brain injury

Severe traumatic brain injuries (TBI) within Western populations predominantly arise due to blunt trauma to the head, such as concussion, road traffic accidents, a fall or an assault (de Sousa, McDonald, & Rushby, 2012). On Malec, Brown, Leibson, Flaada, Mandrekar, Diehl and Perkins' (2007) Mayo Classification System, the moderate-severe TBI classification included loss of consciousness (LoC) of 30 minutes or more. The most common definition of the end of LoC is the time following a TBI, when an individual is reliably able to follow verbal commands (Teasdale & Jennett, 1974).

Effects of a TBI

Following a TBI, cognitive, behavioural and psychosocial difficulties can significantly impact on an individual's independence (Cohen, 2001). Deficits in attention, information processing speed and memory are common after TBIs (Cicerone, Levin, Malec, Stuss, & Whyte, 2006). Deficits in executive function (e.g. planning, monitoring, switching, activating, and inhibition) are associated with controlling emotion, cognition and action, and can result in pronounced effects on functioning at home, at work and difficulty maintaining social relationships (Kanagaratnam & Asbjørnsen, 2006; Cicerone et al., 2006). Furthermore, lack of motivation, deficits in empathy and emotional responding (de Sousa et al., 2012), aggression and personality changes (Kinsella, Parker, & Olver, 1991) can also occur.

Relevance to asylum-seekers

An asylum-seeker is someone who has fled persecution and has formally applied for asylum in another country and is still awaiting a decision (Refugee Council, 2012). While international human rights and humanitarian law (Istanbul Protocol, 2004) consistently prohibit torture under any circumstances, torture and ill-treatment occur in half of the world's countries (Amnesty International, 2005). Torture is defined as the unlawful, intentionally, infliction of severe physical and mental pain (Convention Against Torture).

While severe TBIs within Western populations predominantly arise from road traffic accidents, falls or assaults (de Sousa et al., 2012), asylum-seekers have commonly been

exposed to experiences in which they are physically injured, for example beatings or electric shock torture, and thus there is potentially greater risk of TBI. For example, Freedom from Torture reported that of 35 Sri Lankan torture victims, all had experienced blunt force trauma and 31% asphyxiation (Pettitt, 2011). When asylum-seekers seek protection in another country, they are required to describe what happened to them to make them fearful to return (Herlihy, Jobson, & Turner, 2012). Poor credibility is frequently cited as grounds for refusal of asylum applications (Cohen, 2001), and it may be that some simply cannot remember information due to effects of a TBI.

Neuropsychological assessment of ethnic minorities

Psychological assessment of ethnic minorities poses a challenge to the validity and reliability of tests which often require translation and adaptation for language and culture reasons (Puente & Perez Garcia, 2000; Robertson, Liner & Heaton, 2009). Other pertinent factors include reading ability, vocational background in the home country and degree of acculturation (Weinstein, Fucetola, & Mollica, 2001).

The experience of assessment varies according to social and cultural factors (Steele & Aronson, 1995). Furthermore, the educational background of certain ethnic minorities may not match the skills being assessed in standard Western neuropsychological assessments (Brandt, 2007). Interestingly, research on Spanish speakers indicated that illiterate non-brain damaged individuals had a similar profile to literate brain-damaged individuals (Ardila, Rosseli, & Peunte, 1994). This highlights the impact of education on neuropsychological assessments; consideration must be given to both education and cultural factors when interpreting assessments (Lezak, Howieson, & Loring, 2004).

Interpreter-mediated neuropsychological assessment can significantly affect scores on common verbally-mediated tests such as the Vocabulary and Similarities subtests of the WAIS-III (Casas, Guzmán-Veléz, Cardona-Rodriguez, Rodriguez, Quiñones, Izaguirre, & Tranel, 2012). Puente and Perez-Garcia (2000) highlight that as nonverbal tests have less cultural weight, they may be more valid; however, they also caution that it is unwise to automatically assume that non-verbal tests are unbiased.

Anxiety and depression can impact on neuropsychological assessments. High anxiety levels can result in attention deficits, memory failure, slowness, and scrambled or blocked

words and thoughts (Bennett-Levy, Klein-Boonschate, Batchelor, et al., 1994), while depression, if severe, can interfere with memory (Lezak et al., 2004).

Asylum-seekers flee persecution, violence, armed conflict, detention and torture; experiences very different to those which typically cause TBIs in Western populations. There is no research into TBIs in this vulnerable group. It is thus imperative to understand whether cognitive functioning is compromised differentially in asylum-seekers accessing mental health services.

Aims, research questions and hypotheses

This research aims to:

- Explore cognitive impairment (executive functioning, memory and speed of processing) of asylum-seekers attending mental health services.
- Investigate whether cognitive function is worse in asylum-seekers who report a history of severe TBI compared to asylum-seekers who do not.

Research questions:

1. To what extent are asylum-seekers attending mental health services cognitively impaired?

2. To what extent is cognitive impairment different from asylum-seekers who report having a severe TBI compared to those who do not?

Hypothesis:

1. Asylum-seekers attending mental health services will be more cognitively impaired on tests of executive function, memory and speed of processing than relevant age matched Western controls from normative data.

2. Asylum-seekers with a severe TBI will be significantly more cognitively impaired than asylum-seekers who do not report a TBI.

Plans of Investigations

Participants: Prior to commencing the research, clinicians within the NHSGGC COMPASS Specialist Trauma Service will screen their client's for possible TBI's. Thirty-

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four asylum-seekers, older than 17 years who clinicians believe, based on the screening, have (N=17) and have not (N=17), had a severe TBI (as defined by head injury with a LoC of $\geq$ 30 minutes).

Inclusion criteria:
- Clients aged between 18 and 65 years.
- Clients will have had a severe TBI either in their country of origin or the UK; or
- Clients will not have not had a TBI
- At the time of the assessment, all clients will be involved within the NHSGGC COMPASS Specialist Trauma Service

Exclusion criteria:
- Clients with sensory loss
- Clients with a known substance abuse

These factors have been listed as exclusion criteria as they would limit the assessment, and therefore will be excluded from this research.

Recruitment Procedures: All clients attending the COMPASS Specialist Trauma Service will be screened for a possible severe TBI by the clinician involved in their care. Once clients with a severe TBI have been identified, their clinician will provide them some key information about the study and ask them whether they would like to find out more about the research. If the client agrees to be approached, the clinician will introduce them to the Chief Investigator who will explain the research information sheet (via an interpreter). Any questions the client has at this stage will be answered. It clients agree, they will also complete the consent form at this stage. To identify the non TBI group, the Chief Investigator will use the Patient Identification Management System to find clients who can be matched to the TBI group. The same recruitment process as above will apply. Once potential research participants have been selected, interpreters will be booked via COMPASS. Participants will be given an honorarium of £3.50 for participating in this research.

Measures:

Assessments of mood:

- CORE-OM: self-report measure assessing emotional disturbance (routinely used in COMPASS). The 34 items map onto four domains: problems/symptoms, subjective well-being, life functioning and risk/harm (to others and self).

- Patient Health Questionnaire (PHQ-4): 4 item measure screening for depression and anxiety over the past 2 weeks.

- Mini Mental State Exam (MMSE): brief screen for cognitive impairment, reflecting language ability and culture of the patient (Puente & Perez-Garcia, 2000).

Neuropsychological assessments:

Executive Functioning:
- Colour Trails Test (CTT; Maj, D'Elia, Satz., et al., 1993, based on the Trail Making Test (TMT): to minimise cultural bias, instructions are presented nonverbally with visual cues, no letters are used. For Part 1, the respondent rapidly connects circles numbered 1-25 in sequence. For Part 2, the respondent rapidly connects numbered circles in sequence, but alternates between pink and yellow.

Memory:
- WHO/UCLA Auditory Verbal Learning Test (Maj et al., 1993): a modified version of the Rey Auditory Verbal Learning Test to enhance cultural fairness. Test items consist of 5 categories; body parts, animals, tools, household objects, and transportation vehicles, and are assumed to have 'universal familiarity'. Respondents are verbally presented with a list of 15 unrelated words repeated over five different trials and are asked to repeat them.

Speed of Processing:
- WAIS-III Symbol Search (Wechsler, 1997): each item contains two target symbols and a search group composed of five symbols. The respondent is required to identify whether or not there are any of the target symbols in the search group.

Design: A prospective matched group design with a 'severe TBI' and 'no TBI' group will be used. Participants will be matched on age, gender and nationality.

Research Procedures: A structured clinical interview will be conducted by the clinician involved in the client's treatment which will screen for a possible severe TBI. This is part of a TBI screening protocol which is currently being piloted at COMPASS. As part of routine procedure within COMPASS, the CORE-OM will be completed by the clinician involved in the client's care.

Following this screening, clinicians will ask whether clients wish to be approached for the research, and provide a brief outline of the study. If they agree they will meet with the researcher and be given more information about the study and if they agree provide informed consent. Once potential research participants have been selected, interpreters will be booked via COMPASS. Clients will participate in approximately an hour minutes of mood and neuropsychological assessment using the measures detailed above.

Where possible, interpreters will be briefed as a group regarding the neuropsychological tests which will be used. Following consent, each assessment session will be recorded using a Dictaphone. This will enable the researcher and the interpreter to discuss any aspects of the assessment and be able to go back to the translation of certain points if necessary. This will negate having to solely rely on second-by-second translations. Following post-assessment discussions, recorded information will be erased.

Data Analysis: Data from the neuropsychological tests will be analysed quantitatively using SPSS v. 19. Scaled scores from each sub-test will be converted into Z scores and summed to provide a composite score. Z scores for the TBI group and no TBI group will be analysed using a t-test. Should distributions be not be normal, non-parametric tests will be used. Information from case notes and clinical interviews will be used to provide additional demographics.

Justification of sample size: G*Power (v. 3.1.5, Faul, Erdfelder, Lang, & Buchner, 2007) was used to calculate sample size. With a large effect size (Cohen's d = 1), α = 0.05 and a Power of 80%, using t-test analysis, 34 participants (17 TBI and 17 no TBI) would be

required. This calculation is supported by the following research and has been chosen due to pragmatic reasons such as the potential challenges in recruiting more participants and the financial implication of the research.

Ruffolo, Guilmette and Willis (2000) compared completion time on the TMT for 46 individuals with a moderate/severe TBI and 49 healthy controls. Their study achieved a large effect size (d=1.05) and those with a TBI took significantly longer (p<0.05) to complete Part B on the TMT. Wright, Schmitter-Edgecombe and Woo (2010) used the California Verbal Learning Test (similar to the WHO/UCLA AVLT) to explore episodic verbal impairment in 56 closed TBI patients as compared to 62 healthy controls. For Trails 1 – 5 Recall, those with a TBI performed significantly worse (p<0.01; large effect size (d=0.90)).

Settings and Equipment: The research will take place within the COMPASS service where the clients are being seen for psychological treatment. See Appendix 2 for list of equipment needed.

Health and Safety Issues

Researcher Safety Issues: Clients will be screened by a Clinical Psychologist prior to being invited to take part in the research. If a client is deemed to be too vulnerable they will not be invited to take part in the research. The clients will be seen in an NHS clinic. The researcher will adhere to the NHSGGC Health and Safety Policy.

Participant Safety Issues: At all times whilst the testing is taking place, clinical cover will be available within the COMPASS service (see Appendix 1 for more detail). With the permission of the client, test scores will be passed onto the clinician involved in their care, recorded in their clinical case notes and relayed to their GP and where appropriate, others involved in the clients care.

Ethical Issues

Ethical issues relate to the use of a vulnerable patient group with the possibility of them becoming distressed during the assessment. Precautions have been taken to minimise any distress (see above and Appendix 1). It will be made clear to clients that they have the right to withdraw from the research at any time and that this will not affect their clinical

treatment. Ethical approval will be sought by Research and Development (NHSGGC) and NHS Research Ethics.

Financial Issues

Research costs including interpreter fees and neuropsychological measures will total £3103.16 (see Appendix 2). The D.Clin.Psyc. course at the University of Glasgow have contributed £1500 and the COMPASS Specialist Trauma Service will contribute the remaining funds.

Timetable

Month	Deadline
June 2013	Apply for Ethics
July/August 2013	Ethics approval
August 2013	Systematic Review Outline
September 2013 – April 2014	Data collection, write systematic review
April – July 2014	Data analysis and write-up
July 2014	Submit Portfolio
September 2014	Viva

Practical Applications

This research aims to highlight the impact of TBIs in asylum-seekers accessing mental health services. This is novel research; it is hypothesised that undiagnosed severe TBIs within asylum-seekers will result in cognitive impairment. It is envisaged that, following this research, the issue could be further explored by specialist TBI services, thus improving equality of services for asylum-seekers.

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