



Findlay, Gemma (2016) *The links between head injury and homelessness: A qualitative study*. D Clin Psy thesis.

<http://theses.gla.ac.uk/7633/>

Copyright and moral rights for this thesis are retained by the author

A copy can be downloaded for personal non-commercial research or study, without prior permission or charge

This thesis cannot be reproduced or quoted extensively from without first obtaining permission in writing from the Author

The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the Author

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given

Glasgow Theses Service  
<http://theses.gla.ac.uk/>  
theses@gla.ac.uk

**The links between head injury and homelessness:  
A qualitative study**

**Gemma Findlay**

Submitted in part fulfilment of the requirements for the  
degree of Doctorate in Clinical Psychology

Institute of Health and Wellbeing  
College of Medical, Veterinary and Life Sciences

University of Glasgow

October 2016

## Table of contents

<b>Declaration of Originality Form</b>	<b>4</b>
<b>Acknowledgements</b>	<b>5</b>
<b>CHAPTER 1: Systematic Review</b>	<b>6</b>
Traumatic brain injury among the homeless population: A systematic review update	
Abstract	7
Introduction	9
Method	12
Results	15
Discussion	27
References	34
<b>CHAPTER 2: Major Research Project</b>	<b>39</b>
The links between head injury and homelessness: A qualitative study	
Plan English Summary	40
Abstract	42
Introduction	43
Method	46
Results	51
Discussion	68
References	73

## Appendices

### Systematic Review (Chapter 1)

Appendix 1.1 – Manuscript Preparation	77
Appendix 1.2 – Quality Rating Criteria	82

### Major Research Project (Chapter 2)

Appendix 2.1 – Ethical Approval Letter	86
Appendix 2.2 – Demographics Form	87
Appendix 2.3 – Participant Information Sheet	89
Appendix 2.4 – Information Sheet for Service Managers	92
Appendix 2.5 – Consent Form	94
Appendix 2.6 – Interview Schedule	95
Appendix 2.7 – Major Research Proposal	97
Appendix 2.8 – Ohio State University TBI Identification Method	111
Appendix 2.9 – Sample of Analysed Transcript	113

## List of Tables & Figures

### Systematic Review (Chapter 1)

Figure 1.1: Flow Diagram of Systematic Study Selection Process	13
Table 1.1: Characteristics and Quality Ratings of Included Studies	18
Table 1.2: Prevalence of TBI, Injury-Related Details and Co-Morbid Difficulties	23

### Major Research Project (Chapter 2)

Table 2.1: Inclusion and Exclusion Criteria	46
Table 2.2: Participant Information	51
Table 2.3: Emergent Themes	52



## Declaration of Originality Form

This form **must** be completed and signed and submitted with all assignments.

Please complete the information below (using BLOCK CAPITALS).

Name: GEMMA FINDLAY

Student Number: 0502795

Course Name: DOCTORATE IN CLINICAL PSYCHOLOGY

Assignment Number/Name: CLINICAL RESEARCH PORTFOLIO

**An extract from the University's Statement on Plagiarism is provided overleaf. Please read carefully THEN read and sign the declaration below.**

**I confirm that this assignment is my own work and that I have:**

Read and understood the guidance on plagiarism in the Doctorate in Clinical Psychology Programme Handbook, including the University of Glasgow Statement on Plagiarism

Clearly referenced, in both the text and the bibliography or references, **all sources** used in the work

Fully referenced (including page numbers) and used inverted commas for **all text quoted** from books, journals, web etc. (Please check the section on referencing in the 'Guide to Writing Essays & Reports' appendix of the Graduate School Research Training Programme handbook.)

Provided the sources for all tables, figures, data etc. that are not my own work

Not made use of the work of any other student(s) past or present without acknowledgement. This includes any of my own work, that has been previously, or concurrently, submitted for assessment, either at this or any other educational institution, including school (see overleaf at 31.2)

Not sought or used the services of any professional agencies to produce this work

In addition, I understand that any false claim in respect of this work will result in disciplinary action in accordance with University regulations

**DECLARATION:** I am aware of and understand the University's policy on plagiarism and I certify that this assignment is my own work, except where indicated by referencing, and that I have followed the good academic practices noted above

Signature

Date

## **Acknowledgements**

Firstly, I would like to thank all of the participants who gave up their time to take part in my study. This research would not have been possible without them. Thanks also to the staff members within supported accommodations across Lanarkshire and Glasgow for their assistance with recruitment.

I would also like to thank my research supervisors, Professor Tom McMillan and Dr Sarah Wilson who have offered continual support and guidance.

To my class, I have been so grateful for all of the peer support. In particular, a huge thank you to Gemma McGill. I think we have spoken most days for the last six months. I couldn't have done this without you.

Special thanks go to my mum, who has been a continual source of support. You taught us to believe that we could achieve whatever we set our minds to. Thank you for always being there.

A final thank you to Stuart for your patience and support throughout the last three years. You have been my rock.

# **CHAPTER 1: SYSTEMATIC REVIEW**

Traumatic brain injury among the homeless population:

A systematic review update

Word count: 6113

Gemma Findlay

Submitted in part fulfilment of the requirements for the degree

of Doctorate in Clinical Psychology (D.Clin.Psy).

Written in accordance with the manuscript preparation

guidelines for the journal - Brain Injury (Appendix 1.1)

## **Abstract**

**Background:** Homeless individuals have increased vulnerability to hospital admission, mortality, mental health difficulties and substance misuse. Recent research has also identified an increased prevalence of traumatic brain injury (TBI).

**Aim:** This systematic review updates that of Topolovec-Vranic et al (2012). The aim is to re-visit questions regarding the prevalence rate of TBI within the homeless population; injury-related details and the role that TBI may play in homelessness, incorporating new research in this field.

**Methods:** A systematic literature search was conducted using Medline, PsycINFO and Embase to identify published research on TBI and homelessness. Studies that did not have samples comprised exclusively of homeless individuals; studies solely examining non-TBI; review articles and studies published in a language other than English were excluded. All other studies on TBI and homelessness were included. The methodological quality of included studies was assessed using an adapted version of The Downs and Black Checklist (1998). Data on prevalence of TBI, setting, sampling, TBI assessment method, injury-related details and co-morbid difficulties were extracted.

**Results:** Fourteen studies were identified. The prevalence of TBI ranged from 8-90%. Some studies used screening tools which have been validated for assessing TBI and others used single questions or questionnaires that have not been validated.

Moderate to severe TBI and repeat TBI were common. Methodological quality was high in seven studies and moderate in the other seven.

**Conclusions:** TBI is more prevalent in the homeless than in the general population. Care providers, health care professionals and policy makers should be made aware of the prevalence of TBI in this population, the implications of cognitive and emotional problems for behaviour and potential need to adapt interventions and support. Services should screen for TBI to increase awareness and improve service delivery to this vulnerable group.

## **Introduction**

The United Nations (1998) categorise homelessness as 'primary' or 'secondary'. Primary homelessness (or rooflessness) refers to living on the streets or not having a shelter that could be deemed as 'living quarters'. Secondary homelessness includes individuals with no place of usual residence (i.e. someone who moves between different types of accommodation, including shelters or other living quarters) and individuals who are resident in long-term shelters for the homeless or similar arrangements. Crisis (a national charity for homeless people) state that there is no overall figure for how many people are homeless in the United Kingdom. This is because homelessness is recorded differently in each nation and is complicated by the fact that many homeless people are not recorded in official statistics at all (Crisis, 2016).

It has long been recognised that individuals within the homeless population are vulnerable. Research has found that people who are homeless are more frequently admitted to hospital (often with extended hospital stays) and have a higher mortality rate than individuals with low-income in the general population (Gilchrist & Morrison, 2005; Robertson & Winkleby, 1996). There is also a long history of research that documents a higher prevalence of mental health difficulties (Fichter et al, 1996; Gilchrist & Morrison, 2005; Robertson & Winkleby, 1996) and substance misuse (Gilchrist & Morrison, 2005; Fischer & Breakey, 1991) within the homeless population.

Spence et al (2004) conducted a systematic review of 18 studies on cognitive impairment in the homeless. Among adults living in the general population, 2-3% show deficits on the Mini Mental State Examination; however, most studies of the

homeless population show much higher rates, reaching 30-40%. TBI was suggested as one possible cause.

The prevalence of TBI in the homeless has received relatively little empirical attention. It is important to note that the terms 'head injury' and 'traumatic brain injury' are used interchangeably within the literature. The term 'traumatic brain injury' is used throughout this review. TBI is defined as 'an alteration in brain function, or other evidence of brain pathology, caused by an external mechanical force from direct impact, deceleration forces, blast waves or penetrating trauma' (Smith et al, 2016). A previous systematic review in this area (Topolovec-Vranic et al, 2012) reported that the rate of TBI among samples of homeless individuals varied across studies, ranging from 8-53%. A meta-analysis of papers looking at the prevalence of TBI in the general population found that across 15 studies, 12% of individuals had a history of TBI (Frost et al, 2013). This suggests that the rate of TBI is elevated in the homeless population.

Common neuropsychological sequelae of TBI include: difficulties with planning, organisation, concentration and memory (Tsaousides & Gordon, 2009), all of which are required to gain or maintain employment and secure housing. It is therefore plausible to consider that sustaining a TBI could contribute to the onset of homelessness and/ or perpetuate this situation once it has occurred. A greater understanding of the link between TBI and homelessness is required to ensure that interventions and support offered to this vulnerable group are tailored appropriately.

### **Rationale and current review aims**

Topolovec-Vranic et al (2012) conducted the only systematic review in this area, identifying eight papers. They focussed on the prevalence of TBI and reported that

homeless individuals were more likely to have experienced a TBI than individuals in the general population. They highlighted a number of limitations within the evidence base, including: limited use of validated screening tools to assess TBI history; small sample sizes and sampling bias. Since then, further work has been published which attempts to address some of these limitations. The present review is an update of the evidence for prevalence of TBI within the homeless population. It also re-visits injury-related details and the role that TBI may play in homelessness. This review addresses the following questions:

- What is the prevalence of TBI within the homeless population?
- What are the characteristics of TBI in the homeless population (severity; repeat injury; cause of injury)?
- What role does TBI play in people becoming or remaining homeless?

## **Method**

### **Search strategy**

A systematic literature search was conducted using Medline (OVID); PsycINFO and Embase (OVID). The search strategy replicated that of Topolovec-Vranic et al (2012). The search was run in April 2016, using the combined search terms below:

- Traumatic brain injury OR head injury OR brain injury OR head trauma OR brain damage
- Homeless OR homelessness OR roofless OR rooflessness

The electronic search identified 188 studies, 61 of which were duplicates. The title and abstracts of the remaining papers were then reviewed for inclusion, based on the following criteria.

### **Inclusion criteria:**

- sample must be comprised exclusively of homeless individuals
- study must provide information on TBI within the homeless population
- published in peer-reviewed journal

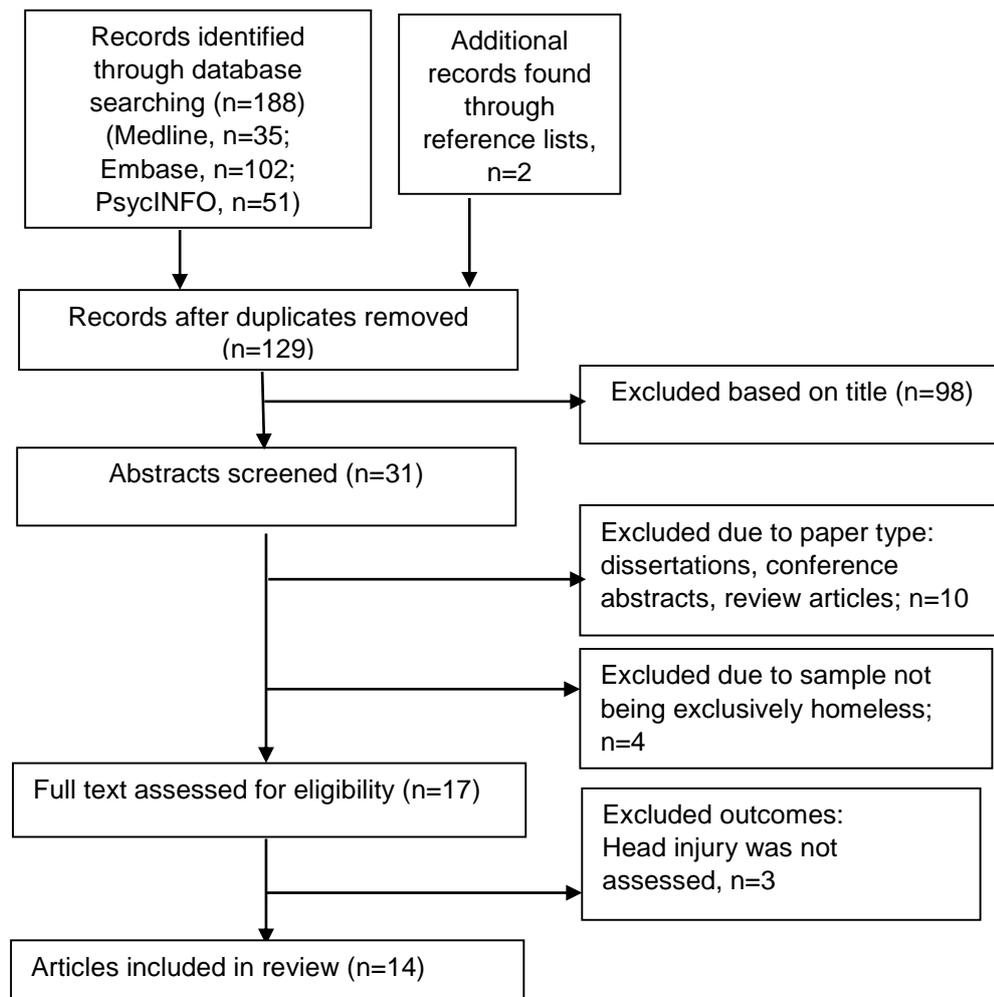
### **Exclusion criteria:**

- review articles
- studies solely examining non-TBI
- published in language other than English

If it was not clear from the title/ abstract if the study met the above criteria, the full text was reviewed. The reference lists of the included studies and the review

conducted by Topolovec-Vranic et al (2012) were also manually searched in order to identify any relevant papers that had been missed by the electronic search. The full search strategy and reasons for exclusions are outlined in figure 1.1 below:

**Figure 1.1: Flow Diagram of Systematic Study Selection Process**



### Quality rating criteria

The methodological quality of included studies was assessed using an adapted version of The Downs and Black Checklist (1998) (Appendix 1.2). This checklist can be used to measure the quality of both randomised and non-randomised clinical trials. The National Collaborating Centre for Methods and Tools (2008) deemed it a valid and reliable tool for measuring the quality of non-randomised studies. Each

item is rated either '0' (if the study does not meet the criterion or if it is not possible to determine if the study meets the criterion) or '1' (if the study meets the criterion).

This tool was used by Topolovec-Vranic et al (2012), who excluded 10 items, stating that they were specific to intervention trials. They do not indicate which 10 items were excluded. This review also excluded items relating to interventional trials, however, only nine were identified (items: 4, 7, 8, 13, 14, 15, 19, 23, 24). In addition to the writer, two other researchers were asked to check for intervention items and independently identified (the same) nine. Attempts to contact the previous authors in order to clarify this issue have been unsuccessful. An article could achieve a total possible score of 18 and the higher the score, the better the methodological quality of the study. Papers were subjectively categorised by the researcher as 'High Quality' ( $\geq 75\%$ ; 14-18); 'Moderate Quality' (50%-74%; 9-13) or 'Poor Quality' ( $\leq 49\%$ ;  $\leq 8$ ).

To assess inter-rater reliability an independent reviewer rated 50% of the included papers. Overall agreement was 92% for rating scores and 100% for overall quality categories. Discrepancies in scores were discussed at a meeting between the two raters and consensus achieved for each item discrepancy.

## **Results**

### **Study selection**

Following the removal of duplicates, electronic database searching and scanning of reference lists identified 129 articles for possible inclusion in the review. 98 articles were excluded based on title, resulting in the screening of 31 abstracts. A further 14 were excluded, leaving 17 full texts to be assessed for eligibility. Three papers were ruled out at this point. The reasons for exclusions are described in Figure 1.1. Hence, a total of 14 studies were included in the review.

### **Study quality**

Using the Downs and Black Checklist (Downs & Black, 1998), the median methodological quality rating of the studies reviewed was 13.5 (range 10-17). Seven were rated as high quality (Andersen et al, 2014; Barnes et al, 2015; Topolovec-Vranic et al, 2014; Oddy et al, 2012; Hwang et al, 2008; McMillan et al, 2015; Bremner et al, 1996) with ratings between 78% and 94%. The remaining seven studies were rated as moderate quality (Mackelprang et al, 2014; Russell et al, 2013; Hux et al, 2009; Kim et al, 2007; Solliday-McRoy et al, 2004; Gonzalez et al, 2001; Cotman & Sandman, 1997) with ratings between 56% and 72%.

### **Participants**

The combined sample size across the 14 studies was 6930, with a range per study from 24 (Cotman & Sandman, 1997) to 2732 (Mackelprang et al, 2014). Of these, 5082 participants were male (73%). The average age of participants ranged from 22 (Mackelprang et al, 2014) to 59 (Andersen et al, 2014). There was a slight variation

in median sample size between studies rated as high quality (n=111) and those rated as moderate quality (n=90).

### **Setting/ Location**

In four studies, samples of homeless individuals were recruited from a single homeless shelter for men: in Canada (Andersen et al, 2014; Topolovec-Vranic et al, 2014); the United States (US) (Solliday-McRoy et al, 2004) and the United Kingdom (UK) (Bremner et al, 1996). A further three studies recruited from mixed-gender homeless services in the US (Hux et al, 2009; Gonzalez et al, 2001; Cotman & Sandman, 1997). In two studies, recruitment focused on two US metropolitan veteran affairs health care systems (Barnes et al, 2015; Russell et al, 2013). In a further three studies, participants were recruited from: homeless shelters, drop-in centres, shelters for domestic violence survivors and the streets in the US (Mackelprang et al, 2014); dry and wet hostels and day centres in the UK (Oddy et al, 2012) and shelters and meal programmes in Canada (Hwang et al, 2008). The final two studies used medical records: from 40 National Health Service (NHS) General Practitioner (GP) services in Glasgow (McMillan et al, 2015) and the Department of Neurosurgery at The National Medical Centre (Seoul, Korea) (Kim et al, 2007). Overall quality ratings tended to be higher in studies recruiting from more than one setting (median quality rating=78%) than those recruiting from a single setting (median quality rating=70%).

### **Outcome measures**

Seven of the fourteen studies used either single questions or questionnaires which have not been validated to determine history of TBI (Mackelprang et al, 2014;

Russell et al, 2013; Oddy et al, 2012; Hwang et al, 2008; Solliday-McRoy et al, 2004; Cotman & Sandman, 1997; Bremner et al, 1996). Four studies used outcome measures which have been validated for identifying TBI in prisoners or substance abusers but not as yet in the homeless. These were the HELPS Brain Injury Screening Tool (HELPS) (Hux et al, 2009); the Ohio State University TBI-Identification Method (OSU TBI-ID) (Barnes et al, 2015) and the Brain Injury Screening Questionnaire (BISQ) (Andersen et al, 2014; Topolovec-Vranic et al, 2014). One study used electronic medical records (McMillan et al, 2015) and another, medical records/ radiological films (Kim et al, 2007). The median overall quality rating of studies using validated outcome measures or hospital records to screen for TBI was 78%, in comparison to 72% for those using other measure

**Table 1.1: Characteristics and Quality Ratings of Included Studies**

<b>Research study</b>	<b>Quality rating</b>	<b>Setting</b>	<b>Sample size (% male); mean age in years (SD); mean duration of homelessness in days (SD)</b>	<b>TBI assessment method</b>
Barnes et al (2015)	14 (78%)	Western Metropolitan Veteran Affairs Health Care System and Eastern Metropolitan Veteran Affairs Health Care System (US)	N=229 (96%); 51.8 (NR); NR.	OSU TBI-ID
McMillan et al (2015)	17 (94%)	40 GP services in Glasgow	N=1590 (78%); Males: 43 (17.9); Females: 31.5 (15.8); NR.	Hospitalized head injury (identified through data linkage with electronic health records)
Andersen et al (2014)	15 (83%)	Long-term care unit of a men's homeless shelter in Toronto, Canada	34 (100%); 58.8 (9.7); 8760 (NR).	BISQ
Mackelprang et al (2014)	13 (72%)	Homeless shelters and drop-in centres, shelters for domestic violence survivors and the streets in 80 communities across Minnesota (US)	2732 (36.2%); 21.8 (3.6); NR.	'Have you ever been hit in the head so hard that you saw stars or were knocked unconscious – for example, from a blow, a fall or a motor vehicle accident?

Topolovec-Vranic et al (2014)	14 (78%)	Urban men's shelter in Toronto, Ontario (Canada)	N=111 (100%); 54.2 (11.5); 615 (median).	BISQ
Russell et al (2013)	10 (56%)	Western metropolitan Veteran Affairs Health Care System and Eastern Metropolitan Veteran Affairs Health Care System (US)	N=678 (94.7%); 51.9 (9.8); NR.	TBI-4
Oddy et al (2012)	14 (78%)	11 homeless hostels and day centre services in Leeds (UK) (dry and wet hostels and day centres)	N=100 (75%); 32.7 (12.3); NR.	Have you ever had an injury to the head which knocked you out or at least left you dazed, confused or disorientated?
Hux et al (2009)	12 (67%)	Homeless Shelter in a Midwest state (USA)	N=240 (14%); 35.6 (NR); NR.	HELPS Screening Tool
Hwang et al (2008)	16 (89%)	Shelters and meal programmes in Toronto, Ontario (Canada)	N=904 (67%); 37.4 (12.9); 1606 (2154).	Have you ever had an injury to the head which knocked you out or at least left you dazed, confused or disorientated?
Kim et al (2007)	12 (67%)	Department of Neurosurgery, National Medical Centre, Seoul, Korea.	N=76 (93%); 53% were over 50 years and 47% were under 50 years; NR.	Medical records and radiological films from hospital admission

Solliday-McRoy et al (2004)	11 (61%)	Large homeless shelter in Milwaukee, Wisconsin (US)	N=90 (100%); 41 (9.06); 87.7 (75.6).	Self-report questionnaire
Gonzalez et al (2001)	13 (72%)	Health care for the homeless clinic in Miami, Florida (US)	N=60 (60%); 39.8 (11.4); NR.	Documented instance of concussion or loss of consciousness (where medical records were available) or self-report (where medical records were not available)
Cotman & Sandman (1997)	10 (56%)	Homeless residents of an 18-month residential program in Orange County, California (US)	N=24 (54%); 30.6 (6.5); NR.	Self-report (no details regarding specific question asked)
Bremner et al (1996)	14 (78%)	Hostel for men, Westminster, London (UK)	N=62 (100%); NR; NR.	Semi-structured questionnaire. Head injury was defined as 'sufficient to lose consciousness at some point in their life'

## **Prevalence of TBI**

The rate of TBI among homeless individuals sampled varied across studies, from 8% to 90%. The median sample size is 106. Prevalence rate in samples of 100 or less ranged from 8-48%. In samples greater than 100, the prevalence rate ranged from 14-90%, suggesting increased prevalence in studies with larger samples. However, it should be noted that the study reporting a prevalence rate of 90% (Barnes et al, 2015) was an outlier, with the next highest rate 53% (Hwang et al, 2008).

## **Injury-related details**

Six of the fourteen studies looked at the severity of TBIs sustained within the homeless population. Of those identified as having a TBI, the number of individuals reported to have sustained a moderate to severe TBI ranged from 19% (Oddy et al, 2012) to 94% (Topolovec-Vranic et al, 2014). However, it should be noted that Oddy et al (2012) only looked at injury-severity for the first TBI. Excluding the results of this study, the prevalence rate of moderate to severe TBI ranged from 23% to 94%. Severity of TBI was assessed by Glasgow Coma Scale score (3-12 = moderate to severe) at hospital admission in one study (Kim et al, 2007) and period of unconsciousness (>30 mins = moderate to severe) in the other five studies (Barnes et al, 2015; Andersen et al, 2014; Topolovec-Vranic et al, 2014; Oddy et al, 2012; Solliday-McRoy et al, 2004).

The same six studies also looked at repeat TBI within the homeless population. Two found that 50% of their sample reported three or more TBIs (Andersen et al, 2014; Topolovec-Vranic et al, 2014) and Barnes et al (2015) identified that the median number of TBIs reported within their sample was three. The lowest frequency reported for individuals sustaining three or more TBIs was 17% (Oddy et al, 2012);

however, this paper noted that 13% of the sample was unsure about the number of TBIs they had sustained.

Two studies provided information about cause of TBI, both indicating that assault was most common (Barnes et al, 2015; Topolovec-Vranic et al, 2014).

## **What role does TBI play in people becoming or staying homeless?**

### **Temporal relationship between TBI and homelessness**

Five studies looked at the relationship between first TBI and onset of homelessness. Between 51% (Mackelprang et al, 2014) and 90% (Oddy et al, 2012) of individuals sustained their first TBI before becoming homeless. Five studies reported mean age at first injury. This ranged from 15 (Barnes et al, 2015; Mackelprang et al, 2014) to 20 (Oddy et al, 2012).

### **Co-morbid difficulties**

Three studies looked at co-morbid difficulties (Mackelprang et al, 2004; Topolovec-Vranic et al, 2014; Hwang et al, 2008). All found that homeless individuals with a TBI were more likely to have co-morbid mental health difficulties and substance misuse than homeless individuals with no TBI history. None of these studies included a control group from the general population; therefore, homeless individuals with a TBI and individuals in the general population could not be compared.

The information outlined above (mean age at first injury; temporal relationship between TBI and homelessness and co-morbid difficulties) were the only areas investigated in papers looking at the role that TBI may play in individuals becoming or remaining homeless. This information is detailed in table 1.2.

**Table 1.2: Prevalence of TBI, Injury-related Details and Co-morbid Difficulties**

Research study	Prevalence of TBI	Severity of most severe TBI (in those reporting a TBI)	Number of TBIs	Cause of injury	TBI preceded homelessness	Mean age at first TBI	Co-morbid difficulties
Barnes et al (2015)	90%	30.4% moderate to severe.	Median: 3; range 1-9.	33.5% assault; 27.9% transportation-related; 15.1% fall; 13% sport-related; 2.2% blasts; 0.6% self-inflicted and 7.6% other.	83%	15	NR
McMillan et al (2015)	14%	78.5% intracranial injury; 9% skull fracture; 9% concussion.	55.8% = 1; 20.9% = 2; 10.7% = 3; 8.8% = 4-6; 3.8% = 7-12.	NR	NR	NR	NR
Andersen et al	35%	8.3% mild; 58%	33.3% =	NR	NR	NR	NR

(2014)		moderate; 33.3% severe	one; 16.7% = two; 50% = three or more.				
Mackelprang et al (2014)	43%	NR	NR	NR	51%	15	Those with TBI more often reported mental health diagnoses (34%-77% greater than among those without a history of TBI), substance use, suicidality, victimization (exposure to violence during a homeless episode was more prevalent among participants with a history of TBI) and difficulties with ADL's.
Topolovec-Vranic et al (2014)	45%	6% mild; 63% moderate; 31% severe.	50% reported 3 or more.	66% assault; 44% sports and recreation; 42% road traffic accident; 42% fall.	87%	16.5	Participants with TBI were significantly more likely to have been arrested and to have a lifetime history of mental illness. Rates of substance abuse and seizures were also higher in the TBI group but were not statistically

							significant.
Russell et al (2013)	47%	NR	NR	NR	NR	NR	NR
Oddy et al (2012)	48%	81% Mild; 19% Moderate to severe (severity of first head injury)	35.4% = 1; 35.4% = 2; 16.7% = between 3 and 8; 12.5% = unsure.	NR	90%	19.9	NR
Hux et al (2009)	20%	NR	NR	NR	NR	NR	NR
Hwang et al (2008)	53%	66% Mild; 23% Moderate to Severe 11% Unknown (severity of most severe	40% = 1; 21% = 2; 12% = 3; 7% = 4; 20% = 5+.	NR	70%	17.8	Participants with TBI had a significantly higher lifetime prevalence of seizures (8% v 22%, p<0.001); higher prevalence of mental health problems (33% v 43%, p=0.001); alcohol problems (28% v 42%,

		head injury)					p<0.001) and drug problems (40% v 57%, p<0.001).
Kim et al (2007)	NA <sup>1</sup>	36% mild; 38% moderate; 26% severe.	NR		NR	NR	NR
Solliday-McRoy et al (2004)	48%	63% mild; 14% moderate; 23% severe.	NR	NR	NR	NR	NR
Gonzalez et al (2001)	38%	NR	NR	NR	NR	NR	NR
Cotman & Sandman (1997)	8%	NR	NR	NR	NR	NR	NR
Bremner et al (1996)	46%	NR	NR	NR	NR	NR	NR

---

<sup>1</sup> All participants had sustained a TBI as they were recruited from a neurosurgical department

## Discussion

### **Prevalence of TBI**

The studies identified estimated a wide range in prevalence of TBI among the homeless (8-90%). The different prevalence rates may be explained by variance in methodology. The lowest (8%) was found by Cotman and Sandman (1997). They recruited from a residential programme with the strictest entrance criteria, whereby individuals with mental health difficulties or developmental delay were not accepted. The highest prevalence of TBI (90%) was proposed by Barnes et al (2015). This elevated rate of TBI may be partially explained by the fact that this sample was comprised solely of veterans, with 30% of injuries occurring on active duty. This highlights heterogeneity between different study samples, contributing to variable prevalence rates of TBI.

There were also discrepancies between studies using hospital records to determine history of TBI and those relying on self-report. Research has found that homeless individuals do not always attend hospital following TBI (Oddy et al, 2012). This provides some explanation for the reduced rates of TBI found by McMillan et al (2015) and Gonzalez et al (2001).

Four of the studies only included males (Andersen et al, 2014; Topolovec-Vranic et al, 2014; Solliday-McRoy et al, 2004; Bremner et al, 1996). In these studies, the prevalence of TBI ranged from 35% to 48%. In contrast, Hux et al (2009) included the fewest males (14% of sample) and found a prevalence rate of 20%. These sex-related differences align with findings of increased rates of TBI amongst males in the general population (Bruns & Hauser, 2003). Only five of the studies included homeless individuals who were not sheltered (Mackelprang et al, 2014; Oddy et al,

2012; Hwang et al, 2008; Kim et al, 2007; Gonzalez et al, 2001), with prevalence rates ranging from 38% to 53%. Previous research has suggested that there may be differences in the physical health of individuals who use shelters and those who do not (Gelberg & Linn, 1989). It therefore seems plausible to consider that there may also be differences in the prevalence of TBI. These issues raise questions regarding the generalisability of some study findings; samples that only include males or exclude unsheltered individuals are not representative of the wider homeless population.

### **Injury-related details**

There was also variability in the prevalence rates of moderate to severe TBI reported (19-94%). Oddy et al (2012) cited the lowest prevalence rate; however, they only looked at the severity of the first TBI sustained. It could be the case that some individuals sustain a mild TBI and subsequently incur more severe injury. It has previously been reported that an initial TBI doubles the risk of another and a second TBI increases the risk of sustaining a third injury eightfold (Gualfieri & Cox, 1991). This finding is consistent with the current review, whereby repeat injury was found to be common. Andersen et al (2014) found the highest prevalence rate of moderate to severe TBI (94%) in the homeless. This should be understood in relation to their sample. 34 males (average age: 57.8) were recruited from the long-term care unit of a homeless shelter. The long-term unit was chosen as these individuals were less likely to leave the shelter during the day (making recruitment more straightforward). However, it results in recruitment bias, whereby participants are older and require more support. Hence, it is likely that there would be a higher rate of moderate to severe TBI within this sample.

### **The role of TBI in individuals becoming or remaining homeless**

Studies examining the temporal relationship between TBI and homelessness indicated that a large proportion of individuals sustained their first TBI before becoming homeless and that the first TBI often occurred before the age of 20. These findings suggest that, in some cases, TBI may contribute to the onset of homelessness. However, additional research is required to explore this hypothesis further.

Co-morbid difficulties (for example, mental health problems and substance misuse) were more common in homeless individuals who had sustained a TBI than in homeless individuals with no history of TBI. None of the studies explored the temporal relationship between TBI and other difficulties, making it difficult to determine what came first. Nonetheless, other research has suggested an increased risk of psychiatric diagnoses following TBI (Hesdorffer et al, 2009). Of particular interest was the finding that even for individuals with a lifetime history of psychiatric diagnoses before injury, the risk of subsequent difficulties is increased. This suggests that pre-existing mental health difficulties could be exacerbated following TBI, contributing to the perpetuation of homelessness.

### **Limitations of the included studies**

The methodological quality of studies, as determined by the Downs and Black (1998) checklist was equally split between moderate and high quality. The most commonly identified limitations of the studies were: limited external validity; lack of a matched control group and uncertainty regarding the validity and reliability of measures used to determine history of TBI. As previously mentioned, a number of issues have been

raised regarding whether study samples were representative of the entire homeless population. These include: individuals being recruited from a single setting; over-representation of males and limited recruitment of unsheltered individuals. In addition, only two studies (Oddy et al, 2012; Kim et al, 2007) employed a matched control group. The varying methods of assessing TBI across studies and resulting difficulties in comparing results were highlighted above. In order to assess whether rates of TBI in a specific group differ from those in the general population, matched control groups should be used. Finally, the method used to determine TBI history was identified as a limitation in half of the studies. This was due to the use of single questions or questionnaires which had not been validated.

There is also a lack of qualitative research within the literature. It is thought that qualitative exploration of TBI and homelessness would provide a deeper insight into the lived experience of this complex client group.

### **Comparison with previous review**

This review employed the same inclusion/ exclusion criteria as the only other review in this area (Topolovec-Vranic et al, 2012). As a result, the eight papers that they reviewed were included, supplemented by six new papers.

There is more discrepancy in rate of TBI in this review (8-90%) than in the previous review (8-53%). However, the median prevalence rates are 45% (current review) and 46% (previous review), indicating a level of consistency in the results. In addition, excluding one outlier (Barnes et al, 2015) from the current review, results in the same estimation of TBI rate (8-53%). The current review adds weight to previous findings as four of the studies used validated tools to screen for TBI and three used hospital records. Topolovec-Vranic et al (2012) were only able to identify one paper

which used a validated tool to screen for history of TBI and one paper which used medical records.

The current review provides additional information regarding injury-severity in the homeless population, with double the number of studies investigating this. The previous review found a high proportion of mild injuries in community samples and high numbers of moderate to severe injury in the neurosurgical setting, illustrating the importance of considering context when looking at this data. However, these conclusions were drawn from a small number of studies. This review illustrated that high rates of moderate to severe TBI were not limited to studies conducted in medical settings. Two studies set in the community identified that over 80% of their sample had a history of moderate to severe TBI. It is well documented that severe cognitive impairment (for example: impaired memory, concentration and information processing abilities) are typically associated with greater severity of injury (Hellawell et al, 1999). These findings highlight the potential implications of moderate to severe TBI on the functioning of homeless individuals.

The previous review raised questions regarding the relationship between TBI and homelessness and specifically, whether TBI plays any part in individuals becoming or remaining homeless. They identified two papers exploring the temporal relationship between TBI and homelessness and found that for the majority of participants, the first incidence of TBI occurred before the onset of homelessness. They concluded that TBI may be a risk factor for homelessness. These results are consistent with the findings of this review, which drew on the results of five studies. In addition, both reviews found that the average age at first TBI was before the onset of adulthood, again suggesting that TBI may have influenced the route to homelessness.

### **Limitations of current review**

A possible limitation of this review was that only studies available in English were included. This may have resulted in some relevant studies being excluded. In addition, time restraints meant that it was only possible to include studies which had been published in peer-reviewed journals. Consequently, there may have been a subsection of unpublished research which was not included.

### **Future research**

Future research should aim to validate TBI screening tools for use within the homeless population. It would also be interesting for the OSU TBI-ID; Helps screening tool and BISQ to be compared in order to assess which tool should be viewed as the 'gold standard' within this area. It would be easier to compare results of different studies if there was more consistency in the methodology used. It would also be useful for future research to look at the association between severity of TBI and duration of homelessness. Additional studies determining the exact timeline of TBIs in relation to homelessness would allow further exploration of the links between these two negative life events.

### **Conclusion**

Despite varying rates of TBI found in the homeless, all of the results suggest that the prevalence of TBI is higher than in the general population. Studies exploring injury-related details highlighted that a large proportion of individuals who were homeless and had a history of TBI had sustained a moderate to severe TBI and that repeat TBI was common. Care providers, health care professionals and policy makers should be made aware of the prevalence of TBI in this population and the cognitive and

behavioural implications that this may have. Support and interventions may have to be adapted in order to be successful. Services should screen for TBI in order to increase awareness and improve service delivery for this vulnerable group.

## References

Andersen J, Kot N, Ennis N, Colantonio A, Ouchterlony D, Cusimano MD, Topolovec-Vranic J. Traumatic brain injury and cognitive impairment in men who are homeless. *Disability and Rehabilitation* 2014; 36 (26): 2210-2215.

Barnes SM, Russell LM, Hostetter TA, Forster JE, Devore MD, Brenner LA. Characteristics of Traumatic Brain Injuries Sustained Among Veterans Seeking Homeless Services. *Journal of Health Care for the Poor and Underserved* 2015; 26 (1): 92-105.

Bremner AJ, Duke PJ, Nelson HE, Pantelis C, Barnes TRE. Cognitive Function and Duration of Rooflessness in Entrants to a Hostel for Homeless Men. *The British Journal of Psychiatry* 1996; 169 (4): 434-439.

Bruns JJr, Hauser WA. The epidemiology of traumatic brain injury: a review. *Epilepsia* 2003; 44 (10): 2-10.

Cotman A, Sandman C. Cognitive Deficits and Their Remediation in the Homeless. *The Journal of Cognitive Rehabilitation* 1997; 15 (1): 16-26.

Crisis [Internet]. 2016 – [cited 2016 June 18]; Available from: <http://www.crisis.org.uk/pages/homeless-def-numbers.html>.

Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal of Epidemiology and Community Health* 1998; 52(6): 377-384.

Fichter MM, Koniarczyk M, Greifenhagen A, Koegel P, Quadflieg N, Wittchen HU, Wolz J. Mental illness in a representative sample of homeless men in Munich, Germany. *European Archive of Psychiatry and Clinical Neuroscience* 1996; 246 (4): 185-196.

Fischer PJ, Breakey WR. The epidemiology of alcohol, drug, and mental disorders among homeless persons. *American Psychologist* 1991; 46 (11): 1115-1128.

Frost R, Farrer TJ, Primosch M, Hedges DW. Prevalence of Traumatic Brain Injury in the General Adult Population: A Meta-Analysis. *Neuroepidemiology* 2013; 40: 154-159.

Gelberg L, Linn LS. Assessing the physical health of homeless adults. *The Journal of the American Medical Association* 1989; 262: 1973-1979.

Gilchrist G, Morrison DS. Prevalence of alcohol-related brain damage among homeless hostel dwellers in Glasgow. *European Journal of Public Health* 2005; 15: 587-588.

Gonzalez EA, Dieter JN, Natale RA, Tanner SL. Neuropsychological Evaluation of Higher Functioning Homeless Persons: A Comparison of an Abbreviated Test Battery to the Mini-Mental State Exam. *The Journal of Nervous and Mental Disease* 2001; 189 (3): 176-181.

Gualtieri T, Cox DR. The delayed neurobehavioural sequelae of traumatic brain injury. *Brain Injury* 1991; 5: 219-232.

Hellawell DJ, Taylor R, Pentland B. Cognitive and psychosocial outcome following moderate or severe traumatic brain injury. *Brain Injury* 1999; 13 (7): 489-504.

Hesdorffer DC, Rauch SL, Tamminga CA. Long-term psychiatric outcomes following traumatic brain injury: a review of the literature. *Journal of Head Trauma Rehabilitation* 2009; 24: 452-459.

Hux K, Schneider T, Bennett K. Screening for traumatic brain injury. *Brain Injury* 2009; 23 (1): 8-14.

Hwang SW, Colantonio A, Chiu S, Tolomiczenko G, Kiss A, Cowan L, Redelmeier DA, Levinson W. The effect of traumatic brain injury on the health of homeless people. *Canadian Medical Association Journal* 2008; 179: 779-78.

Kim DK, Jwa CS, Kim GH, Kang JK. An Experience of Management of Homeless Neurosurgical Patients. *Journal of the Korean Neurosurgical Society* 2007; 42: 191-194.

Mackelprang JL, Harpin SB, Grubenhoff JA, Rivara FP. Adverse Outcomes Among Homeless Adolescents and Young Adults Who Report a History of Traumatic Brain Injury. *American Journal of Public Health* 2014; 104 (10): 1986-1992.

McMillan TM, Laurie M, Oddy M, Menzies M, Stewart E, Wainman-Lefley J. Head injury and Mortality in the Homeless. *Journal of Neurotrauma* 2015; 32 (2): 116-119.

National Collaborating Centre for Methods and Tools [Internet]. Hamilton ON: McMaster University; 2008. Quality checklist for health care intervention studies. – [cited 2016 May 25]. Available from: <http://www.nccmt.ca/registry/view/eng/9.html#sthash.2JrpIEpG.dpuf>.

Oddy M, Moir JF, Fortescue D, Chadwick S. The prevalence of traumatic brain injury in the homeless community in a UK city. *Brain Injury* 2012; 26 (9): 1058-1064.

Robertson MJ, Winkleby MA. Mental health problems of homeless women and differences across subgroups. *Annual Review of Public Health* 1996; 17: 311-336.

Russell LM, Devore MD, Barnes SM, Forster JE, Hostetter TA, Montgomery AE, Casey R, Kane V, Brenner LA. Challenges Associated With Screening for Traumatic Brain Injury Among US Veterans Seeking Homeless Services. *American Journal of Public Health* 2013; 103 (2): s211-s213.

Smith MM, Citerio GG, Kofke WAI. *Oxford Textbook of Neurocritical Care* 2016; Oxford University Press: 210.

Solliday-McRoy C, Campbell TC, Melchert TP, Young TJ, Cisler RA. Neuropsychological functioning of homeless men. *Journal of Nervous and Mental Disease* 2004; 192 (7): 471-478.

Spence S, Stevens R, Parks R. Cognitive dysfunction in homeless adults: a systematic review. *Journal of the Royal Society of Medicine* 2004; 97 (8): 375-379.

Topolovec-Vranic J, Ennis N, Colantonio A, Cusimano MD, Hwang SW, Kontos P, Ouchterlony D, Stergiopoulos V. Traumatic brain injury among people who are homeless: a systematic review. *BioMedCentral Public Health* 2012; 12 (1): 1059.

Topolovec-Vranic J, Ennis N, Howatt M, Ouchterlony D, Michalak A, Masanic C, Colantonio A, Hwang, SW, Kontos P, Stergiopoulos V, Cusimano MD. Traumatic brain injury among men in an urban homeless shelter: observational study of rates and mechanisms of injury. *Canadian Medical Association Journal* 2014; 2 (2): E69-E76.

Tsaousides T, Gordon WA. Cognitive Rehabilitation Following Traumatic Brain Injury: Assessment to Treatment. *Mount Sinai Journal of Medicine* 2009; 76: 173-181.

United Nations [Internet] Principles and Recommendations for Population and Housing Censuses 1998. Series: M, No. 67/Rev. 2. [cited 2016 June 18]; Available from: [http://unstats.un.org/unsd/publication/SeriesM/Seriesm\\_67rev2e.pdf](http://unstats.un.org/unsd/publication/SeriesM/Seriesm_67rev2e.pdf).

## **CHAPTER 2: MAJOR RESEARCH PROJECT**

The links between head injury and homelessness:

A qualitative study

Gemma Findlay

Word count: 6911

Word count (minus quotes): 5169

Submitted in part fulfilment of the requirements for the degree of Doctorate in Clinical Psychology (D.Clin.Psy).

Written in accordance with the manuscript preparation guidelines for the journal - Brain Injury (Appendix 1.1)

## **Plain English Summary**

### **Background**

Recent research has found that head injury (HI) is more common in homeless individuals than in the general population. McMillan et al (2015) reported that over a 30-year period, the incidence of hospitalised HI was 5.4 times higher in a homeless sample than in the general population. This research has raised questions about the relationship between HI and homelessness. Other studies have found that between 51% and 90% of individuals sustain their first HI before becoming homeless (Mackelprang et al, 2014; Oddy et al, 2012). These findings suggest that HI may be a risk factor for homelessness.

### **Aims**

This study explores the perceptions of homeless adults who have sustained a HI and their views regarding the relevance of HI to their homeless status.

### **Methods**

Participants were recruited from homeless supported accommodation in Lanarkshire and Glasgow. To be included, individuals had to be aged over 18; registered homeless and have had a moderate or severe HI. This is any HI which resulted in at least 30 minutes of unconsciousness. Participants were excluded if they could not communicate proficiently in English or if unable to give informed consent.<sup>2</sup>

Staff within services provided potential participants with an information sheet. If interest was expressed, the staff member ensured that the individual met the inclusion criteria and then liaised with the researcher. Before the interview,

---

<sup>2</sup> Funding was not available for interpreter

participants were invited to ask further questions and provide written informed consent.

The study used a qualitative design through in-depth interviews. This allowed the researcher to review the stories of participants; their views about what led them to become homeless and what they felt was maintaining this problem. Of particular interest was their perception about the impact of HI.

### **Main findings and conclusions**

Homeless individuals with a moderate or severe HI also have several other difficulties. Exploring their perceptions of the relationship between HI and homelessness produced four recurring themes: impairment following HI; substance misuse; feeling let down by services and difficult relationships with family. Participants identified HI as a trigger for becoming homeless and for maintaining homelessness. They also emphasised the role of other difficulties. Four out of seven participants identified substance misuse as their primary difficulty, highlighting that HI and homelessness cannot be studied in isolation. Individuals who are homeless and have sustained a HI should receive an in-depth assessment which considers the effects of their HI (cognitive/ physical impairment or emotional difficulties) alongside other co-morbid problems (e.g. substance misuse/ mental health difficulties). This is necessary in order to ensure that supports/ interventions are adapted to suit individual needs.

## **Abstract**

### **Background and aims**

Head injury (HI) is a cause of cognitive impairment within the homeless population (Hwang et al, 2008). One study reported that over a 30-year period, the prevalence of hospitalised HI was 5.4 times higher in the homeless than in the general population (McMillan et al, 2015). This study explores the perceptions of homeless adults who have sustained a HI and their views regarding the relevance of HI to their homeless status.

### **Methods**

Participants were seven homeless adults with a moderate or severe HI. They were asked to talk about their journey to homelessness and in particular, to reflect on any perceived links between HI and their homeless status. The data were analysed using Interpretative Phenomenological Analysis (IPA).

### **Results and conclusions**

Emerging themes included: impairment following HI; substance misuse, feeling let down by services and difficult relationships with family. Evidence for the role of HI in precipitating and maintaining homelessness was found. Despite this, co-morbid difficulties complicate the picture. Four out of seven participants viewed substance misuse as their primary difficulty. This illustrates the need for in-depth assessment within this population in order to ensure that difficulties are fully understood and that the correct supports/ interventions are offered.

## **Introduction**

### **Homelessness**

Homelessness is essentially a culturally defined term based on concepts such as 'adequate housing', 'minimum community housing standard' and 'security of tenure'. The definition of homelessness varies from country to country because these concepts are perceived in different ways by different communities (United Nations, 1998). The United Nations (1998) categorise homelessness as primary or secondary. Primary homelessness (or rooflessness) refers to living on the streets or not having a shelter that is within the scope of living quarters. Secondary homelessness includes individuals with no place of usual residence who move between different types of accommodation (including shelters or other living quarters) and individuals who are resident in long-term shelters for the homeless or similar arrangements. It is well recognised that homelessness is prevalent; however, it is notoriously difficult to assess its true extent. Crisis (a National charity for homeless people) state that there is no national figure for how many people are homeless in the United Kingdom. This is because homelessness is recorded differently in each nation and is complicated by the fact that many homeless people are not recorded in official statistics at all (Crisis, 2016).

### **Cognitive impairment in the homeless**

An increasing evidence base suggests that there is greater cognitive impairment among homeless people than in the general population. Gonzalez et al (2001) interviewed 60 'higher functioning' homeless individuals and found that 80% displayed cognitive impairment. Gilchrist and Morrison (2005) assessed 266 homeless individuals and 82% showed cognitive impairment. This may explain why

some homeless people find it difficult to find or retain permanent accommodation and to benefit from supportive services (Spence et al, 2004).

### **Prevalence of HI in the homeless population**

Moderate to severe HI has been suggested as one possible cause of high rates of cognitive impairment in the homeless population (Hwang et al, 2008). Oddy et al (2012) conducted a study in Leeds, estimating the prevalence of HI in homeless people against a control group from the general population. They found that 48% of the homeless sample self-reported HI compared to 21% of controls. McMillan et al (2015) investigated the prevalence of hospitalised HI in a population of homeless people in Glasgow compared to the general population. The rate of hospital admission with HI in a 30-year period was 5.4 times higher in the homeless than in the general Glasgow population. Hwang et al (2008) surveyed 904 individuals attending shelters and meal programs (2004-2005) and found a lifetime prevalence of 53% for all HI and 12% for moderate or severe HI.

### **The relationship between HI and homelessness**

The research described above indicates a high prevalence of HI in the homeless population. It therefore seems important to consider the relevance of HI to becoming or remaining homeless.

Common neuropsychological sequelae of HI include: difficulties with planning, organisation, concentration and memory (Tsaousides & Gordon, 2009), all of which are required to gain or maintain employment and secure housing. Consequently, it is plausible to consider that sustaining a HI could contribute to the onset of homelessness. Nevertheless, it is well documented that this population experience high rates of injury of all types and are frequently victims of assault (Kushel et al,

2003). Therefore, it could also be the case that being homeless increases the risk of sustaining a HI.

The few published studies investigating the temporal relationship between HI and homelessness found that initial HI occurred before the onset of homelessness in 51-90% of cases (Mackelprang et al, 2014; Topolovec-Vranic et al, 2014; Oddy et al, 2012; Hwang et al, 2008). These findings support the argument that sustaining a HI is a risk factor for becoming homeless.

### **Aims**

Research on HI and homelessness to date has been quantitative and consequently, limited in detailed information about experiences in this population. This study aims to explore the perceptions of homeless adults who have sustained a HI and their views regarding the relevance of HI to their homeless status.

## Method

### **Ethical approval**

Ethical approval was obtained from the University of Glasgow, Medical, Veterinary and Life Sciences College Ethics Committee (Ref no: 200140173) (Appendix 2.1).

### **Participants**

Participants were recruited from homeless supported accommodation (The Village Project, East Kilbride; The Glasgow Simon Community; The Blue Triangle Housing Association and Loretto Housing). A demographics form (Appendix 2.2) was used to supplement the information collected from the interview in order to describe the sample. Inclusion and exclusion criteria are given in table 2.1:

**Table 2.1: Inclusion and Exclusion Criteria**

<b>Inclusion Criteria</b>	<b>Exclusion Criteria</b>
Aged over 18 Meet the following definition of homelessness: 'Living within the last 7 days at a shelter, public place, vehicle, abandoned building or someone else's house, and not having a home of one's own'. This definition was used by Oddy et al (2012) (p1060) and Hwang et al (2008) (p780). Have sustained a moderate/ severe HI defined as: 'a HI that resulted in unconsciousness for more than 30 minutes'. Again, this definition was	cannot communicate proficiently in the English language (due to limited funds) cannot provide informed consent

used by Oddy et al (2012) (p1062) and Hwang et al (2008) (p781).	
---	--

### **Justification of sample size**

Qualitative research tends to use smaller samples than quantitative research (Braun & Clarke, 2013, p.55). Smith et al (2009) indicate an awareness of the many demands on the time of those working for a practitioner doctorate. They state that between four and ten interviews are adopted for such projects (Smith et al, 2009, p.52). These numbers are considered reasonable and likely to produce valuable information. Therefore, it was anticipated that six to ten participants would be recruited.

### **Settings and Equipment**

The principal researcher met individually with participants and conducted interviews in private rooms within the buildings of the services where they were recruited. Interviews were recorded using a digital voice recorder. Interview scripts were then transcribed verbatim by the researcher. At this point, any identifiable information was removed from the transcript.

### **Recruitment Procedures**

The researcher contacted services for homeless people. The aims of the study and interview process were explained to senior staff who then provided potential participants with the information sheet (Appendix 2.3). If interest was expressed, staff members used the information sheet for service managers (Appendix 2.4) to

ask questions regarding the individual's history of HI. If they met the inclusion criteria, the researcher liaised with staff to arrange an appointment for the interview, at a time convenient for the participant. Before the interview, participants were invited to ask any further questions and to provide written informed consent (Appendix 2.5).

A £10 supermarket voucher was given to participants to thank them for taking part. This was initially planned as an incentive; however, some service managers felt that this might lead individuals to provide invalid information regarding their history of HI. Therefore, the participants were not informed of this before taking part.

## **Interview**

Semi-structured interviews lasting approximately 45 minutes were conducted with each participant. An interview schedule (developed through discussion between the researcher and research supervisor) was used to structure the interviews (Appendix 2.6). Braun and Clarke (2013) (p. 78) identify that participants should be given the opportunity to discuss issues that are important to them, that the researcher has not anticipated. Therefore, the researcher ensured that each interview was flexible.

A potential issue raised in development of the research proposal (Appendix 2.7) was that participants might over-emphasise the importance of HI on their homelessness when they understood this to be the focus of the study. This issue was explicitly addressed in the construction of the interview schedule, in that the interview did not initially focus on HI and only explicitly addressed this if the participant did not mention it during the initial part of the interview.

## **Assessment of HI**

The Ohio State University TBI Identification Method (OSU TBI-ID) (Corrigan & Bogner, 2007) (Appendix 2.8) is a short, structured interview designed to elicit self-report of lifetime history of HI. It explores multiple dimensions of an individual's HI history, including: number of injuries; severity of injuries; initial and persistent sequelae and age at injury. The OSU TBI-ID has been validated for identifying HI within forensic populations (Bognor & Corrigan, 2009) and with substance abusers (Corrigan & Bognor, 2007). Due to the overlap between these populations and the homeless population, this was deemed an appropriate measure for use in this study. No HI screening tool has been validated for use within the homeless population.

## **Design**

The study used a retrospective qualitative design through the completion of in-depth interviews.

## **Data Analysis**

Interpretative Phenomenological Analysis (IPA) was used to analyse the narratives. The main aim of IPA is to explore peoples' lived experiences and the meanings that they attach to these experiences (Braun & Clarke, 2013, p.181). As this study is addressing individuals lived experience of HI and homelessness, IPA was considered appropriate.

Analysis followed a six step process (Smith et al, 2009): immersing oneself in the data and noting any recollections of the interview experience and initial striking observations of the transcript; examining the content and language of the transcript

and developing a conceptual understanding of the data; developing emergent themes in the data and considering how these themes were connected. The process was then repeated with subsequent transcripts, allowing new themes to emerge. The final stage focussed on identifying themes across cases.

Following analysis, a second experienced qualitative researcher checked four of the scripts to ensure that appropriate themes had been identified.

## Results

Eight individuals agreed to participate and were interviewed. During one interview (participant three), it became clear that the participant did not meet the inclusion criteria. The interview was discontinued and has not been included in analysis. Consequently, data from seven participants was analysed. Participant characteristics are summarised in table 2.2. This information was gained through self-report.

**Table 2.2: Participant Information**

Participant number	Age	Gender	Age when first became homeless	Longest period of time homeless	Age at first HI	Number of HI's	Age at first moderate – severe HI	Cause of moderate – severe HI
1	45	Male	39	6 years	19	6	40	Assault
2	37	Male	15	10 years	16	3	34	Assault
4	25	Male	16	11 months	17	4	21	Assault
5	45	Male	43	5 months	31	2	43	Assault
6	42	Male	30	3 weeks	20	3	42	Assault
7	41	Female	37	4 years	24	1	24	Fall
8	44	Female	39	5 years	39	1	39	Fall

The demographic forms indicated that: all participants were unemployed; 71% (five out of seven) had co-morbid physical health problems; 71% (five out of seven) described co-morbid mental health problems and 86% (six out of seven) reported previous substance misuse. Of the six individuals with a history of substance misuse: one was continuing to abuse alcohol; two had been 'sober' for less than four weeks and one was using methadone.

All participants reflected on their life journey, in particular what had influenced their route to homelessness and the impact that current homelessness had on their lives. If they did not mention HI within their initial narrative, they were asked to reflect on whether they felt that there were any links between having sustained a HI and being homeless. Four superordinate and several subordinate themes were identified from the participant narratives (table 2.3). Quotes from the participant transcripts are presented to illustrate the themes. They have been anonymised to protect the identity of participants.

**Table 2.3: Emergent Themes**

<b>Superordinate themes</b>	<b>Subordinate themes</b>
Impairment following HI	Psychological impact Mobility/ physical difficulties Cognitive difficulties Requiring support Link to homelessness
Substance misuse	Contributing to HI Negative influence of others within homeless population Maintaining homelessness
Let down by services	Feeling unsupported Unfair allocation of housing
Difficult relationships with family	Being asked to leave family home Impact of breakdown in family relationships

## **Theme 1: Impairment following HI**

All participants acknowledged impairment following HI. This ranged from mild difficulties to long-standing psychological, physical and cognitive impairment. Three participants received input from specialist HI rehabilitation services.

### 4.1: Psychological impact

Two participants spoke of the psychological impact of HI. They both made reference to feeling paranoid, having sustained HIs through assault.

*'Paranoia just rips out of me. Know what I mean? Like, see if I'm walking down the road and I see, say for instance it's a rainy day and I would be walking up - say up there (points out of the window) and I'd just turn back round. I'd just come back home'*

**Participant 2 (P7:L25)**

*'I get dead paranoid now when I go out. See at certain times if there's somebody walking behind me, I always stop'*

**Participant 5 (P1:L9)**

Another participant talked about feeling embarrassed regarding the paralysis of one side of her body following HI.

*'It's embarrassing – that full side is just away with it'*

**Participant 8 (P5:L34)**

#### 4.2: Mobility/ physical difficulties

Three participants made reference to on-going physical/ mobility difficulties following HI.

One spoke about difficulties walking and the effort this requires. He also made reference to his altered gait (legs wide apart) and explained that this was caused by HI.

*'See even to walk, it's an effort'*

**Participant 1 (P4:L33)**

*'See, see when I walk..... my legs are wide apart... that's my brain telling my legs for my balance'*

**Participant 1 (P5:L23)**

Another participant highlighted her distress at life-changing physical impairment following HI:

*'I'm just not the way I used to be. I wish I could run. I wish I could jog. I used to walk everywhere. I had the money for my bus fare but I would say 'no I'll just walk it'. I had the money but I used to just love walking, love it. And erm, now I can't walk from here to across the road'*

**Participant 8 (P3:L11)**

#### 4.3: Cognitive difficulties

Two participants spoke of memory difficulties following HI.

One individual found impairment in his memory very distressing:

*'I forget like, oh, I forget everything man. Appointments, anything, things that people are like, like – are you serious? Are you really telling me that you forgot to do that? and I'm like, I never even knew that it existed. If I never knew it existed, how am I meant to know about it? Know what I mean?*

**Participant 2 (P8:L7)**

*'Yeah, I notice my memory. Well my memory is excellent compared to the pummelling I did to my body but it's just fine, I just forget things, certain things'*

**Participant 7 (P7:L8)**

#### 4.4: Requiring support

Three transcripts revealed changes in independence following HI and acknowledged a need for support with everyday activities.

One participant talked about his need for housing adaptations after HI:

*'I'm more needing a house now and I need adaptations as well – walk in shower and maybe a wee banister thing, low down, no stairs'*

**Participant 1 (P10:L11)**

Another participant talked about difficulties in organising his everyday affairs, finding it difficult to converse via telephone and requiring support in this area.

*'I was struggling with like, like, like authorised, like talking on the phone n like I got nervous like trying to speak to people, like on a phone. I needed to get somebody to do it for me'*

**Participant 5 (P2:L6)**

The same participant spoke of an internal struggle in asking for help.

*'The way I looked at it, I'll deal with it myself. I wouldn't go to like people and ask for help. That's one thing, I, I can't, I hate doing'*

*'It is hard – getting used to asking your family for help'*

**Participant 5 (P2:L33/P7:L38)**

Another participant reflected on needing extensive support post-injury due to being unable to do things for herself.

*'I just need help, the way I am just now, just because of the accident'*

*'I can't really do much for myself just now. I'm just not the way I used to be'*

**Participant 8 (P3:L6/ P3:L11)**

#### 4.5: Link to homelessness

Three participants identified links between HI and their 'homeless' status.

One talked about losing her tenancy due to being in hospital for a long period following HI, highlighting this as a precipitating factor to homelessness.

*'I had to give my house up. Oh, I didn't know it was given up until I came out of it, because I died about four times in the Royal'*

#### **Participant 8 (P2:L8)**

Another believes that sustaining a HI has perpetuated homelessness. He feels unable to fight his corner, resulting in the housing department simply forgetting about him.

*'No, the truth is .... I think they have just forgot about me. I mean, I'm no phoning, no outside. I mean, he's no here so why should we worry about him? Cause he's no up... see see see before my injury, if something like this happened to me, I'd have been there hounding them every f\*\*\*ing day'*

*'So probably if I hadn't got the doing, I'd be in a house by now but.... the way I look at it, I need the house more now than I did then'*

#### **Participant 1 (P13:L8/ P10:L10)**

Another participant acknowledged the impact of substance misuse and HI, concluding that they had both contributed to the development and maintenance of her current situation. She reflected that alcohol was the main difficulty but that HI also had an impact.

*'I think erm, the alcohol is 80% and the HI is 20%'*

#### **Participant 7 (P9:L3)**

Two participants had never considered this link and struggled to answer the question:

*'I, I canny say it's hingmy, caused me to become homeless. It might have had a, the way I look at it, I don't know, know what I mean?'*

**Participant 5 (P14:L5)**

*'Maybe. I don't know. I've never asked'*

**Participant 2 (P9:L3)**

## **Theme 2: Substance misuse**

This reflects the impact of substance misuse on the lives of the participants. Six out of seven participants made reference to difficulties with substance misuse.

### **1.1: Contributing to HI**

Three participants talked about being under the influence of alcohol or drugs at the time of HI:

*'I got pushed down a set of stairs and I got cleaned out. Ach, I was full of Valium and vodka and I don't know man, I can't remember much about it'*

**Participant 4 (P6:L8)**

*'I fell down the stairs paralytic and banged my head off a radiator. I was drinking two bottles of vodka every day and my veins were so thin'*

**Participant 7 (P5:L35)**

*'I fell off, you know I was drunk and I sat on a wall, went over the other side that was red stanes'*

**Participant 5 (P5:L5)**

### 1.2: Negative influence of others within the homeless population

Four participants voiced concerns about mixing with other individuals living in supported accommodation, stating that these individuals were likely to be abusing substances:

*'Everybody is drinking in here – it's really doing my head in. I thought that when I came here it was to get you off the drink. I didn't know everybody was drinking'*

**Participant 8 (P3:L32)**

*'This place was a dumping ground for alcoholics and drug abusers'*

**Participant 6 (P16:L10)**

*'It's all druggies and alkies. Sorry, not particularly politically correct'*

**Participant 7 (P2:L21)**

The participants then reflected on the impact that their peer group has on their wellbeing, particularly around efforts to abstain from substances. There was an underlying feeling of frustration regarding being placed in supported accommodation which was supposed to aid recovery but was perceived to perpetuate difficulties.

*'See once you're in the cycle and there's a few people round about you getting drink and whatever else is going on, you just, you get involved in it. It's kind of hard to break the cycle'*

**Participant 4 (P3:L1)**

*'It makes it hard to stay away from drugs because you last a few days and then the only folk that you are seeing are intoxicated'*

**Participant 6 (P15:L32)**

*'As soon as I got out of the hospital I came back in and I'm on the booze again because of everybody in here that's drinking about me. Do you want a drink? Do you want a drink? No, I really need to get out of here. I really need to'*

**Participant 8 (P3:L36)**

One participant talked about the benefits of living in a supervised flat which was outwith the main building of the supported accommodation. He had clearly identified that associating with other people within the accommodation would increase his risk of relapse.

*'That appealed to me because I don't need to see all of these other folk that have got a substance issue, do you know what I mean? I still see them and say hello but I try not to associate with them, do you know what I mean because I know that all they are interested in is going to score drugs or going to get alcohol and then score drugs'*

**Participant 6 (P16:L27)**

### 1.3: Maintaining homelessness

Three participants identified substance misuse as a perpetuating factor to their homeless status.

One participant was asked 'What do you think is stopping you from getting your own tenancy?' and responded:

*'Because I've not been sober for a long enough period'*

**Participant 4 (P5:L16)**

Another participant expressed regret at having made herself 'intentionally homeless', highlighting that her difficulties with alcohol have made it impossible to be rehoused:

*'I shouldn't have made myself homeless. I've been homeless for four years and erm, if you want to get a flat you have to be sober but erm, I'm working at that'*

**Participant 7 (P1:L24)**

The final comment made by participant six reflected his beliefs regarding the relationship between homelessness and substance misuse:

*'It's nine times out of ten, it's a substance issue, from my experience anyway'*

**Participant 6 (P19:L24)**

This was re-iterated by another participant, who attributed a large proportion of her difficulties with homelessness to alcohol misuse:

*'I think erm, the alcohol is 80% and the HI is 20%'*

**Participant 7 (P9:L3)**

### **Theme 3: Let down by services**

Five out of seven participants made negative reference to support received from services. This included: social work; the housing department; the care sector and the government.

#### 2.1: Feeling unsupported

The theme of feeling unsupported by services came across strongly in the majority of participant narratives.

One participant expressed the view that he had been completely overlooked by housing services. He believed that impairment following HI had left him unable to fight his corner and therefore, easily forgotten about.

*'No, the truth is .... I think they have just forgot about me. I mean, I'm no phoning, no outside. I mean, he's no here so why should we worry about him? Cause he's no up... see see see before my injury, if something like this happened to me, I'd have been there hounding them every f\*\*\*ing day'*

*'They know I've been in rehabs, here, there and everywhere so they've just washed their hands of me'*

*'They can't even be bothered being in contact with me. So, they deserted me as well. Every c\*\*\* deserted me'*

**Participant 1 (P13:L8/ P13:L16/ P11:L2)**

Another participant talked about the lack of input from her social worker:

*'I don't really see my social worker much. I'll need to give her a phone and tell her to get her bum out here again, so that I can – you know what I'm talking about, get my own place again'*

**Participant 8 (P4:L11)**

Another spoke extensively of his interactions with the housing department. He felt his concerns were ignored, resulting in the housing he was offered being unsuitable and likely to fail, perpetuating the difficulty of homelessness:

*'They just don't listen to you; do you know what I mean? I mean the fact that they gave me that house that I was only in for four days and had to move out through violence'*

*'They never house you anywhere reasonable or anywhere next to where you stay. If they were to put people back into the area that they come from or nearer their family and friends, there wouldn't be much bother because that's where they live, do you know what I mean?'*

*'It's like from the frying pan into the fire. They will never give you a decent area, you're a single guy so you're bottom of the s\*\*\* heap'*

**Participant 6 (P15:L18; P7:L20; P10:L2)**

## 2.2: Unfair allocation of housing

There was a perception that allocation of council housing is unfair:

*'I'm born and bred in Scotland.... so why are they housing other people and no housing me?'*

**Participant 1 (P9:L5)**

*'It is unfair because we should be getting the houses'*

**Participant 2 (P4:L11)**

Three participants linked their difficulties in regaining housing to immigration. They talked about the Scottish government offering housing to immigrants, resulting in prolonged homelessness for individuals from Scotland.

*'My final thought is: when the f\*\*\* do I get a house? Ok right, it just seems like it's gone on forever and ever and ever so my thought is: who's giving a f\*\*\*? because it seems to me that no c\*\*\* is giving a fuck about me and I'm homeless, so I don't want to keep banging on but like I said earlier on if I was a refugee, I'd be housed. So, what's the difference between them and me?'*

**Participant 1 (P14:L12)**

*'Just too many immigrants to give people houses. So, eh, they can't give us houses.... The way I put it is, erm have you ever came across, eh, a homeless Asian person or a homeless, eh, Chinese person?..... Never. You never will come across one because they get houses'*

**Participant 2 (P4:L1)**

*'My friend said that I should pretend that I'm Syrian, then I would get a house'*

**Participant 7 (P4:L23)**

#### **Theme 4: Difficult relationships with family**

Five out of seven participants made reference to difficult family relationships. This included being asked to leave the family home ('kicked out') and a lack of support/contact from family.

##### **3.1: Being asked to leave the family home**

One participant spoke of moving back to Glasgow for support following his HI and then having to declare himself homeless when his family stated that there was no room for him in the family home.

*'Yeah, it was, it was when I moved back, back fae Manchester, the 20th. I was staying with ma sister n that and ma mam and they were like that, you canny stay, we've nae room, so I had to go homeless then. Know what I mean? and I've been homeless since'.*

**Participant 5 (P7:L6)**

Two participants described being asked to leave the family home during adolescence. In both cases there was some reticence when revealing this information, possibly due to strong emotional feelings.

*'My mum kicked me out' .... 'eh, 15' (aged 15)*

**Participant 2 (P2:L9/12)**

*'My maw's, aye. I got kicked out of there and then my Da - I left a homeless unit to go back and stay with him in 2011 but he ended up dying man'*

**Participant 4 (P2:L20)**

### 3.2: Impact of breakdown in family relationships

One participant reflected on the break-up of his parents, stating that this precipitated his substance misuse. He talked about never getting back on track after this:

*'My maw and da split up and I turned to the drink and drugs. I never ever got out of it, kind of thing'*

**Participant 4 (P2:L15)**

Another participant spoke about being encouraged to live with family members. He indicated that this was not possible as he does not have any family:

*'You need to live with a family member but if you haven't got any family members, you can't do it'*

**Participant 2 (P4:L2)**

Two participants talked about their loss of contact/ negative contact with family members and the distress that this caused.

One participant made reference to her father's new wife:

*'She said 'Don't tell \*\*\*\*\* where you live (to my dad) because she might rock up and demand money off us'..... but erm, that really, erm, it offends me'*

**Participant 7 (P5:L17)**

*'I got my wee boy took off me.... I just want to see my son again'*

**Participant 8 (P7:L35)**

*'I've not seen my brother in years and years. It's terrible'*

**Participant 8 (P6:L18)**

## **Discussion**

This study explored the life-journey of homeless adults with moderate or severe HI. In particular, their perceptions regarding any links between these two negative life events. Four superordinate themes emerged through participant narratives: impairment following HI; substance misuse; let down by services and difficult relationships with family. There were differences in the presentation of participants and their ability to reflect. Two participants were very reticent and required prompts or additional questions; three responded fully to questions and two were garrulous and repetitive (possibly as a consequence of HI). Four out of seven participants spontaneously mentioned HI and three were prompted. This illustrates that despite having sustained a moderate or severe HI, some of the participants did not view this as central to their life story. As a consequence, two of the emergent themes ('let down by services' and 'difficult relationships with family') have only a slight connection to HI and homelessness. There was a clear difference in the narratives of the three participants who had received input from HI neurorehabilitation services. They appeared to have more understanding of the effects of HI and were the only participants to perceive a link between HI and homelessness. The other four participants said that they had never considered this link and some seemed to have limited insight into the effects of HI. This had an impact on their commentary, in that detailed, insightful reflection was limited in some cases.

All participants identified difficulty following HI. This ranged from mild problems to life-changing effects on psychological, physical and cognitive functioning. Three participants indicated that they required increased support as a result of disabling effects of their HI. This fits with previous research suggesting that HI is a leading cause of disability (Thurman et al, 1999). Despite identifying on-going difficulties (for

example, severe paranoia; memory problems; the requirement for continued support), some participants were unable to see how these problems could influence their homeless status. It appeared easier for individuals to identify more concrete links; for example, one participant talked about having to give up her tenancy due to being in hospital for a prolonged period following HI. A participant who displayed more insight into the impact of his HI talked about cognitive and emotional impairment making it difficult for him to engage in the processes required to gain a new tenancy. This is in line with previous research, highlighting that cognitive impairment in this population could affect an individual's ability to benefit from many of the services and supports offered (Solliday-McRoy, 2004).

Substance misuse was found to be extremely pertinent in this sample. This is in-line with previous research, finding that substance misuse is more prevalent in the homeless with HI than in the homeless without HI (Mackelprang et al, 2014; Hwang et al, 2008). In four out of seven participants, substance misuse was perceived as the primary problem, leading to further difficulties. Participants talked about finding it difficult to gain sobriety whilst living in supported accommodation surrounded by drug-abusers and other addicts. Neale (2001) conducted qualitative research exploring the perceptions of homeless, drug users in Glasgow. Participants in this study also complained about the high incidence of alcohol consumption and drug taking that occurred in these premises. Despite being drug-users themselves, the respondents did not like being in close contact with other addicts as this increased their own temptation to use. The extent of substance misuse within this population provides some explanation of why HI (often referred to as a 'hidden disability') may become lost amongst more pressing difficulties. Pluck et al (2007) found that 58% of a sample of homeless individuals living in shelters had started taking at least one

new drug since becoming homeless. This raises questions regarding what could be done differently to support individuals presenting with chronic homelessness.

There was a dearth of HI knowledge within the staff groups involved in supporting recruitment. They often lacked awareness that their residents had sustained a HI and had limited knowledge of the implications of this. Difficulties were attributed to substance misuse, possibly contributing to individuals not receiving neurorehabilitation for HI. It is hypothesised that this lack of awareness/ knowledge of HI may be replicated in other professional groups. Participants talked about receiving inadequate support from statutory services (mainly social work and housing). Solliday-McRoy et al (2004) acknowledged that homeless individuals often seek treatment in crisis, with complex difficulties, chaotic lifestyles and little social support. It is therefore understandable that subtler issues (for example, mild or moderate cognitive problems) are ignored or missed. One participant expressed the view that he had been cast aside by housing services due to being unable to fight his corner as a result of cognitive and physical impairment following HI. This fits with previous research, highlighting that HI may affect an individual's ability to engage in or benefit from treatment/ support (Starkstein & Pahissa, 2014; Langlois et al, 2006).

Difficult relationships with family members were also common. This is of little surprise as research has documented the negative impact that substance misuse (Greenblatt & Robertson, 1993) and the neurobehavioural sequelae of HI (Wood et al, 2005) often has on family members. However, it could also be the case that early life family problems; for example, conflict, violence and/ or abuse predisposed these individuals to difficulties (Eddin et al, 2012).

This study emphasises the complex nature of this client group. There are multiple presenting difficulties, making it difficult to determine what is the primary problem and of particular relevance to this study – what the contribution of HI is.

## **Reflection**

During the proposal phase of this research, concerns were raised regarding the focus of the project (HI and homelessness) leading individuals to over-emphasise the role of HI on their homeless status. As a result, the interview schedule was constructed in a way which allowed individuals to talk about what they felt had influenced their route to homelessness. If HI was not mentioned initially, this was then explored. Individuals were asked if they felt that there were any links between HI and homelessness. However, they were not asked if they felt that HI was linked to every other difficulty that they described (e.g. 'difficult relationships with family' or 'let down by services') as it was felt that this would be leading and might bias their responses.

## **Strengths and Limitations**

It would appear that the sample is largely representative of the head-injured, homeless population. The majority of participants were male and the range of co-morbid difficulties reflect those documented in the literature. In addition, this is the first qualitative study in this area and provides a deeper insight into the experience of being homeless and having a HI. The study also uses a validated tool to screen for HI.

The study is limited by a lack of 'unsheltered' individuals in the sample. This is noteworthy as there may be significant differences in the physical and mental health of those who use shelters and those who do not (Nyamathi et al, 2000).

## **Clinical implications and future research**

This research gives a voice to individuals who are often overlooked and perceived negatively within society. It highlights the complex nature of this client group and illustrates the need for in-depth assessment of homeless individuals who have sustained a HI. Presenting problems need to be considered in relation to their HI but also in the context of other difficulties (for example, substance misuse or mental health issues). This is vital in order to ensure that the correct supports/ interventions are offered.

Future research would benefit from further use of qualitative methods, that: i) gain access to medical records to investigate HI history; and (ii) include other homeless individuals; for example, individuals sleeping rough or living in temporary accommodation.

## **Conclusions**

This study found that homeless individuals who have sustained a moderate or severe HI are a complex group, with an array of co-morbid difficulties. Exploring perceptions of the relationship between HI and homelessness identified four recurring themes: impairment following HI; substance misuse; feeling let down by services and difficult relationships with family. Participants identified evidence of HI precipitating homelessness and maintaining this difficulty once it has occurred. However, it was clear that HI and homelessness are not isolated from other problems. This research illustrates the need for in-depth assessment within this population in order to ensure that difficulties are fully understood and that supports/ interventions are adapted appropriately.

## References

- Bogner JA, Corrigan JD. Reliability and validity of the OSU TBI Identification Method with Prisoners. *Journal of Head Trauma Rehabilitation* 2009; 24(6): 279-291.
- Braun V, Clarke C. *Successful Qualitative Research: a practical guide for beginners* 2013; SAGE Publications Ltd: London.
- Corrigan JD, Bogner J. Initial reliability and validity of the Ohio State University TBI Identification Method. *Journal of Head Trauma Rehabilitation* 2007; 22 (6): 318 – 329.
- Crisis [Internet]. 2016 – [cited 2016 June 18]; Available from: <http://www.crisis.org.uk/pages/homeless-def-numbers.html>.
- Eddin JP, Ganim Z, Hunter SJ, Karnik NS. The mental and physical health of homeless youth: a literature review. *Child Psychiatry & Human Development* 2012; 43 (3): 354-375.
- Gilchrist G, Morrison D. Prevalence of alcohol related brain damage among homeless hostel dwellers in Glasgow. *The European Journal of Public Health* 2005; 15: 587-588.
- Gonzalez EA, Dieter JN, Natalie RA, Tanner SL. Neuropsychological evaluation of higher-functioning homeless persons: A comparison of an abbreviated test battery to the Mini-Mental State Exam. *Journal of Nervous and Mental Disease* 2001; 189: 176-181.
- Greenblatt M, Robertson M J. Life-styles, adaptive strategies, and sexual behaviours of homeless adolescents. *Hospital and Community Psychiatry* 1993; 44(12): 1177–1180.

Hwang SW, Colantonio A, Chiu S, Tolomiczenko G, Kiss A, Cowan L, Redelmeier DA, Levinson W. The effect of traumatic brain injury on the health of homeless people. *Canadian Medical Association Journal* 2008; 179: 779-78.

Kushel MB, Evans JL, Perry S, Robertson MJ, Moss AR. No door to lock: victimization among homeless and marginally housed persons. *Archives of International Medicine* 2003; 163: 2492-2499.

Langlois JA, Rutland-Brown W, Wald MM. The epidemiology and impact of traumatic brain injury: a brief overview. *Journal of Head Trauma Rehabilitation* 2006; 21 (5): 375-378.

Mackelprang JL, Harpin SB, Grubenhoff JA, Rivara FP. Adverse Outcomes Among Homeless Adolescents and Young Adults Who Report a History of Traumatic Brain Injury. *American Journal of Public Health* 2014; 104 (10): 1986-1992.

McMillan TM, Laurie M, Oddy M, Menzies M, Stewart E, Wainman-Lefley J. Head Injury and Mortality in the Homeless. *Journal of Neurotrauma* 2015; 32 (2): 116-119.

Oddy M, Moir JF, Fortescue D, Chadwick S. The prevalence of traumatic brain injury in the homeless community in a UK city. *Brain Injury* 2012; 26 (9): 1058-1064.

Neale J. Homelessness amongst drug users: a double jeopardy explored. *International Journal of Drug Policy* 2001; 12: 353-369.

Nyamathi AM, Leake B, Gelberg L. Sheltered versus nonsheltered homeless women differences in health, behaviour, victimization, and utilization of care. *Journal of General Internal Medicine* 2000; 15: 565-572.

Pluck G, Lee K-H, Parks R. Homeless shelters and substance misuse. *Canadian Medical Association Journal* 2007; 176 (4): 489.

Smith J, Flowers P, Larkin M. *Interpretative Phenomenological Analysis: theory, method and research* 2009; Sage Publications: London.

Solliday-McRoy C, Campbell TC, Melchert TP, Young TJ, Cisler RA. Neuropsychological functioning of homeless men. *Journal of Nervous and Mental Disease* 2004; 192: 471-478.

Spence S, Stevens R, Parks R. Cognitive dysfunction in adults: a systematic review. *Journal of the Royal Society of Medicine* 2004; 97 (8): 375-379.

Starkstein SE, Pahissa J. Apathy following traumatic brain injury. *Psychiatric Clinics of North America* 2014; 37 (1): 103-112.

Thurman DJ, Alverson C, Dunn KA, Guerrero J, Sniezek JE. Traumatic brain injury in the United States: A public health perspective. *Journal of head trauma rehabilitation* 1999; 14 (6): 602-615.

Topolovec-Vranic J, Ennis N, Howatt M, Ouchterlony D, Michalak A, Masanic C, Colantonio A, Hwang SW, Kontos P, Stergiopoulos V, Cusimano MD. Traumatic brain injury among men in an urban homeless shelter: observational study of rates and mechanisms of injury. *Canadian Medical Association Journal* 2014; 2 (2): E69-E76.

Tsaousides T, Gordon WA. Cognitive Rehabilitation Following Traumatic Brain Injury: Assessment to Treatment. *Mount Sinai Journal of Medicine* 2009; 76: 173-181.

United Nations [Internet] Principles and Recommendations for Population and Housing Censuses 1998. Series: M, No. 67/Rev. 2. [cited 2016 June 18]; Available from: [http://unstats.un.org/unsd/publication/SeriesM/Seriesm\\_67rev2e.pdf](http://unstats.un.org/unsd/publication/SeriesM/Seriesm_67rev2e.pdf).

Wood R LI, Lioffi C, Wood L. The impact of head injury neurobehavioural sequelae on personal relationships: Preliminary findings. *Brain Injury* 2005; 19 (10): 845-851.

# **Systematic Review Appendices**

## **(Chapter 1)**

## Appendix 1.1: Manuscript Preparation Guidelines for the journal - Brain Injury

### Brain Injury

#### Instructions for Authors

**Brain Injury** publishes critical information relating to research and clinical practice, adult and pediatric populations. The Journal covers a full range of relevant topics relating to clinical, translational, and basic science research. Manuscripts address emergency and acute medical care, acute and post-acute rehabilitation, family and vocational issues, and long-term supports. Coverage includes assessment and interventions for functional, communication, neurological, and psychological disorders.

#### Manuscript Preparation

*Brain Injury* is committed to improving and maintaining the consistency and quality of manuscripts submitted and published. Authors are strongly encouraged to review and comply with the reporting guidelines relevant to their submission. Reviewers have been instructed to evaluate submissions on the basis of their conformity to the guidelines. The table below provides information about guidelines for different study types.

Authors should prepare and upload two versions of their manuscript. One should be a complete text, while in the second all document information identifying the author(s) should be removed from files to allow them to be sent anonymously to referees. When uploading files authors will then be able to define the non-anonymous version as "File not for review".

**Brain Injury** considers all manuscripts at the Editors' discretion; the Editors' decision is final.

**Brain Injury** considers all manuscripts on the strict condition that they are the property (copyright) of the submitting author(s), have been submitted only to **Brain Injury**, that they have not been published already, nor are they under consideration for publication, nor in press elsewhere. Authors who fail to adhere to this condition will be charged all costs which **Brain Injury** incurs, and their papers will not be published. Copyright will be transferred to the journal **Brain Injury** and Taylor and Francis, if the paper is accepted.

#### General Guidelines

Please write clearly and concisely, stating your objectives clearly and defining your terms. Your arguments should be substantiated with well-reasoned supporting evidence.

In writing your paper, you are encouraged to review articles in the area you are addressing which have been previously published in the Journal, and where you feel appropriate, to reference them. This will enhance context, coherence, and continuity for our readers.

For all manuscripts, gender-, race-, and creed-inclusive language is mandatory.

#### Publishing Ethics

The Editors and Taylor & Francis Group are committed to the highest academic, professional, legal, and ethical standards in publishing work in this journal. To this end, we have adopted a [set of guidelines](#), to which all submitting authors are expected to adhere, to assure integrity and ethical publishing for authors, reviewers, and editors.

Taylor & Francis is a member of the Committee of Publications Ethics (COPE). COPE aims to provide a forum for publishers and editors of scientific journals to discuss issues relating to the integrity of their work, including conflicts of interest, falsification and fabrication of data, ethical misconduct, unethical experimentation, inadequate subject consent, and authorship disputes. For more information on COPE please visit <http://publicationethics.org>.

Please note that *Brain Injury* uses [CrossCheck™](#) to screen papers for unoriginal material. By submitting your paper to the journal you are agreeing to originality checks during the peer-review and production processes.

### **File preparation and types**

Manuscripts are preferred in Microsoft Word format (.doc files). Documents must be double-spaced, with margins of one inch on all sides. Tables and figures should not appear in the main text, but should be uploaded as separate files and designated with the appropriate file type upon submission. References should be given in Council of Science Editors (CSE) Citation & Sequence format (see References section for examples).

Manuscripts should be compiled in the following order: title page; abstract; main text; acknowledgments; Declaration of Interest statement; appendices (as appropriate); references; tables with captions (on separate pages); figures; figure captions (as a list).

### **Title Page**

A title page should be provided comprising the manuscript title plus the full names and affiliations of all authors involved in the preparation of the manuscript. One author should be clearly designated as the corresponding author and full contact information, including phone number and email address, provided for this person. Keywords that are not in the title should also be included on the title page. The keywords will assist indexers in cross indexing your article. The title page should be uploaded separately to the main manuscript and designated as "title page – not for review" on ScholarOne Manuscripts.

### **Abstract**

Structured abstracts are required for all papers, and should be submitted as detailed below, following the title and author's name and address, preceding the main text.

For papers reporting original research, state the primary objective and any hypothesis tested; describe the research design and your reasons for adopting that methodology; state the methods and procedures employed, including where appropriate tools, hardware, software, the selection and number of study areas/subjects, and the central experimental interventions; state the main outcomes and results, including relevant data; and state the conclusions that might be drawn from these data and results, including their implications for further research or application/practice.

For review essays, state the primary objective of the review; the reasoning behind your literature selection; and the way you critically analyse the literature; state the main outcomes and results of your review; and state the conclusions that might be drawn, including their implications for further research or application/practice.

The abstract should not exceed 200 words.

**Tables and Figures:** Tables and figures should not be embedded in the text, but should be included as separate sheets or files. A short descriptive title should appear above each table with a clear legend and any footnotes suitably identified below. All units must be included. Figures should be completely labeled, taking into account necessary size reduction.

Captions should be typed, double-spaced, on a separate sheet. All original figures should be clearly marked with the number, author's name, and top edge indicated.

**Illustrations:** Illustrations submitted (line drawings, halftones, photos, photomicrographs, etc.) should be clean originals or digital files. Digital files are recommended for highest quality reproduction and should follow these guidelines:

- 300 dpi or higher
- sized to fit on journal page
- EPS, TIFF, or PSD format only
- submitted as separate files, not embedded in text files

**Color Reproduction:** Color art will be reproduced in color in the online publication at no additional cost to the author. Color illustrations will also be considered for print publication; however, the author will be required to bear the full cost involved in color art reproduction. Please note that color reprints can only be ordered if print reproduction costs are paid. Print Rates: \$900 for the first page of color; \$450 per page for the next three pages of color. A custom quote will be provided for articles with more than four pages of color. Art not supplied at a minimum of 300 dpi will not be considered for print.

Authors are responsible for obtaining permission to reproduce copyrighted material from other sources and are required to sign an agreement for the transfer of copyright to the publisher. As an author you are required to secure permission if you want to reproduce any figure, table or extract text from any other source. This applies to direct reproduction as well as "derivative reproduction" (where you have created a new figure or table which derives substantially from a copyrighted source).

### Letters to the Editor

Letters to the Editor will be considered for publication subject to editor approval and provided that they either relate to content previously published in the Journal or address any item that is felt to be of interest to the readership. Letters relating to articles previously published in the Journal should be received no more than three months after publication of the original work. Pending editor approval, letters may be submitted to the author of the original paper in order that a reply be published simultaneously.

Letters to the Editor can be signed by a maximum of three authors, should be between 750 and 1,250 words, may contain one table/figure and may cite a maximum of five references. All Letters should be submitted via ScholarOne Manuscripts and should contain a Declaration of Interest statement.

### Notes on Style

All authors are asked to take account of the diverse audience of *Brain Injury*. Clearly explain or avoid the use of terms that might be meaningful only to a local or national audience.

Some specific points of style for the text of original papers, reviews, and case studies follow:

- *Brain Injury* prefers US to 'American', USA to 'United States', and UK to 'United Kingdom'. *Brain Injury* uses conservative British, not US, spelling, i.e. colour not color; behaviour (behavioural) not behavior; [school] programme not program; [he] practises not practices; centre not center; organization not organisation; analyse not analyze, etc.
- Single 'quotes' are used for quotations rather than double "quotes", unless the 'quote is "within" another quote'.
- Punctuation should follow the British style, e.g. 'quotes precede punctuation'.
- Punctuation of common abbreviations should follow the following conventions: e.g. i.e. cf. Note that such abbreviations are not followed by a comma or a (double) point/period.
- Dashes (M-dash) should be clearly indicated in manuscripts by way of either a clear dash (-) or a double hyphen (- -).
- *Brain Injury* is sparing in its use of the upper case in headings and references, e.g. only the first word in paper titles and all subheads is in upper case; titles of papers from journals in the references and other places are not in upper case.
- Apostrophes should be used sparingly. Thus, decades should be referred to as follows: 'The 1980s [not the 1980's] saw ...'. Possessives associated with acronyms (e.g. APU), should be written as follows: 'The APU's findings that ...', but, NB, the plural is APUs.
- All acronyms for national agencies, examinations, etc., should be spelled out the first time they are introduced in text or references. Thereafter the acronym can be used if appropriate, e.g. 'The work of the Assessment of Performance Unit (APU) in the early 1980s ...'. Subsequently, 'The APU studies of achievement ...', in a reference ... (Department of Education and Science [DES] 1989a).
- Brief biographical details of significant national figures should be outlined in the text unless it is quite clear that the person concerned would be known internationally. Some suggested editorial emendations to a typical text are indicated in the following with square brackets: 'From the time of H. E. Armstrong [in the 19th century] to the curriculum development work associated with the Nuffield Foundation [in the 1960s], there has been a shift from heurism to constructivism in the design of [British] science courses'.
- The preferred local (national) usage for ethnic and other minorities should be used in all papers. For the USA, African-American, Hispanic, and Native American are used, e.g. 'The African American presidential candidate, Jesse Jackson...' For the UK, African-Caribbean (not 'West Indian'), etc.
- Material to be emphasized (italicized in the printed version) should be underlined in the typescript rather than italicized. Please use such emphasis sparingly. n (not N), % (not per cent) should be used in typescripts.
- Numbers in text should take the following forms: 300, 3000, 30 000. Spell out numbers under 10 unless used with a unit of measure, e.g. nine pupils but 9 mm (do not introduce periods with measure). For decimals, use the form 0.05 (not .05).

## **Acknowledgments and Declaration of Interest sections**

Acknowledgments and Declaration of interest sections are different, and each has a specific purpose.

The Acknowledgments section details special thanks, personal assistance, and dedications.

Contributions from individuals who do not qualify for authorship should also be acknowledged here. Declarations of interest, however, refer to statements of financial support and/or statements of potential conflict of interest. Within this section also belongs disclosure of scientific writing assistance (use of an agency or agency/ freelance writer), grant support and numbers, and statements of employment, if applicable.

### **Acknowledgments section**

Any acknowledgments authors wish to make should be included in a separate headed section at the end of the manuscript preceding any appendices, and before the references section. Please do not incorporate acknowledgments into notes or biographical notes.

### **Declaration of Interest section**

All declarations of interest must be outlined under the subheading "Declaration of interest". If authors have no declarations of interest to report, this must be explicitly stated. The suggested, but not mandatory, wording in such an instance is: *The authors report no declarations of interest.* When submitting a paper via ScholarOne Manuscripts, the "Declaration of interest" field is compulsory (authors must either state the disclosures or report that there are none). If this section is left empty authors will not be able to progress with the submission.

Please note: for NIH/Wellcome-funded papers, the grant number(s) must be included in the Declaration of Interest statement.

## **References**

References should follow the Council of Science Editors (CSE) Citation & Sequence format. Only works actually cited in the text should be included in the references. Indicate in the text with Arabic numbers inside square brackets. Spelling in the reference list should follow the original. References should then be listed in numerical order at the end of the article. Further examples and information can be found in *The CSE Manual for Authors, Editors, and Publishers*, Seventh Edition. Periodical abbreviations should follow the style given by Index Medicus.

Examples are provided as follows:

**Journal article:** [1] Steiner U, Klein J, Eiser E, Budkowski A, Fetters LJ. Complete wetting from polymer mixtures. *Science* 1992;258:1122-9.

**Book chapter:** [2] Kuret JA, Murad F. Adenohypophyseal hormones and related substances. In: Gilman AG, Rall TW, Nies AS, Taylor P, editors. *The pharmacological basis of therapeutics*. 8th ed. New York: Pergamon; 1990. p 1334-60.

**Conference proceedings:** [3] Irvin AD, Cunningham MP, Young AS, editors. *Advances in the control of Theileriosis. International Conference held at the International Laboratory for Research on Animal Diseases; 1981 Feb 9-13; Nairobi. Boston: Martinus Nijhoff Publishers; 1981. 427 p.*

**Dissertations or Thesis:** [4] Mangie ED. *A comparative study of the perceptions of illness in New Kingdom Egypt and Mesopotamia of the early first millennium [dissertation]. Akron (OH): University of Akron; 1991. 160 p. Available from: University Microfilms, Ann Arbor MI; AAG9203425.*

**Journal article on internet:** [5] De Guise E, Leblanc J, Dagher J, Lamoureux J, Jishi A, Maleki M, Marcoux J, Feyz M. 2009. Early outcome in patients with traumatic brain injury, pre-injury alcohol abuse and intoxication at time of injury. *Brain Injury* 23(11):853-865. <http://www.informaworld.com/10.1080/02699050903283221>. Accessed 2009 Oct 06

**Webpage:** [6] British Medical Journal [Internet]. Stanford, CA: Stanford Univ; 2004 July 10 - [cited 2004 Aug 12]; Available from: <http://bmj.bmjournals.com>

**Internet databases:** [7] Prevention News Update Database [Internet]. Rockville (MD): Centers for Disease Control and Prevention (US), National Prevention Information Network. 1988 Jun - [cited 2001 Apr 12]. Available from: <http://www.cdcnpin.org/>

**Page Proofs:** All proofs must be corrected and returned to the publisher within 48 hours of receipt. If the manuscript is not returned within the allotted time, the editor will proofread the article and it will be printed per the editor's instruction. Only correction of typographical errors is permitted.

**Complimentary Policy and Reprints:** Authors for whom we receive a valid email address will be provided an opportunity to purchase reprints of individual articles, or copies of the complete print issue. These authors will also be given complimentary access to their final article on *Taylor & Francis Online*.

**Open Access:** Articles are eligible for Open Access. Electing this option allows the article to be made freely available online under a Creative Commons License. Authors of accepted papers will have the opportunity to purchase open access at proofs stage. Please note: This option is separate from Taylor and Francis's NIH Fund policy.

## Appendix 1.2: Quality Rating Criteria (modified Downs and Black Checklist, 1998)

### Appendix

#### Checklist for measuring study quality

##### Reporting

1. *Is the hypothesis/aim/objective of the study clearly described?*

yes	1
no	0

2. *Are the main outcomes to be measured clearly described in the Introduction or Methods section?*

If the main outcomes are first mentioned in the Results section, the question should be answered no.

yes	1
no	0

3. *Are the characteristics of the patients included in the study clearly described?*

In cohort studies and trials, inclusion and/or exclusion criteria should be given. In case-control studies, a case-definition and the source for controls should be given.

yes	1
no	0

4. *Are the interventions of interest clearly described?*

Treatments and placebo (where relevant) that are to be compared should be clearly described.

yes	1
no	0

5. *Are the distributions of principal confounders in each group of subjects to be compared clearly described?*

A list of principal confounders is provided.

yes	2
partially	1
no	0

6. *Are the main findings of the study clearly described?*

Simple outcome data (including denominators and numerators) should be reported for all major findings so that the reader can check the major analyses and conclusions. (This question does not cover statistical tests which are considered below).

yes	1
no	0

7. *Does the study provide estimates of the random variability in the data for the main outcomes?*

In non normally distributed data the inter-quartile range of results should be reported. In normally distributed data the standard error, standard deviation or confidence intervals should be reported. If the distribution of the data is not described, it must be assumed that the estimates used were appropriate and the question should be answered yes.

yes	1
no	0

8. *Have all important adverse events that may be a consequence of the intervention been reported?*

This should be answered yes if the study demonstrates that there was a comprehensive attempt to measure adverse events. (A list of possible adverse events is provided).

yes	1
no	0

9. *Have the characteristics of patients lost to follow-up been described?*

This should be answered yes where there were no losses to follow-up or where losses to follow-up were so small that findings would be unaffected by their inclusion. This should be answered no where a study does not report the number of patients lost to follow-up.

yes	1
no	0

10. *Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?*

yes	1
no	0

##### External validity

All the following criteria attempt to address the representativeness of the findings of the study and whether they may be generalised to the population from which the study subjects were derived.

11. *Were the subjects asked to participate in the study representative of the entire population from which they were recruited?*

The study must identify the source population for patients and describe how the patients were selected. Patients would be representative if they comprised the entire source population, an unselected sample of consecutive patients, or a random sample. Random sampling is only feasible where a list of all members of the relevant

population exists. Where a study does not report the proportion of the source population from which the patients are derived, the question should be answered as unable to determine.

yes	1
no	0
unable to determine	0

12. *Were those subjects who were prepared to participate representative of the entire population from which they were recruited?*

The proportion of those asked who agreed should be stated. Validation that the sample was representative would include demonstrating that the distribution of the main confounding factors was the same in the study sample and the source population.

yes	1
no	0
unable to determine	0

13. *Were the staff, places, and facilities where the patients were treated, representative of the treatment the majority of patients receive?*

For the question to be answered yes the study should demonstrate that the intervention was representative of that in use in the source population. The question should be answered no if, for example, the intervention was undertaken in a specialist centre unrepresentative of the hospitals most of the source population would attend.

yes	1
no	0
unable to determine	0

#### Internal validity - bias

14. *Was an attempt made to blind study subjects to the intervention they have received?*

For studies where the patients would have no way of knowing which intervention they received, this should be answered yes.

yes	1
no	0
unable to determine	0

15. *Was an attempt made to blind those measuring the main outcomes of the intervention?*

yes	1
no	0
unable to determine	0

16. *If any of the results of the study were based on "data dredging", was this made clear?*

Any analyses that had not been planned at the outset of the study should be clearly indicated. If no retrospective unplanned subgroup analyses were reported, then answer yes.

yes	1
no	0
unable to determine	0

17. *In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls?*

Where follow-up was the same for all study patients the answer should be yes. If different lengths of follow-up were adjusted for by, for example, survival analysis the answer should be yes. Studies where differences in follow-up are ignored should be answered no.

yes	1
no	0
unable to determine	0

18. *Were the statistical tests used to assess the main outcomes appropriate?*

The statistical techniques used must be appropriate to the data. For example non-parametric methods should be used for small sample sizes. Where little statistical analysis has been undertaken but where there is no evidence of bias, the question should be answered yes. If the distribution of the data (normal or not) is not described it must be assumed that the estimates used were appropriate and the question should be answered yes.

yes	1
no	0
unable to determine	0

19. *Was compliance with the intervention's reliable?*

Where there was non compliance with the allocated treatment or where there was contamination of one group, the question should be answered no. For studies where the effect of any misclassification was likely to bias any association to the null, the question should be answered yes.

yes	1
no	0
unable to determine	0

20. *Were the main outcome measures used accurate (valid and reliable)?*

For studies where the outcome measures are clearly described, the question should be answered yes. For studies which refer to other work or that demonstrates the outcome measures are accurate, the question should be answered as yes.

yes	1
no	0
unable to determine	0

*Internal validity - confounding (selection bias)*

21. *Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population?*

For example, patients for all comparison groups should be selected from the same hospital. The question should be answered unable to determine for cohort and case-control studies where there is no information concerning the source of patients included in the study.

yes	1
no	0
unable to determine	0

22. *Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time?*

For a study which does not specify the time period over which patients were recruited, the question should be answered as unable to determine.

yes	1
no	0
unable to determine	0

23. *Were study subjects randomised to intervention groups?*

Studies which state that subjects were randomised should be answered yes except where method of randomisation would not ensure random allocation. For example alternate allocation would score no because it is predictable.

yes	1
no	0
unable to determine	0

24. *Was the randomised intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?*

All non-randomised studies should be answered no. If assignment was concealed from patients but not from staff, it should be answered no.

yes	1
no	0
unable to determine	0

25. *Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?*

This question should be answered no for trials if: the main conclusions of the study were based on analyses of treatment rather than intention to treat; the distribution of known confounders in the different treatment groups was not described; or the distribution of known confounders differed between the treatment groups but was not taken into account in the analyses. In non-randomised studies if the effect of the main confounders was not investigated or confounding was demonstrated but no adjustment was made in the final analyses the question should be answered as no.

yes	1
no	0
unable to determine	0

26. *Were losses of patients to follow-up taken into account?*

If the numbers of patients lost to follow-up are not reported, the question should be answered as unable to determine. If the proportion lost to follow-up was too small to affect the main findings, the question should be answered yes.

yes	1
no	0
unable to determine	0

*Power*

27. *Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?*

Sample sizes have been calculated to detect a difference of x% and y%.

	Size of smallest intervention group	
A	$<n_1$	0
B	$n_1 - n_2$	1
C	$n_1 - n_3$	2
D	$n_1 - n_4$	3
E	$n_1 - n_5$	4
F	$n_1 +$	5

# **Major Research Project Appendices**

## **(Chapter 2)**

## Appendix 2.1: Ethical approval letter



16<sup>th</sup> September 2015

Dear Gemma Findlay, Professor Tom McMillan and Dr Sarah Wilson

**MVLS College Ethics Committee**

*Project Title:* Relationships between homelessness and head injury: A qualitative study  
*Project No:* 200140173

The College Ethics Committee has reviewed your application and has agreed that there is no objection on ethical grounds to the proposed study. It is happy therefore to approve the project, subject to the following conditions:

- Project end date: August 2016
- The data should be held securely for a period of ten years after the completion of the research project, or for longer if specified by the research funder or sponsor, in accordance with the University's Code of Good Practice in Research: ([http://www.gla.ac.uk/media/media\\_227599\\_en.pdf](http://www.gla.ac.uk/media/media_227599_en.pdf))
- The research should be carried out only on the sites, and/or with the groups defined in the application.
- Any proposed changes in the protocol should be submitted for reassessment, except when it is necessary to change the protocol to eliminate hazard to the subjects or where the change involves only the administrative aspects of the project. The Ethics Committee should be informed of any such changes.
- You should submit a short end of study report to the Ethics Committee within 3 months of completion.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'A Rankin', is written over a light blue horizontal line.

Prof. Andrew C. Rankin  
Deputy Chair, College Ethics Committee

Andrew C. Rankin  
Professor of Medical Cardiology  
BHF Glasgow Cardiovascular Research Centre  
College of Medical, Veterinary & Life Sciences  
University of Glasgow, G12 8TA  
Tel: 0141 211 4833  
Email: [andrew.rankin@glasgow.ac.uk](mailto:andrew.rankin@glasgow.ac.uk)

## Appendix 2.2: Demographics form



### Relationships between homelessness and head injury: A qualitative study

#### Demographics Form

Participant ID number: \_\_\_\_\_ Current age: \_\_\_\_\_

Gender: \_\_\_\_\_

Service recruited from: \_\_\_\_\_

Current living arrangements: \_\_\_\_\_

Current occupation/ employment status: \_\_\_\_\_

#### History of homelessness

Age at which you first became homeless? \_\_\_\_\_

Is this the first episode of homelessness? \_\_\_\_\_

If not, how many times has the individual been deemed 'homeless'?

\_\_\_\_\_

\_\_\_\_\_

What's the longest period of time that you have been homeless?

\_\_\_\_\_

\_\_\_\_\_

#### Co-morbid problems

How would you describe your physical health?

\_\_\_\_\_

\_\_\_\_\_

Any specific physical health problems?

\_\_\_\_\_

\_\_\_\_\_

How would you describe your mental health?

---

---

---

Any issues with drugs/ alcohol?

---

---

---

---

## Appendix 2.3: Participant Information sheet



Gemma Findlay  
Trainee Clinical Psychologist  
Email: g.findlay.1@research.gla.ac.uk  
Institute of Health and Wellbeing  
Administration Building (1<sup>st</sup> floor)  
Gartnavel Royal Hospital  
1055 Great Western Road  
Glasgow, G12 0XH

### Relationships between homelessness and head injury: A qualitative study

#### PARTICIPANT INFORMATION SHEET

We would like to invite you to take part in a research study. Before you decide you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. You may also wish to talk to others about the study. Please ask if there is anything that is not clear or that you would like more information about.

#### **Who is conducting the research?**

The research is being carried out by Gemma Findlay (Trainee Clinical Psychologist) and is being supervised by Professor Tom McMillan and Dr Sarah Wilson from the University of Glasgow.

#### **What is the purpose of the study?**

The aim of the study is to learn more about what leads individuals to become homeless and what makes it difficult to regain housing. We are interested in hearing the stories of homeless adults who have had a head injury. This research may contribute to helping to improve and adapt services for similar individuals.

This study will be submitted as part of the main researcher's (Gemma Findlay) portfolio for examination by the University of Glasgow, as part of the Doctorate in Clinical Psychology.

#### **Why am I being invited to take part?**

We are looking for people who are aged over 18, have experienced a moderate to severe head injury (unconsciousness for more than 30 minutes) and are deemed to be 'homeless'. We believe that you may fit this criteria and this is why we have invited you to take part.

#### **Do I have to take part?**

It is up to you to decide whether you would like to take part. If you are interested then Gemma Findlay (Principal Researcher) will meet with you to go through the information sheet and answer any questions that you may have. If you decide that you would like to take part then you will be asked to sign a consent form to show that

you have agreed to take part. You are free to withdraw from the research at any time without giving a reason. This would not affect the care that you receive or any future support that you may require.

**What does taking part involve?**

If you agree to take part, you will be asked to meet with Gemma Findlay (Principal Researcher). The study involves you talking to the interviewer about what led you to become homeless and the impact that this has had on your life. It is thought that this discussion will last for approximately 45 minutes (up to one hour), during which you may take breaks if required. The interview will be audio recorded to allow the researcher to listen back to the conversation and identify key points that you made. Some quotes from your interview may be included in the research paper; however, all information will be anonymised. Following the interview, you will also be asked some additional questions. These will relate to your history of homelessness and general wellbeing.

**What happens to the information?**

Your identity and personal information will remain confidential and be known only to the researchers. The information obtained will be kept in accordance with The Data Protection Act, meaning that it will be stored safely and cannot be revealed to other people without your permission.

However, if you disclose anything that gives the researcher cause for concern, such as reason to believe that you may harm yourself or others, the researcher will have a duty to report this to the relevant agencies. This would be discussed with you first.

**What are the possible benefits of taking part?**

It is hoped that by taking part, you will be providing an insight into what it is like to be homeless and the things that make it difficult to regain housing. It is also hoped that this research will highlight gaps in current service provision and that services for individuals in a similar situation to yourself could be improved.

**Who has reviewed the study?**

The study has been reviewed by the MVLS College Ethics Committee, University of Glasgow.

**If you have any further questions?**

We will give you a copy of the information sheet and signed consent form to keep. If you would like more information about the study and wish to speak to someone **not** closely linked to the study, please contact:

Professor Jonathan Evans  
Email: [Jonathan.Evans@glasgow.ac.uk](mailto:Jonathan.Evans@glasgow.ac.uk)  
Telephone Number: 01412113978

## Researcher Contact Details

Gemma Findlay (Trainee Clinical Psychologist)  
Email: [0502795f@student.gla.ac.uk](mailto:0502795f@student.gla.ac.uk)

Professor Tom McMillan (Professor of Clinical Neuropsychology)  
Email: [Thomas.McMillan@glasgow.ac.uk](mailto:Thomas.McMillan@glasgow.ac.uk)  
Telephone Number: 0141 211 3920

Dr Sarah Wilson  
Email: [Sarah.Wilson@glasgow.ac.uk](mailto:Sarah.Wilson@glasgow.ac.uk)  
Telephone Number: 01412113921

### **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 principal researcher (Gemma Findlay) in the first instance. You can also contact either of the research supervisors or Professor Jonathan Evans (contact details above), who is not closely linked with the study.

Thank you for your time and co-operation

## Appendix 2.4: Information sheet for service managers



Gemma Findlay  
Trainee Clinical Psychologist  
Email: g.findlay.1@research.gla.ac.uk  
Institute of Health and Wellbeing  
Administration Building (1<sup>st</sup> floor)  
Gartnavel Royal Hospital  
1055 Great Western Road  
Glasgow, G12 0XH

### Relationships between homelessness and head injury: A qualitative study

#### Information sheet for service managers

Please inform your service users of our study by giving them a copy of the participant information sheet. If they are interested in taking part, please ask them question 1 (below). If they answer 'yes', please ask them question two. If they answer 'yes' to question 2 then they meet the inclusion criteria for the study and would be eligible to take part.

If the service user answers 'yes' to question one but does not know the answer to question 2, ask them question 3. If the service user answers 'yes' to question 3 then they may meet the inclusion criteria and their details should be passed onto the researcher.

Please contact the researcher if a service user meets the inclusion criteria and would like to take part in the study.

#### Questions

1. Have you ever had an injury to the head which knocked you out or at least left you dazed, confused or disorientated?

---

---

If the individual answers 'no', stop here. They do not fit the inclusion criteria for the study. If they answer yes, please ask them question 2.

2. Have you ever been knocked out for a period of 30 minutes or more following an injury to your head?

---

---

If the individual answers 'yes' or 'no', stop here. If they answer 'yes', they meet the inclusion criteria for the study. If they answer 'no', they do not meet the inclusion criteria.

If the individual does not know the answer to the question, please ask question 3.

3. Have you ever been kept in hospital for longer than 48 hours following an injury to your head?

---

---

**If the service user answers 'yes' to question 3 then they may meet the inclusion criteria and their details should be passed to the researcher.**

## Appendix 2.5: Consent form



Principal Researcher: Gemma Findlay  
Trainee Clinical Psychologist  
Email: g.findlay.1@research.gla.ac.uk  
Institute of Health and Wellbeing  
Administration Building (1<sup>st</sup> floor)  
Gartnavel Royal Hospital  
1055 Great Western Road  
Glasgow, G12 0XH

Research Supervisors: Professor Tom McMillan and Dr Sarah Wilson

### Relationships between homelessness and head injury: A qualitative study PARTICIPANT CONSENT FORM

Please  
initial the  
BOX

I confirm that I have read and understand the information sheet dated 15/07/2015 (version 3) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason, without my medical care or legal rights being affected.

I understand that the interview I participate in will be audio recorded and that anonymised quotes may be included in the research paper.

I understand that I will be asked to answer some additional questions following the interview. These will relate to my history of homelessness and general wellbeing.

I understand that if I disclose anything that causes concern for the researcher (in terms of my safety or the safety of others) during the course of the interview then there is a duty of care to report such a disclosure to the appropriate agencies.

I agree to take part in the above study

\_\_\_\_\_  
Name of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name of Researcher

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

1 copy to the participant, 1 original for the researcher

Version 5

07/09/2015

## Appendix 2.6 Interview Schedule



### **Relationships between homelessness and head injury: A qualitative study**

#### **Interview Schedule**

#### **General introduction**

The aim of the research is to learn more about what leads individuals to become homeless and what makes it difficult to get out of this situation.

We want to hear your story.

Our interview today will be recorded to allow me to listen to it later and identify key points that you have made. I may take some quotes from your interview to include in the research paper; however any information used will be anonymised so that anything you say cannot be identified as coming from you.

#### **Introduction to interview**

I am interested in hearing your story. Why don't you start by telling me a bit about your current circumstances? How did you become homeless? Do you think that there were particular events that influenced this?

#### **Specific prompts**

What impact has being homeless had on your life?

What do you feel is keeping you in this situation? (What is maintaining it?)

#### **If head injury is not covered, discuss this at the end.**

I am aware that you have had a head injury – can you tell me a bit more about this?

How many head injuries have you had where you have been knocked out? When did the first one occur? (if they have had several ask if they have had a particularly bad head injury and use this as the reference point) Do you have still have difficulties caused by the head injury?

Do you think that the head injury has had any major effect on your life?

Has the head injury had any impact on your homelessness; either causing it or keeping you homeless?

**Closing question:**

That's everything that I wanted to ask you about. Have you any final thoughts about what we have been discussing?

## Appendix 2.7: Major Research Project Proposal

### Title:

Relationships between head injury and homelessness: a qualitative study

### Abstract

#### **Background**

An increasing evidence base suggests that there are higher levels of cognitive impairment among homeless people than in the general population, with studies reporting prevalence rates of around 80% (Gonzalez et al, 2001; Gilchrist & Morrison, 2005). Head injury has been suggested as one possible cause of this phenomenon (Hwang et al, 2008). One study reported that over a 30 year period, the incidence of hospitalised head injury was 5.4 times higher in the homeless than in the general population (McMillan et al 2015). This research has caused questions to be raised regarding the relationship between head injury and homelessness. Studies have found that between 70 – 90% of their sample experienced their first head injury before becoming homeless (Hwang et al, 2008; Oddy et al, 2012). These findings support the argument that sustaining a head injury may be a risk factor for becoming homeless.

#### **Aims**

The aim of this study is to explore the perceptions of homeless adults who have sustained a head injury and their views regarding the relevance of this head injury to their current 'homeless' status.

#### **Method**

Participants will be adults who are deemed to be 'homeless' and have sustained a moderate to severe head injury. An Interpretative Phenomenological Analysis (IPA)

approach will be implemented with participants taking part in semi-structured interviews to explore how they perceive the relationship between being head injured and becoming homeless.

### **Applications**

If the cognitive sequelae of head injury is leading to homelessness then there is a need for services to re-evaluate the support that is being offered to this vulnerable group.

## **Introduction**

### **The potential problem of head injury and homelessness**

An increasing evidence base suggests that there are higher levels of cognitive impairment among homeless people than in the general population, with studies reporting prevalence rates of around 80% (Gonzalez et al, 2001; Gilchrist & Morrison, 2005). Moderate to severe head injury (an injury which results in unconsciousness lasting at least 30 minutes) has been suggested as one possible cause of this phenomenon (Hwang et al, 2008). One study reported that over a 30 year period, the incidence of hospitalised head injury was 5.4 times higher in the homeless than in the general population (McMillan et al 2015). This research has caused questions to be raised regarding the possible relevance of sustaining a head injury in the journey to becoming homeless. It is thought that the cognitive sequelae of head injury could make it difficult to sustain a tenancy and/ or perpetuate the situation once it has occurred. If this is the case, then work need to be done to provide appropriate support to this vulnerable client group.

## **Homelessness**

It is well recognised that homelessness is a prevalent problem. However, it is notoriously difficult to estimate the true extent of the problem. The national charity 'Homeless Link' categorise homeless people into three groups: rough sleepers; statutory homeless and hidden homeless, each of which is measured by a different technique and complicated by the transient nature of this lifestyle. The term 'statutory homeless' is applied by local authorities. This means that a person is: (i) eligible for public funds; (ii) has some sort of connection to the area covered by the local authority; (iii) can prove that they are 'unintentionally homeless' and (iv) can prove that they are in 'priority need' of housing. Only people who meet these criteria are entitled to local authority housing. The varying estimations of homelessness within the literature should be interpreted with caution due to the array of different definitions of homelessness imposed. Hwang et al (2008, p.780) define homelessness as 'living within the last 7 days at a shelter, public place, vehicle, abandoned building or someone else's house, and not having a home of one's own', whereas Fichter et al (1996) only included subjects who were literally 'roofless' in their calculations.

### **Incidence of head injury in the homeless population**

Moderate to severe head injury has been suggested as one possible cause of the high rates of cognitive impairment seen in the homeless population (Hwang et al, 2008). Oddy et al (2012) conducted a study in Leeds, comparing the proportion of homeless people who had sustained a head injury to a control group. They found that 48% of the homeless participants self-reported head injury in comparison to 21% of the control group. McMillan et al (2015) investigated the prevalence of

hospitalised head injuries in a population of homeless people within Glasgow and compared them to those within the general population. Over a 30 year period, it was found that the prevalence of admission to hospital with a head injury was 5.4 times higher in the homeless than in the Glasgow population. Hwang et al (2008) surveyed 904 individuals at shelters and meal programs in 2004-2005 and found a lifetime prevalence of 53% for any traumatic head injury and 12% for moderate or severe traumatic head injury. However, these studies have a number of limitations. Firstly, both Oddy et al (2012) and Hwang et al (2008) rely on the self-report of participants regarding the history of head injury. In addition, there were variations in the manner by which participants were asked about head injury. Hwang et al (2008) enquired about 'an injury to the head which knocked you out or at least left you dazed, confused or disorientated', possibly leading to more affirmative responses. However, they did not then ask for further details of the injury to ensure that the initial indication was correct.

#### **The relationship between head injury and homelessness**

The research described above indicates that there may be a high prevalence rate of head injury in the homeless population. It therefore seems imperative to consider the relevance of head injury to becoming or remaining homeless. Oddy et al (2012) highlighted two possibilities, namely that (i). Sustaining a head injury may be a risk factor for becoming homeless or (ii), being homeless may be a risk factor for sustaining a head injury.

Common neuropsychological sequelae of head injury include: difficulties with planning, organisation, concentrating and memory, all of which are required to gain or maintain employment and secure housing. It is therefore plausible to consider that

sustaining a head injury could contribute to an individual becoming homeless. It has however, been well documented that this population experience high rates of injury of all types and are frequently victims of assault (Kushel et al, 2003). Therefore, it could be the case that being homeless in itself, may increase the risk of sustaining a head injury.

A small number of studies have been conducted in order to investigate the relationship between homelessness and head injury. Hwang et al (2008) surveyed 904 homeless individuals in Toronto and found that 70% of their sample sustained their first traumatic brain injury before the onset of homelessness. Oddy et al (2012) found that 90% of their sample who had sustained a traumatic brain injury indicated that this had occurred before they were homeless. These findings support the argument that sustaining a brain injury may be a risk factor for becoming homeless.

#### **Cognitive impairment in the homeless population**

An increasing evidence base suggests that there are higher levels of cognitive impairment among homeless people than in the general population. Gonzalez et al (2001) assessed the neuropsychological functioning of 60 'higher functioning' homeless individuals and found that 80% of their sample displayed signs of cognitive impairment. Solliday et al (2004) assessed 90 homeless men and again detected cognitive impairment in 80% of their sample. Gilchrist and Morrison (2005) assessed 266 homeless individuals and found an even higher prevalence rate, with 82% of their sample displaying cognitive impairment. Spence et al (2004) queried whether the presence of cognitive impairment (i.e. memory, attention and executive functioning difficulties) could partially explain why homeless people may find it difficult to find or retain permanent accommodation.

## **Aims**

There is limited research regarding the links between head injury and homelessness. Previous studies have highlighted that head injury is common within the homeless population and that the majority of initial head injuries occur before individuals become homeless (Hwang et al 2008). However, all of the research to date has been quantitative in nature and consequently, limited by a lack of detailed information about the population in question. Therefore, this study aims to explore the perceptions of head-injured adults who are deemed to be 'homeless' and their views regarding any potential links between these two life events.

### **Plan of investigation**

#### **Participants**

Participants will be recruited from homeless supported accommodations (The Village Project, East Kilbride, Eva Burrows Centre, Cambuslang and The Glasgow Simon Community). The demographics form will supplement the information collected from the interview, providing a deeper understanding of the participant group.

#### **Inclusion and Exclusion Criteria**

1. Participants will be aged between 18 and 65
2. Participants are required to meet the following definition of homelessness: 'Living within the last 7 days at a shelter, public place, vehicle, abandoned building or someone else's house, and not having a home of one's own'. This definition was also utilised by Oddy et al (2012) (p1060) and Hwang et al

(2008) (p780).

3. Participants must have sustained a moderate/ severe head injury defined as: 'a head injury that resulted in unconsciousness for more than 30 minutes'. Again, this definition was also utilised by Oddy et al (2012) (p1062) and Hwang et al (2008) (p781).
4. Participants will be excluded if they cannot communicate proficiently in the English language (due to limited funds) and if they cannot provide informed consent.

#### **Recruitment Procedures**

The researcher will contact various services who support homeless people. The aims of the study and interview process will be explained to senior staff members. They will provide potential participants with the information sheet. If interest is then expressed in taking part, staff members will utilise the information sheet for service managers to ask some initial questions regarding the individuals history of head injury. This will allow the researcher to determine if they meet the inclusion criteria. The staff member will seek consent to pass the individuals details onto the principal researcher. Participants who meet the inclusion criteria will then be contacted by the researcher and an appointment will be made to conduct the interview. Before the interview takes place, participants will be invited to ask any further questions and provide written informed consent. Recruitment will continue until the required number of participants have been interviewed.

During the appointment, consent will be sought to access the person's medical records in order to confirm the presence of a moderate/ severe head injury. Hwang

et al (2008) highlights that most of the research in this field to date is limited by relying on the participants self-report.

This client group have been identified as potentially difficult to engage. Therefore, a £10 supermarket voucher will be offered as an incentive for taking part in the study.

### **Interview**

A semi-structured interview lasting approximately 45 minutes will be conducted with each participant and will be recorded using a digital voice recorder. An interview schedule (developed through discussion between the principal researcher and research supervisor) will be utilised to structure the interviews. Braun and Clarke (2013) (p. 78) identify that participants should be given the opportunity to discuss issues that are important to them and that the researcher has not anticipated. Therefore, the interview will be flexible.

One potential issue is that the study aims to explore the impact of head injury on homelessness and only people who have had a head injury are being recruited and this is explicit on the information sheet. Therefore, there is the possibility of leading participants to over-emphasise the importance of head injury on their homelessness. This issue has been explicitly addressed through the construction of the interview schedule, in that the interview will not initially focus on the head injury and only explicitly address this if the participant does not mention it during the more open initial discussion.

### **Design**

The study will utilise a retrospective qualitative design through the completion of in-depth interviews.

### **Data Analysis**

Interpretative Phenomenological Analysis (IPA) will be used to analyse the narratives obtained. The main aim of IPA is to explore people's lived experiences and the meanings people attach to these experiences (Braun & Clarke, 2013, p.181). As this study is addressing a number of experience-type questions, IPA is considered to be an appropriate method of analysis.

The analysis will follow a six step process outlined by Smith et al (2009) of: immersing oneself in the data and noting any recollections of the interview experience and initial striking observations of the transcript; examining the content and language of the transcript and developing a conceptual understanding of the data; developing emergent themes in the data and considering how these themes are connected. The process is then repeated with subsequent transcripts, allowing new themes to emerge. The final stage focusses on identifying themes across cases.

Following analysis, a second experienced researcher will check some of the scripts to ensure that appropriate themes have been identified.

### **Justification of sample size**

Qualitative research tends to utilise smaller samples than quantitative research

(Braun and Clarke, 2013, p.55). Smith et al (2009) indicate an awareness of the many demands on the time of those working for a practitioner doctorate. They go on to state that between four and ten interviews are adopted for such projects (Smith, Flowers and Larkin, 2009, p.52). These numbers are considered reasonable and likely to produce valuable information. Therefore, it is anticipated that between six and ten participants will be recruited to this study, dependant on respondent rates.

#### **Settings and Equipment**

The principal researcher will meet individually with participants and conduct interviews in private rooms within the buildings of the services from which they have been recruited. The interview will be recorded using a digital voice recorder. Interview scripts will then be transcribed verbatim by the principal researcher. At this point, any identifiable information will be removed from the transcription.

#### **Project considerations**

##### **Health and safety issues:**

##### **Researcher Safety Issues**

This project may involve going into settings out with the NHS. Managers will be informed that the interviews are taking place. In addition, the researcher will check-in with administrative staff immediately before and after the interview, ensuring that someone within the building is aware of her whereabouts. The researcher will be made aware of any risk assessment paperwork which is in place for the participants. Interviews will be conducted during normal working hours and comply with standard safety procedures.

### **Participant Safety Issues**

Written consent will be sought before the interview and the opportunity to opt out at any point will be made clear. In the event of a participant becoming distressed during the interview, the researcher will assist in managing this distress. However, if the distress persists the researcher will offer to contact the participants GP and inform their key worker within the supported accommodation. If it is felt that the participant is at risk of harm to themselves or others, the appropriate agencies will be contacted. Participants will be informed of this limit to confidentiality during the consenting process.

### **Ethical issues**

Potential participants will only be contacted by the researcher when they have shown interest in taking part and consented to their contact details being passed on. Information regarding the aims of the research and what will be involved will be provided before informed consent is sought. Participants will be informed that they can withdraw from the research (with no repercussions) at any point.

In addition, audio recordings will be stored on an encrypted laptop.

Ethical approval will be sought through the Integrated Research Application System (IRAS). R & D management approval will also be sought for each site.

### **Financial issues**

Equipment required will include a digital voice recorder and transcribing kit (provided by Mental Health and Wellbeing, University of Glasgow). Photocopying costs will also be incurred. The principal researcher will also require travel expenses to and

from appointments. In addition, funds will be required to provide an incentive (between £60 and £100 dependant on respondent rates).

#### **Timetable**

Dec 2014: Two page proposal to Research Supervisor

Jan 2015: Preliminary proposal to Research Supervisor

March 2015: Research proposal to University

July 2015: Ethics submission

September 2015: Recruitment and data collection

September 2015: Systematic Review outline

September 2015: Research agreement/ research logbook initiation

May 2016: Data analyses and write up

July 2016: Submit research to University

August 2016: Draft paper for publication

September 2016: Viva

#### **Practical applications**

If the cognitive sequelae of head injury is leading to and/ or contributing to the persistence of homelessness then there is a need for services to re-evaluate the support that is being offered to this vulnerable group.

## References

Braun, V., & Clarke, C. (2013). *Successful Qualitative Research: a practical guide for beginners*. SAGE Publications Ltd: London.

Fichter, M.M., Koniarczyk, M., Greifenhagen, A., Koegel, P., Quadflieg, N., Wittchen, H.U., & Wolz, J. (1996). Mental illness in a representative sample of homeless men in Munich, Germany. *The European Archives of Psychiatry and Clinical Neuroscience*, 246 (4), 185-196.

Gilchrist, G., & Morrison, D. (2005). Prevalence of alcohol related brain damage among homeless hostel dwellers in Glasgow. *The European Journal of Public Health*, 15, 587-588.

Gonzalez, E.A., Dieter, J.N., Natalie, R.A., & Tanner, S.L. (2001). Neuropsychological evaluation of higher-functioning homeless persons: A comparison of an abbreviated test battery to the Mini-Mental State Exam. *Journal of Nervous and Mental Disease*, 189, 176-181.

Homeless Link. Available online at: <http://www.homeless.org.uk/facts>, accessed 12<sup>th</sup> January 2015.

Hwang, S.W., Colantonio, A., Chiu, S., Tolomiczenko, G., Kiss, A., Cowan, L., Redelmeier, D.A., & Levinson, W. (2008). The effect of traumatic brain injury on the health of homeless people. *Canadian Medical Association Journal*, 179, 779-78

Kushel, M.B., Evans, J.L., Perry, S., Robertson, M.J., & Moss, A.R. (2003). No door to lock: victimization among homeless and marginally housed persons. *Archives of International Medicine*, 163, 2492-2499.

McMillan, T.M., Laurie, M., Oddy, M., Menzies, M., Stewart, E., & Wainman-Lefley, J. (2015). Head Injury and Mortality in the Homeless. *Journal of Neurotrauma*, 32 (2), 116-119.

Oddy, M., Moir, J.F., Fortescue, D., & Chadwick, S. (2012). The prevalence of traumatic brain injury in the homeless community in a UK city. *Brain Injury*, 26 (9), 1058-1064.

Smith, J., Flowers, P. & Larkin, M. (2009). *Interpretative Phenomenological Analysis: theory, method and research*. Sage Publications: London.

Solliday-McRoy, C., Campbell, T.C., Melchert, T.P., Young, T.J., & Cisler, R.A. (2004). Neuropsychological functioning of homeless men. *Journal of Nervous and Mental Disease*, 192, 471-478.

## Appendix 2.8: Ohio State University TBI Identification Method (OSU TBI-ID)

Name: \_\_\_\_\_ Current Age: \_\_\_\_\_ Interviewer Initials: \_\_\_\_\_ Date: \_\_\_\_\_

### Ohio State University TBI Identification Method — Interview Form

#### Step 1

*Ask questions 1-5 below. Record the Cause of each reported injury and any details provided spontaneously in the Chart at the bottom of this page. You do not need to ask further about loss of consciousness or other injury details during this step.*

**I am going to ask you about injuries to your head or neck that you may have had anytime in your life.**

- In your lifetime, have you ever been hospitalized or treated in an emergency room following an injury to your head or neck? Think about any childhood injuries you remember or were told about.  
 No  Yes—Record cause in chart
- In your lifetime, have you ever injured your head or neck in a car accident or from crashing some other moving vehicle like a bicycle, motorcycle or ATV?  
 No  Yes—Record cause in chart
- In your lifetime, have you ever injured your head or neck in a fall or from being hit by something (for example, falling from a bike or horse, rollerblading, falling on ice, being hit by a rock)? Have you ever injured your head or neck playing sports or on the playground?  
 No  Yes—Record cause in chart
- In your lifetime, have you ever injured your head or neck in a fight, from being hit by someone, or from being shaken violently? Have you ever been shot in the head?  
 No  Yes—Record cause in chart
- In your lifetime, have you ever been nearby when an explosion or a blast occurred? If you served in the military, think about any combat- or training-related incidents.  
 No  Yes—Record cause in chart

**Interviewer Instruction:**  
*If the answers to any of the above questions are "yes," go to Step 2. If the answers to all of the above questions are "no," then proceed to Step 3.*

#### Step 2

*Interviewer Instruction: If the answer is "yes" to any of the questions in Step 1 ask the following additional questions about each reported injury and add details to the Chart below.*

Were you knocked out or did you lose consciousness (LOC)?

If yes, how long?

If no, were you dazed or did you have a gap in your memory from the injury?

How old were you?

#### Step 3

*Interviewer Instruction: Ask the following questions to help identify a history that may include multiple mild TBIs and complete the Chart below.*

Have you ever had a period of time in which you experienced multiple, repeated impacts to your head (e.g. history of abuse, contact sports, military duty)?

If yes, what was the typical or usual effect—were you knocked out (Loss of Consciousness - LOC)?

If no, were you dazed or did you have a gap in your memory from the injury?

What was the most severe effect from one of the times you had an impact to the head?

How old were you when these repeated injuries began? Ended?

Step 1 Cause	Step 2 Loss of consciousness (LOC)/knocked out				Dazed/Mem Gap		Age
	No LOC	< 30 min	30 min-24 hrs	> 24 hrs	Yes	No	

**If more injuries with LOC:** How many? \_\_\_\_\_ Longest knocked out? \_\_\_\_\_ How many ≥ 30 mins.? \_\_\_\_\_ Youngest age? \_\_\_\_\_

Step 3 Cause of repeated Injury	Typical Effect		Most Severe Effect			Age		
	Dazed/ memory gap, no LOC	LOC	Dazed/ memory gap, no LOC	LOC < 30 min	LOC 30 min - 24 hrs.	LOC > 24 hrs.	Began	Ended

Adapted with permission from the Ohio State University TBI Identification Method (Corrigan, J.D., Bogner, J.A. (2007). Initial reliability and validity of the OSU TBI Identification Method. J Head Trauma Rehabil, 22(6):318-329. © Reserved 2007, The Ohio Valley Center for Brain Injury Prevention and Rehabilitation



**Appendix 2.9: Sample of analysed transcript**

Emergent themes	Original transcript	Exploratory comments
<p>Let down by services – feeling unsupported</p> <p>Impairment following HI</p>	<p><b>I: So, in terms of the head injury and the homelessness... you've said that you were classed as homeless before the head injury (aye) but you feel like if you had not had the head injury, you would have got housing much quicker (ach aye) but your just not sure what the reason is for that?</b></p> <p>P: No, the truth is .... I think they have just forgot about me. <b>(ok)</b>. I mean, I'm no phoning, no outside. I mean, he's no here so why should we worry about him? Cause he's no up... see see see before my injury, if something like this happened to me, I'd have been there hounding them every f**king day.</p>	<p>Summary of previous interview content</p> <p>Cast aside by services.</p> <p>HI maintaining homelessness? Can't fight his corner resulting in longer homeless period? Change in capabilities/ behaviour following HI Swearing emphasises strong feeling</p>
<p>Impairment following HI</p> <p>Let down by services – feeling unsupported</p>	<p><b>I: You would have been hounding them every day?</b></p> <p>P: Aye, pester, pester, pester, pester until I got somewhere <b>(right)</b> but I can't do that <b>(ok)</b>. Know what I mean? And plus the fact, they know that right? They know I've been in rehabs, here, there and everywhere so they've they've just washed their hands of me.</p>	<p>Acknowledging limitations following HI Feeling that professionals are treating him differently due to HI? Sense of being unsupported/ disregarded.</p>
<p>Let down by services – feeling unsupported</p>	<p><b>I: Ok, that's what it feels like?</b></p> <p>P: Aye, aye they just don't give a f**k. Sorry for swearing but they don't give a f**k.</p>	<p>Frustrated by lack of support/ belief that no one cares</p>

<p>Change in perception of self following HI ('disabled')</p>	<p><b>I: But, you've got this re-scheduled appointment so you're going to go again...</b></p> <p>P: Friday, aye. case work team in ***** but see that place, ***** ***** in ***** , they they seem more sensible, more on the ball, know what I mean? Cause they care for disabled people as well so they might look at my needs more.</p>	<p>Awareness of adaptations required following HI. More comfortable with staff who work with 'disabled' people</p>
<p>Impairment following HI – requiring support</p>	<p><b>I: Ok, so is that a place where ... you have your own flat but there's staff there or how...</b></p> <p>P: No, no no... erm...I have my own house but.. I can... if needed I can get, what do you call it... I can get help, like home help or whatever you call it but it's called ***** ***** . <b>(right ok)</b> So, they can help you out.</p>	<p>Acknowledging desire for own space but aware that he needs additional support.</p>
<p>Impairment following HI – motor/ physical difficulties; requiring support</p>	<p><b>I: Ok so they are not in the same building as you but you can get them in?</b></p> <p>P: Aye, they can come and see me <b>(ok)</b> and see my mate **** - we go out for a cup of tea or whatever. He says '****', see when you, see when you do get a house, when you leave here, they they they will come and check on you' <b>(right)</b>. They will make sure <b>(the staff from here?)</b> Aye, cause cause this is, people stay here but they do outreach work as well <b>(oh ok)</b>, so so when I have my own place they will come and make sure I'm settling in and that I'm showering and all that. Know what I mean?</p> <p><b>I: Ok, that sounds like a good support (aye).</b>  <b>I: Erm.. well I suppose we have talked about loads</b></p>	<p>Desire to stay in touch with current staff team? Sense of belonging in current accommodation?  Possibly feeling apprehensive about moving on?  Reassured by thought that current staff team will remain in contact?</p>

<p>Let down by services: feeling unsupported/ unfair allocation of housing</p>	<p><b>of different things ***** and everything you have said is really helpful. You have answered all my questions (nae bother, nae bother). Is there anything else you want to say about what we have been talking about? Any final thoughts?</b></p> <p>P: No no really, just my final thought is: when the f**k do I get a house? <b>(ok)</b> Ok right, it just seems like it's gone on forever and ever and ever so my thought is: who's giving a f**k? <b>(ok)</b> cause it seems to me that no c**t is giving a f**k about me <b>(ok)</b> and I'm homeless, so I don't want to keep banging on but like I said earlier on if I was a refugee, I'd be housed. So, what's the difference between them and me?</p>	<p>Swearing highlights frustration</p> <p>Extended period of time 'homeless'/ Passage of time</p> <p>Sense of abandonment/ professionals as uncaring</p> <p>Perception of housing system as unfair/ unjust</p>
--	---	--



