

Dementia in the Acute General Hospital

– Prevalence, Practices and Outcomes

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Doctor of Medicine

by

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Declaration

I declare that the work contained in this thesis is entirely my own, except where credit is given in the acknowledgments section. Specifically, I was actively involved in the design, data collection and analysis for each of the four studies described herein.

This work was completed in the Mercer's Institute for Research in Ageing and the Department of Psychiatry for the Elderly of St. James's Hospital, Dublin.

The individual projects were approved by the Joint Research Ethics Committee of St. James's and the Adelaide and Meath Hospitals and/or the local St. James's Hospital Research and Innovation Office.

This thesis has not been submitted as an exercise for a degree to any other university.

I agree that the library of the University of Dublin may lend a copy of this thesis on request.

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Summary

Background

The number of people living with dementia in Ireland is projected to increase exponentially in the coming decades. The international literature suggests, however, that the recognition of dementia is poor, even within health-care settings. It also points to systemic inadequacies in the care that people with dementia receive in acute hospitals. Failure to recognise that a person has dementia precludes access to specialist multi-disciplinary services and support organisations. A person with an unrecognised dementia may be vulnerable to receiving treatment with medications which may be unhelpful or harmful. And although a holistic, palliative care-informed approach to dementia care has been widely endorsed as a means of enhancing the quality of life of people with dementia, the emerging literature in this field indicates that the majority do not enjoy the same quality of end of life care as those with non-dementia diagnoses.

The focus of this research is on how people with dementia are cared for in the Irish acute hospital from initial admission through to discharge and end of life care planning. The aims of this project were designed to be in line with international inpatient-based research on the quality of care available for people with dementia within the acute health-care system.

Methods Used

Research was carried out among the elderly inpatient population of St. James's Hospital, Dublin. Data were collected between 2014 and 2016 under the auspices of the Department of Psychiatry for the Elderly and the Mercer's Institute for Research in Ageing. Interventional studies were carried out with the informed consent of the participants and/or next of kin. Information relevant to the individual studies, exempli gratia (eg.), demographics, details of physical and mental health, social and daily functioning, smoking and alcohol use, were collected contemporaneously. Well-validated cognitive screening tools were applied to assess cognitive function and results were normed for age and level of education. Medical and electronic records were examined for information on clinical course, aspects of management, decision-making, communication, correspondence and follow-up.

Major Findings

1. Dementia and Mild Cognitive Impairment are highly prevalent but under-recognised in the Irish acute hospital

27% of elderly inpatients met the criteria for Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) dementia of whom just 41% were previously

recognised as having a cognitive impairment of any kind. The prevalence of dementia increased with age, affecting 41% of those aged 80 years or over. Among the same group, 21% met the criteria for mild cognitive impairment (MCI) of whom only 10% were previously recognised as having a cognitive disability.

2. People with dementia suffer poorer hospital outcomes than those without dementia

The mean length of hospital stay for people with dementia was 15 days longer than for those with normal cognition, an association that was strengthened on multivariate analysis. Dementia patients were also less likely to be discharged to their own home once their admission had concluded and were more likely to be readmitted to hospital in the 12 months following discharge, although these associations were attenuated in multivariate models. There was no impact for dementia on mortality at 12 months. A diagnosis of MCI did not appear to have an effect on outcomes.

3. The 6 Item Cognitive Impairment Test (6CIT) is a valid cognitive screening tool in this population. It is conveniently-administered and is viewed positively by patients

The 6CIT can accurately detect dementia in this population of patients with a sensitivity of 0.87 and specificity of 0.74 using a cut-point of ≥ 9 . The ability of the 6CIT to detect cognitive impairment of any degree may be less accurate but its high sensitivity of 0.89 using a cut-point of ≥ 6 is useful in that a negative result effectively out rules the presence of cognitive impairment. Though it correlates well with the standardised Mini Mental State Examination (sMMSE), the 6CIT takes half the time to administer. Patients were uniformly positive in their experience of the 6CIT with over 98% of participants reporting that they would be happy to encounter the test again.

4. The management of antipsychotic medications among frail, elderly inpatients falls short of best practice

Antipsychotic medications were prescribed for a small number of elderly inpatients. Over three quarters of new antipsychotic prescriptions were commenced for the management of delirium and BPSD. Prescribed doses were at the lower end of the therapeutic scale. However, there was scant evidence that consideration was given to non-pharmacological interventions before beginning antipsychotic treatment and there was an apparent lack of consultation with the patient or next of kin around the decision to begin treatment. Half of those prescribed an antipsychotic during admission were discharged on the new drug and communication with follow-up healthcare providers was inadequate.

5. The shift to a palliative care-informed model of dementia care has yet to become established practice in Ireland

Among a group of inpatients with dementia, there was little evidence that the core principles of the palliative approach to dementia care were routinely applied.

Communication within the triad of clinician, patient and carer was inadequate and decision-making happened during times of crisis rather than in anticipation of a future need. Additionally, there was an incremental loss of critical clinical information at key transition points on the journey toward nursing home care.

List of Abbreviations

ACE - Addenbrook's Cognitive Examination

AChEI – Acetylcholinesterase Inhibitor

AD – Alzheimer's Disease

ADD - Alzheimer's Disease Dementia

ADL – Activity of Daily Living

AMT - Abbreviated Mental Test

APA – American Psychiatric Association

AUC – Area Under Curve

BPAD – Bipolar Affective Disorder

BPSD – Behavioural and Psychological Symptoms of Dementia

CAM – Confusion Assessment Method

CATIE – Clinical Antipsychotic Trials Intervention Effectiveness

CCI – Charlson Co-morbidity Index

CDT – Clock-Drawing Test

CI – Confidence Interval

CSF – Cerebrospinal Fluid

CSO - Central Statistics Office

CT – Computed Tomography

CUTLASS – Clinical Utility of the Latest Antipsychotic drugs in Schizophrenia Study

CVE – Cerebrovascular Event

DA - Dopamine

DSM - Diagnostic and Statistical Manual of Mental Disorders

DSM-III - Diagnostic and Statistical Manual of Mental Disorders, 3rd edition

DSM-IV – Diagnostic and Statistical Manual of Mental Disorders, 4th edition

DSM-5 – Diagnostic and Statistical Manual of Mental Disorders, 5th edition

ECAD – Enhancing Care in Alzheimer’s Disease

ECG – Electrocardiogram

eg – exempli gratia

EOLC – End Of Life Care

EPR – Electronic Patient Record

EPS - Extra-Pyramidal Side-Effects

FAST – Functional Assessment Staging Tool

FDA – Food and Drug Administration

FTLD – Frontotemporal Lobar Degeneration

GAI-SF – Geriatric Anxiety Inventory, Short Form

GDS – Geriatric Depression Scale

GDS-4 4 item Geriatric Depression Scale

GP – General Practitioner

HIV – Human Immunodeficiency Virus

HL – Hollybrook Lodge

HR – Hazard Ratio

HSE – Health Service Executive

ICD – International Classification of Diseases

ICD-6 - International Classification of Diseases, 6th Revision

ICD-10 – International Classification of Diseases, 10th Revision

ie - id est

LBD – Lewy Body Dementia

MAT – Mental Alteration Test

MCI – Mild Cognitive Impairment

MINI-5 – Mini International Neuropsychiatric Interview, Version 5

MIS – Memory Impairment Screen

MMSE – Mini Mental State Examination

MoCA – Montreal Cognitive Assessment

MRI – Magnetic Resonance Imaging

NFT – Neurofibrillary Tangle

NIA-AA National Institute on Aging - Alzheimer's Association

NICE – National Institute for Health and Care Excellence

NICE-SCIE - National Institute for Health and Care Excellence – Social Care Institute of Excellence

NINDS-ADRDA -National Institute of Neurological and Communicative Diseases and Stroke/Alzheimer's Disease and Related Disorders Association

NMDA-R – N-Methyl-D-Aspartate Receptor

NNH – Number Needed to Harm

NNT – Number Needed to Treat

NOK – Next Of Kin

NPV – Negative Predictive Value

PET – Positron Emission Tomography

PIN – Patient Identity Number

PPV – Positive Predictive Value

PRN – Pro Re Nata

ROC (curve) – Receiver Operating Characteristic (curve)

RR – Relative Risk

SJH – St. James's Hospital

sMMSE – Standardised Mini Mental State Examination

SPC – Specialist Palliative Care

SPECT – Single Photon Emission Computed Tomography

TFTs – Thyroid Function Tests

TILDA – The Irish Longitudinal Study on Ageing

UK – United Kingdom

US – United States

VaD – Vascular dementia

WHO – World Health Organisation

5HT – 5-Hydroxy-Tryptamine

6CIT – 6 Item Cognitive Impairment Test

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CHAPTER ONE

INTRODUCTION

1.1 – Dementia

Definition

Dementia is a progressive and irreversible syndrome of cognitive decline which is sufficient to impact on an individual's functional abilities and more than would be expected as part of the normal ageing process. Reversible causes, such as delirium, and alternative diagnoses, such as depression, must be out-ruled before the diagnosis is made. The diagnosis should be made on the basis of objective information from an informant familiar with the person and supplemented by neuropsychological assessment, when possible.

Though the wording and detail differ, the major disease classification systems agree that these are the minimum criteria required for a diagnosis of dementia. Table 1 presents an abbreviated comparison of the International Statistical Classification of Diseases, 10th Revision (ICD-10), the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) and the National Institute of Neurological and Communicative Diseases and Stroke/Alzheimer's Disease and Related Disorders Association (NINDS-ADRDA) criteria for dementia ¹⁻³.

It is notable that DSM-5 replaced the term 'dementia' with 'Major Neurocognitive Disorder' ². Also, in recognition of the fact that many neurodegenerative conditions begin with impairment of other domains such as language or executive functioning, DSM-5 does not require impairment of memory in order to meet criteria for Major Neurocognitive Disorder.

ICD-10 also specifies that dementia may be categorised as mild, moderate or severe based on the degree of impairment of memory or other cognitive domains ¹:

Mild – a deficit that is severe enough to impact on everyday activities but is still compatible with independent living

Moderate – a degree of impairment that seriously compromises the ability to live independently

Severe – a complete inability to retain new information and only fragments of previously learned information is available

Dementia may also be classified according to age of onset. By convention, symptom onset before the age of 65 years is considered 'Early Onset Dementia'. Dementia in people aged 65 years or older is termed 'Late Onset Dementia'

Table 1. Comparison of the ICD-10, DSM-5 and NINDS-ADRDA criteria for dementia

ICD-10 ¹	1. Evidence of each of the following: • A decline in memory which is most evident in the learning of new information • A decline in other cognitive abilities characterised by deterioration in judgement and thinking 2. Preserved awareness of the environment for a period sufficient to allow the unequivocal demonstration of criterion 1 3. A decline in emotional control or motivation or a change in social behaviour manifest as at least one of: • Emotional lability • Irritability • Apathy • Coarsening of social behaviour 4. Criterion 1 should be present for at least 6 months
DSM-5 ² 'Major Neurocognitive Disorder'	A. Evidence of cognitive decline from previous level of functioning in one or more cognitive domains • Learning and memory • Language • Executive function • Complex attention • Perceptual-Motor • Social Cognition B. The deficits interfere with independence in everyday activities C. The deficits do not occur exclusively in the context of delirium D. The deficits are not better explained by another mental disorder
NINDS-ADRDA ³	Cognitive and behavioural symptoms that: • Interfere with work or usual social activities • Represent a decline from previous levels of functioning • Not explained by delirium or major psychiatric disorder

	• Cognitive impairment is diagnosed through a combination of history-taking from the patient, a knowledgeable informant and an objective cognitive assessment and involves at least two of the following domains: a) Impaired ability to acquire and retain new information b) Impaired reasoning and handling of complex tasks, poor judgement c) Impaired visuo-spatial abilities d) Impaired language functions e) Changes in personality, impaired initiative or motivation
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Historical Notes

The Ancient Egyptians were aware of an age-related decline in mental function as far back as 2,000 BC ⁴. Ancient Chinese texts also reference what we now term dementia ⁵. The earliest such text, 'The Yellow Emperor's Internal Classic', written between 475 BC and AD 220, referred to a loss of memory due to Qi, a flowing energy, moving in the wrong direction within the body ⁶. The Chinese word for dementia is attributed to Hua Tuo, a physician who lived between AD 140-208 ⁷. His prescription for the treatment of dementia consisted of various herbs used in traditional Chinese medicine such as ginseng and poria mixed with 2 litres of water and boiled down to a draught of 200mls.

Ancient Greece had a strong tradition of caring for the elderly and, it is likely, physicians who specialised in geriatric care ⁸. Ancient Greek physicians seemed to view dementia as an inevitability of ageing. Pythagoras's last two stages in the life of man were considered 'Old Age', a period associated with decline of the body and failure of mental abilities ⁹. Galen provided the Ancient Greeks with a term for dementia in the second century BC: *morosis* from the Greek for 'silly' or 'stupid' ⁸.

During the middle ages, Western Europe was dominated by the geopolitical power of Christendom. During this period the mysteries of nature were described in the mystical terms of an almighty Christian god. Mental illness was widely viewed as occurring due to sin, intemperance and an 'imbalance of the humors' ¹⁰.

Although the first use of the word 'dementia' has been traced back to 1381 ¹¹, the term made its first legal appearance in France in 1794 in the case of a woman who feigned insanity to avoid trial ¹². This was the era of Pinel and Esquirol who wrote extensively and precisely on their experience of working with patients with various mental disorders, including dementia ^{13 14}.

However, the concept of a neurodegenerative disease that irreversibly and progressively affected cognitive function was cemented in the late 19th and early 20th centuries. At a 1906 conference in Tübingen, German neuropathologist Alois Alzheimer presented a lecture entitled 'On a Peculiar Severe Disease Process of the Cerebral Cortex' in which he described the clinical presentation of Auguste D. and the findings at post-mortem of senile plaques:

'In the centre of an otherwise almost normal cell there stands out one or several fibrils

due to their characteristic thickness and peculiar impregnability’.

He commented, also, on neurofibrillary tangles (NFTs):

‘Numerous small miliary foci are found in the superior layers. They are determined by the storage of a peculiar material in the cortex’¹⁵.

Emil Kraepelin subsequently named this disease for Alois Alzheimer in his 1910 textbook on Clinical Psychiatry¹⁶. Critics point out that the association between plaques, tangles and dementia had been identified years before Alzheimer presented his famous lecture¹⁷. However, the professional milieu in which he was working, with collaborators that included Franz Nissl and the aforementioned Kraepelin, as well as his elegant clinical and neuropathological writings, have ensured that his name remains indelibly linked with what is now recognised as the most common form of dementia worldwide¹⁸.

The ICD-6, published in 1949, was the first iteration of the classification system to include a section on mental disorders¹⁹. The first version of DSM followed suit shortly thereafter with mention of an ‘Organic Brain Syndrome’ which was chronic and irreversible. DSM-III for the first time introduced the term dementia as:

‘A deterioration of previously acquired intellectual abilities of sufficient severity to interfere with social or occupational functioning’

This description persisted through the various iterations of DSM-III and DSM-IV. However, DSM-5 has instigated substantive change in how neurodegenerative disorders are categorised with dementia now designated ‘Major Neurocognitive Disorder’. This is, seemingly, an attempt to distance the clinical syndrome from the negative connotations associated with the term ‘dementia’, particularly when used in relation to younger patients²⁰.

Aetiology

Dementia is caused by an interplay between genes, lifestyle factors and the environment²¹. A number of underlying pathophysiological processes can lead to the clinical syndrome of dementia. Most dementias are unified by the common findings of abnormal protein accumulation in the brain as well as cerebrovascular dysfunction at some point during the disease trajectory^{18 22}. The various dementias differ in the protein involved as well as the predominant location of the pathological changes in the early stages in particular. The hippocampus is one of the earliest structures to be affected in Alzheimer’s Disease (AD), for example, and short term memory impairment is consequently an early symptom²³. By contrast, Frontotemporal Lobar Degeneration (FTLD) affects the frontal and anterior temporal lobes, presenting as behavioural dysfunction or language impairment, while Lewy Body Dementia (LBD) pathology is

found in the brainstem and/or cortex, affecting movement and perception^{24 25}. The disease processes invariably progress with time to involve broader brain regions and structures. This manifests clinically as impairment of wider cognitive domains. Vascular dementia is the exception in that there is no proteinopathic component to its pathogenesis.

The four most common neurodegenerative causes of dementia are Alzheimer's Disease, Vascular Dementia (VaD), Frontotemporal Lobar Degeneration and Lewy Body Dementia. Dementia of mixed aetiology ('Mixed Dementia') is also a common type in clinical practice, in particular mixed Alzheimer's-Vascular aetiology. Rarer causes include Huntington's Disease, Multiple Sclerosis, and Human Immunodeficiency Virus (HIV).

Epidemiology

Prevalence rates of dementia vary widely between studies. This may be due to population differences, such as population age differences, or methodological differences, such as the application of differing diagnostic criteria.

A 2013 meta-analysis of the global literature on dementia prevalence in those aged 60 years and over, estimated an age-standardised prevalence of between 5 and 7%²⁶. The highest prevalence was found in Latin America (8.5%) and the lowest in Sub-Saharan Africa (2-4%). The authors estimated that in 2010 there were approximately 35.6 million people living with dementia worldwide and projected that this figure would double every two decades, reaching 115.4 million by 2050. This exponential projected increase is thought to be attributable to growth in the numbers of people with dementia in low and middle income countries. Among developed countries, Japan appears to have the lowest prevalence of dementia²⁷.

An earlier study that pooled data from 11 European population-based studies estimated an age-standardised prevalence of 6.4% for dementia amongst those aged 65 years and over²⁸. The prevalence doubled with every 5 years of age and was higher among women.

This increase in prevalence with age is consistent across studies²⁹⁻³¹ and mirrored amongst those with early onset dementia. A systematic review of 11 studies from economically developed countries with data on the prevalence of early onset dementia estimated rates of between 38 and 260 per 100,000 for the 30-64 years age group³². This increased to 420 per 100,000 amongst those aged between 55-64 years.

Prevalence estimates differ by dementia sub-type. Alzheimer's Disease Dementia (ADD) followed by VaD, are consistently the most common forms of dementia in population studies^{27 33 34}. Lobo et alia (et al) estimated European prevalence rates of

4.4% for AD and 1.6% for VaD ²⁸. The age-related increase in prevalence was steepest for AD.

Prevalence rises steeply, also, in particular settings. While prevalence in populations of community-dwelling adults range from approximately 6-10% ²¹, estimates of prevalence in residential care vary between 69% and 90% with evidence to suggest that this wide discrepancy may be due to underdiagnosis ^{30 35-37}. Prevalence of dementia in acute care settings is also notably high. This will be expanded upon further in section 1.3.

Incidence of dementia in Europe was evaluated in 2000 by compiling data from 8 population-based studies ³⁸. In total, there were 42,996 person-years of follow-up with 835 new cases. New diagnoses of AD comprised 60-70% of cases. VaD diagnoses comprised 15-20%. As expected, incidence rates increased dramatically with age and rates among women were higher. An earlier meta-analysis of 23 studies from Europe, the USA and East Asia also demonstrated an age-related increase in incidence of dementia ³⁹. Although there was no overall sex difference seen in this study, older women had a higher incidence of AD while men were more affected by VaD at younger ages.

Although the evidence for an inexorable increase in the prevalence of dementia with time is incontrovertible, there is some emerging evidence that the incidence of dementia may, in fact, be declining in certain areas. Regions in the United Kingdom (UK) and Sweden, for example, have both shown reduced incidence of dementia over time ^{40 41}. The Framingham Heart Study, which has been monitoring for incident dementia since 1975 has demonstrated the same phenomenon ⁴². Relative to incidence in the first wave of the study, carried out in the 1970s and 1980s, incidence in the second, third and fourth waves declined by 22%, 38% and 44% respectively. This decline was seen amongst those who had completed second level education only.

The discrepancy between increasing prevalence and reducing incidence is hypothesised to be due, in part, to advances in healthcare which have increased life expectancy in combination with improved public attention to preventative measures such as vascular risk factor optimisation and cognitive stimulation.

Assessment

History

The diagnosis of a dementia is a clinical one based on an objectively corroborated history of progressive and irreversible cognitive decline that impairs normal functioning. A comprehensive history should note symptoms, clinical features and risk factors that may assist in identifying the probable causative pathology/pathologies.

The degree of functional impairment and individual specific needs will inform the risk assessment and management plan.

General Investigations

National Institute for Health and Care Excellence (NICE) advise a full panel of bloods at initial assessment to include folate, vitamin B12, thyroid function tests (TFTs) and glucose⁴³ to out-rule potentially reversible causes of cognitive decline.

Neuropsychological/Cognitive Assessment

Cognitive screening tests are useful in busy, acute settings, to detect those in need of more in-depth assessment and to track progress over time. Specialist neuropsychological assessment may be necessary in certain circumstances. The neuropsychologist applies well-established tests of graded difficulty with age-related normative data to characterise the cognitive presentation in detail and to assist in determining a diagnosis⁴⁴. Formal psychometric evaluation may be necessary to detect early cognitive changes or impairment amongst those with a high pre-morbid cognitive ability. It can also be useful when early onset impairment is suspected or when atypical features are present.

Radiology

Structural brain imaging with either magnetic resonance imaging (MRI) or computed tomography (CT) is advised in all patients undergoing assessment for dementia to out-rule pathology such as tumours, strokes or subdural haematomas as a cause for the cognitive impairment^{43 45}. Additionally, structural MRI can show evidence of vascular disease or regions of focal atrophy which are predictive of dementia type^{45 46}.

Functional imaging such as Single Photon Emission Computed Tomography (SPECT) and Positron Emission Tomography (PET) improve diagnostic accuracy by evaluating patterns of hypometabolism or hypoperfusion which differ across the various dementia syndromes. However, these specialist radiological investigations are costly and are not generally accessible in many settings.

Management

Pharmacological Strategies

There are, as yet, no disease-modifying agents available for the treatment of dementia. In their absence, treatment is symptomatic.

Acetylcholinesterase inhibitors (AChEI) and Memantine, an N-Methyl-D-aspartic Acid (NMDA) receptor antagonist, are currently the only medications licensed for the

treatment of dementia. AChEIs have modestly beneficial effects on cognition, activities of daily living (ADLs) and behaviour in mild to moderate ADD.

Treatment of behavioural and psychological symptoms of dementia (BPSD) should ideally involve the use of non-pharmacological interventions in the first instance. The treatment of more severe symptoms or syndromes may involve the use of antidepressants, antipsychotics, benzodiazepines or hypnotics. These medications should be prescribed under close specialist supervision. However, many studies have found excessive use of both antipsychotics and benzodiazepines in the management of BPSD in acute settings ⁴⁷⁻⁴⁹.

Dementia in Ireland

There is no population-based study on the prevalence of dementia in Ireland. However, by applying established dementia prevalence rates onto population data obtained from the Central Statistics Office (CSO), Pierce et al determined estimates of the status quo with regard to dementia in Ireland ⁵⁰. See Table 2 for a summary of the major findings.

Table 2. Estimated prevalence of dementia in Ireland

Number of people with dementia in Ireland in 2011	47,849
Percentage of total Irish population with dementia in 2011	1.04%
Number of people aged less than 65 years with dementia in 2011	4,066
Number of people aged between 30-59 years with dementia in 2011	2,866
Number of people aged 90 and over with dementia in 2011	7,635
Number of people with dementia living in the community in 2011	30,000
Number with dementia living in own homes with family nearby in 2011	6,000-10,000
Projected number of people with dementia in 2031	94,000
Projected number of people with dementia in 2041	130,000+

Almost half (45%) of the entire population with dementia were aged between 80 and 89 years. In excess of 4,000 people aged less than 65 were living with dementia. 64% of those affected by dementia in Ireland were female, a preponderance which was particularly notable among the older age categories.

The economic cost of dementia in Ireland was estimated by a 2012 research review to exceed €1.69 billion annually, of which only 9% was contributed by formal health and social care services ⁵¹. Though the majority of people with dementia in Ireland live in the community, it was estimated that 63% of residents of Ireland's long-term care

facilities have dementia, accounting for 43% of the total economic cost of dementia care.

Essential to accessing dementia-specific services is achieving a diagnosis of dementia. This may be particularly difficult in Ireland due to a range of obstacles⁵¹. Irish General Practitioners (GPs) recognise the importance of making a dementia diagnosis but are slow to do so, citing difficulties differentiating between the symptoms of dementia and normal ageing, a lack of clinical confidence and worry about the impact of a diagnosis on the patient^{52 53}. Ireland has substantially fewer memory clinics than seen in other developed countries⁵¹ and there are persisting issues of stigma and negative attitudes towards those with dementia among the public⁵⁴. These difficulties in the detection and diagnosis of dementia at community level in Ireland preclude people living with dementia from accessing specialist services and render them particularly vulnerable upon hospital admission where their needs may also go unrecognised. This will be discussed in further detail in section 1.3.

1.2 Mild Cognitive Impairment

Definition

Mild cognitive impairment (MCI) is defined as a syndrome of subjective and objective cognitive decline which is greater than expected for an individual's age and level of education but is insufficient to impact on their level of independent daily functioning so that consistent help is required^{55 56}. It is considered a transitional stage between the cognitive changes due to normal ageing and early dementia. The concept of MCI arose from recognition of the need to characterise and define the pre-clinical phase of dementia. Adults who are aware of cognitive decline are often fearful of what it may portend and wish in many cases to know what their risk of future progression may be^{57 58}. Disease-modifying agents, when available, may be more effective in the earliest phase of the disease process⁵⁵. And although MCI, by definition, does not meet the threshold required for a diagnosis of dementia, it is, nonetheless, associated with a reduced quality of life, increased neuropsychiatric symptoms, increased disability and increased health care costs⁵⁹⁻⁶².

The terminology used to describe MCI varies, though there is significant overlap in the criteria used to define the syndrome. Table 3 presents the criteria currently in clinical use. However, despite clear clinical criteria being readily available, the distinction between normal ageing and MCI and MCI and dementia can be subtle and subjective⁶³.

MCI may be categorised according to the predominant cognitive domain affected, for example, 'amnesic' versus 'non-amnesic' MCI, or, the number of domains affected, for example 'single-domain' versus 'multi-domain' MCI^{64 65}. Further characterisation is

typically aimed at identifying the probable underlying pathology. For example, the National Institute on Aging-Alzheimer's Association (NIA-AA) criteria include guidance on the use of biomarkers such as cerebrospinal fluid (CSF) amyloid- β -42 and tau levels or amyloid PET imaging to indicate whether the MCI is due to AD⁶⁴.

Epidemiology

The prevalence of MCI is about 4 times greater than for dementia⁶⁶ though rates vary between 10 - 20% depending on the clinical criteria employed and the populations assessed^{65 67-69}.

Assessment

The main goals of assessment in MCI are to distinguish it from the cognitive changes associated with normal ageing or dementia, identify potentially modifiable causes and

Table 3. Criteria in current clinical use to define MCI

Revised Mayo Clinic Criteria for MCI ⁵⁶	• Subjective and objective cognitive decline • ADL independence is preserved • No dementia
DSM-5 Criteria for Mild Neurocognitive Disorder ²	• Evidence of modest cognitive decline from previous performance in one or more cognitive domains • ADL independence is preserved • The deficits do not solely occur in the context of delirium • The deficits are not better explained by another mental disorder • No dementia
NIA-AA Criteria for MCI due to AD ⁶⁴	• Concern about a change in cognition • Objective evidence of impairment in one or more cognitive domains (typically including memory) • ADL independence is preserved • No dementia
ADL=Activity of Daily Living, DSM-5=Diagnostic and Statistical Manual of Mental Disorders, 5th Revision, MCI=Mild Cognitive Impairment, NIA-AA=National Institute of Aging-Alzheimer's Association	

predict the risk of progression to dementia with time^{65 70}. The diagnosis is a clinical one based on subjective and informant history. For the most part, the assessment is similar to that carried out for a suspected dementia with a comprehensive history, general investigations, cognitive testing and, if indicated, the use of biomarkers to identify the primary aetiology and determine prognosis.

Management

There are no medications available currently that have been shown to be effective in MCI. Trials of cholinesterase inhibitor use in MCI have failed to show a reduction in the risk of progression to dementia⁷¹⁻⁷³.

Management of cardiovascular risk factors and co-morbid conditions, such as sleep-disordered breathing, depression or hypothyroidism, is advised^{70 74 75}. However, the evidence for a clear reduction in the risk of progression to dementia as a result of these measures is limited.

Cognitive rehabilitation or 'brain training' programs have shown positive results on objective measures of cognitive performance in MCI^{76 77}. Trials examining the benefits of physical exercise in MCI have shown encouraging results^{78 79}.

Counselling about the diagnosis of MCI is also advised with an emphasis on the uncertainty of prognosis and the wisdom of future planning while still capable of doing so⁷⁴.

MCI in Ireland

There is a paucity of literature pertaining to MCI in Ireland, specifically. Data from the first wave of the Irish Longitudinal Study on Ageing (TILDA), a nationally-representative cross-sectional study of the non-institutionalised population⁸⁰, found a prevalence of 10.1% among its community-dwelling participants aged 50 years and over using the NIA-AA criteria⁸¹.

The very limited data on prevalence, progression, correlates and burden associated with MCI in Ireland are reflected at policy level. There is no mention of MCI in 2014's National Dementia Strategy, for example⁸². Though we are aware from the international literature that MCI is not a benign condition and is, in fact, associated with negative quality of life indicators for both the affected individual and carers,^{59 60}⁸³ MCI remains under-recognised publicly and under-prioritised at higher policy levels in Ireland.

1.3 Dementia in the Acute Hospital Setting

Clinical Relevance

People with dementia have high rates of hospital admission⁸⁴⁻⁸⁷. In the UK, it is estimated that people with dementia are 10 times more likely to be in hospital at any given time than over-65s without dementia⁸⁸. In the United States (US), people with cognitive impairment have three times as many hospital stays as those who do not⁸⁶⁸⁹. Dementia, itself, is rarely the primary cause of an acute hospital admission: falls, infections and cardiovascular events are among the most common admission complaints⁹⁰⁻⁹². In 2015, the first prospective study to investigate predictors of hospitalisation for people with dementia showed that the presence and severity of neuropsychiatric symptoms independently predicted the risk of future admission⁹³.

An acute hospital admission represents a significant event in the life of a person with dementia. Their high level of functional dependency and behavioural and psychological needs render them more vulnerable to complications and adverse outcomes than their counterparts without dementia^{88 91 94-104}. Hospitalised patients with dementia are at increased risk of a multitude of complications with falls, delirium and overwhelming functional decline of particular concern in terms of outcomes^{95 97}
104-106.

Unsurprisingly, the cost of hospitalisation is substantially higher for people with dementia than for those without^{87 100 107}. Australian figures estimate the difference to be in excess of A\$2,700 per inpatient episode¹⁰⁸. A nationally-representative sample of US Medicare beneficiaries showed that dementia patients cost 3.3 times more than people without dementia with the cost of hospitalisation for a person with dementia coming to more than US\$3,700 annually⁸⁶. Bail et al demonstrated that complications among dementia inpatients were more than twice as costly as complications among patients without dementia¹⁰⁰. A review of activity specific to dementia over the 3 year period from 2010-2012 in an Irish university hospital estimated an average cost of care of €13,832 per dementia patient¹⁰⁹. This was almost 3 times the cost of a patient without dementia. Dementia care accounted for 5% of the total hospital casemix budget during this period.

There is a view that acute hospitals, which are organisationally oriented toward providing efficient, cure-oriented care, are not set up to meet the specific needs of people with dementia¹¹⁰. Hospital staff feel ill-equipped to assess and manage their needs and carers report dissatisfaction with services¹¹¹⁻¹¹³. A survey of 163 hospitals in New South Wales revealed that access to dementia expertise was largely available only in major urban centres. The majority of hospitals in New South Wales had a limited capacity to assess and manage dementia appropriately¹¹⁴. Less than two thirds of hospitals had a policy on care in dementia or delirium. The Irish National Audit of Dementia Care in Acute Hospitals highlighted inadequacies in the Irish setting^{115 116}. Only 4 of the 35 participating hospitals had a dementia care pathway in place or in

development. There was a systemic lack of guidance or education on how to care for people with dementia. Data collection systems, access to advocacy and social work resources and integration with community services were all noted as particularly lacking.

Although there is general agreement that hospitalisation should be avoided for people with dementia as far as practicable, the level of frailty and medical complexity of these patients means that acute illness requiring inpatient management at some point during the disease trajectory is an inevitability^{85 117}. A hospital admission could be an ideal opportunity for multidisciplinary assessment, therapeutic intervention, guidance toward support services and future planning. In recognition of this and the current systemic failings in care, many countries, including Ireland, the UK, Australia and Norway, have identified the provision of high quality acute hospital care for people with dementia as a key objective in their national dementia strategies^{82 118-121}.

Prevalence

Studies that investigate the prevalence of dementia in the acute hospital setting demonstrate widely varying results. See Table 4 for a summary of these papers and their salient findings. The studies are highly heterogenous. They differ in their populations, settings, methodology, assessments, criteria and outcomes. Prevalence ranges from 2.8% in an acute hospital in Nigeria to 63% in a specialist geriatric unit in the US. Studies that obtained diagnoses from medical notes, informants or electronic records^{91 94 122} show lower prevalence rates than studies wherein participants were actively assessed by trained experts^{97 101 102 123-126}.

Many of the studies assessed for delirium but they differed in how it was managed within the study protocol. For example, delirious patients were explicitly excluded by Sampson et al to minimise the risk of erroneously misclassifying a delirious patient as having a dementia^{99 125 127}. By contrast, the presence of delirium was not an exclusion criterion in other studies on the basis that many elderly patients with delirium have a pre-morbid underlying cognitive impairment^{103 126 128 129}. In these studies careful attention was paid to pre-morbid functioning with careful collateral history or the use of specific tools to reduce the risk of misclassifying a participant. Nine studies failed to screen for delirium^{94 98 123 130-135}. These studies may have over-estimated the prevalence of dementia in their samples. However, in their 2011 systematic review of the studies available at that time, Mukadam et al found no evidence that screening for delirium produced lower prevalence rates for dementia¹⁰⁶.

Given the degree of heterogeneity between the studies, it is hard to draw firm conclusions. Broadly speaking, dementia is prevalent among elderly patients in the acute settings and prevalence is higher among older populations in geriatric or acute medical units.

Detection

Ten studies compared rates of dementia following formal assessment with rates of previously-recognised dementia^{98 99 101-103 125-127 129 131 132 134}. See Table 4. Within the limitations of the heterogeneity between the studies, as outlined previously, the findings are stark. With the exception of Uwakwe et al's study where dementia was recognised by hospital physicians in three of three patients with 'obvious features of cognitive deficits', dementia is strikingly under-recognised within the acute medical setting, even within specialist geriatric units.

This is likely a multi-factorial problem. A number of obstacles were highlighted in 2005 by clinicians drawn from varying medical disciplines in eight European countries¹³⁶. Concerns about stigma around ageing and dementia and a sense that there was little to offer in terms of treatment emerged as major barriers to early diagnosis. Clinician under-confidence and worry about how the diagnosis may impact on the patient are other concerns^{52 53}. Others may fear that a diagnosis will result in increased clinical responsibility or complicate the process of hospital discharge and appropriate placement¹³⁷. Iliffe and Manthorpe discuss concerns about medication side-effects, the impact on families and the effect of increased demand on already strained public health and voluntary services¹³⁸.

Nonetheless, timely diagnosis of dementia is a recurring objective of national policies and best practice recommendations^{51 118 119 121 139 140}. Advantages of early diagnosis include early access to medical treatment and psychosocial support services and time to plan for the future. The busy acute hospital is a challenging environment for any new patient to negotiate. For a person with impaired cognition, these challenges are multiplied. A diagnosis of dementia flags to staff that a patient may have specific needs, may require support with communication and assistance with decision-making, may be more sensitive to the adverse effects of common medications or more vulnerable to poor outcomes. There is some evidence that patients with a mild to moderate degree of impairment may be more vulnerable in the hospital environment than those with a severe impairment⁹⁵. This is probably because they are ambulatory and appear, superficially, to be functioning, whereas those with severe symptoms are more obviously in need of additional support. A clear diagnosis of dementia should increase the likelihood that they will be routed toward services with specific expertise in supporting people with cognitive impairment. In general, patients seem to welcome diagnosis, even those with more severe symptoms^{57 141}.

The ideal setting to make a diagnosis of dementia remains controversial, however. In particular, it has been argued that the acute hospital is neither fit for the purpose of making a dementia diagnosis nor operationally oriented toward providing the type of long-term, multi-modal, community-based care that dementia, as a chronic illness, requires. A recent review of Australian models of care noted that GPs were found to

be the patients' preferred professional when working toward a diagnosis of dementia but under-confidence in symptom identification and cognitive screening led to under-diagnosis¹⁴². Memory clinics were felt to be most effective for diagnosing dementia, with the added benefits of services such as pre- and post-diagnosis counselling and multi-disciplinary expertise but they were disadvantaged by long waiting lists and organisational complexities. The authors noted the time constraints and medical factors that hinder effective dementia diagnoses in acute hospitals. Dementia diagnoses in these settings were considered 'opportunistic'. Certainly, there are numerous drawbacks to making a dementia diagnosis in the acute setting but at a minimum, vigilance among acute clinicians for those who may benefit from outpatient or community follow-up assessments would be a positive step forward. Routine cognitive screening for certain patient groups within the acute hospital has the added benefit of helping to identify delirium and cognitive impairment due to causes other than dementia. This will be discussed in further detail in section 1.4.

Outcomes

More recent studies have compared hospital admission outcomes between those with dementia and those with normal cognition. The outcomes chosen differ across the studies. Nonetheless, people with dementia do consistently worse than people without dementia following an acute hospital admission. They are more likely to have a longer hospital stay, more likely to be readmitted following discharge and more likely to require institutional care. See Table 4. People with dementia require more nursing care and are more vulnerable to adverse events^{88 106}. These are some of the factors that contribute to substantially increased costs of stay.

Dementia has been associated with higher interval mortality rates though this is not a consistent finding. Sampson et al showed that close to half of their cohort of dementia patients were deceased within twelve months of admission while those without dementia had a mean survival time that was twice as long⁹⁹. The finding remained significant after adjustment but the strength of the association was reduced by a quantitative score of physical frailty. By contrast, Zekry et al found no association between dementia and mortality at either one or five years post discharge in multivariate models¹⁰¹. Differences in participating populations, such as the mean age, the degree of physical frailty and the location of care (eg. general ward versus geriatric unit) as well as the range of potential confounders included in survival models likely account for some of these discrepancies.

There is very limited robust data pertaining to outcomes of hospitalised dementia patients in Ireland.

Table 4. Studies investigating the prevalence of dementia in the acute hospital setting

Study	Design	Setting	Age	Assessments/ Criteria	Prevalence	Detection	Outcomes
Erkinjuntti, Wikstrom et al. 1986 ¹³⁰	Prospective Cohort	Medical admissions in single hospital Finland	≥55	SPMSQ, DSM-III Delirium Assessed: No	9.1%	Not available	Increased LOS
Erikinjuntti, Autio et al. 1988 ¹²³	Prospective Cohort	Medical admissions in single hospital Finland	≥65	SPMSQ, DSM- III, Royal College of Physicians Criteria (1981) Delirium Assessed: No	40%	Not available	Increased LOS
Torian, Davidson et al. 1992 ¹³¹	Prospective Cohort	Geriatric unit in single hospital USA	≥60	DSM-III-R Delirium Assessed: No	63%	31%	Increased LOS Increased cost
Kolbeinsson and Jonsson 1993 ¹⁴³	Prospective Cohort	Medical admissions in single hospital Iceland	≥70	MSQ, MMSE, DSM-III-R Delirium Assessed: DSM- III-R	18%	Not available	Not available
Bowler, Boyle et al. 1994 ¹²⁷	Cross-sectional	Geriatric wards in single hospital	≥65	MMSE, CAMCOG, ICD- 10	26.8%	54%	Not available

		UK		Delirium Assessed: SCAN			
Lazaro, Marcos et al. 1995 ¹²⁴	Cross-sectional	Medical and surgical wards in single hospital Spain	≥70	CAMDEX, MMSE, DSM- IIIR Delirium Assessed: CAMDEX	35.2%	Not available	Not available
Harwood, Hope et al. 1997 ¹³²	Cross-sectional	Acute medical unit in single hospital UK	≥65	AMTS, DSM-IIIR Delirium Assessed: No	12.9%	85%	Not available
Rockwood, Cosway et al. 1999 ¹³³	Prospective Cohort	Medical admissions in single hospital Canada	≥65	IQCODE, MMSE, CSHA Delirium Assessed: No	18.7%	Not available	Reduced survival time
Uwakwe 2000 ¹³⁴	Cross-sectional	Medical, surgical, gynaecological wards in single hospital Nigeria	≥60	SRQ-24, GMS, MMSE, ICD-10 Delirium Assessed: No	2.8%	100%	Not available
Wancata, Windhaber et al. 2003 ¹⁴⁴	Prospective cohort	Medical wards, single hospital Austria	≥60	CIS, DSM-III-R, Global Severity Scale Delirium Assessed: CIS	27.4%	Not available	Increased LOS Increased institutionalisation
Joray,	Prospective	Medical	≥75	MMSE	32%	37%	Increased

Wietlisbach et al. 2004 ⁹⁸	cohort	inpatients Switzerland		Delirium Assessed: No			institutionalisation
Laurila, Pitkala et al. 2004 ¹²⁹	Cross-sectional	Two geriatric hospitals Finland	≥70	MMSE, Digit span, parts of WAIS, DSM-IV Delirium Assessed: DSM-IV	40.2%	53.4%	Not available
Margiotta, Bianchetti et al. 2006 ¹³⁵	Cross-sectional	Acute Medical Unit in single hospital Italy	≥65	MMSE, DSM-IV Delirium Assessed: No	26.1%	Not available	Increased vulnerability to delirium at lower level of medical acuity
Zekry, Herrmann et al. 2009 ¹⁰¹ , Zekry, Herrmann et al. 2011 ¹⁰²	Prospective cohort	Acute Geriatric Unit Switzerland	≥75	MMSE, Short Cognitive Evaluation, DSM-IVTR Delirium Assessed: Short GDS	43.3%	42%	Increased institutionalisation No effect on mortality
Sampson, Blanchard et al. 2009 ¹²⁵ , Sampson, Leruent et al. 2013 ⁹⁹	Prospective cohort	Medical admissions to single General Hospital UK	≥70	MMSE, DSM-IV Delirium Assessed: CAM	42.4%	49%	Increased mortality at 12 months
Marengoni, Corrao et al. 2011 ¹²²	Prospective cohort	General medicine and geriatric admissions	≥65	DSM-IV Delirium Assessed: No	9.6%	Not available	Increased in-hospital death Increased rate of adverse events

		Italy					
Mukadam and Sampson 2011 ¹⁰⁶	Systematic Review	Not applicable (n/a)	n/a	n/a	12.9-63% in studies with robust methodology	Not available	Increased LOS Increased risk functional decline
Draper, Karmel et al. 2011 ⁹¹	Retrospective review	Admissions to all NSW hospitals Australia	≥50	ICD-10-AM Delirium Assessed: Yes (ICD-10-AM database code)	0.9% aged 50-54 25% aged ≥85s	Not available	Increased LOS Increased readmissions Increased institutionalisation Increased mortality
Travers, Byrne et al. 2013 ¹²⁸	Prospective observational	Medical, surgical, orthopaedic wards in 4 hospitals Australia	≥70	MMSE, IQCODE, DSM-IV Delirium Assessed: CAM	20.7%	Not available	Not available
Li, Wang et al. 2013 ⁹⁴	Retrospective Case Control	General Hospital China	≥60	MMSE, DSM-IV-TR Delirium Assessed: No	2.6%	Not available	Increased LOS Increased severity of illness Increased mortality
Timmons, Manning et al. 2015 ¹²⁶	Prospective Cohort	All admissions to 6 regional hospitals Ireland	≥70	sMMSE, IQCODE, CDR, DSM-IV Delirium Assessed: CAM and DRS-R98	25%	35.6%	Not available
Briggs, Dyer	Prospective	All admissions	≥70	sMMSE, AD8	38.4%	36%	Increased

et al. 2017 ¹⁰³	Observational	to single hospital Ireland		Delirium Assessed: CAM			readmission <u>or</u> mortality in 12 months
Reynish, Hapca et al. 2017 ⁹⁷	Prospective Cohort	Acute Medical Unit Scotland	≥65	AMT, prior documentation, self or informant report Delirium Assessed: CAM	17.3% and 4.5% unspecified cognitive impairment	Not available	Increased mortality Increased risk of readmission
AD8=8 Item Interview to distinguish Aging and Dementia, AMT=Abbreviated Mental Test, AMTS=Abbreviated Mental Test Score, CAM=Confusion Assessment Method, CAMCOG=Cambridge Cognitive Examination, CAMDEX=Cambridge Mental Disorders of the Elderly Examination, CDR=Clinical Dementia Rating, CIS=Cognitive Impairment Scale, CSHA=Canadian Study of Health and Ageing, DRS-98=Delirium Rating Scale 98, DSM-III=Diagnostic and Statistical Manual of Mental Disorders, 3rd Edition, DMS-IV=Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, et al=Et Alia, GMS=Geriatric Mental State, ICD-10=International Statistical Classification of Diseases and Related Health Problems, 10th Revision, IQCODE=Informant Questionnaire on Cognitive Decline in the Elderly, LOS=Length of Stay, MMSE=Mini Mental State Examination, MSQ=Mental Status Questionnaire, n/a=not applicable, SPMSQ=Short Portable Mental Status Questionnaire, SRQ-24=24 Item Self Reporting Questionnaire, WAIS=Wechsler Adult Intelligence Scale							

MCI in the Acute Hospital Setting

The literature on mild cognitive impairment within the acute hospital is sparse. Four relatively recent studies consider the issue. The first of these detected a prevalence for MCI of 36.1% among 65-85 year olds in a large multi-centre study in Munich ¹⁴⁵. Zekry et al subsequently questioned whether MCI predicted mortality among a group of inpatients in an acute geriatric unit ¹⁰². Of the 444 participants included, 48 (10.8%) met criteria for MCI. They did not differ from those with normal cognition or dementia in terms of age, sex or education. MCI did not predict intra-hospital mortality or mortality at 1 or 5 years. In this they behaved similarly to the group of patients with normal cognition.

In 2015, analysis of 3,072 community-dwelling adults aged over 75, of whom 428 had MCI, showed that MCI conferred an increased risk of 17% for hospitalisation compared to participants with normal cognition (adjusted hazard ratio (HR)=1.17 (95% confidence intervals (CI) 1.02-1.34)) ¹⁴⁶. MCI participants who lived with a proxy were significantly more likely to have an admission (adjusted HR=1.392 (95% CI 1.169-1.657)) than those MCI patients who lived alone (adjusted HR=0.936 (95% CI 0.758-1.155)), suggesting that people with MCI who live alone may lack the insight to recognise the symptoms of imminent illness. MCI was not associated with increased odds of hospital admission within 30 days of discharge.

Most recently, Amini et al obtained data from a cross-sectional survey carried out nationally in the US to query a relationship between degree of cognitive impairment and frequency of hospital admissions ¹⁴⁷. In line with Callahan et al's findings, they determined that MCI was associated with an increased risk of hospitalisation in models adjusted for multiple variables including demographics, medical co-morbidities and environmental factors.

There is no Irish data available on this topic.

1.4 Cognitive Screening

Screening, as defined by the UK National Screening Committee, is 'the systematic application of a test, or inquiry, to identify individuals at sufficient risk of a specific disorder to warrant further investigation or direct preventive action, amongst persons who have not sought medical attention on account of that disorder' ¹⁴⁸. A test with high specificity, id est (ie). a test with the fewest false positive results, is desirable for diagnosis ¹⁴⁹. High sensitivity, ie. a test with the fewest false negative results, is preferable for screening where the objective is to out-rule a particular condition.

The ideal cognitive screening test should be quick, easy to administer, repeatable, acceptable to the patient and statistically robust to minimise the risk of misidentifying a patient with dementia ¹⁵⁰. The primary purpose of a cognitive screening tool is to

determine the likelihood of genuine cognitive impairment which will indicate the most appropriate course of action to be taken by the clinician ¹⁵¹. A very impaired score which fits with the history may be sufficient to make a diagnosis. A more ambiguous result may prompt additional in-depth testing or specialist referral.

A multitude of cognitive assessment tools have been developed to screen for cognitive impairment/dementia. They vary in their psychometric properties, degree of validation against gold standard and validity in general and specific populations. A full review of each of these is outside the scope of this discussion but is readily available elsewhere ¹⁵⁰⁻¹⁵⁵.

There are a number of factors to be considered when choosing a cognitive screening test and interpreting the results. The setting in which it is to be used is a salient consideration. Interpretation of a test result depends greatly on how likely it is that the disease is present in that population ¹⁴⁹. The prevalence of dementia, for example, ranges from 6-10% in the general population of community-dwelling older adults but exceeds 70% in residential care settings ^{21 26 37}. A cognitive screening tool will therefore have a higher positive predictive value when used in a nursing home than in a primary care clinic.

Feasibility is another consideration. A busy GP surgery, for example, will be pressured for time and is likely to lack personnel with specialist training in neuropsychological assessment. A brief tool which is valid and reliable, easily scored and does not require specific training would, therefore, be most useful for GPs. A longer, more detailed test which requires specialist interpretation is likely to be more suited to a specialist memory clinic. The chosen test should also be acceptable to patients. Studies that comment on a particular tool's psychometric properties and validity rarely comment on how a test was received by the individual. Longer, more challenging instruments may prove distressing for patients, particularly if they sense that they are performing poorly on them.

Tests differ in their range of applicability. For example, certain tests, such as the Mini Mental State Examination (MMSE), the Addenbrook's Cognitive Examination (ACE), the Clock-Drawing Test (CDT) and the Montreal Cognitive Assessment (MoCA) are sensitive to the level of education achieved by the individual ¹⁵⁰, whereas the Mini-Cog and the Memory Impairment Screen (MIS) are relatively unaffected ¹⁵³. Language and cultural background also affect test sensitivity. The Abbreviated Mental Test (AMT), MMSE and MoCA are vulnerable to translation artefacts and, perhaps, cultural differences in how dementia is manifested ^{153 154 156 157}. By contrast, the CDT, Mini-Cog or MIS are comparatively free of cultural bias ¹⁵³. Patients with disabilities such as deafness, blindness, dyslexia or dysgraphia may also be disadvantaged. The MMSE and MoCA have both been adapted for use among the visually-impaired ^{158 159}. Tests such as the

6-Item Cognitive Impairment Test (6-CIT) and Mental Alteration Test (MAT) have the advantage of not requiring pen and paper.

Tests will differ, also, in their applicability to different types of dementia. Cullen et al criticise the emphasis placed on memory functioning in many cognitive tests at the expense of other cognitive domains, such as executive function, which may be the primary impairment in certain types of dementia such as VaD or FLTD ¹⁵¹. They highlight six cognitive domains which should be included in a comprehensive cognitive screening test: attention and working memory, verbal recall, expressive language, visual construction, executive function and abstract reasoning. The time necessitated to administer such a thorough assessment, however, will inevitably affect feasibility in primary care settings.

Cognitive screening tests are generally scored by the application of a cut-point to determine a binary outcome: 'impairment - yes or no'. Though a psychometric necessity, it excludes a qualitative interpretation of the individual's performance. The participant's ability to sustain attention, self-regulate, negotiate problems and deal with errors as well as their emotional reactions and level of engagement provide valuable insights to assist with determining a differential diagnosis ^{151 154}. In circumstances of mild symptoms or an atypical presentation, clinical judgement will likely take precedence over cut-points.

Importantly, the decision to carry out a screening test should not be divorced from the implications of the result. This includes the availability of facilities for diagnosis, access to treatment and effectiveness of interventions ¹⁴⁹. The Wilson Criteria for screening emphasise the importance of the following features for a screening program ¹⁶⁰:

- The condition should be an important health problem
- Its natural history should be understood
- There should be a recognisable or early latent phase
- There should be a test that is easy, acceptable, accurate, reliable, sensitive and specific
- There should be an accepted treatment
- Treatment should be more effective if started early
- There should be a policy on who should be treated
- Diagnosis and treatment should be cost-effective
- Case-finding should be a continuous process

The obvious short-coming when it comes to screening for dementia is the lack of disease-modifying treatments currently available. Additionally, there is a lack of evidence that early intervention is of material benefit to patients. For these reasons,

the US Preventive Services Task Force and the Alzheimer's Association do not recommend routine cognitive screening in primary care ^{161 162}.

It is recognised, however, that the modest benefit to be had from currently available treatments is most likely to be effective in the earlier stages of dementia. Early detection also affords opportunities for future planning and access to non-pharmacological intervention modalities. There is emerging consensus, therefore, that screening is advisable among specific patient groups. Older patients in primary care who are considered to be at risk because of an informant history or clinically observed cognitive decline should be considered for testing ¹⁶³. Cognitive screening is also recommended for all hospital inpatients aged 65 years or over ¹⁶⁴.

1.5 Antipsychotic Use in Dementia

Antipsychotic drugs

Antipsychotic medications refer to the heterogeneous class of drugs which are used to treat delusions and hallucinations. Chlorpromazine, discovered in 1952, revolutionised the practice of psychiatry and represented the first effective treatment for people with schizophrenia ¹⁶⁵. Antipsychotics are usually classified as 'Typical' or 'Atypical' based on their mechanisms of action and side-effect profiles.

Typical antipsychotic medications, of which chlorpromazine is the prototype, exert their effect by blocking dopamine (DA) D₂-receptors in the limbic region of the brain ¹⁶⁶. They have a narrow therapeutic profile, however, and higher rates of D₂-receptor occupancy increase the risk of extra-pyramidal side-effects (EPS), (including parkinsonism, akathisia and tardive dyskinesia) and hyperprolactinaemia ^{167 168}.

Atypical antipsychotics, which were initially licensed in the 1990s, are more potent antagonists of 5-hydroxy-tryptamine_{2A}-receptors (5HT) than D₂-receptors and produce lower incidence of EPS at clinically significant doses ¹⁶⁹. Of concern, however, is their impact on metabolism. Though there is significant variability between individual drugs, atypical antipsychotic use is limited by weight gain, insulin resistance, hyperglycaemia and dyslipidaemia ¹⁷⁰.

The relative efficacy and tolerability of typical and atypical antipsychotics is a long-standing source of debate. In the 2,000s, the Clinical Antipsychotics Trials in Interventions Effectiveness (CATIE) and the Cost Utility of the Latest Antipsychotic drugs in Schizophrenia Study (CUtLASS) suggested that there is no difference in efficacy or tolerability between the two classes ^{171 172}. Methodological difficulties in these studies have led to criticism of the findings ¹⁶⁶. Most meta-analyses, however, agree that there is little to choose from between the two classes ^{173 174}. Clozapine, with its superior efficacy and unique side-effect profile is a notable exception ¹⁷⁵.

Antipsychotics are Food and Drug Administration (FDA)-approved for use in schizophrenia and, more recently, bipolar affective disorder (BPAD). Individual agents are also approved for use in other conditions, for example, haloperidol is used in Tourette Syndrome. Risperidone is licensed in Europe for use in aggression in Alzheimer's disease. Use of antipsychotics in dementia is otherwise off-license despite prescription prevalence rates of up to 30% ¹⁷⁶.

Indications in dementia

Antipsychotic medications are used widely in the treatment of behavioural and psychological symptoms of dementia, though their use in this context is largely off-license. Risperidone is currently the only antipsychotic licensed for use in dementia. BPSD refer to non-cognitive symptoms of dementia and include agitation, aggression, mood disturbance, anxiety, psychosis, repetitive behaviours and apathy. BPSD are very common and are experienced by over 90% of patients at some point during the course of the disease ^{83 177}. In the community, up to two thirds of people with dementia experience one BPSD symptom, while one third experience multiple ^{178 179}. Prevalence is up to 75% among hospitalised dementia patients and 90% in institutional care facilities ^{180 181}. BPSD are associated with excess disability, increased hospitalisation, premature institutionalisation and increased mortality ^{178 182 183}. They contribute to caregiver burden and financial costs ^{178 184}. Despite their ubiquity and impact, however, the aetiology remains unclear. They likely arise as a result of a complex interplay of biological, psychological and socio-environmental factors ¹⁸⁴. Potentially treatable causes of BPSD include pain, sensory impairment, infection, environmental disruption and medications.

Though antipsychotics are considered first line pharmacotherapy in BPSD their use remains controversial and their mechanism of action in this context uncertain ^{185 186}.

Efficacy and safety in dementia

By now there are over twenty placebo-controlled randomised clinical trials examining the efficacy of atypical antipsychotics in the management of BPSD ¹⁸⁷. Meta-analyses and interventional studies indicate a modest efficacy for atypicals in this context ¹⁸⁸⁻¹⁹¹. Maher et al's meta-analysis of 14 placebo-controlled trials calculated effect sizes of between 0.12 and 0.2 for olanzapine, risperidone and aripiprazole but no benefit for quetiapine ¹⁹⁰. A 2006 Cochrane review concluded that risperidone and olanzapine are effective in aggression and psychosis in dementia ¹⁸⁷. Schneider et al's meta-analysis of 15 placebo-controlled trials determined a number needed to treat (NNT) of between 5 and 14 ¹⁸⁸. Smaller effect sizes were noted for less severe dementia and psychotic symptoms. This finding is echoed by Raskind and Wang who argue that antipsychotics are most effective in the alleviation of agitation rather than the treatment of psychosis in dementia – indeed that psychosis in dementia is a different entity to psychosis due

to other causes¹⁸⁵. There is, additionally, some limited evidence to suggest that discontinuation of antipsychotics may precipitate a relapse of symptoms¹⁹². However, though studies vary in the drugs they deem effective, the symptoms that are most responsive to treatment and the relative effect sizes seen, they are remarkably consistent in their recognition of the significant adverse effects associated with the use of antipsychotics in this population.

In 2003 the US FDA issued a black box warning highlighting the increased risk of cerebrovascular events (CVE) associated with the use of atypical antipsychotics in people with dementia¹⁹³. Since then, placebo-controlled studies have demonstrated that people with dementia on antipsychotics are up to 3 times more likely to suffer a CVE than those not on treatment^{188 194 195}. A more recent systematic review calculated a 1.3-2 fold greater risk of a CVE for elderly patients on antipsychotic medications¹⁹⁶. The risk was greatest for older patients with cognitive impairment during the initial weeks of treatment. There was no difference in risk when typicals were compared with atypicals.

A second black box warning was issued in 2005 advising that atypical antipsychotic use in dementia was associated with increased mortality¹⁹⁷. A warning against the use of typical antipsychotics followed in 2008¹⁹⁸.

A 2005 meta-analysis of 15 trials (nine unpublished) determined that death occurred more often among those randomised to atypical antipsychotic use rather than placebo with an absolute mortality risk increase of 1% over 8-12 weeks of treatment or number needed to harm (NNH) of 100¹⁹⁹. A large retrospective cohort study subsequently demonstrated that the mortality associated with antipsychotic use in dementia was significantly greater than that associated with other psychotropics²⁰⁰. In this study, no difference was seen between adjusted mortality rates for typical and atypical antipsychotics. By contrast, another meta-analysis published the same year suggested that typicals may be associated with a higher mortality risk in dementia than atypicals²⁰¹. In 2013, the first study comparing the mortality risk of individual antipsychotics in dementia confirmed a spectrum of risk for individual agents.²⁰² Haloperidol was associated with the highest mortality (Relative Risk (RR) 1.54, 95% CI 1.38-1.73) and quetiapine the lowest (RR 0.73 95% CI 0.67-0.80). Risk was highest for haloperidol within the first 30 days of treatment whereas for the other agents the risk persisted for 180 days before tapering off. Subsequent analyses have generally confirmed that individual antipsychotic agents differ in the mortality risk conferred, regardless of setting^{203 204}. A recent retrospective case control study encompassing over 90,000 participants aged over 65 with dementia showed a differential mortality risk for individual antipsychotics ranging from haloperidol with a NNH of 26, to risperidone (NNH 27), to olanzapine (NNH 40) to quetiapine (NNH 50)²⁰⁵. Atypical antipsychotics showed a dose-response increase in mortality risk.

Though very convincing, the evidence is not absolutely consistent in this area, however. Two small studies carried out among institutionalised dementia patients failed to demonstrate an increased mortality risk with antipsychotic use after adjustment for other variables^{206 207}. A more recent longitudinal study of 957 dementia patients (mean follow-up of 4.3 years) found no mortality increase with antipsychotic use²⁰⁸. Instead, psychosis was strongly associated with time to institutionalisation and death, suggesting that the BPSD syndrome may itself be a marker of illness severity that portends an increase in mortality, rather than the drugs used to treat it. Further research is required to look into this in more depth.

Trends in use in dementia

In the late 1980s and early 1990s, typical antipsychotics were trialled for 'behavioural disturbance' in dementia. The emergence of the atypical antipsychotics saw a shift in prescribing patterns so that by the late 1990s atypical antipsychotics accounted for more than 80% of the antipsychotic medications prescribed in dementia in nursing homes²⁰⁹.

Despite the well-publicised concerns and black box warnings of the early 2000s, however, there is little evidence that antipsychotic prescribing patterns in dementia changed significantly as a result. Canadian data extracted from prescription claims databases showed an increase in the use of antipsychotics in dementia²¹⁰. Minor reductions were seen in the US and Europe^{211 212}. A 2013 interrogation of a German insurance claims database showed a non-significant reduction of antipsychotic use from 35.5% in 2004 to 32.5% in 2009 ($p=0.1645$)¹⁷⁶. Though use of typical antipsychotics was significantly reduced this was offset by an increase in atypical prescriptions.

Black box warnings may not have impacted on prescribing practices but a coordinated effort by clinicians, advocacy groups and governmental agencies in the UK has shown that a change in prescribing culture is possible. The second round of the National Audit of Dementia Care in General Hospitals demonstrated a 52% reduction in the use of antipsychotics among hospitalised dementia patients in England and Wales between 2008 and 2011²¹³.

Currently it is thought that between 17 and 31% of all dementia patients are on antipsychotic medications^{214 215}. 25% of patients in Germany were prescribed an antipsychotic within a year of their dementia diagnosis according to Schulze et al²¹⁶. In line with other studies, prescription prevalence increased with increasing level of dependency.

In Ireland, estimates from the Enhancing Care in Alzheimer's Disease (ECAD) study suggest that 6% of people living with dementia in the community are taking an

antipsychotic medication at a total annual cost of almost two million euro^{51 217 218}. Consistent with international findings, the prevalence of antipsychotic prescription is higher among dementia patients who are hospitalised. The National Audit of Dementia Care found that 29% of hospitalised patients with dementia were on an antipsychotic before admission⁴⁸. Those admitted from nursing homes or transferred from other hospitals were more likely to be prescribed an antipsychotic than those admitted from home. 24% of patients were started on a new antipsychotic or had their antipsychotic altered during their admission. Twelve percent of patients who were not on an antipsychotic on admission were discharged home on a new regular prescription. 'Agitation' accounted for 61% of the new or altered prescriptions. These figures are notably higher than those detected in corresponding audits carried out in England, Wales and Northern Ireland^{213 219 220}. Using data from the same audit, it was seen that 37% of patients with advanced dementia considered to be at the terminal phase of the illness received antipsychotic medications, 71% of which were prescribed following hospital admission⁴⁹. However, the quality of screening for potentially modifiable causes of 'agitation' such as pain, mood disturbance, personal preferences etc., led the authors to conclude that in many cases, antipsychotic prescription may have been both inappropriate and avoidable.

Recommendations and Guidelines

A systematic review of clinical practice guidelines on the management of BPSD was published in 2012²²¹. Guidelines from Canada, the UK, Scotland, Malaysia and the Netherlands were evaluated. Though there was some divergence on various aspects of BPSD management, there was uniformity in their recommendations that antipsychotics should be used with caution in BPSD. Non-pharmacological strategies should be considered first line and antipsychotic medications considered for severe agitation, aggression or psychosis only if these fail. There is no guidance on the choice of typical versus atypical drugs. Instead, it is advised that the decision should be made on a case by case basis following a risk-benefit review of the individual's history. Gareri et al suggest that this should include attention to cardiovascular history, QTc duration on electrocardiogram (ECG) and concomitant medications²²². Guidelines agreed, also, that antipsychotics should be introduced on a time-limited basis²²¹. The authors suggested that 3-monthly reviews of efficacy, tolerability and clinical need would be prudent. A 2013 Cochrane review of studies concerned with the withdrawal of antipsychotics used in the treatment of BPSD concluded that this can be done safely though caution is required with older patients with more severe symptoms²²³. Moreover, they recommended that programmes aimed at withdrawing antipsychotics should be incorporated into routine clinical practice, particularly among those with less severe BPSD.

The 2011 Banerjee Report provides a comprehensive review of the evidence relating to antipsychotic use in dementia and, in section 4, outlines what should be considered best practice in this context²²⁴. The recommendations are in line with the 2006 National Institute for Health and Clinical Excellence-Social Care Institute for Excellence (NICE-SCIE) guidelines and the subsequent 2015 guidance document^{140 225}. There is a strong emphasis on the use of antipsychotics only when environmental, psychological, behavioural and complementary approaches are ineffective. There should be a full review to out-rule potentially treatable causes of BPSD such as pain or sensory impairment. An atypical antipsychotic is considered preferable. Medication should be used at the lowest effective dose for the shortest possible time and reviewed monthly. The report stresses the importance of patient and family/carer participation in the decision to begin treatment following a frank discussion of the potential benefits and harms. More recently, a guideline published by the Irish College of General Practitioners echoes the need for patients and carers to be fully informed and involved in decisions around initiating antipsychotic treatment advising, additionally, that these discussions should be carefully documented²²⁶. The Irish National Dementia Strategy references the NICE guidelines on antipsychotic medication use in BPSD.

No studies, to date, have robustly evaluated the quality of antipsychotic prescription with respect to best practice among hospitalised people with dementia in Ireland.

1.6 End Of Life Care in Dementia

Needs in advanced dementia

Dementia is a progressive terminal illness for which there is, as yet, no cure^{227 228}. Life expectancy varies substantially across studies and ranges from 3-12 years depending on the aetiology, age group and initial start point eg. time from first noted symptoms or time from diagnosis²²⁸⁻²³⁰. Advanced dementia may last 2-3 years, though these estimates vary also²²⁷. A 6 month mortality rate of 25% and median survival of 1.3 years was seen when 323 nursing home residents with advanced dementia were followed for 18 months²³¹. By contrast, community-dwelling patients with advanced dementia attending a memory clinic had a mean survival of 3.2 years²²⁸.

The trajectory of decline in dementia is one of gradually increasing disability which may be accelerated by periods of acute illness and, invariably, substantial decline in cognitive and functional abilities within the last months of life²³². Up to 95% of dementia patients will eventually require 24 hour care as they become increasingly dependent in their basic personal functioning^{233 234}. Advanced dementia is associated with progressive impairment of speech, swallow, gait and continence as well as loss of appetite, weight and muscle mass^{227 235}.

Several retrospective and prospective studies have assessed the needs of people with dementia as they approach the end of life. In a large, retrospective comparative survey of carers, McCarthy et al documented confusion, incontinence, pain, low mood and constipation as the most commonly-reported symptoms of 170 dementia patients in the final year of their lives ²³⁶. This was similar to the experience of patients dying of cancer but the dementia patients experienced the symptoms for longer. Mitchell et al's prospective study of nursing home patients with advanced dementia found high levels of pain, dyspnoea, agitation and pressure ulcers in their last months, all of which increased as death approached ²³¹. There is a striking consistency across the studies in the prevalence of pain in advanced dementia with up to three-quarters of patients experiencing pain in the final stage of the illness ^{229 235 237 238}. Pain may be caused by comorbid medical conditions, infections, constipation, pressure ulcers or procedures ^{235 239}.

What is Palliative Care?

The World Health Organisation (WHO) defines palliative care as 'an approach that improves the quality of life of patients and their families facing problems associated with life-threatening illness, through the prevention and relief of suffering by means of early intervention and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual' ²⁴⁰.

The earliest iteration of palliative care as a distinct clinical specialty was developed primarily to meet the needs of those dying of cancer. It is now recognised, however, that good quality palliative care should extend to those with long-term conditions which are not necessarily imminently terminal but are not amenable to curative treatment ²⁴¹. People suffering from progressive neurological illnesses, chronic respiratory diseases or chronic cardiac conditions all stand to benefit from good quality symptom palliation.

The provision of palliative care in Ireland is structured as three ascending levels of specialisation ²⁴²:

- **Level One – Palliative Care Approach**

A general approach of care which draws from the core principles of palliative care and can be practiced by all healthcare professionals within the community or general hospitals

- **Level Two – General Palliative Care**

The provision of palliative care by health professionals who have additional training and expertise in providing palliative care without being engaged as full-time palliative care specialists

- Level Three – Specialist Palliative Care

Specialist palliative care (SPC) services are those which provide palliative care as their core specialty. They are provided by a multi-disciplinary team under the direction of a consultant in palliative medicine. SPC services are available within the community, general hospitals and hospices

Dementia Palliative Care

Dementia palliative care aims to optimise the quality of life of people with dementia and their families by treating distressing symptoms, supporting decision-making about care, providing a framework to anticipate and plan for cognitive decline and assisting in coming to terms with the grief and loss associated with progression of the disease and, ultimately, death^{243 244}.

Calls for a shift in approach to the management of advanced dementia go back to the mid-1980s when Volicer et al argued that medical care based on maximal prolongation of life is inappropriate²⁴⁵. Literature reviews have highlighted the benefits of a palliative approach to dementia care which emphasises the factors that enhance quality of life rather than disease management^{227 235 246}. However, a 2005 systematic review of the efficacy of palliative care in dementia concluded that there is very limited evidence on which to base a framework for service development²⁴⁷. Only two studies were suitable for inclusion in the review and both were beset by methodological difficulties. This lack of high quality interventional and prospective observational studies means that guidelines are mainly consensus-based and adapted from the evidence which supports the treatment of pain, dyspnoea and depression in cancer patients²²⁹.

Nonetheless, the provision of high quality palliative care for people with dementia has been endorsed by dementia advocacy groups, palliative care providers, health organisations and national policy documents^{118 119 140 248-251}. In Ireland, the National Dementia Strategy, the Health Service Executive (HSE), the Alzheimer Society of Ireland and the Irish Hospice Foundation attest to the right of people with dementia to have access to palliative care services should they feel that this is the appropriate route for them^{82 252}. A 2012 report on the feasibility of providing palliative care for people with dementia concluded that palliative care should be considered as having a role from the point of diagnosis, through the progression of the disease, to end of life care and bereavement support²⁴⁴.

Yet the evidence shows unequivocally that high quality end of life care is inadequate for people with dementia. The majority of people with dementia in Europe do not have access to palliative care and health professionals lack training in general dementia care, communication and pain assessment in dementia^{250 253}. A 1996

retrospective case note audit concluded that symptom palliation in advanced dementia was inadequate with under-treatment of pain of particular concern ²³⁸. A subsequent case note review of general hospital patients who died during their admission between 2002 and 2003 showed that dementia patients were significantly less likely to be referred to the palliative care team or prescribed palliative medications than patients who died without a diagnosis of dementia ²⁵⁴. The same study found that dementia patients were more likely to have blood gasses measured and urinary catheters or nasogastric tubes inserted. A prospective assessment of consecutive admissions to a geriatric ward found that 63% of patients with dementia died with a high level of suffering, while a further 30% died with an intermediate level ²⁵⁵. Patients with advanced dementia who were admitted for the management of hip fractures were prescribed one third the amount of analgesia of their cognitively intact counterparts ²⁵⁶. In a subsequent paper, the same authors reported that only 7% of patients with advanced dementia had a documentation of their wishes around life-sustaining treatment and many were subjected to procedures which were considered unnecessary and burdensome ²⁵⁷. The minimal evidence available suggests that the spiritual needs of patients with advanced dementia are neglected ^{254 258}. A 2010 review of the experiences of families and carers of people with advanced dementia highlighted a high level of unmet needs ²⁵⁹. These included grief, anxiety around decision-making, a wish for increased contact with health care workers and a lack of knowledge around dementia as a terminal illness.

There are a number of reviews which explore barriers to the provision of good quality palliative care in dementia ^{227 235 239 253 260}. One of the greatest challenges is poor recognition of dementia as a life-limiting illness. Death is often precipitated by other acute events such as pneumonia, cardiovascular disease or hip fracture and these are more commonly recorded as the cause of death on death certificates ^{125 229 257 261}. A prospective cohort study that monitored acutely-admitted end-stage dementia patients found that despite a high mortality rate there was no evidence that end of life care was undertaken either in conjunction with or instead of life-prolonging measures ²⁵⁷. The authors suggested that this was because families and clinicians did not view dementia as a terminal illness and were unaware of the particularly poor short-term prognosis for these patients. Poor clinician and carer recognition of dementia as a terminal illness has been demonstrated repeatedly ^{236 261}. Mitchell et al showed that of 1789 patients with advanced dementia who were admitted to a nursing home, only 1.1% was recognised as having a life expectancy of less than 6 months despite over 70% dying within that period. Dementia patients were less likely to have directives regarding their care in place and were more likely to undergo burdensome interventions such as tube feeding and re-hospitalisation ²⁶².

Where there is awareness of dementia as a life-limiting disease, there is additional difficulty in knowing when the end of life is approaching ²⁵³. The slow degeneration

and decline of dementia contrast with the typical trajectory of terminal cancer. As discussed previously, the final stage of dementia may last up to 3 years^{228 231}. Attempts have been made to identify prognostic markers which may assist clinicians in appropriately timing a transition to end of life care. Coventry et al were unable to recommend a prognostic model for routine use in non-malignant life-threatening disease following their review of the literature²⁶³. A more recent review of prognostic indicators of mortality in advanced dementia was also unable to identify reliable and sensitive prognosticators for clinical use²⁶⁴. Nonetheless, Sachs et al have suggested three indicators of severity which they believe should precipitate discussions around end of life care²⁶⁵. Functional Assessment Staging (FAST)²⁶⁶ stage 7c where the person is non-ambulatory, fully dependent for ADLs and non-conversational is the first. Secondly, the need for artificial feeding should prompt consideration of the need for palliation. Finally, pneumonia or hip fracture in advanced dementia should also be considered indicative of end of life needs.

Good quality palliation of symptoms can improve comfort and quality of life but this may be particularly challenging in dementia. As cognitive, motor and communicative abilities decline, many people in the advanced stages may be unable to effectively communicate their needs. Pain may manifest, for example, as aggression, irritability or resistance to care²⁶⁷. Emotional distress, depression and psychosis are common and treatable but grossly under-recognised and commonly precipitate behavioural crises^{235 268 269}. Patients are vulnerable, in these circumstances, to inappropriate prescription of antipsychotics^{49 224}. Though there are a variety of tools used to assess emotional and physical symptoms in dementia, their validity is disputed^{247 270}. Clinical experience and carer input are critical, therefore, to detect and diagnose distressing symptoms that require active management.

Family carers of people with dementia who consider themselves 'prepared' are less likely to experience complicated grief symptoms following the death of their loved one²⁷¹. Despite the need for substantial carer support, however, clinicians, as discussed, may not recognise that end of life is near. Others feel uncomfortable and ill-equipped to discuss issues of death and dying with families²⁵³. The concept of 'anticipatory grief' describes the protracted process of adjustment to progressive losses experienced by carers as the disease progresses²⁷². Carers may also be tasked with making major decisions on behalf of their loved one in times of crisis, adding to their burden²⁷³. Reinhardt et al showed that a structured palliative care-informed conversation with carers of people with dementia resulted in more documented decisions around care preferences and higher overall satisfaction with care²⁷³. Advance care planning is another way to potentially reduce the decision-making burden of carers as well as the exposure of the patient to futile or burdensome interventions²⁷⁴.

The ideal scenario is that envisioned by the Irish Hospice Foundation and the Alzheimer Society of Ireland and ratified in the Irish National Dementia Strategy, whereby a palliative approach is adopted from the point of diagnosis and carried through the entire illness trajectory^{82 244}. In the early stages of dementia this is likely to be complimentary to an active treatment approach and may simply consist of facilitating open discussions and shared decision-making between patients, carers and clinicians. Establishing and affirming the patient's own views, values and expectations of care while still capable is fundamental to the concept of patient-centred care and equips carers with a better understanding of how best to represent their loved ones wishes should the need eventually arise.

Findings from the Irish National Audit of Dementia Care in Acute Hospitals suggest that end of life care (EOLC) for patients dying with dementia in Irish hospitals is inadequate^{49 115}. High quality Irish research into these failings, however, is lacking. The Irish Hospice Foundation and HSE have identified this lack as contributing to the current situation and have called for further work in this area to inform the frameworks that will be necessary to provide high quality end of life care for all dementia patients.

CHAPTER TWO

AIMS

The aims of this project are as follows:

1. To examine the prevalence, detection rates and impact on outcomes of dementia and mild cognitive impairment among elderly admissions to an Irish, acute, general hospital

International research consistently demonstrates that dementia is highly prevalent and under-diagnosed within the acute care setting. This study (Chapter 4) will add to the existing Irish data on the current situation within our health care system. It will also, for the first time, consider the prevalence and correlates of mild cognitive impairment within the Irish acute setting and examine the impact of cognitive impairment on patient outcomes longitudinally.

2. To examine the clinical utility and patient acceptability of an ultra-brief cognitive screening tool within the acute care environment

Cognitive screening is recommended for hospital inpatients aged 65 years and over. Yet the under-diagnosis of dementia in this population suggests that screening is inadequate despite the multitude of cognitive screening tools that are available. Factors such as the test's psychometric properties, the time needed to administer it, the expertise required to interpret the results and its acceptability to the patient should be taken into consideration when deciding whether a particular test will be of use within the busy, acute medical setting. This study (chapter 5) considers whether an ultra-brief cognitive screening tool meets these criteria and offers a potential means to improve screening within this population.

3. To examine current practices around the prescription of antipsychotic medications among elderly hospital inpatients

Antipsychotic medications are used widely among the elderly who are particularly vulnerable to their substantial adverse effects. There is some preliminary evidence to suggest that their use among Irish dementia patients may be higher than seen in neighbouring jurisdictions. The Irish literature on this topic, however, is very limited and this paucity of data impedes an understanding of the reasons antipsychotics are prescribed in this population and whether their use is in accordance with international best practice. This study (chapter 6) examines the indications for antipsychotic prescription among hospitalised elderly, how they are tolerated by this frail group and whether they are prescribed, managed and followed-up in line with best practice.

4. To identify whether a palliative approach to care is considered for inpatients with dementia awaiting nursing home placement and to assess the quality of clinical handover information pertaining to diagnosis and end of life care upon discharge

The palliative care approach, which focuses on enhancing quality of life over curative treatment, is widely regarded as an important component of good quality dementia care. Palliative input may be complementary to active medical treatment or implemented as the primary approach depending on the stage of illness and complexity of the individual's needs. However, the literature is clear that the vast majority of people with dementia do not enjoy the benefits of good palliative care. While the UK has a burgeoning literature in this field, there is a significant absence of comparable Irish data. This study (chapter 7) was designed to determine whether a palliative approach to end of life planning was considered for a group of hospital inpatients with dementia requiring twenty-four hour care. Furthermore, with the knowledge that one of the primary barriers to the provision of high quality dementia palliative care is poor clinician awareness of dementia as a terminal illness, the study will also examine the quality of information around diagnosis and treatment preferences which is handed over to clinical staff at key transition points during the journey from acute to long term care.

CHAPTER THREE

METHODS

The data presented in this thesis were collated from a series of studies carried out in St. James's Hospital (SJH), Dublin, between 2014 and 2016 under the auspices of the Mercer's Institute for Research in Ageing and the Department of Psychiatry for the Elderly. This chapter will describe the core methodology employed in the project. Methodology specific to each chapter will be described therein.

3.1 Research Population

The research presented in this thesis was conducted amongst the elderly (ie. aged 65 years and older) inpatient population of St. James's Hospital Dublin. SJH is a university-affiliated hospital of 1000 beds. From the mid to late 20th century St. Kevin's hospital, as it was then known, gradually expanded to incorporate a number of other Dublin city hospitals that were closing. Officially changing its name in 1971 to St. James's Hospital, the institution continued to expand and modernise. Today, its catchment area comprises Dublin 6, 8, 10, 12 and 14, encompassing a broad swathe of inner city, traditionally working-class, Dublin. This catchment includes the most socially deprived sub-population in the country as well as areas of high socioeconomic advantage. Over 20% of its catchment population are aged over 65 years²⁷⁵. SJH provides tertiary and quaternary specialist services including 13 national specialist centres and 23 regional specialist centres. In 2014, SJH provided treatment for 23,358 inpatients, 47,083 day care patients and 283,107 outpatients. An average of 150 patients aged 65 years or over are admitted to SJH weekly.

3.2 Assessments

Cognition

Cognition was assessed using the standardised Mini Mental State Examination (sMMSE)²⁷⁶ (Appendix A) and the MoCA^{277 278} (Appendix B). The sMMSE was derived from the Folstein MMSE which was originally created to differentiate between organic and functional psychiatric disorders²⁷⁹. The MMSE has been shown to be internally consistent and to have high inter-rater reliability for both cognitively intact and impaired groups²⁸⁰. Sensitivity using a cut-off of 23/24 to indicate cognitive impairment is generally held to approximate 85-90% though this can vary from 54%-100% according to the population studied and the reference standard employed^{150 280}. Sensitivity is lower for milder impairment. Specificity is considered moderate to high with rates between 80-85%^{150 280}. A meta-analysis of the validity of the MMSE in specialist hospital settings provided sensitivity of 71.1%, specificity of 95.6%, positive predictive value (PPV) of 34.5% and negative predictive value (NPV) of 76.4%²⁸¹. The

sMMSE, which has expanded guidelines for administration and scoring, has been shown to compare favourably with the Folstein MMSE, with better inter-rater reliability and a faster administration time²⁷⁶.

The MoCA was developed as a tool to screen for milder forms of cognitive impairment for which the MMSE lacks sensitivity²⁷⁷. It incorporates executive and attentional tasks and has a suggested cut-point of 26/30 to detect MCI. Inter-rater reliability and internal consistency of the MoCA are considered to be good^{150 277}. The MoCA has been shown to have excellent sensitivity for the detection of MCI (97%) though specificity is poor (35%)²⁸². It has also been shown to detect progression from MCI to mild dementia with a sensitivity of 94% and specificity of 50% at 6 month memory clinic follow up²⁸³.

Raw scores from the sMMSE and MoCA were normed against previously-established normative values for age and education in this population. Where a binary outcome was necessary for statistical purposes, a locally validated cut-point of ≤ 23 on the sMMSE was considered to indicate cognitive impairment²⁸⁴.

The 6CIT²⁸⁵ (Appendix C) was included as part of the cognitive assessment battery for validation purposes (Chapters Four and Five). Please see Chapter 5 for a discussion of the extant literature looking at the reliability and validity of the 6CIT.

Physical Health Data

The Charlson Co-morbidity Index (CCI) was used to quantify the burden of medical co-morbidity²⁸⁶ (Appendix D). The CCI is the most used tool worldwide for this purpose²⁸⁷. It consists of 19 categories of co-morbidity and predicts ten year mortality for patients who may have a range of co-morbid conditions. Higher scores indicate greater co-morbidity. The original validation study determined a 2.3-fold increase in the 10 year risk of death per CCI score increment among a cohort of breast cancer patients²⁸⁶. A later study conducted among post-operative patients with diabetes and hypertension had similar results²⁸⁸. It has since been found to have clinical utility among diverse patient groups including cardiac, renal and a range of cancer patients²⁸⁹⁻²⁹³ and has been adapted for use with administrative databases^{287 294 295}.

Information was obtained by self-report, from carers, medical notes and the electronic patient record (EPR). (Chapters Four and Five)

The Confusion Assessment Method (CAM) (Appendix E) was used to screen for delirium. The CAM is the most widely-used delirium screening tool worldwide²⁹⁶. It has been utilised in over 4,000 published studies and has been translated into 19 languages. It has a sensitivity of 94-100%, specificity of 90-95% and high inter-rater reliability ($k=0.92$)^{296 297}. It has been validated for use in the emergency department, intensive care and institutional care settings²⁹⁷⁻³⁰⁰. For the purpose of this project, the

objective observations of the research team and collateral information from carers and familiar staff were used to complete the tool. (Chapters Four and Five)

Information on reason for admission, medical and surgical history, family history, progress during stay, medical complications and discharge diagnosis was obtained from self-report, carers, medical notes, discharge correspondence and the EPR. (Chapters Four, Five, Six and Seven)

Details on amount of alcohol consumed in units per week and smoking history by self-report and carer information were recorded. (Chapter Four)

A list of medications being administered at the time of the study was recorded from the subjects' medication kardexes. This record was subsequently compared with medication prescription provided at discharge. (Chapter Six)

QTc measurement was obtained from electrocardiograms (ECG). (Chapter Six)

Mental Health Data

The 4-Item Geriatric Depression Scale (GDS-4)³⁰¹ (Appendix F) and the short form of the Geriatric Anxiety Inventory (GAI-SF) (Appendix G)³⁰² were used to screen for depression and anxiety respectively (Chapter Four). The GDS-4 compared favourably with the 30-item, 15-item and 10-item versions of the Geriatric Depression Scale (GDS)³⁰³ among a large group (n=586) of community-dwelling elderly³⁰¹. In fact, the diagnostic value of the various iterations did not differ significantly, though difficulty in completing the 30-item version was noted. When compared against the diagnostic interview schedule as the reference standard, the GDS-4 had a sensitivity of 67% of and specificity of 66% using a cut-point of ≥ 2 , suggesting that these scales may be better suited for exclusion rather than inclusion purposes.

The GAI-SF was developed and validated by the authors of the original 20-item Geriatric Anxiety Inventory (GAI)^{302 304}. When applied amongst community-dwelling women aged 60 years and over against the Mini International Neuropsychiatric Interview, version 5 (MINI-5) as the reference standard, it was determined to have a sensitivity of 75% and specificity of 87% for generalised anxiety disorder using a cut-point of 3 or more positive answers. It correlated highly with the 20-item GAI and was found to have good internal consistency (Cronbach's alpha 0.81). Follow-up validation studies among community-dwelling and institutionalised elderly have since confirmed the psychometric validity of the GAI-SF in these populations^{305 306}.

Subjects' psychiatric history was obtained from self-report, carer information and medical notes and classified as per DSM-IV diagnostic categories³⁰⁷. (Chapters Four, Five and Six)

Function

The Functional Assessment Staging Tool (FAST) ²⁶⁶ (Appendix H) was used to assess the functional capability of participants. It is the most well validated measure of the course of AD and describes a continuum of 16 stages and sub-stages from normal to most severe degree of impairment. Concurrent validity of the earlier FAST stages has been shown against the MMSE with a correlation of 0.8 ³⁰⁸. The later stages of the FAST (stages 6+), where the MMSE bottoms out due to the degree of impairment, have been shown to correlate well with a tool specifically designed to assess cognition in the severest stages of dementia (the modified Ordinal Scales of Psychological Development) with a correlation coefficient of -0.77 ³⁰⁹. Post-mortem neuropathological studies have proven criterion validity for the sub-stages of FAST Stage 7 ³¹⁰. For this project, completion of the FAST was informed by self-report, carer information and the observations of medical and allied health staff (Chapters Four and Five)

Sociodemographic Details

Sociodemographic details including age, gender, marital status, living arrangements and level of education were obtained from patients, carers, familiar staff, medical notes and the EPR. (Chapters Four, Five, Six and Seven)

Service Use

Number of admissions, length of stay and discharge arrangements were obtained from the EPR, medical notes and medical correspondence. (Chapter Four, Six and Seven)

End of Life Care Planning

Information on end of life care planning was obtained from medical notes, nursing notes, the EPR, discharge summaries and medical correspondence. (Chapter Seven)

Miscellaneous

Information on mortality at 12 months post-admission was collected from medical notes, the EPR, telephone calls to GPs and public death notices on www.rip.ie. (Chapter Four)

The acceptability of the 6CIT to patients was assessed using a specifically-designed 5-point Likert questionnaire (Appendix I). (Chapter Five)

3.3 Ethical Approval

Ethical approval was sought from and granted by the Joint Research Ethics Committee of St. James's and the Adelaide and Meath Hospitals for the studies presented in Chapters Four and Five. The studies described in Chapters Six and Seven did not involve direct patient interaction or a clinical intervention. As these studies had a

retrospective case note design, approval to proceed with these studies was given by the local (SJH) Research and Innovation Office.

3.4 Data Collection, Analysis and Writing

Data were initially recorded on paper and later entered into a Filemaker-Pro database (Chapters Four and Five) or Microsoft Excel 2010 spreadsheet (Chapters Six and Seven). All data were pseudonymised and coded using a patient identification number (PIN). Hard copies of data were stored in departmental locked filing cabinets. Electronic data were stored on password-protected computers in accordance with the SJH data protection protocol. Data were analysed using SPSS Statistics 22 for Windows on a Dell laptop. This thesis was written using Microsoft Word 2010 on a Dell laptop.

CHAPTER FOUR

THE PREVALENCE, DETECTION AND IMPACT ON OUTCOMES OF DEMENTIA AND MILD COGNITIVE IMPAIRMENT IN THE ACUTE HOSPITAL SETTING

4.1 Introduction

In line with much of the developed world, Ireland's population is ageing³¹¹. A population increase rate for the over 65 age group of 1.7% in 2006 jumped to 14.4% in 2011³¹². Data from the same year estimated that 47,000 people were living with dementia in Ireland. This figure is projected to treble in the coming 3 decades⁵⁰. With increasing age well established as the most significant risk factor for the development of dementia^{21 313}, health services must anticipate the needs of this vulnerable group and plan for how we wish them to be met.

Data suggest that the diagnosis of dementia remains grossly inadequate, even within health-care settings^{98 125-127 129 131}. Early diagnosis affords opportunities to implement appropriate multi-disciplinary care and to access medications and support services. It allows patients and carers to plan for the future. Existing data are in agreement that outcomes for hospitalised dementia patients are consistently worse than for their cognitively intact counterparts^{88 91 99 101 106}. A formal diagnosis increases the likelihood that patients will be routed toward specific care pathways which can benefit outcomes³¹⁴.

Mild cognitive impairment represents a specific risk factor for the development of dementia with multi-domain deficits highly predictive of subsequent transition¹⁴⁵. It is associated with cardiovascular disease, depression and poorer general health status^{315 316}, factors which are associated with dementia in their own right. Despite these links, however, studies examining the prevalence, detection and outcomes associated with MCI are sparse, indicating a gap in the literature around this cognitive syndrome.

In addition, hospital studies to date have tended to focus on patients admitted under acute medical services where high rates of dementia have been detected^{98 101 122 125 132 135 143}. Data on the prevalence of dementia and associated outcomes in the wider hospital setting, encompassing a broader range of specialties, are lacking. As people live longer, increasing numbers of older patients are accessing surgical, oncological and other specialty services that would traditionally have cared for a younger cohort. Information on the 'cognitive make-up' of the hospital-wide older population is crucial to plan for service provision, provide for staff education and support and ensure equitable access for patients to specialist care pathways.

The aims of this study were as follows:

- (i) to examine the prevalence of dementia, mild cognitive impairment and normal cognition among adults aged over 65 admitted to a tertiary referral general hospital via any route and under any specialty
- (ii) to delineate the characteristics of the three cohorts
- (iii) to investigate rates of detection
- (iv) to assess the outcomes of the three groups at six and twelve months.

4.2 Methods

Study design

This was a prospective, observational study of patients aged 65 years and older who were admitted to St. James's Hospital (SJH) in Dublin, Ireland.

Participants

Over a consecutive two week period in October 2014, all patients aged 65 and older who were admitted to SJH via any route (emergency, elective, hospital transfer) under any speciality (broadly categorised as medical, surgical, geriatric, haematology/oncology/radiation-oncology) were approached by a member of the research team and invited to participate in the study. Patients were excluded if they were medically unstable, receiving palliative care, unable to communicate in English or suffering from profound sensory impairment. Patients who were admitted and discharged within 72 hours were excluded due to the constraints of a small research team and time necessitated to administer a thorough cognitive battery on a large number of patients. Each patient or their carer was given verbal and written information about the study and given a minimum of 24 hours to consider whether they wished to participate. The contact details of the research team were made available for further information if required. Written informed consent was obtained prior to participation from each patient or their next of kin when the patient was deemed to lack decision-making capacity. Positive findings and novel diagnoses were clearly documented in the patients' medical notes. The clinical services of the Old Age Psychiatry team were made available to any patient, carer or treating team in the case of a query or concern regarding the findings.

Procedures and Data Collection

Patients were recruited and data collected by two Registrars and two Clinical Nurse Specialists in Old Age Psychiatry. All had undergone formal training in the use of the specific assessment tools prior to the study period and deemed competent and consistent by the supervising Consultant in Old Age Psychiatry. Members of the team were available to recruit and assess at weekends.

The Confusion Assessment Method (CAM)³¹⁷ was used to screen for delirium. Objective information about baseline cognition and mental state was obtained from family, carers and ward staff familiar with the patient to inform the CAM. Those who had a positive screen did not undergo further testing at that point. Findings were conveyed to the treating team and patients were re-assessed 2 weeks later. If they screened negatively for delirium at that point, the cognitive assessment proceeded.

Demographic information, reason for admission, medical history and prior cognitive diagnoses were obtained from the patients, their carers, the electronic patient record (EPR), medical notes, discharge summaries and GP and medical correspondence.

The cognitive assessment battery comprised the 6-CIT²⁸⁵, the sMMSE²⁷⁶ and the MoCA²⁷⁷. Scores for the sMMSE and MoCA were normed for age and level of education using the normative values from a representative sample of the older Irish population participating in the Irish Longitudinal Study on Ageing (TILDA)^{278 318}. Scores that fell to below the tenth percentile for age and level of education were deemed to indicate a cognitive impairment.

The FAST²⁶⁶ was used to assess level of functional ability with input from patients, their carers and familiar hospital staff. Additional information was obtained from allied health professional and public health nurse assessments as well as medical correspondence.

MCI was diagnosed using the Petersen Criteria which require objective evidence of cognitive impairment – in our case test scores below the tenth percentile for age and education - with largely intact functional abilities⁶³.

A diagnosis of dementia was given if cognitive and functional impairment were both present and the DSM-IV criteria for dementia were otherwise met, ie. the deficits were progressive and irreversible and an alternative cause was unlikely³⁰⁷. Patients were classified into 3 groups (Dementia, MCI, Normal) on the basis of their cognitive diagnosis.

In cases where scores between various tests were discrepant, an expert opinion was sought from the supervising Consultant who made the decision based on a review of all the available information. Cases where a decision was not reached due to either a lack of information or incomplete assessment were excluded from data analysis.

All patients were screened for depression and anxiety, using GDS-4³⁰¹ and the GAI-SF³⁰², respectively.

The burden of medical co-morbidity was calculated using the CCI²⁸⁶ with data obtained from the sources outlined above. To enhance consistency, the same doctor

calculated the CCI for all study participants with randomly-selected cases reviewed by the supervising Consultant.

Smoking and alcohol consumption was assessed by self-report or collateral information when necessary. Weekly consumption of greater than 21 units for a male and 14 units for a female was considered to indicate harmful use.

Outcomes of interest were the total length of the index admission, the discharge destination of the patient, the number of readmissions in the six and twelve months post-discharge and mortality at twelve months post-admission. The EPR and discharge summaries provided much of this information. Telephone calls to GPs and public death notifications on www.rip.ie facilitated 100% completion of outcome data. Patients who were deceased during the index admission were excluded from further outcome analysis.

Statistics

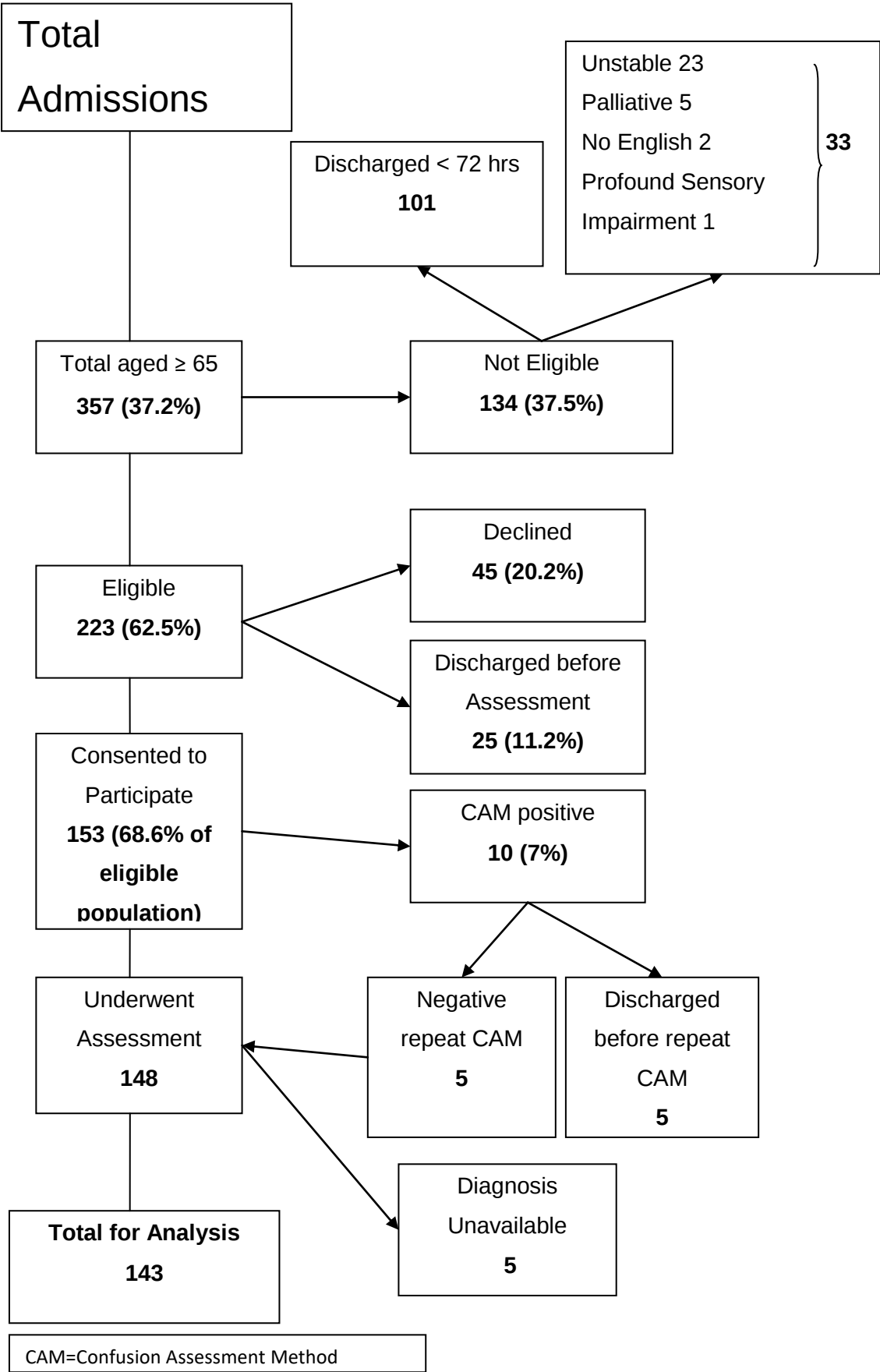
Differences between categorical variables were tested for using Pearson chi-squared tests. Continuous, non-parametric variables were examined using Mann-Whitney U Tests and Kruskal-Wallis Tests. Multiple comparisons were corrected for using the Bonferroni correction. Linear regression models were constructed to explore the relationship between cognitive status and the outcomes: length of stay and number of readmissions. Logistic regression models were used to examine the outcomes of discharge home and mortality. Cognitive status was treated as the independent variable in these analyses. Covariates included age and sex, level of education, CCI, admitting team, living circumstances, smoking and alcohol history, psychiatric history, family history of dementia, and anxiety and depression scores. Bootstrap analyses were performed to ensure the robustness of the results. Statistical significance was determined using $p < 0.05$.

4.3 Results

Figure 1 illustrates the study pathway. A total of 959 people were admitted over the two week study period of whom 357 (37.2%) were aged 65 or older. The most common reason for exclusion was patients being discharged within 72 hours of admission (75.3%). In addition, 23 (17.1%) were medically unstable, five (3.7%) were receiving palliative care, two (1.5%) were unable to communicate in English and one (0.7%) had a profound speech and hearing impairment precluding assessment.

Of the 223 patients who were eligible to participate, 45 (20.1%) declined and 25 (11.2%) were discharged before assessment. The remaining 153 patients who consented to participate represent 68.6% of the eligible study population.

Figure 1. Study Pathway



10 (6.5%) patients screened positively for delirium and were re-screened two weeks later. Five screened negatively at that point and underwent the test battery. Five had been discharged in the intervening period. 148 patients, therefore, were assessed in full. A diagnosis could not be reached for five patients and these were excluded from further analysis.

The cohort characteristics are summarised in table 5. The mean age of the participants was 78.1 years (range 65-94). 47.6% of the group were aged 80 years or older. The majority were female (55.9%). Primary level education predominated and most lived with a spouse or family member. The mean burden of co-morbidity was an index of 2.21 (with an index of 2 predictive of 90% 10 year survival).

Cognitive impairment was present in 48% of the study population with 27.3% meeting the DSM-4 criteria for dementia and 21% meeting the criteria for MCI. Of those aged over 80, dementia prevalence rose to 41.2% and 14.7% for MCI. Only 41% of those with dementia and 10% of those with MCI had a previously-documented cognitive impairment of any kind.

The characteristics of the three groups are outlined in Table 6. For the most part, the significant findings arose from differences between the dementia group and the normal group. Patients with dementia were older ($p=0.001$) by five years than those with normal cognition. They were less likely to live alone and were more prevalent among medical admissions. Dementia patients were absent amongst the over 65s receiving haem-/rad-/oncology care and were much less prevalent among those undergoing surgery. MCI patients, however, were present in each of these sub-specialties.

There was a trend to indicate that the more cognitively impaired groups had a lower level of formal education (primary education highest level achieved in 72% of dementia group vs 60% of MCI group vs 52% of the normal group) although the p -value fell to just above the cut-off for statistical significance for the dementia vs normal group ($p=0.056$). Anxiety levels emerged as highly variable across the groups ($p=0.004$) with mean anxiety screening scores highest amongst the dementia patients. By contrast, there was no difference when depression screening scores were compared.

When the Bonferroni Correction for multiple comparisons is applied, requiring a p value of < 0.004 for significance, age remains a significant factor across groups as well

Table 5. Characteristics of included patients

Variable	n(%)
Gender	
Male	63 (44.1)
Female	80 (55.9)
Age, mean (SD)	78.2 (7.4)
Marital Status	
Single	17 (11.9)
Married	58 (40.6)
Separated/divorced	11 (7.7)
Widowed	57 (39.9)
Education	
Primary	84 (58.7)
Secondary	49 (34.3)
Tertiary	10 (7.0)
Living Circumstances	
Lives Alone	53 (37.1)
Lives with Family/Other	86 (60.1)
Nursing Home Resident	4 (2.8)
Charlson Comorbidity Index, mean (SD)	2.21 (2.1)
Family History of Dementia	
Yes	28 (19.6)
No	115 (80.4)
Past Psychiatric History	
Yes	27 (18.9)
No	116 (81.1)
Smoker	
Yes	22 (15.4)
No	89 (62.2)
Former	32 (22.4)
Harmful Use of Alcohol	
Yes	23 (16.1)
No	120 (83.9)
GDS-4, mean (SD)	1.99 (11.6)
GAI-SF, mean (SD)	3.25 (11.6)
Admitting Team	
Medicine	61 (42.7)
Geriatrics	20 (14.0)
Surgery	51 (35.7)
Haem-/Rad-/Oncology	11 (7.7)
GAI-SF=Geriatric Anxiety Inventory-Short Form, GDS-4=4 Item Geriatric Depression Scale, SD=Standard Deviation	

Table 6. Characteristics of Dementia, MCI and normal cognition groups

Factor	Dementia n=39 n(%)	MCI n=30 n(%)	Normal n=74 n(%)	Test p-value			
				All Groups	Dem v MCI	Dem v Normal	MCI v Normal
Gender							
Male	15 (38.4)	16 (53.3)	32 (43.2)	$\chi^2=1.563$	$\chi^2=0.974$	$\chi^2=0.084$	$\chi^2=0.516$
Female	24 (61.5)	14 (46.6)	42 (56.7)	0.561	0.324	0.772	0.473
Age, mean (SD)	81.97 (6.72)	76.23 (6.409)	76.97 (7.413)	$\chi^2=14.6$ 0.001	Z=- 1.22 0.22	Z= -3.329 0.001	Z= -0.431 0.666
Marital Status							
Married	13 (33)	13 (43.3)	32 (43.2)	$\chi^2=6.685$	$\chi^2= 3.579$	$\chi^2=5.088$	$\chi^2=0.156$
Single	9 (23.0)	2 (6.6)	6 (8.1)	0.351	0.311	0.165	0.984
Widowed	14 (35.8)	13 (43.3)	30 (40.5)				
Separated/divorced	3 (7.6)	2 (6.6)	6 (8.1)				
Education							
Primary	28 (71.7)	18 (60)	38 (51.3)	$\chi^2=6.562$	$\chi^2= 1.077$	$\chi^2=5.771$	$\chi^2=1.916$
Secondary	8 (20.5)	9 (30)	32(43.2)	0.161	0.584	0.056	0.384
Tertiary	3 (7.6)	3 (10)	4 (5.4)				
Lives With							
Alone	15 (38.4)	8 (26.6)	30 (40.5)	$\chi^2=13.19$	$\chi^2=5.139$	$\chi^2=7.919$	$\chi^2=1.916$
Family/Other	20 (51.2)	22 (73.3)	44 (59.4)	0.01	0.077	0.019	0.384
Nursing home	4 (10.2)	0 (0)	0 (0)				
Harmful Use							
Alcohol							
Yes	4 (10.2)	4 (13.3)	15 (20.2)	$\chi^2=2.11$	$\chi^2=0.00$	$\chi^2=1.185$	$\chi^2=0.302$
No	35 (89.7)	26 (86.6)	59 (79.7)	0.348	0.987	0.276	0.583
Smoker							

Yes	10 (25.6)	5 (16.6)	7 (9.4)	X=5.284	X ² =0.894	X ² =5.237	X ² =1.161
No	21 (53.8)	19 (63.3)	49 (65.2)	0.259	0.640	0.073	0.560
Former	8 (20.5)	6 (20)	18 (24.3)				
Family Hx Dementia							
Yes	7(17.9)	5 (16)	16 (21.6)	X ² =0.423	X ² =0.00	X ² =0.046	X ² =0.090
No	32 (82)	25 (83)	58 (78.3)	0.809	1.00	0.830	0.764
Admitting Team							
Medicine	24 (61.5)	11 (36.6)	26 (35.1)	X ² =18.59	X= 14.557	X ² =15.63	X ² =0.749
MedEl	9 (23)	2 (6.6)	9 (12.1)	0.005	0.002	0.001	0.862
Haem/Rad/Onc	0 (0)	3 (10)	8 (10.8)				
Surgery	6 (15.3)	14 (46.6)	31 (41.8)				
Past Psychiatric Hx							
Yes	10	2	15	X ² =4.179	X ² =3.031	X ² =0.173	X ² = 1.980
No	29	28	59	0.124	0.039	0.678	0.159
CCI							
Mean (SD)	2.49 (2.037)	2.43 (2.012)	1.97 (2.152)	X ² =3.387 0.184	Z= -0.081 0.936	Z= -1.534 0.125	Z= -1.454 0.146
GDS 4							
Mean (SD)	0.49 (0.731)	0.50 (0.861)	0.73 (1.089)	X ² =0.535 0.765	Z= -0.471 0.638	Z= -0.790 0.430	Z= -0.723 0.470
GAI-SF							
Mean (SD)	2.84 (1.965)	1.43 (1.755)	1.99 (1.716)	X ² =11.205 0.004	Z= -3.019 0.003	Z= -1.984 0.047	Z= -1.826 0.068
CCI=Charlson Comorbidity Index, dem=dementia, GAI-SF=Geriatric Anxiety Inventory-Short Form, GDS 4=4 Item Geriatric Depression Scale, Hx=history, MCI=Mild Cognitive Impairment, MedEl=Medicine for the Elderly, SD=standard deviation, v=versus							

as in comparisons of those with dementia and those with normal cognition. Admitting team also retains significance when comparing the dementia and MCI patients as well as the dementia and normal patients. Anxiety remained a significant factor both across the groups and in comparisons of the dementia and MCI patients.

Outcomes at six and twelve months according to cognitive diagnosis are summarised in Table 7. Dementia was associated with longer hospital stays ($p=0.01$). The mean length of hospital stay for dementia patients was 15.15 days longer than for the cognitively normal group ($p=0.003$) and 13.95 days longer than for those with MCI ($p=0.042$).

There were no differences detected between the groups when comparing the number of readmissions to hospital in the six months following discharge. At twelve months, however, the dementia group had significantly more readmissions than the cognitively normal group ($p=0.036$). Cognition impacted on discharge destination ($p=0.033$) with 29.4% of dementia patients discharged to somewhere other than home in comparison to just 10% of MCI patients and 11.1% of the non-impaired group. Cognitive impairment did not impact on twelve month mortality across the groups.

When the Bonferroni correction is applied, a p -value of < 0.01 is required to retain significance. In this case, length of stay remains a significant factor across the three cognitive groups as well as when comparing those with dementia and those with normal cognition.

On multivariate analysis, the impact of cognition on outcomes remained significant for length of stay only with the strongest contribution to the model of all analysed variables. See Appendix J Length of stay increased for those with dementia after adjustment with a mean stay 15.3 days (95% confidence intervals 1.9 to 18.8, $p=0.047$) longer than for those with normal cognition. There was no significant association between cognitive status and other outcome variables on regression analyses.

4.4 Discussion

The key findings from this study are that cognitive impairment is pervasive among the elderly in the acute hospital, under-recognised by clinicians and associated with poorer outcomes. Our findings for prevalence and rates of detection of dementia are in line with the results of another Irish study which showed that 25% of patients aged over 70 were found to have dementia, of whom only 35.6% had a prior dementia diagnosis¹²⁶. When our findings are compared to similar international studies, our results place us somewhere in the middle of the spectrum. Travers et al reported dementia rates of 20.7% amongst medical and surgical admissions in Queensland, Australia¹²⁸. 42% of medically-admitted older patients in a London hospital had dementia, as reported by Sampson et al. in 2009, of whom only 49% were previously

diagnosed¹²⁵. This consistent discrepancy between the prevalence and recognition of dementia in clinical environments is striking. Clinician under-confidence, concerns about stigma, paternalism, fears around increased clinical responsibility and potential barriers to discharge are some of the factors that may contribute to the status quo⁵²

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This is all the more concerning when we see the impact that a diagnosis of dementia has on patient outcomes. Our study showed that patients with dementia had a substantially longer length of hospital stay, an association that was strengthened on multivariate analysis. Longer hospital stays for patients with dementia have been noted in earlier studies, though the strength of the association is not always consistent in multivariate models¹⁰¹. It is difficult to determine what may drive this phenomenon. Intuitively, we must consider the lengthy process necessitated in Ireland to move a patient from an acute facility to a long-term care facility. However, on multivariate analysis, those with dementia were not more likely to go to institutional care. A potential explanation may be that these patients were awaiting the placement of additional supports at home before they could be safely discharged. Perhaps they required lengthier rehabilitation periods because of their cognitive and functional deficits. They may have been more vulnerable to the development of secondary medical problems or more likely to become behaviourally disturbed in the unfamiliar hospital environment, all of which may have added to their length of stay.

We also showed, on univariate analysis, that patients with dementia were more likely to be readmitted to hospital than those with normal cognition in the year following discharge and less likely to be discharged home. Hospitalised elderly are at risk of loss of independence³¹⁹, nosocomial infection³²⁰, falls³²¹ and delirium³²².

These findings have significant implications for health care budgets. In 2015, Bail et al demonstrated that the average cost of care per hospital episode is significantly more for patients with dementia than for those without¹⁰⁰. Additionally, patients with dementia were twice as likely to suffer complications during their hospital stay, which added substantially to the overall cost of their stay. The identification of patients with dementia at an early point during a hospital admission affords an opportunity to implement enhanced discharge planning that is tailored to meet the specific needs of this group, thereby minimising the risk of some of these adverse physical, social and financial outcomes.

Table 7. Outcomes at 6 and 12 months

Factor	Dementia n=39 n (%)	MCI n=30 n(%)	Normal Cog n=74 n(%)	Test p-value			
				All	Dem v MCI	Dem v Normal	MCI V Normal
Length of Stay, mean (SD)	32.15 (33.5)	18.2 (15.2)	17.0 (21.2)	$\chi^2=9.208$ 0.010	Z=-2.034 0.042	Z=-2.990 0.003	Z=-0.409 0.683
Mean no. of readmissions in: 6 months, mean (SD)	0.82 (1.1)	0.73 (.94)	0.58 (.99)	$\chi^2=1.954$ 0.376	Z= -0.613 0.054	Z= -1.699 0.089	Z= -0.967 0.333
12 months, mean (SD)	1.21 (1.5)	0.87 (1.2)	0.84 (1.3)	$\chi^2=2.406$ 0.30	Z= -1.543 0.123	Z= -2.100 0.036	Z= -0.168 0.867
Discharge Destination							
Home	24/34 (70.5)	27/30 (90)	64/72 (88.8)	$\chi^2=6.797$	$\chi^2=2.608$	$\chi^2=4.265$	$\chi^2=0.0$
Other	10/34 (29.4)	3 (10)	8 (11.1)	0.033	0.054	0.039	1.000
Deceased at 12 months Yes	15/39 (38.4)	6/30 (20)	18/74 (24.3)	$\chi^2=3.586$	$\chi^2=1.927$	$\chi^2=1.832$	$\chi^2=0.047$
No	24/39 (61.5)	24/30 (80)	56/74 (75.6)	0.166	0.165	0.176	0.828
Dem=dementia, MCI=Mild cognitive impairment, SD=Standard deviation, v=versus							

We did not demonstrate an association between dementia and mortality. This contrasts with Sampson et al's finding in 2013⁹⁹. The mean CCI of their patient cohort was 2.8, indicating a higher burden of co-morbidity than that of our population with a CCI of 2.1. We suspect that the lower co-morbidity index in our group reflects the broad inclusion criteria which allowed us to incorporate patients from the full range of hospital specialties into our sample. We also acknowledge the possibility that some participants who were deceased at follow-up may have gone undetected due to limitations of our follow-up methodology. Our findings, however, are consistent with two other studies that failed to find an association between dementia inpatients and interval mortality after adjustment^{98 102}.

Literature examining the prevalence of MCI in hospital populations is relatively scarce. Zekry et al's 2009 prospective study reported a prevalence of 11% for MCI amongst an inpatient cohort with a mean age of 85 years¹⁰¹. 14% of our over-80s met the criteria for MCI. This figure was higher (21%) for our overall population though still significantly less than the prevalence of 36.1% detected in a large multicentre study in Munich¹⁴⁵. The decline in the prevalence of MCI with increasing age in our population coincides with an increase in dementia prevalence and may reflect the eventual transition of a proportion of patients from MCI to dementia. In accordance with our findings, MCI patients in Zekry et al's series behaved more like those with normal cognition when examining outcomes. We surmise that this may be due, in part, to the aetiological heterogeneity of MCI patients. The scope of our study did not allow for more detailed classification of our MCI patients - or, indeed, more detailed classification of our dementia patients - for example into amnesic versus non-amnesic groups, which may have allowed us to select those with a profile that was more suspicious for an underlying neurodegenerative process. Whether such a group are more vulnerable in terms of hospital outcomes remains unclear.

In contrast to findings from Timmons et al, depressive symptoms did not emerge as differing significantly between our groups¹²⁶. Mean anxiety screening scores, however, differed significantly according to cognitive status, with the highest scores detected in those with dementia. When analysed as a binary variable (positive/negative), 56.4% of patients with dementia screened positively for anxiety. This is consistent with the literature that has established anxiety symptoms as highly prevalent in dementia and associated with behavioural disturbance and increased cognitive impairment and disability^{323 324}. A hospital admission is a particularly disorientating and challenging experience for patients with dementia. Though our data do not allow us to draw conclusions as to the relative impact that this may have had on the participants' cognitive screening scores, the high prevalence of positive screens amongst those with dementia serves to underline the need to be vigilant for potentially-treatable anxiety syndromes in this group.

Our study has a number of strengths and weaknesses. Our sample was representative of the elderly population of a large Irish teaching hospital and encompassed patient groups and medical specialties that have not previously been included in studies of this nature. As a national referral centre for a number of medical and surgical specialties, the breadth of national representation and socio-economic diversity of the hospital's patient population supports the generalisability of the study's findings. Cognitive screening scores were normed for age and highest educational attainment according to the normative values established for this population. This is a unique feature of our study which enhances the interpretation and validity of our scores. Our study is also unusual in that we sought and followed MCI patients in addition to those with dementia and normal cognition. Only one other study has employed this methodology, thus far, with results broadly comparable to ours¹⁰². Our study sample was small, however, confined to a single centre and recruitment was carried out over a short time-frame. Almost one third of potentially eligible patients were discharged within 72 hours of admission. An admission of more than 48 hours was necessary to participate in two other studies of this nature but the number that was excluded as a result was not reported^{125 128}. Timmons et al did not apply such a criterion and demonstrated dementia rates reasonably similar to ours¹²⁶. However, when added to those we failed to capture prior to their discharge as well as those who declined to participate, we must acknowledge considerable potential selection bias. Analysis of basic data such as the age and gender of those who declined to participate may have provided some indication of the nature of this selection bias but our ethical permissions did not extend to the collation of non-participants' data. We must be cognisant, also, that anxiety, which was particularly prevalent amongst those with dementia, may have impacted negatively on affected participants' performance on cognitive tests, with the potential for bias, therefore, in the interpretation of their scores. We are aware, also, that rates of delirium were notably low in our population. We suspect this may be due, in part, to the composition of our patient population, which included all those admitted electively for medical and surgical procedures, a cohort that is likely to be physically well. We included, also, patients who were transferred from other hospitals, having presumably already undergone a period of treatment, as well as patients admitted from home for respite or rehabilitation. Additionally, our study methodology prescribed that patients be admitted for a minimum of 72 hours before assessments began. Delirious patients may well have responded to treatment within this time. Nevertheless, we must acknowledge the possibility that delirious patients may have been included erroneously and misclassified as having a cognitive impairment. Finally, the limitations of a small research team and finite resources necessitated the collection of a convenience sample within a brief (two week) window. A power calculation using Daniel's formula³²⁵ based on a conservative estimate for dementia prevalence in this setting and 95% confidence intervals, suggests that a sample size of 316 participants would be required

(see Appendix K). We must acknowledge, therefore, that our study is under-powered and our results should be interpreted in this light. As previously discussed, our observations are largely in line with those of much larger studies both nationally and internationally. Nonetheless, the study should be replicated with a larger sample size to test the robustness of our findings.

4.5 Conclusions

Cognitive impairment is highly prevalent within the Irish general hospital population and cognitively impaired patients are encountered in all hospital specialties. MCI patients behave similarly to those with normal cognition in terms of outcomes. Dementia patients are older, more anxious and vulnerable to poorer outcomes including longer hospital stays and the risks attendant upon this. Hospital admission should represent a key opportunity to identify those patients who may benefit from dementia-specific interventions to improve their care and quality of life. Instead, dementia remains grossly under-recognised in this setting and thousands of patients are admitted and discharged annually without their specific needs being identified and addressed. If we are to adequately address this short-coming, wide-spread clinical education, investment in resources and a change in the culture of health-care institutions and wider society will be essential.

CHAPTER FIVE

ESTABLISHING THE CLINICAL UTILITY AND PATIENT ACCEPTABILITY OF AN ULTRA-BRIEF COGNITIVE SCREENING TOOL IN THE ACUTE HOSPITAL SETTING

5.1 Introduction

Dementia and mild cognitive impairment are highly prevalent in acute hospitals and associated with poorer outcomes^{99 101}. Cognitive screening is recommended for all hospital inpatients aged 65 years and over with a view to identifying those in need of additional assistance and ensuring that they receive the specialist multi-disciplinary support that they may require¹⁶⁴. Prospective studies have repeatedly shown, however, that routine screening is not carried out and, as a result, the majority of patients with dementia or MCI who journey through our acute hospitals go undetected^{125 126}. The perceived time taken to administer a cognitive screening instrument may be a barrier to the implementation of routine screening and previous studies have highlighted the importance of very short screening tools in this context³²⁶.

The 6-Item Cognitive Impairment Test (6CIT)²⁸⁵ is a brief cognitive screening tool that is recommended for use in primary care^{150 327 328} and as a quick and reliable alternative to the MMSE with which it correlates well³²⁸⁻³³⁰. Also known as the Short Orientation-Memory-Concentration Test or the Short Blessed Test, it is an abbreviated version of the Blessed Information-Memory-Concentration Scale³³¹. Large diagnostic accuracy trials have confirmed its utility as a dementia screening tool in the general hospital^{330 332}, among patients attending a psychiatry of old age service³³³, a neurology-led cognitive clinic³³⁴ and the emergency department³³⁵. While one community-based case-control study found that the 6CIT outperformed the MMSE in the detection of mild dementia³²⁸, only one study has questioned its use in screening for mild cognitive impairment, determining that it was more sensitive than the MMSE to detect MCI but less specific³³⁴.

These studies differed, however, in a number of respects. The cut-points chosen to indicate dementia varied as well as the test(s) applied as the gold standard. The patient populations differed in their age and source. Perhaps unsurprisingly, post-hoc evaluations of the best cut-point to achieve optimal sensitivity and specificity vary in their results also. Additionally, although Abdel-Aziz and Larner commented that the 6CIT was acceptable to patients on the basis that no participant declined to be tested, there is a notable absence of objective information on the patients' views and experiences of the tool³³⁴.

This study aimed to determine whether the 6CIT has clinical utility as an ultra-brief bedside screening tool for dementia and cognitive impairment among our cohort of

elderly general hospital inpatients. We wished, also, to establish the optimal cut-points for dementia and cognitive impairment in this population. Finally, we wished to objectively assess whether the instrument was acceptable to the patients.

5.2 Methods

Study Design

There were three components to this study:

- A diagnostic accuracy component which calculated the sensitivity and specificity of the 6CIT compared to the gold standard diagnosis for different cut-points
- A comparison component which compared the sensitivity and specificity of the 6CIT to that of the sMMSE
- A qualitative component designed to objectively evaluate the acceptability of the 6CIT to our patients

Participants

Participants were recruited to the study as described in Chapter Four. The same inclusion and exclusion criteria were applied. In brief, all were inpatients of St. James's Hospital, Dublin, for a minimum period of 72 hours and aged 65 years or over. All received verbal and written information about the study procedures and written informed consent was obtained from each participant or their next of kin when necessary.

Instruments

The 6CIT consists of one memory, two attention and three orientation questions. The questions are weighted to give a total score of 28 with higher scores indicating a greater degree of cognitive impairment. It does not require collateral information or pen and paper for completion.

A simple five point Likert questionnaire was designed by the research team to evaluate the participants' experiences of the 6CIT.

The sMMSE and MoCA are widely-used cognitive screening tools which are sensitive and specific in this population^{150 284}. The FAST²⁶⁶ was used to determine functional ability.

Procedures and Data Collection

The reference standard against which the 6CIT was evaluated was diagnosis as per the full research protocol of the study described in detail in Chapter 4. A cut point of ≥ 11

on the 6CIT was chosen to indicate cognitive impairment based on the findings of Tuijl et al in a similar population³³⁰.

The researchers applied the three screening instruments (6CIT, MMSE, MoCA) in random sequence in order to minimise the risk of bias arising from a learning effect due to replicated tasks. The time taken to apply the 6CIT was measured for each participant. Immediately after completion of the 6CIT, each participant was asked to complete the Likert questionnaire.

To enhance consistency, a single researcher normed the raw MMSE and MoCA scores according to the established normative values for age and level of education in this population²⁷⁸. This researcher was blinded to 6CIT scores.

For the purpose of this study, outcomes chosen were dementia or *any* cognitive impairment (MCI + dementia). This decision was based on a wish to maximise power, given the relatively small numbers in the dementia and MCI groups, as well as a pragmatic recognition of the purpose of an ultra-brief screening tool in an acute care setting: to quickly detect those who require additional investigation and reliably out-rule those who do not.

Statistics

Diagnostic accuracy was assessed by calculating the area under the receiver operating characteristic (ROC) curves (AUC). 2 x 2 cross-tabulations of 6CIT and diagnosis according to the reference standard were composed to calculate sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) with 95% confidence intervals. The ability of the 6CIT to detect dementia and cognitive impairment was also directly compared to that of the sMMSE using a locally-validated cut-point of ≤ 23 to indicate cognitive impairment²⁸⁴. The strength of the association between the 6CIT and sMMSE was calculated by the Pearson correlation between the tests. Finally, post-hoc assessments were carried out to determine the optimal 6-CIT cut-points for dementia and cognitive impairment in this population. Data were analysed using SPSS Statistics 22 for Windows. Statistical significance was determined using $p < 0.05$.

5.3 Results

A full description of the 143 included participants is available in Chapter 4. Briefly, mean age of the cohort was 78.1 years (range 65-94) and primary level education predominated. The sample spanned the full range of hospital specialities. Cognitive impairment was present in 48% of the cohort with 27.3% meeting the DSM-4 criteria for dementia and 21% meeting the criteria for MCI.

The diagnostic accuracy of the 6CIT in the detection of (a) dementia and (b) any cognitive impairment is displayed in Figure 2. The AUC for curve Figure 2(a) was 0.904 (95% CI 0.842-0.967 $p=0.001$) indicating that the 6CIT has an excellent fit to predict dementia against the reference standard. The sensitivity of the 6CIT to detect dementia at the pre-specified cut-point of ≥ 11 was 0.79 (95% CI 0.63-0.90) and specificity was 0.81 (95% CI 0.72-0.88). The AUC for Figure 2(b) was 0.874 (95% CI 0.8120-0.936 $p=0.001$) indicating a good fit to predict *any* cognitive impairment against the reference standard at this cut-point. The sensitivity was 0.67 (95% CI 0.54-0.77) and specificity 0.94 (95% CI 0.86-0.98).

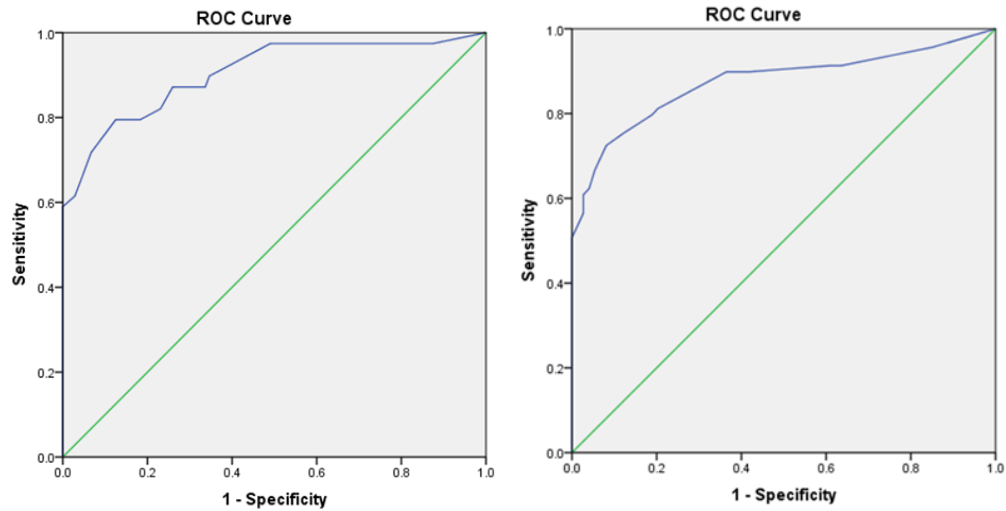
A high (negative) correlation was achieved between the 6CIT and sMMSE ($r = -0.848$, $p=0.001$). Figure 3 shows the diagnostic accuracy of the sMMSE to detect (a) dementia and (b) any cognitive impairment at the pre-specified cut-point of ≤ 23 . The area under the curve for Figure 3(a) was 0.941 (95% CI 0.904–0.978). The sensitivity of the sMMSE to detect dementia at this cut-point was 0.94 (95% CI 0.82-0.99) and specificity was 0.75 (95% CI 0.66-0.83). The area under the curve for Figure 3(b) was 0.918 (95% CI 0.872-0.964). The sensitivity of the sMMSE to detect any cognitive impairment at this cut-point was 0.78 (95% CI 0.66-0.87) and specificity was 0.89 (95% CI 0.79-0.95).

Table 8 shows the relationship between the 6CIT and dementia according to the reference standard. In this population, a cut-point of ≥ 9 achieves optimal sensitivity, as is most desirable in a screening test.

Table 9 shows the relationship between the 6CIT and any cognitive impairment according to the reference standard. A cut-point of ≥ 6 may be preferable to indicate any cognitive impairment with high sensitivity at this point, although specificity is quite low.

The 6CIT took a mean time of 2.1 minutes to administer (range 15-293 seconds) and the participants' feedback on the instrument was overwhelmingly positive. 98.6% of participants stated that they would be happy to perform the 6CIT again. They felt comfortable carrying out the tasks (86.4%) and described the test as brief (75.5%) and 'easy' (81.3%). See Table 10.

Figure 2. ROC for 6CIT using the reference standard

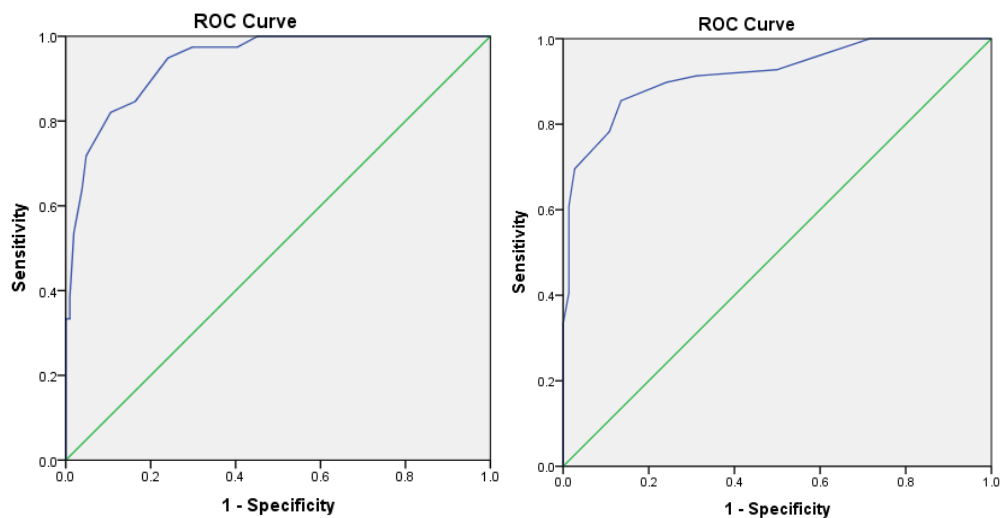


(a) 6CIT to detect dementia

(b) 6CIT to detect any cognitive impairment

6CIT=6Item Cognitive Impairment Test, ROC=Receiver Operating Characteristic Curve

Figure 3. ROC for sMMSE using the reference standard



(a) sMMSE to detect dementia

(b) sMMSE to detect any cognitive impairment

ROC=Receiver Operating Characteristic Curve, sMMSE=standardised Mini Mental State Examination

Table 8. Relationship between 6CIT and dementia as per the reference standard

6CIT Cutoffs	Dementia as per Research Protocol				Sensitivity 95% CI	Specificity 95% CI	PPV 95% CI	NPV 95% CI
	Yes		No					
	6CIT +	6CIT -	6CIT +	6CIT -				
≥ 8	34	5	35	69	0.87 0.72-0.95	0.66 0.56-0.75	0.49 0.41-0.56	0.93 0.85-0.96
≥ 9 ^b	34	5	27	77	0.87 0.72-0.95	0.74 0.64-0.82	0.55 0.47-0.64	0.93 0.87-0.97
≥ 10	32	7	24	80	0.82 0.66-0.92	0.76 0.67-0.84	0.57 0.47-0.66	0.91 0.85-0.95
≥ 11 ^a	31	8	19	85	0.79 0.63-0.90	0.81 0.72-0.88	0.62 0.51-0.71	0.91 0.85-0.95
≥ 12	31	8	15	89	0.79 0.63-0.90	0.85 0.76-0.91	0.67 0.58-0.80	0.91 0.85-0.95
≥ 13	31	8	13	91	0.79 0.63-0.90	0.87 0.79-0.93	0.70 0.55-0.77	0.91 0.85-0.95
≥ 14	30	9	11	93	0.76 0.60-0.88	0.89 0.81-0.94	0.73 0.60-0.83	0.91 0.85-0.94
≥ 15	28	11	7	97	0.71 0.55-0.85	0.93 0.86-0.97	0.80 0.65-0.89	0.89 0.84-0.93
≥ 16	26	13	5	99	0.66 0.49-0.80	0.95 0.89-0.98	0.83 0.68-0.92	0.88 0.82-0.92
≥ 17	24	15	3	101	0.61 0.44-0.76	0.97 0.91-0.99	0.88 0.71-0.96	0.87 0.81-0.90
6CIT=6 Item Cognitive Impairment Test, CI=Confidence Intervals, NPV=Negative Predictive Value, PPV=Positive Predictive Value								

a: pre-specified cut-point b: optimal cut-point in this population

Table 9. Relationship between 6CIT and any cognitive impairment as per the reference standard

6CIT Cutoffs	Dementia as per Research protocol		Sensitivity 95% CI		Specificity 95% CI	PPV 95% CI	NPV 95% CI
	Yes		No				
	6CIT +	6CIT -	6CIT +	6CIT -			
≥ 3	63	6	47	27	0.91 0.82-0.96	0.365 0.25-0.48	0.57 0.52-0.61
≥ 4	63	6	45	29	0.91 0.82-0.96	0.392 0.28-0.51	0.58 0.53-0.63
≥ 5	62	7	31	43	0.89 0.80-0.95	0.581 0.46-0.69	0.66 0.60-0.72
≥ 6^c	62	7	27	47	0.89 0.80-0.95	0.635 0.51-0.74	0.69 0.62-0.75
≥ 7	56	13	15	59	0.81 0.69-0.89	0.79 0.68-0.88	0.78 0.70-0.85
≥ 8	55	14	14	60	0.79 0.68-0.88	0.81 0.70-0.89	0.79 0.70-0.86
≥ 9	52	17	9	65	0.75 0.63-0.84	0.87 0.78-0.94	0.85 0.75-0.91
≥ 10	50	19	6	68	0.72 0.60-0.82	0.91 0.83-0.96	0.82 0.79-0.94
≥ 11	46	23	4	70	0.66 0.54-0.77	0.94 0.86-0.98	0.92 0.81-0.96
≥ 12	43	26	3	71	0.62 0.49-0.73	0.95 0.88-0.99	0.93 0.82-0.97
≥ 13	42	27	2	72	0.60 0.48-0.72	0.97 0.90-0.99	0.95 0.84-0.98
6CIT=6 Item Cognitive Impairment Test, CI=Confidence Intervals, NPV=Negative Predictive Value, PPV=Positive Predictive Value							

c: optimal cut-point in this population

Table 10. Participants' experiences of the 6CIT

	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
This memory test was easy	20.1%	61.2%	8.6%	7.9%	2.2%
This memory tests took a long time	2.2%	14.4%	7.9%	56.8%	18.7%
This memory test made me feel uncomfortable	3.6%	6.5%	3.6%	54.0%	32.4%
I would be happy to do this memory test again	40.3%	58.3%	0.7%	0.7%	0%

5.4 Discussion

The main findings of this study are that the 6CIT is a reliable tool for the detection of dementia in our elderly, non-delirious, general inpatient population. Its ability to detect cognitive impairment of any kind is also good but less precise. Improved psychometrics can be achieved in this cohort by applying cut-points of ≥ 9 and ≥ 6 for dementia and cognitive impairment, respectively. The 6CIT correlates highly with the SMMSE, is administered briefly and is viewed positively by the participants.

Our pre-specified cut-point of ≥ 11 was chosen based on the findings of Tuijl et al³³⁰. They found that ≥ 11 on the 6CIT paired optimally with a cut-point of ≤ 23 on the MMSE to indicate cognitive impairment among a sample that was similar to ours. Our post-hoc analysis, however, suggests that ≥ 9 on the 6CIT would be more suitable to detect dementia in our population. At this point, the 6CIT has a sensitivity of 0.87 (95% CI 0.72-0.95) and specificity of 0.74 (95% CI 0.64-0.82). Our sample age was younger by almost 2 years and included a wider age range than that recruited by Tuijl et al, though this, alone, is unlikely to account for the differences in our findings. We surmise that our research protocol, which prospectively and robustly assessed cognition and functional abilities, was more sensitive in the detection of patients with milder dementia who would, perhaps, have been classified as cognitively normal on the basis of MMSE assessment alone. A cut-point of ≥ 9 on the 6CIT has been found to achieve the optimal balance of sensitivity and specificity in the detection of dementia in two other large studies that used elderly clinical populations^{333 335}. Abdel-Aziz and Larner found that a slightly higher threshold of ≥ 10 was most suited to their population which was substantially younger than ours with a mean age of 59 years and a much lower prevalence of dementia of 19.6%.

Abdel-Aziz and Larner also questioned whether the 6CIT was useful in the detection of MCI. In their sample, a 6CIT score of > 4 but ≤ 9 detected MCI (versus no cognitive

impairment) with a sensitivity of 0.66 and specificity of 0.70. On this basis, they concluded that the 6CIT was less discriminating in the detection of MCI than of dementia. Our study, which aimed to find the best cut-off to reliably detect those with any MCI or dementia, came to a similar conclusion. We found that a threshold of ≥ 6 on the 6CIT detected any level of cognitive impairment with high sensitivity of 0.89 (0.80-0.95) but a comparatively low specificity of 0.635 (0.51-0.74). In this case, the inverse relationship between sensitivity and specificity is quite stark. Though high sensitivity should be favoured over specificity in a screening tool, this cut-point produces a strikingly high number of false positives. The unnecessary distress for patients of a false diagnosis of cognitive impairment, as well as the additional workload for the clinicians who will be tasked with further investigating these positive results, may negate the effect of the high sensitivity. On the other hand, increasing the threshold to ≥ 7 reduces the number of false negatives but results in a substantial loss of sensitivity. We therefore agree with Abdel-Aziz and Larner that the 6CIT shows less good metrics in the detection of milder levels of cognitive impairment. This is visually discernible in the ROCs of Figure 2. However, contrary to Abdel-Aziz and Larner who found that the 6CIT outperformed the MMSE in the detection of MCI, we determined that the sMMSE was the more accurate test of the two in this regard, as is displayed in Figure 3. Nonetheless, the high sensitivity of the 6CIT in this context indicates that it has a role, all the same, in screening for MCI.

The almost uniformly positive feedback received from our patients regarding their experience of the 6CIT is an additional point in its favour, though there is remarkably little in the literature to permit a comparison with the patient experience of other assessment tools. Patient attitudes toward the MMSE have apparently yet to be considered despite over four decades of use. Two very recent papers commented on the acceptability of the MoCA among specific patient groups^{336 337}. 75% of psychiatric inpatients agreed to complete the MoCA in a 2019 study investigating cognitive impairment in this setting, leading the authors to declare the test acceptable to this patient cohort³³⁷. A more structured approach was taken by Renovanz et al in their assessment of the MoCA as a tool to assess cognition in their group of patients undergoing surgery for brain tumors³³⁶. In a structured interview with 57 patients, more than 90% found the MoCA to be easily understood, useful and not burdensome. The little qualitative research that is available on the general process of cognitive testing reports that older adults have found it to be stressful, embarrassing and a threat to their dignity^{338 339}. It is all the more heartening, therefore, that the 6CIT met with such positive feedback among our patient group.

The 6CIT has other properties which add to its attractiveness as a screening tool in the acute care setting. It correlates very well with the sMMSE but takes half the time to administer³³⁰. Our mean duration of just over 2 minutes to complete the test would be compatible with use in a busy clinical environment where clinicians are pressured

for time. Additionally, unlike the sMMSE, the 6CIT is insensitive to educational level or cultural bias^{150 328 330}. The 6CIT is a verbally-administered tool that does not require pen and paper or other specialised equipment, making it suitable for use among the visually-impaired³⁴⁰ or for administration over the telephone. It is easily translatable into other languages^{328 330} and formal training in its use is not required. Importantly, with up to half of hospitalised dementia patients experiencing delirium during their inpatient stay¹²⁶, the 6CIT has been shown to reliably out-rule delirium in older hospital patients³³⁵ and may be able to discriminate between the cognitive impairment due to delirium and that due to dementia³⁴¹. A disadvantage is the unusual negative scoring system which may prove initially confusing to those more familiar with the MMSE or MoCA.

The main strength of this study is the robustness of the reference diagnosis against which the 6CIT was assessed. Only one other study outlines a diagnostic methodology of comparable integrity, encompassing both psychometric and functional evaluation with results broadly similar to ours³³⁵. Abdel-Aziz and Lerner may well have achieved a similarly robust reference diagnosis in their memory clinic population but the particulars of their diagnostic process are not outlined in the resulting paper³³⁴. Unlike all other studies, our sample population was drawn from the full scope of general hospital specialties and is, we would argue, more representative of the elderly general hospital population, as a result. Another unique feature of our study is that we addressed a broader concept of cognitive impairment than, merely, dementia. 21% of our cohort met the criteria for MCI, of whom only 10% were previously documented as cognitively impaired³⁴². Our study has shown that the 6CIT can quickly and sensitively detect these patients, though a second-step test is likely to be required to identify the false screen positives. Our study is also the first to objectively assess how participants received the 6CIT with very positive results.

Our study is limited by the relatively small numbers included and the single-centre location. The loss of potential recruits due to the restrictions of a small research team and the demands of our study protocol may have introduced inadvertent selection bias. Additionally, we specifically chose to exclude patients with delirium from our sample but acknowledge that despite the use of a well-validated delirium screening tool (the CAM³¹⁷), we may have erroneously included and misclassified some delirious patients as suffering from a dementia or MCI.

5.5 Conclusions

The 6-CIT is sensitive and specific in the detection of dementia in an elderly general hospital inpatient population. It correlates well with the sMMSE. It may be of more clinical utility in the detection of dementia than MCI, though it has value in this situation also. The time to administer the tool is brief and it is acceptable to patients. Additional advantages include not needing a pen and paper and its insensitivity to

educational level and cultural factors. As such, we propose that the 6-CIT is a satisfactory choice as an initial bedside cognitive screening tool in the acute hospital setting.

CHAPTER SIX

ANTIPSYCHOTIC PRESCRIBING PRACTICES AMONGST ELDERLY HOSPITAL INPATIENTS

6.1 Introduction

Age-related physiological changes in body composition, metabolism and receptor functioning, as well as comorbid illnesses and the polypharmacy that accompanies them, render the elderly particularly vulnerable to the unwanted effects of medications. The particular risks associated with antipsychotic use in the elderly first came to prominence following the series of black box warnings issued by the FDA in the early to mid-2000s^{193 197 198}. Though these warnings were based on data pertaining to dementia patients, specifically, they served to caution against their use in the elderly in general.

Nonetheless, antipsychotic medications are still commonly prescribed for the elderly for a range of behavioural and psychiatric/psychological disturbances. Rates are highest among hospital inpatients or those in nursing home facilities^{47 176 210 343}. A hospital admission can be a particularly disorientating experience for an elderly person who must negotiate an unfamiliar environment staffed by busy and changing personnel while physically unwell. These difficulties are amplified in the presence of cognitive impairment or dementia. Up to 75% of hospitalised dementia patients will experience BPSD at some point during their admission¹⁸¹. This group are particularly vulnerable to delirium and its effects on behaviour, perception and mood¹²⁶. Hospital staff have reported feeling under-trained and under-resourced to appropriately manage behaviourally disturbed elderly^{112 113} and non-pharmacological interventions are under-utilised^{344 345}. This culminates in a situation where those most vulnerable to the adverse effects of antipsychotic medications become a group particularly likely to receive them. There is some evidence to suggest that the use of antipsychotics among dementia patients in Ireland may be higher than in neighbouring jurisdictions^{49 213 219}. More worryingly, it is thought that in certain cases, the prescription of antipsychotics in this cohort may be inappropriate and avoidable⁴⁹.

In the last decade, efforts have been made at both local and national levels to improve how antipsychotics are prescribed and managed among this vulnerable group. Extant guidelines emphasise that antipsychotics must be used with caution in dementia and considered only where there is an imminent risk or when non-pharmacological strategies have proven ineffective^{140 221 224 225}. The patient (when possible) and carers should be fully appraised of the hoped for benefits and associated risks. Their use should be time-limited and closely monitored for efficacy and adverse effects.

The aim of this study was to examine current clinical practices around the prescription of antipsychotic medications among the elderly, hospitalised patients of St. James's

Hospital. We wished to identify (i) the indications for antipsychotic medications in this age group, (ii) determine whether they are prescribed according to best practice guidelines, (iii) investigate tolerability and adverse effects and (iv) investigate the duration of treatment and practices around discharge.

6.2 Methods

Study Design

This study was designed as a hospital-wide cross-sectional case note review.

Participants

On a single, pre-determined day (23rd February 2016), all SJH inpatients aged 65 years or older who were receiving an antipsychotic medication were identified by ward pharmacists who alerted the research team. There were no exclusion criteria.

Procedures and Data Collection

Data were collected by two Registrars in Old Age Psychiatry. Information on demographics, reason for admission, medical history and diagnoses, therapeutic interventions, adverse events and clinical contacts with patients and carers were obtained from the patients' medical and nursing notes and EPR. Medication kardexes were examined for medication history and drug doses. ECGs were sought for data on QTc intervals. All participants were followed until their index admission concluded at which point their discharge summary and medical correspondence were examined for their discharge prescription and follow-up arrangements.

Statistics

Basic descriptive analyses were carried out to characterise the subject group and current clinical practice. Quantitative data were presented as means or percentages of the whole. Categorical data were presented as yes/no binary outcome variables. Prescribed daily doses of newly-introduced antipsychotics were converted to chlorpromazine equivalents using published equivalencies for oral typical³⁴⁶ and atypical antipsychotics³⁴⁷. In the case of antipsychotics that were prescribed on a pro re nata (PRN) basis, chlorpromazine equivalents were calculated for the specified maximum permissible daily dose.

6.3 Results

On the 23rd February 2016, 59 patients aged 65 years or older were prescribed an antipsychotic medication in SJH. A substantial portion of the medical record was missing in two cases. Four records were unavailable due to legal or post-mortem proceedings. Complete data were available for 53 patients, therefore, who were

included for analysis. See Table 11 for the cohort characteristics. The mean age of the participants was 79.9 years (range 65-99 years). There was a male predominance, the majority (n=47, 88%) were living at home prior to admission and almost 80% (n=42) were admitted under the care of either the medical or geriatrics services. Almost three quarters of subjects (n=39, 73.6%) had a documented cognitive impairment of some degree at baseline. See Figure 4 for the cognitive diagnoses of the group. More than a quarter (n=15, 28.3%) had a previous history of delirium. Prevalence of cardiac disease (n=24, 45%) and significant cerebrovascular disease (n=17, 32%) was high. 17% (n=9) and 30% (n=16) had a history of a psychotic disorder and mood disorder, respectively. The mean length of admission was in excess of three months (range 7-305 days) with a median stay of 73 days and while less than 10% (n=5, 9.4%) were admitted from a nursing home, 40% (n=21) of subjects were discharged to long-term institutional care. 22% (n=12) died during the admission.

41.5% (n=22) were prescribed an antipsychotic medication prior to admission, most commonly olanzapine (n=7, 32%), quetiapine (n=6, 27%) and risperidone (n=6, 27%). 55% (n=12) of this group were also receiving a benzodiazepine or Z-drug. In 23% (n=5) of cases, the antipsychotic was changed to an alternative during the admission.

In 58.5% (n=36) of cases, the antipsychotic was started following admission. See Table 12 for the indications, considerations and outcomes of the group of patients who received a new (or alternative) antipsychotic prescription.

Of the new prescriptions (n=36), the most common indications were delirium (n=19, 53%) and BPSD (n=9, 25%). Antipsychotics were prescribed on a PRN basis only in 42% (n=15) of patients. Haloperidol was the most commonly-prescribed antipsychotic overall (n=20, 56%) followed by quetiapine (n=7, 19%).

In delirium (n=19), haloperidol (n=12, 63%) and quetiapine (n=4, 21%) were favoured. The most commonly prescribed antipsychotics in BPSD (n=9) were quetiapine (n=3 33%), haloperidol (n=3, 33%) and risperidone (n=1, 11%).

The mean prescribed daily dose among the 36 patients newly-prescribed an antipsychotic equated to chlorpromazine 69.4mg (range 25mg-375mg). See Figure 5 for an illustration of the prescribed dose range. In 8% (n=3) of these cases, multiple antipsychotics were prescribed concurrently. 41% (n=15) of patients were co-prescribed a benzodiazepine or Z-drug.

Two thirds of patients (n=24, 67%) newly-prescribed an antipsychotic had had an ECG within the three months preceding the prescription start date. In 22% (n=8) of cases, there was no ECG for at least 12 months before the antipsychotic was introduced. Another medication with effects on the QTc interval was prescribed concurrently in 42% (n=15), most commonly antidepressants (n=6, 40%), antiemetics (n=5, 33%) and

antibiotics (n=2, 13%). Of those with an available ECG (n=28), 14% (n=4) of patients were commenced on an antipsychotic with a baseline QTc interval duration of greater than 500msec. Table 13 shows the antipsychotics and doses prescribed in this group.

One or more non-pharmacological interventions were trialled before the introduction of the antipsychotic in 47% (n=17) of cases. Clear evidence of a risk-benefit discussion with either the patient or carer/next of kin (NOK) was found for 25% (n=9) of patients. The prescriber provided recommendations for monitoring or suggested indications for withdrawal or cessation of the antipsychotic in 17% (n=6) of cases. Adverse effects that were significant enough to require a reduction in dose or change of drug were noted in 17% (n=6) with equal incidence of falls, EPSEs and ECG changes.

25% (n=9) of patients newly started on an antipsychotic died during their admission. Of the 75% (n=27) that were discharged from hospital, 56% (n=15) were discharged on the new drug. Only one discharge summary (7%) provided recommendations on the future management of the antipsychotic medication.

6.4 Discussion

This study has highlighted positive and negative aspects of current practices around the prescribing of antipsychotics for elderly hospital inpatients. The number of elderly patients on antipsychotics was small. Delirium and BPSD are considered appropriate indications for antipsychotic use according to clinical practice guidelines^{348 349} and the doses administered were low.

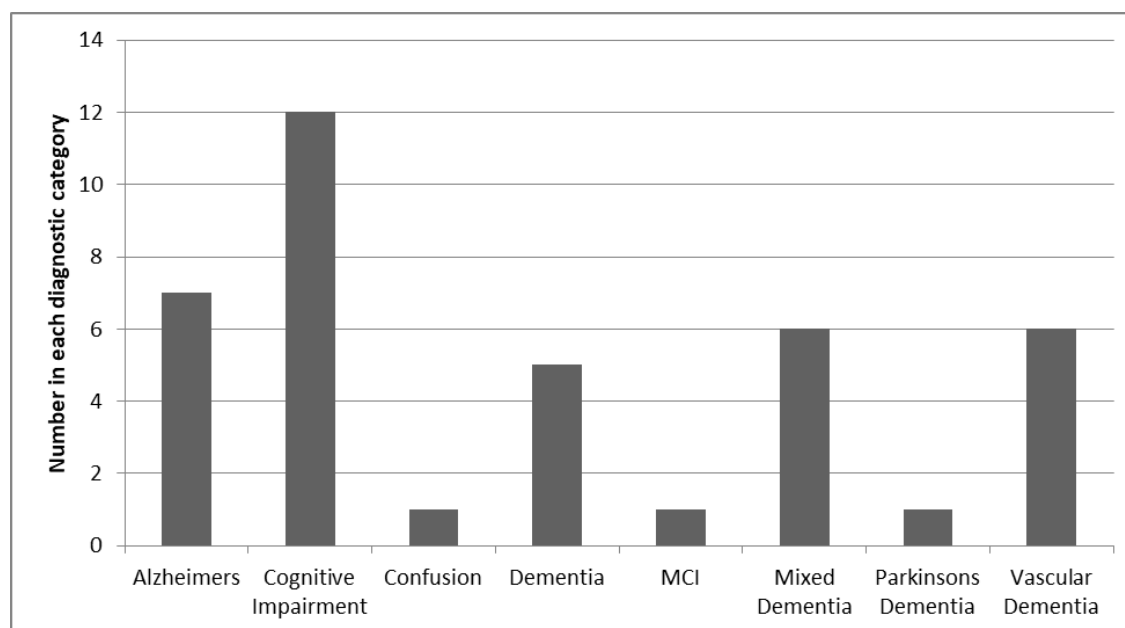
However, the cohort was particularly frail, as evidenced by the high numbers who died during the admission or were discharged to nursing home care. Furthermore, the strikingly high rate of cognitive impairment in this group is likely an underestimate of the true prevalence, as demonstrated in chapter four. Antipsychotic use in this group, therefore, should be considered carefully and managed with caution. Our findings suggest that procedures around antipsychotic prescribing in this group of frail elderly inpatients fell short of best clinical practice.

Non-pharmacological management was attempted in less than half of our patients before an antipsychotic was commenced despite the growing body of literature which supports the efficacy of a range of environmental, sensory and social interventions for behavioural disturbances in the elderly³⁴⁸⁻³⁵¹. For the most part, patients were adequately worked up for potential medical causes of distress or agitation, such as infection or dehydration. Pain assessments were notably absent, however, and potential psychological, environmental or social triggers were rarely considered unless a psychiatry or old age opinion was requested. In the absence of this comprehensive

Table 11. Cohort Characteristics

Variable	n (%)
Gender	
Male	33 (62.2)
Female	20 (37.7)
Age, mean (SD)	79.91 (7.47)
Admitting Team	
Medicine	19 (35.8)
Surgery	7 (13.2)
Geriatrics	23 (43.4)
Psychiatry	2 (3.8)
Haem-/Rad-/Oncology	2 (3.8)
Admitted From	
Home	47 (88.7)
Nursing Home	5 (9.4)
Other	1 (1.9)
Smoker	
Yes	6 (11.3)
No	47 (88.7)
Impaired Cognition	
Yes	39 (73.6)
No	14 (26.4)
History of Psychotic Disorder	
Yes	9 (17.0)
No	44 (83.0)
History of Mood Disorder	
Yes	16 (30.2)
No	37 (69.8)
History of Delirium	
Yes	15 (28.3)
No	38 (71.7)
History of Cardiac Disease	
Yes	24 (45.3)
No	29 (54.7)
History of Stroke/TIA	
Yes	17 (32.1)
No	36 (67.9)
Length of Admission, mean (SD)	98.45 (73.14)
Discharged to	
Home	18 (34.0)
Nursing Home	21 (39.6)
Other	2 (3.8)
RIP	12 (22.6)
RIP=Rest In Peace, SD=Standard Deviation, TIA=Transient Ischaemic Attack	

Figure 4. Diagnoses of the 39 cognitively impaired patients



MCI=Mild Cognitive Impairment

Table 12. Indications, considerations and outcomes for new antipsychotic prescriptions

Total n=36	n(%)
Indication	
Delirium	19 (52.8)
BPSD	9 (25.0)
Psychosis	2 (5.6)
Other	6 (16.7)
Name	
Haloperidol	20 (55.6)
Quetiapine	7 (19.4)
Risperidone	3 (8.3)
Olanzapine	1 (2.7)
Amisulpride	1 (2.7)
Multiple	3 (8.3)
Other	1 (2.7)
Prescribed 'prn' only	
Yes	15 (41.6)
No	21 (58.3)
Concurrent benzodiazepine or Z-drug	
Yes	15 (41.6)
No	21 (58.3)
ECG within:	
3 months	24 (66.7)
6 months	2 (5.6)

12 months	2 (5.6)
>12 months/none	8 (22.2)
Concurrent QTc-prolonging medication	
Yes	15 (41.6)
No	21 (58.3)
Non-pharmacological intervention attempted	
Yes	17 (47.2)
No	19 (52.7)
Discussion with patient or NOK	
Yes	9 (25)
No	27 (75)
Adverse effects	
Yes	6 (16.6)
No	30 (83.3)
Total n=27	n (%)
Discharged on antipsychotic	
Yes	15 (55.6)
No	12 (44.4)
Instructions for follow-up provided	
Yes	1 (6.6)
No	26 (93.3)
BPSD=Behavioural and Psychological Symptoms of Dementia, ECG=Electrocardiogram, NOK=Next Of Kin, prn=Pro Re Nata	

Table 13. Antipsychotics started in those with baseline QTc >500msec

QTc (msec)	Antipsychotic	Dose	Route
502	Haloperidol	0.5mg bd	po
	Quetiapine	12.5mg prn	po
507	Quetiapine	25mg od	Po
550	Haloperidol	2mg stat	po/im
522	Haloperidol	0.5mg od	Po

Chlorpromazine dose equivalents (mg)

n=36 patients

Patient Index	Dose Equivalent (mg)
1	100
2	75
3	25
4	100
5	25
6	50
7	25
8	25
9	75
10	300
11	100
12	75
13	50
14	150
15	75
16	50
17	25
18	25
19	25
20	25
21	375
22	75
23	25
24	50
25	50
26	50
27	100
28	75
29	25
30	100
31	50
32	25
33	25
34	25
35	25
36	25

We found scant documentary evidence that patients or carers were included in discussions about the rationale for starting an antipsychotic, the hoped for effects or the potential risks, as is universally recommended by prescribing guidelines. Six patients required a dose reduction or a switch to an alternative drug due to very 'visible' adverse effects. However, the quality of monitoring for tolerability in this group was poor. In a busy clinical environment, where the focus, very often, is on the

most disruptive or challenging patients, it is quite possible that more subtle unwanted effects, such as over-sedation or an acute decline in cognition, went undetected.

Cardiac monitoring was also inadequate. Both typical and atypical antipsychotics are associated with an increased risk of ventricular arrhythmia and sudden death ³⁴⁸⁻³⁵⁰. Our patients had a high prevalence of established cardiac disease and four individuals were started on an antipsychotic with a baseline QTc interval greater than 500msecs, considered a high-risk threshold. With the exception of one individual, the doses prescribed in this group were reassuringly low and treatment may well have been clinically appropriate upon risk-benefit consideration. Guidelines are inconsistent as to how the cardiac effects of antipsychotics should be monitored, though most advise a pre-treatment ECG to evaluate baseline cardiac function. This was omitted for almost one quarter of our antipsychotic-naïve patients. Clinical guidelines provide no specific recommendations for cardiac monitoring among the elderly. A guidance paper published in 2006 proposes that 'older age' should be regarded as an independent vulnerability factor in antipsychotic prescribing but offers no advice on appropriate monitoring ³⁵¹. Similarly, guidelines on the use of antipsychotics in dementia advise noting the presence of cardiac risk factors but offer no further clarity on cardiac monitoring in patients considered to be at higher risk. In the absence of clear guidance, a baseline ECG and repeat ECGs once treatment is established or following a dose increase would seem a minimum requirement among older, frail patients.

Guidelines are clearer when it comes to choosing an antipsychotic for a particular indication. The American Psychiatric Association (APA) guideline and the more recent NICE guideline, advise that haloperidol should be considered first choice in the pharmacological management of delirium due to its few anticholinergic side effects, few active metabolites and lower propensity for sedation ^{352 353}. In keeping with this, haloperidol was the drug of choice for our delirious patients. By contrast, risperidone is the only medication licensed for use in BPSD. Quetiapine and haloperidol were favoured for BPSD treatment in our group. Reasons for this are debatable. Non-psychiatric prescribers may be less familiar with risperidone than haloperidol or quetiapine and it is likely, also, that the sedative effects of quetiapine were considered desirable for a group of disruptive, unsettled patients. There is no empirical evidence or published guidance, as yet, as to whether PRN or regular antipsychotics should be favoured.

More than half of the patients that survived their admission were discharged from hospital on the new antipsychotic medication. This is particularly troubling when we reflect that the large majority of antipsychotics were apparently prescribed for the management of delirium and should have been withdrawn upon its resolution. Of still more concern, is that just one discharge summary provided recommendations to the follow-up health-care provider on the future management of the drug. Poor

communication between inpatient treating teams and primary care physicians increases the risk that the clinical responsibility for ongoing review of the medication is left undefined. Barnes et al found that almost two thirds of patients in mental health and long term care facilities had been on antipsychotics for more than six months with inadequate treatment reviews ⁴⁷. This was consistent with the findings of an earlier study conducted across multiple UK care homes ³⁵⁴. Guidelines clearly state that antipsychotic use in BPSD must be reviewed at regular intervals and a trial withdrawal should be considered after a three to six month period of behavioural stability. Discontinuation trials have demonstrated that antipsychotics can be safely withdrawn even after a prolonged period of treatment, though caution may be required among those with the most severe behavioural disturbances ^{223 354}.

41% of our patients were prescribed a benzodiazepine or Z-drug in addition to an antipsychotic. This was substantially higher than the rate of 18% seen in Barnes et al's cohort ⁴⁷. White et al found that 18% of BPSD patients in two general hospitals were being treated with a benzodiazepine or sedative but it is unclear how many of these were receiving an antipsychotic concurrently ³⁴⁵. As a general rule, the use of these drugs in the elderly should be considered with caution. Though there is no empirical data as to their efficacy in dementia, they may have a role in the management of agitation or insomnia under expert supervision ⁴⁷. The APA suggest that they may be useful as adjunctive therapy in delirium when patients are unable to tolerate sufficient doses of antipsychotics ³⁵³.

A recent observational study of 2,453 hospitalised delirious patients with a mean age of 74 years and a co-morbid dementia rate of 30% showed that antipsychotics were effective and safe when used under strict expert supervision which included fine dosage adjustment, serial clinical assessments and the early detection of side effects ³⁵⁵. When the treatment armamentarium for behavioural disturbances in the elderly is so limited, these findings should instil clinical confidence and generate therapeutic optimism. Though our findings suggest that we have some way to go before achieving this high standard, it is, nonetheless, eminently attainable via staff education, more thoughtful dissemination of resources and regular clinical audit.

This study is limited, primarily, by the small numbers captured and the single centre setting which limits the generalisability of the findings. As a retrospective case note review, we can comment only on what was documented in the medical record. For instance, the research team suspects that non-pharmacological interventions are, in fact, more regularly utilised than is captured in this review. Many of the basic components of high quality nursing care might be considered under this rubric yet are unlikely to be formally documented in the patient's record. We suspect, also, that a number of patients being treated for severe behavioural disturbance were unable to

tolerate an ECG prior to antipsychotic treatment. In these scenarios, forgoing a pre-treatment ECG may be clinically justified but not always explicitly documented.

The study's main strength is the real world snap-shot view that it provides of current prescribing practices among elderly patients covering the full range of general hospital clinical specialties.

6.5 Conclusions

Delirium and BPSD accounted for more than three quarters of new antipsychotic prescriptions among a small number of frail, elderly hospital inpatients. However, the case notes reviewed suggested that little, if any, consideration was given to non-pharmacological interventions and there was an apparent lack of consultation with carers and next of kin. This may be entirely attributable to poor documentation, however, existing data on antipsychotic prescribing practices in the Irish inpatient population suggest otherwise⁴⁹. Half of those commenced on an antipsychotic during admission were discharged on the new drug and documented communication with the follow-up health-care provider was inadequate. Though antipsychotics are important options in the treatment of behavioural disturbance in the elderly, there is significant scope for improvement in how we prescribe them and monitor their use.

CHAPTER SEVEN

END OF LIFE PLANNING PRACTICES AMONG HOSPITAL PATIENTS WITH DEMENTIA AWAITING LONG TERM NURSING HOME CARE

7.1 Introduction

As is the case in much of Europe and the USA, the majority of people with dementia in Ireland will die in either acute hospitals or long-term care facilities^{115 356 357}. A hospital or care-home admission should, ideally, represent an opportunity for patients, carers and health professionals to evaluate the current needs and future expectations of all stakeholders. In reality, health-care settings evoke substantial concern about their ability to appropriately meet dementia-specific needs and the quality of their care practices, particularly as the end of life approaches^{49 254}.

In Chapter One I discussed some of the persisting barriers that hinder the delivery of high quality end of life care (EOLC) to people with dementia. Among these barriers is a lack of recognition among front-line clinicians that dementia is a life-limiting illness with specific needs which are amenable to palliation^{236 257 261}. Additionally, medical and nursing staff report feeling uncomfortable and poorly-equipped to discuss issues related to death and dying with patients and carers^{253 356}. Yet, early indications are that medical staff are receptive to improving their knowledge and skills in this area and the accumulating body of evidence supports palliative care-informed open conversations and care planning in dementia^{273 356}. Furthermore, the Irish Hospice Foundation and the Alzheimer Society of Ireland have emphatically endorsed the adoption of a palliative-informed clinical approach from the point of dementia diagnosis right through the entire illness trajectory, a recommendation which has since been ratified in the Irish National Dementia Strategy^{82 244}.

This study aims to (i) identify whether a palliative approach to end of life planning is considered in elderly, cognitively impaired patients admitted to a transitional care unit to await nursing home placement, (ii) assess the quality of clinical handover information around the diagnosis of cognitive impairment and future plan of care.

7.2 Methods

Study Design

This was a retrospective case note study conducted among residents of Hollybrook Lodge (HL), a 50-bed community-based unit which is affiliated with SJH.

Participants

HL was initially established as a 'transitional care' unit, facilitating continuing care for older SJH inpatients whose acute care had concluded and were awaiting either

discharge home with additional supports or long term nursing home care. All admissions to HL for the first year of its operation as a transitional care facility (2014-2015) were sought. Participants were included if there was (a) a formal diagnosis in the medical record of dementia or a diagnosis of cognitive impairment with documentary evidence of impaired ADLs felt to be attributable to the cognitive impairment and (b) the reason for admission to HL was to await appropriate nursing home placement.

Procedures and Data Collection

An initial literature review was conducted to inform a core group of SJH healthcare professionals with links to HL and an interest in palliative care (see Chapter 1.6). The group consisted of a General Practitioner, a Geriatrician, two Consultants in Palliative Medicine, a Clinical Nurse Manager III, an EOLC Coordinator, and a Consultant and Registrar in Psychiatry for the Elderly. The group considered the literature with a view to distilling a sequence of questions and standards which would best capture the current practices around the provision of EOLC to this cohort of patients. The standards were operationalised in a binary fashion and were marked as present or absent on the basis of the medical record (Appendix J).

Data were collected by two registrars in Psychiatry for the Elderly in 2016 and 2017. Medical, nursing and allied health professionals' notes as well as the EPR were reviewed retrospectively to obtain demographic information, medical diagnoses and outcome data. Medical notes were examined for evidence that a palliative approach to end of life care planning had been adopted by the treating team. The quality of information around diagnosis and EOLC planning communicated between clinicians at key transition points (SJH to HL and HL to nursing home) was reviewed by examining discharge summaries and clinical correspondence.

Statistics

Descriptive statistics were used to report on patient characteristics. Quantitative data were presented as means or percentages of the whole. Categorical data were presented as yes/no binary outcome variables.

7.3 Results

Study Cohort

The study pathway is illustrated in Figure 6. A total of 115 patients with dementia were admitted to HL from SJH to await nursing home placement. The characteristics of the cohort are displayed in Table 14. Over two thirds (n=80, 69.6%) were female, the vast majority were admitted to hospital from their own home (n=108, 93.9%) and more than half were widowed (n=62, 53.9%). The mean age of the group was 84 years

(range 62-98 years). Close to one third (n=34, 30%) were admitted following a fall while over half (n=65, 57%) had a history of falls. A similar proportion had a history of delirium (n=62, 54%). The full spectrum of dementing illnesses was represented among the group, though 58% (n=67) were undifferentiated. 44% (n=51) had a past history of psychiatric illness of whom 18% (n=9) were documented as having experienced BPSD. The mean length of admission to SJH was almost four months (112 days, range 6-758 days, median 86 days). This was only slightly longer than the mean length of stay in HL (102 days, range 1-477 days, median 73 days).

Figure 6. Study pathway

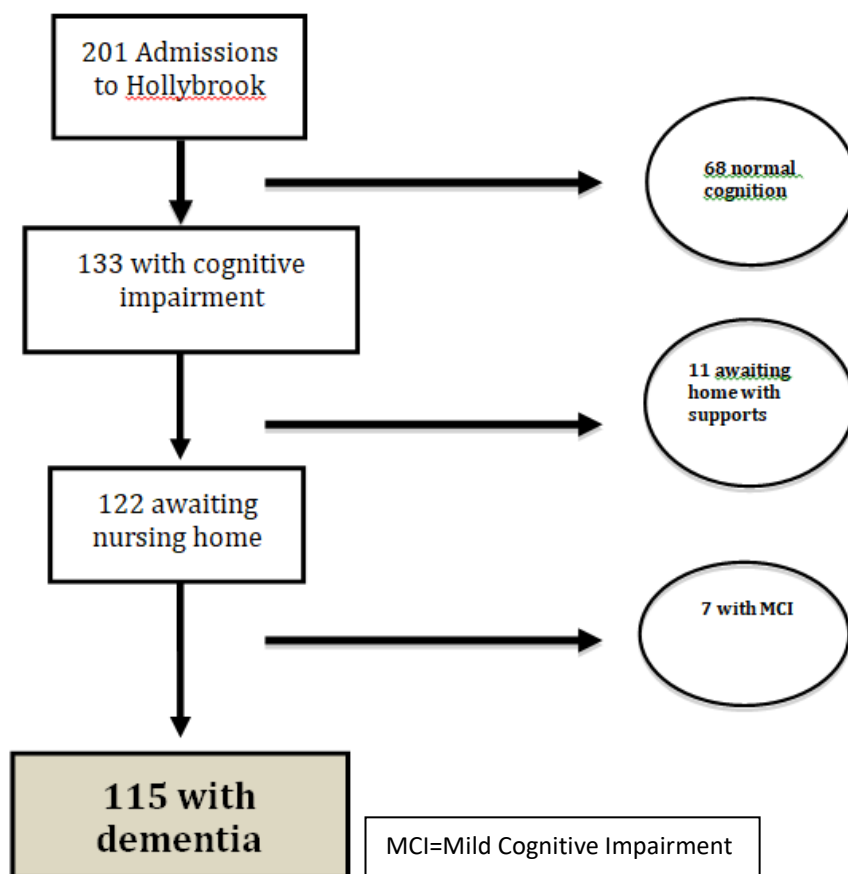


Table 14. Characteristics of the study cohort

Variable	n (%)
Gender	
Male	35 (30.4)
Female	80 (69.6)
Age, mean (SD)	83.7 (6.861)
Marital Status	
Single	28 (24.3)
Married	22 (19.1)
Separated/divorced	3 (2.6)
Widowed	62 (53.9)
Admitted from	
Home	108 (93.9)
Nursing home	4 (3.5)
Supported accommodation	3 (2.6)
Reason for SJH admission	
General Medical	33 (28.7)
Respiratory	14 (12.2)
Urosepsis	11 (9.6)
Falls	34 (29.6)
Stroke	6 (5.2)
General Surgery	2 (1.7)
Orthopaedics	6 (5.2)
Haem-/Rad-/Onc	1 (0.8)
Social	8 (7.0)
Cognitive Diagnosis	
'Dementia'	22 (19.1)
'Cognitive impairment'	45 (39.1)
Alzheimer's Dementia	16 (13.9)
Vascular Dementia	10 (8.7)
Lewy Body Dementia	7 (6.1)
Mixed Dementia	7 (6.1)
Parkinson's Dementia	5 (4.3)
Other	3 (2.6)
Psychiatric History	51 (44.3)
Depression	28
Anxiety	6
Bipolar Affective Disorder	2
Schizophrenia	2
Mixed anxiety and depression	4
BPSD	9
Past History of Delirium	62 (53.9)
Past History of Falls	65 (56.5)
Mean no. admissions to SJH in previous year (SD)	0.70 (0.975)
Mean length of stay (days), SJH (SD)	112.4 (100.6)
Mean length of stay (days), HL (SD)	101.5 (95.7)
BPSD=Behavioural and Psychological Symptoms of Dementia, SD=Standard Deviation, SJH=St. James's Hospital	

EOLC in SJH

Findings pertaining to EOLC planning practices in SJH are illustrated in Figure 7. Clear evidence of a discussion between the treating team and the patient/carers focussing on issues relating to end of life planning was found in 51.3% (n=59) of cases. 33% (n=38) of patients were involved in these discussions. A formal family meeting was held for 42.6% (n=49) of patients. The person's preferred place of care was discussed for 33% (n=38) of patients. The preferred place of death of the individual was explicitly documented in less than 2% (n=2, 1.7%) of cases. Goals of care were established for 11.3% (n=13) of patients and ceilings of care were established for 14.8% (n=17). Practical issues such as considering a will or Enduring Power of Attorney (EPOA) were discussed for 13.9% (n=16) of patients. Spiritual concerns were queried for one patient (0.9%). Resuscitation status was documented for 27% (n=31) of patients.

EOLC in HL

EOLC planning practices in HL are illustrated in Figure 8. EOLC discussions were documented for 29.6% (n=34) of patients with 13.9% (n=16) of patients involved in this discussion. A formal family meeting was held for 7% (n=8) of patients. The person's preferred place of care was documented in 11.3% (n=13) of records. The preferred place of death was established for 3.5% (n=4) of individuals. 10.4% (n=12) of patients had their goals of care documented. Ceilings of care were established for the same number. Practical issues were considered for 6% (n=7) and spiritual concerns were addressed in one case (0.9%). Resuscitation status was documented for 28.7% (n=33) of patients.

20.9% of patients (n=24) were re-admitted to SJH from HL. Reasons for readmission were falls (n=7, 29.2%), respiratory failure (n=7, 29.2%), general medical problems (n=5, 20.8%), acute surgical issues (n=3, 12.5%) and urosepsis (n=2, 8.3%).

In total, 11 patients (9.6%) were made wards of court.

11.3% of the cohort (n=13) died following their admission to HL. n=6 died in HL, n=7 died in SJH.

Figure 7. End of life care planning in SJH

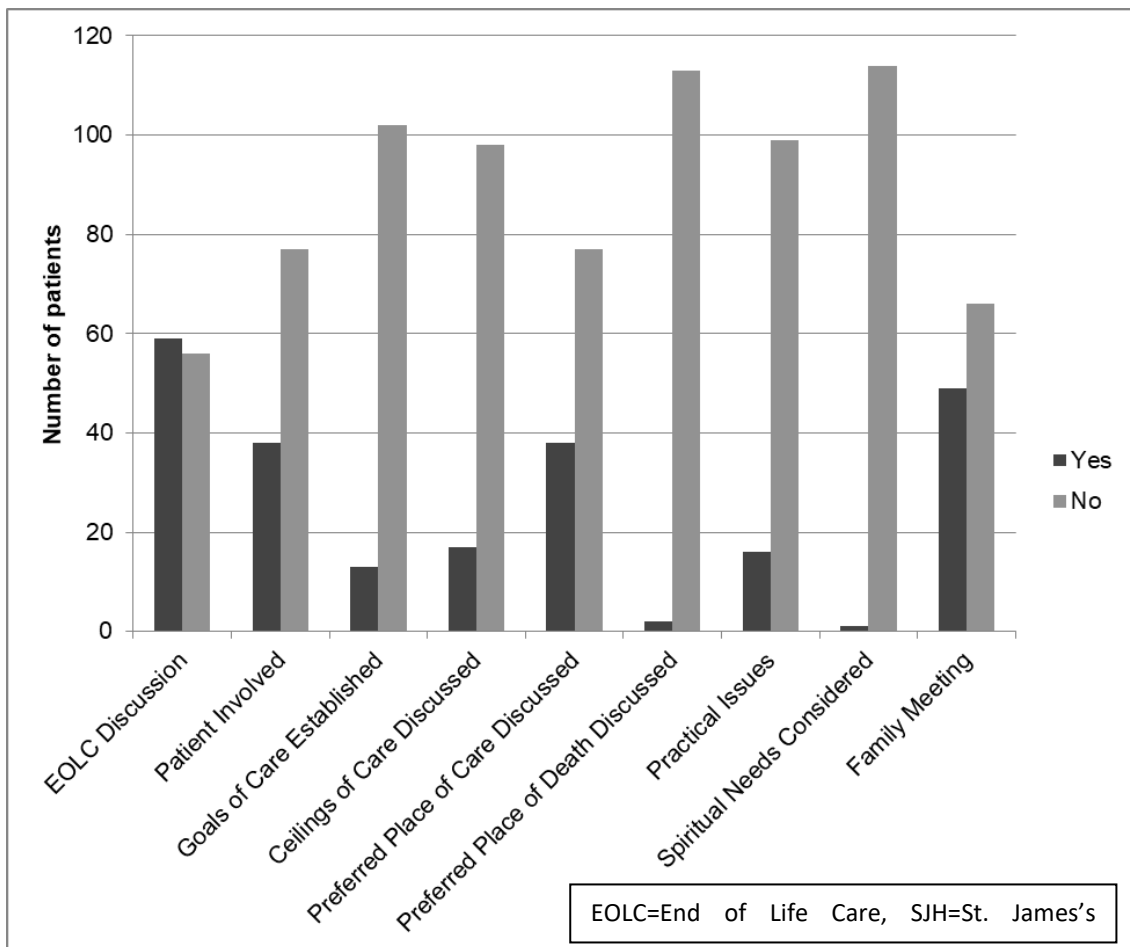
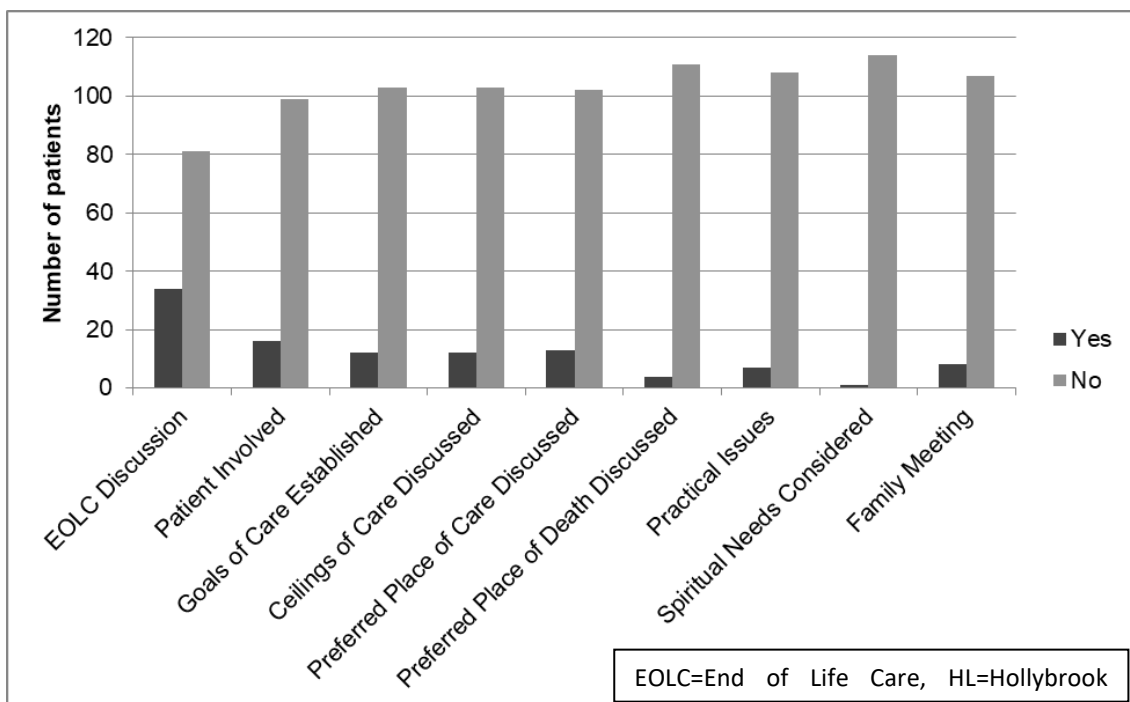


Figure 8. End of life care planning in HL



Communication at Transition Points

Figure 9 illustrates the findings from discharge summaries completed in SJH upon discharge to HL. All patients had a discharge summary completed. The patient's cognitive status was documented in 64% (n=74) of discharge summaries. Decisions around EOLC planning were outlined in 4.3% (n=5) of discharge summaries. Resuscitation status was noted for 9.6% (n=11) of individuals.

On admission to Hollybrook, the cognitive status of the patient was formally noted in 62% (n=71) of cases.

Figure 10 displays the findings from discharge summaries completed in HL upon discharge to nursing homes. Discharge summaries were not completed for the 13 patients who were deceased. An additional four patients were discharged to nursing home care without a discharge summary. Of the 98 discharge summaries that were completed, cognitive status was noted in 47% (n=46) of cases. Details of an EOLC plan were mentioned in 2% (n=2) of discharges. Resuscitation status was noted in 5% (n=5) of cases.

7.4 Discussion

Among this group of patients with dementia, whose needs were such that they required nursing home care, a palliative approach to end of life care planning appears to have been the exception rather than the rule. We identified little documentary evidence of communication between health professionals, patients and carers, limited involvement of the patient in the decision-making process and a failure to hand over critical clinical information between treating clinicians. In reality, it is likely that many more discussions were had and decisions made with families' involvement than these findings suggest. However, if these conversations are not documented, there is no clinical 'evidence' that they took place.

Just over half (n=59, 51.3%) of our patients had documentary evidence of a discussion that focussed on end of life planning before they were discharged to HL. In seeking records of such discussions we allowed fairly broad latitude to what constituted an 'end of life care planning discussion', yet this figure clearly demonstrates, at best, poor documentation of such discussions and, at worst, inadequate communication between clinical teams, patients and families. In the vast majority of cases, the end of life aspect of these discussions was implicit to the content of the conversation rather than explicitly expressed. For example, these conversations were largely focussed on the need of the individual for long term care. When this possibility is broached, families are aware that their loved one will not be returning home and will ultimately pass away in the nursing home. Yet the person's preferred place of death was explicitly noted in less than 2% (n=2, 1.7%) of cases. This suggests a culture of 'closed

awareness', where clinicians and families are aware of the approach of end of life but it is not openly discussed^{358 359}. A lack of staff

Figure 9. Findings in discharge summaries from SJH to HL

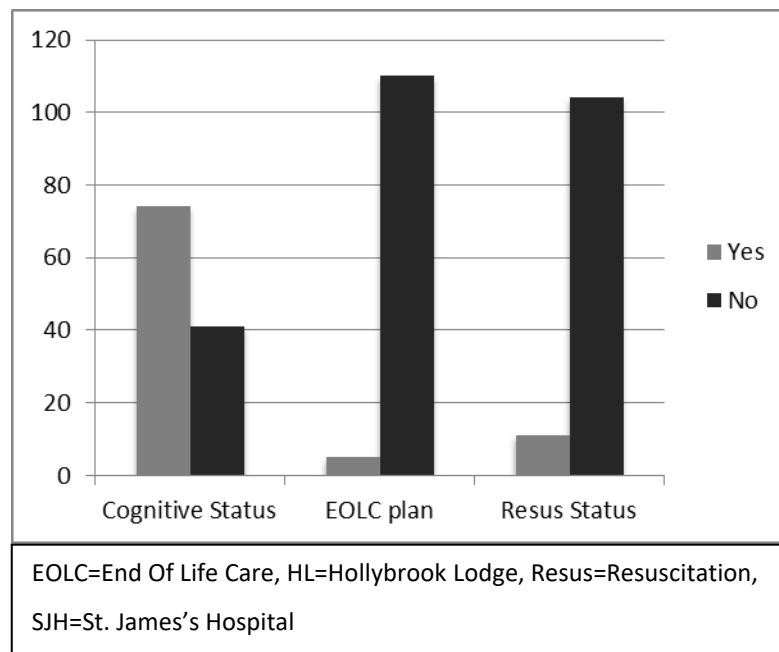
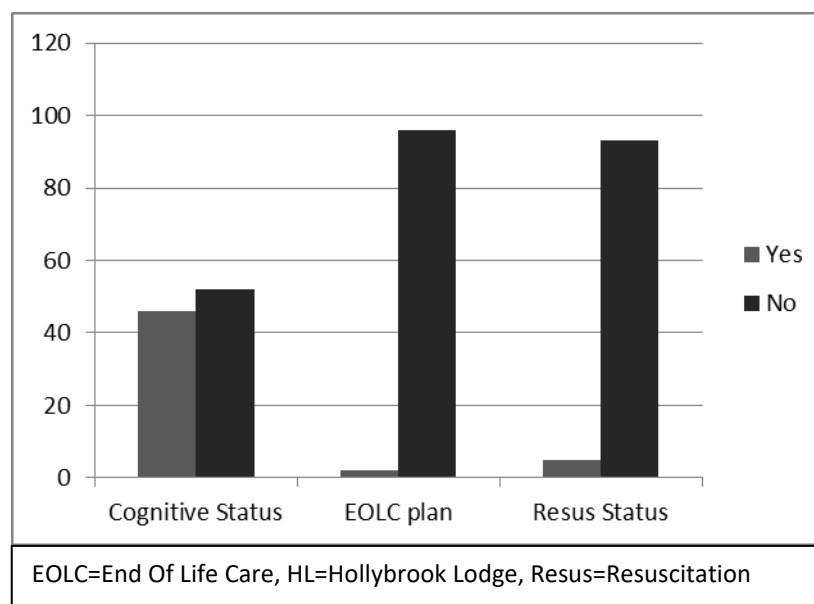


Figure 10. Findings in discharge summaries from HL to nursing homes



skills, the ethos of the institution and a wish to protect oneself emotionally, have been cited as contributing to this culture³⁵⁹.

One third (n=38, 33%) of patients had direct input into decisions to do with their care during the initial admission to SJH. We suspect that many were simply too far advanced in their illness to have the capacity to consider their preferences. One of the basic tenets of dementia palliative care is that care planning should be commenced from the point of diagnosis when patients still have the cognitive ability to partake of these conversations^{51 82}. This assumes an early diagnosis has been achieved, something that is still rare in Ireland⁵¹. Denning et al found that conceptualising future needs and considering preferences was challenging for a small group of patients with mild dementia (mean MMSE 24)³⁶⁰. In the moderate to advanced stages of the disease, this ability will inevitably decline further. The particular challenge of appropriately timing care planning discussions in dementia has been previously highlighted by a group of professionals who work with people with dementia across a range of settings³⁶¹. Though there was clear agreement that people with dementia should be given the opportunity to plan for the future, there was concern that beginning the conversation too early risked inflicting distress or despair while deferring it until later could result in the person no longer having the ability to participate in the discussion. Among this group of clinicians, the responsibility for instigating planning discussions was seen as 'someone else's problem' with families left at a loss without clinical guidance. As patient involvement declines, family decision-making necessarily increases³⁶². Indeed, the central role of family in the decision-making process distinguishes end of life care for people with dementia from end of life care for those who are cognitively intact³⁶³. Families who consider themselves involved in the decision-making process and equipped to represent their loved ones wishes report less stress, less complicated grief and overall better satisfaction with care^{271 273}.

Poor familiarity with the specific palliative framework may be another factor that contributes to an apparent lack of care planning discussions. For example, a treating doctor may advise nursing home care to provide a safe environment for an individual who is suffering recurrent falls at home. Or a family member may state that they want their loved one to be cared for in an environment where they will be content, safe and comfortable. In both situations, the 'goals of care' are being addressed but may not be recognised and documented as such by a clinician who is unfamiliar with the principles of a palliative-informed clinical approach.

A culture of closed awareness, fears about timing and poor familiarity with the palliative framework, however, cannot explain the inadequate handover of core clinical information between care teams that was evident in this review. We found no reference to a cognitive disability or dementia diagnosis in the handover documentation for one third of patients (n=41, 36%) when discharged from SJH to HL. The outcomes of care planning discussions were handed over for just 4% (n=5) of the group and resuscitation status was transmitted for fewer than 10% (n=11, 9.6%) of

individuals despite being available for 27% (n=31) of the cohort. Further loss of critical clinical information occurred upon discharge from HL: over half (n=52, 53%) of the patients may have moved to nursing home care without their new care team being made aware that they had dementia. Decisions around EOLC planning were handed over for 2% (n=2) of the patients while just 5% (n=5) of discharge summaries documented the resuscitation status of the individual. A 2010 assessment of 100 randomly sampled nursing home residents in the Dublin Mid-Leinster area showed a high prevalence of dementia (89%) though just one third of these patients had a clinical diagnosis³⁶⁴. One third of those without a diagnosis were within the severe range. A significant discrepancy was seen, also, between the perceptions of nursing staff and the actual cognitive status of the patients: 65% of those deemed to be cognitively intact by nursing staff were shown on assessment to be cognitively impaired. These findings were similar to those of another UK study which showed that just 34% of dementia patients in residential care had a formal dementia diagnosis³⁶⁵. Staff's assessment of patients' cognitive status is essential for optimising care³⁶⁴⁻³⁶⁶. Patients suffering from an unrecognised dementia cannot access dementia-specific clinical assessments, are vulnerable to the inappropriate prescription of psychotropics and may be more likely to undergo burdensome interventions in the later stages of the disease^{49 262 367}.

21% (n=24) of the cohort was re-admitted to SJH for acute care during their HL admission, reflecting the degree of frailty of the group. A determination as to the appropriateness of these re-admissions was outside the scope of this project. It was noted, however, that decisions around goals and ceilings of care were usually established by clinicians with carers over the phone in response to an acute deterioration in the patient's condition when a decision was required regarding transfer back to SJH. This pattern of decision-making in a time of crisis rather than in anticipation of a future need suggests a reactive rather than proactive approach to care. Lawrence et al identified a clear demarcation in the quality of dementia palliative care provided to nursing home residents on the basis of this ethos³⁶¹. Care homes where a unified position between clinicians, patients and families was achieved by formal discussion on issues such as hospital transfer, the need for investigative procedures and what was considered an acceptable intervention, were associated with better quality end of life care.

One of the core principles of high quality palliative care is attendance to the individual's spiritual needs^{368 369 242}. At face value, our finding that just one patient in each setting had their spiritual needs addressed is troubling. This is likely an under-representation of the spiritual care practices in both locations, however. All patients who are admitted to either SJH or HL have their religious denomination documented as part of the admission procedure. In both settings Roman Catholic and Church of Ireland chaplains routinely round the wards to offer spiritual care and support to

patients and Mass is held daily in SJH. But where a palliative care framework is not being applied to patient care these routine services will not be captured in the medical record. A 2010 comparative review of end of life care for people with and without dementia in an Irish acute hospital also noted that religious affiliation was routinely documented ³⁷⁰. Additionally, a hospital proforma for each individual demonstrated that their spiritual needs had been formally addressed. The authors concluded that the predominance of the Roman Catholic religion in this age group explains these positive findings which contrast with a comparable study in the UK ²⁵⁴. As the ethnic diversity of the Irish population increases, however, current practices may well be insufficient to provide for the spiritual needs of more diverse elderly populations.

Many of the failings identified in this study could be addressed by improved training for clinicians involved in the care of dementia patients. Casey et al's interviews with 33 staff members of Irish residential care facilities highlighted numerous examples of practical, sensitive and appropriate care for the elderly residents as they approached the end of life ³⁵⁹. However, participants reported a lack of knowledge in areas such as symptom assessment, pain management, discussions about death and dying and the provision of psychosocial care and recognised that this deficit in skills impacted on their ability to provide the best end of life care for their patients. The Irish National Dementia Strategy states that all staff who care for people with dementia should be competent with the palliative approach to dementia care while selected staff should possess general palliative care competences ⁸². The findings of this review suggest that the shift to a palliative approach to dementia care for all affected by the disease has yet to become established practice. Regardless of the stage of illness or place of care, improved training for staff in the general palliative care approach as well as the dementia-specific model of palliative care is crucial to ensure the best possible quality of life for people living with and dying from dementia.

This study is limited by the relatively small numbers included and the single site setting which may affect the generalisability of the findings. Additionally, our method of determining who did and did not have dementia was indirect and we must therefore acknowledge that some participants may have been erroneously misclassified as having dementia. As a case note review, we are able to comment only on what was documented in the medical record. To the best of our knowledge, however, this is the first study of its kind to be carried out in an Irish setting and the first in the international literature to consider the quality of handover information at clinical transition points.

7.5 Conclusions

End of life care planning for patients with dementia was poorly documented in these clinical settings, suggesting that a palliative approach to dementia care is not routinely practiced. Opportunities for patients and families to plan for their advancing needs are

being missed. Inadequate documentation, a lack of confidence and specific skills in approaching these discussions and poor understanding of the palliative approach to dementia care may be some of the reasons for these shortcomings.

CHAPTER EIGHT

CONCLUSIONS

The data presented in this thesis provide an overview of how we currently care for patients with dementia within the acute hospital, from initial admission through to end of life care. Admission to hospital can represent a significant event in the life of a person with dementia. At the very least, it should afford an opportunity to be assessed and cared for by a range of skilled health-care professionals. However, the literature points to systemic inadequacies in the care that people with dementia receive in acute hospitals. International findings indicate that dementia goes unrecognised and patients go unsupported within clinical environments. They receive treatment which may be unhelpful or potentially harmful. Opportunities to plan for the future, achieve optimal quality of life and provide support to carers are lost. General hospital outcomes are poorer for people with dementia than for their cognitively intact counterparts.

In recent years, a number of initiatives established by governmental bodies, advocacy groups and philanthropic organisations have advanced public awareness of dementia and led calls for improved services for those affected by the condition. The Programme for Government 2011-2016 committed to a strategy to improve dementia care in Ireland. The publication of the Irish National Dementia Strategy in 2014 for the first time prioritised dementia care as a matter of national policy⁸². However, there is a paucity of research into dementia care in Ireland, not least into how Irish dementia patients fare within our acute hospitals. This deficiency in local knowledge impedes the construction of a clinical framework which is tailored to the particular needs of our population. It is hoped that the findings arising from this thesis will contribute to the body of data that is essential for service planning in Ireland and, ultimately, improve the quality of life of our dementia patients, their families and carers.

The main findings of this thesis may be summarised as follows:

Cognitive impairment is highly prevalent among the elderly within the Irish acute hospital

Almost half (48%) of the patients aged 65 years or over who were prospectively assessed following their hospital admission showed evidence of cognitive impairment. This broke down to 27% who met the DSM-4 criteria for dementia and 21% who met the criteria for MCI. In keeping with international trends^{26 28 31}, the prevalence of dementia increased with greater age, affecting 41% of patients aged over 80. The reverse was found for MCI with a lower prevalence of 15% seen among the older cohort. Dementia patients were older, more anxious, less likely to be living at home prior to admission, most prevalent among medical admissions and absent among

specialities such as oncology or haematology. By contrast, people with MCI were represented among every hospital speciality.

Dementia and MCI are grossly under-recognised by clinicians

Only 41% of those with dementia and 10% of those with MCI were previously noted to have a cognitive impairment of any kind. This confirms that within the Irish context, thousands of patients journey through our acute hospitals every year without their disability identified and appropriately addressed.

Patients with dementia suffer poorer hospital outcomes

At least 15 papers have been published internationally on outcomes for hospitalised dementia patients (see Chapter One). In the first such Irish investigation, we showed that patients with dementia had a substantially longer hospital stay than those without. This association was strengthened in multivariate models. On univariate analysis, dementia patients were more likely to be readmitted during the subsequent year and less likely to be discharged home. We found no association between cognitive status and mortality rates at 12 months. These findings strengthen existing views that the acute hospital in its current configuration is a counter-therapeutic environment for those with dementia¹¹⁰. It is hoped that these data may lend additional support for the development of more 'dementia friendly' hospital environments.

Outcomes for people with MCI are similar to those with normal cognition

MCI has been shown to impact negatively on measures of behaviour, disability and healthcare costs. In accordance with the only other study that considers how people with MCI fare during an acute admission¹⁰², however, we found no impact for MCI on length of stay, number of readmissions, discharge destination or 12 month mortality.

The 6CIT is a briefly-administered and reliable tool to screen for dementia among elderly hospital inpatients

Screening tools that can be applied rapidly and reliably to older populations within the acute setting are a necessity if routine screening for cognitive impairment is to become a reality, as is recommended. We showed that the 6CIT can accurately detect dementia in our population of elderly inpatients with a sensitivity and specificity comparable to the more widely-used but longer MMSE. Its ability to detect cognitive impairment of any degree is less precise but the high sensitivity of the test in this scenario is valuable, nonetheless, in that it effectively out rules the presence of impaired cognition.

Optimal cut-points on the 6CIT in this population are ≥ 9 to detect dementia and ≥ 6 to detect cognitive impairment of any degree

The cut-point that achieves the best balance of sensitivity and specificity for any test will vary according to the particular population undergoing the investigation. Post-hoc

analyses of our data showed that cut-points of ≥ 9 and ≥ 6 on the 6CIT provide the optimal psychometrics for the detection of dementia and cognitive impairment, respectively, among our population of elderly inpatients.

The 6CIT is acceptable to patients

'Memory testing' may be a source of anxiety for patients, particularly if they already have some concerns about their memory. Lengthy tests may be burdensome for patients who are being treated for, or are recovering from, illness. Additionally, in an environment where privacy is rarely guaranteed, participating in a 'memory test' may be perceived as stigmatising. The feedback from our patients who undertook the 6CIT was overwhelmingly positive with 86.4% reporting that they felt comfortable during the test and 98.6% stating that they would be happy to encounter the test again.

The number of frail elderly inpatients receiving treatment with antipsychotic medications was small, indications were appropriate and prescribed doses were low

In welcome contradiction of concerns that the prescription of antipsychotics among the Irish elderly is inappropriately high, we found that the number of elderly inpatients receiving treatment with antipsychotics was, in fact, quite small. Additionally, doses were prescribed at the lower end of the therapeutic scale. Delirium and BPSD accounted for over three quarters of newly-commenced antipsychotics in this group, indications which are considered appropriate by clinical practice guidelines^{352 353}.

The management of antipsychotic medications in this group falls short of best practice

The group of patients captured in this study were noted to be particularly frail with a high prevalence (73%) of cognitive impairment, rendering them particularly vulnerable to the potential adverse effects of antipsychotic medications. Despite this, non-pharmacological interventions were trialled for a minority of the group before antipsychotics were started. Patient and carer involvement in treatment decisions was rare and monitoring for tolerability and adverse effects was poor. While these findings may be accounted for, in part, by poor quality medical documentation and the challenging circumstances of an emergency situation, it is more difficult to explain the troubling fact that more than half of those who were started on an antipsychotic following admission were subsequently discharged on the new drug. Of still more concern was the finding that just one discharge summary provided guidance on the future management of the drug. It is hoped that a local clinical guideline drawn up in response to the findings of this study will ameliorate these shortcomings.

A palliative approach to end of life planning is rare among patients with dementia awaiting long-term care

The palliative approach to dementia care promotes early care planning and provides a framework for the assessment of biological, psychosocial and spiritual needs in the face of progressive disability and eventual death. Our review of a distinct group of

inpatients with dementia whose needs were such that nursing home care was warranted showed that the shift toward this model of care has yet to become established practice. We suspect that our findings may be explained to a certain extent by the fact that these patients were simply too far advanced in their illness to meaningfully consider their needs and wishes according to the palliative model, though carer involvement in the process was also found to be poor. Our findings underline the importance of introducing the palliative model as soon as possible following diagnosis, as advised by the Alzheimer Society of Ireland and the Irish Hospice Foundation²⁴⁴.

Communication between clinicians, patients with dementia and their families is insufficient

Open communication within the triad of patient, carer and clinician is a central principle of the palliative approach to clinical care. Our exploration of end of life planning practices among dementia patients highlighted a culture of ‘closed awareness’ within this triad and discomfort with discussions of death and dying. Uncertainty around the best timing for these conversations almost certainly leads to their indefinite deferral. Decision-making, therefore, happens in reaction to a crisis rather than proactively in anticipation of a future need.

The quality of information which is handed over between care teams at key transition points during the journey from acute to long term care is inadequate

Poor awareness among clinicians of dementia as a life-limiting illness with specific and evolving needs has been described as a barrier to the provision of high quality end of life care^{236 256 261}. Furthermore, it has been shown that Irish nursing home staff fail to recognise the presence and degree of dementia among their patients³⁶⁴. However, the quality of clinical information that is transmitted among clinicians across care settings has not previously been scrutinised. Our study showed that despite lengthy admissions in both the acute hospital and transitional care unit, over half of the cohort was discharged to nursing home care without their future care teams being notified of their dementia diagnosis. The limited information that was available outlining care preferences and treatment plans was incrementally lost as patients moved across care settings. Diagnosis has been called the ‘Gateway for Care’. It is incumbent on health care workers to provide accurate information to those who will be involved in the future management of their patients so that they may secure the best possible care and outcomes.

A number of recommendations can be made on the basis of the findings presented in this thesis:

- Cognitive screening needs to be implemented routinely in our acute hospitals for all older patients as well as for those where a concern around cognition has been raised. A clear pathway should be in place to appropriately triage and

manage patients with a positive initial screen. It is important to emphasise that cognitive screening and dementia diagnosis are distinct entities. Although the diagnosis of dementia during an acute hospital admission remains controversial, cognitive screening is nonetheless important to identify delirium or cognitive impairment due to causes other than dementia and to 'flag' those who may warrant additional assessment once their acute care has concluded. Screening should be offered on an 'opt-out' rather than 'opt-in' basis in order to protect the rights of those who do not wish to be tested while at the same time establishing the cognitive screening process as a routine part of a hospital admission. Cognitive screening should be presented to patients and families in the same light as routine blood tests or chest x-rays. By 'normalising' the process, it is reasonable to hope that the fear and stigma that surrounds 'memory testing' may be reduced. The brief time taken to apply a screening tool is an opportunity, also, to promote good brain health and encourage positive lifestyle choices that support cognitive wellbeing.

- Dementia care pathways should be developed and implemented in all acute hospitals. Patients with dementia must be regarded as having specific cognitive, sensory and psychosocial needs. A specifically-adapted clinical care pathway that streamlines patients toward the structures and clinical expertise that best meet those needs has the potential to transform how dementia patients experience a hospital admission and improve their clinical outcomes.
- It is impossible to underestimate the importance of the environment for a person with dementia. More 'dementia friendly' hospital environments can help to minimise some of the challenges experienced by people with dementia as they negotiate the complexities of a hospital admission. Simple first steps such as clearer signs and lighting can improve accessibility and orientation. A designated quiet space can be helpful to calm anxiety and ease confusion before it becomes overwhelming.
- Basic dementia skills training should be a compulsory component of training for all hospital employees who have any contact with patients. Core competencies should include dementia awareness, clear communication skills and an understanding of drivers of challenging behaviour.
- Medical, nursing and allied health staff who work closely with the elderly or people with dementia, specifically, should be up-skilled in the recognition of cognitive impairment and how to assess its impact as well as the needs of the affected individual and carers. Specific training should be devoted to a comprehensive, multi-modal assessment of behavioural disturbance. Clinicians

should be familiarised with the palliative approach to dementia care and encouraged to apply the core concepts of person-centredness, open communication and meticulous assessment of symptoms in all their clinical contacts with dementia patients.

- A local clinical guideline should be drawn up to promote responsible antipsychotic prescribing practices among dementia patients. Its efficacy should be assessed at an interval by means of the clinical audit process.
- Processes around the appropriate transfer of clinical information upon discharge must be reviewed to ensure that GPs, community teams and any other professional who will have follow-up input into the individual's care are fully informed as to the salient clinical facts. The implications for patient safety are obvious and in an era of rapidly advancing communications technology, it is inexcusable that the current process is so patchy and fragmented.

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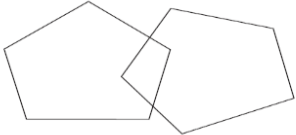
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Appendix A: Standardised Mini Mental State Examination (sMMSE)

	SCORE
1a. What year is this?	/1
1b. Which season is this?	/1
1c. What month is this?	/1
1d. What is today's date?	/1
1e. What day of the week is this?	/1
2a. What country are we in?	/1
2b. What province are we in?	/1
2c. What city/town are we in?	/1
2d. IN FACILITY – What is the name of this building?	/1
2e. IN HOME – What room are we in? IN FACILITY – What floor are we on?	/1
3 Registration - ball/ car/ man	/3
4 Spell the word WORLD. Now spell it backwards.	/5
5 Now what were the three objects I asked you to remember?	/3
6 SHOW wristwatch. ASK: What is this called?	/1
7 SHOW pencil. ASK: What is this called?	/1
8 SAY: I would like you to repeat this phrase after me: No ifs, ands or buts.	/1
9 CLOSE YOUR EYES	/1
10 Write any complete sentence	/1
	/1
	
11 Copy design	
12 3 stage command	Takes paper correctly in hand /1 Folds it in half /1 Puts it on the floor /1

Appendix B: Montreal Cognitive Assessment (MoCA)

1. **Executive Function** (Alternating Trail Making): Instruct the subject to draw a line going from a number to a letter in ascending order (/1)
2. **Visuoconstructional Skills** (Cylinder): Ask the subject to copy the cylinder (/1)
3. **Visuoconstructional Skills** (Clock): Ask the subject to draw a clock, put in all the numbers and set the time to 10 past 11 (/3)
4. **Naming** (Lion, Rhinoceros, Camel): Ask the subject to name each figure (/3)
5. **Memory** (Face, Velvet, Church, Daisy, Red): Read the list of 5 words at a rate of one per second and ask the subject to remember them as he will be asked to recall them after. Carry out two trials. After the second trial, inform the subject that he will be asked to recall them later in the test (no points)
6. **Attention** (Forward and Backward Digit Span): Ask the subject to repeat a series of five numbers that are read out to him. Then ask him to repeat a second series of three numbers in reverse order (/2)
7. **Attention** (Vigilance): Ask the subject to tap his hand every time he hears the letter A read aloud from a random sequence of letters (/1)
8. **Attention** (Serial 7s): Ask the subject to count by subtracting seven from 100 until told to stop (/3)
9. **Sentence Repetition**: Ask the subject to repeat a sentence exactly as heard. "I only know that John is the one to help today". Followed by "The cat always hid under the couch when dogs were in the room" (/2)
10. **Verbal Fluency**: Ask the subject to produce as many words as possible beginning with the letter F within one minute. Names and numbers are excluded (/1)
11. **Abstraction**: Ask the subject to explain what each pair of words has in common starting with an example: orange and banana. After the practice trial ask: train and bicycle, watch and ruler (/2)

12. **Delayed Recall:** Ask the subject to recall as many of the five learned words as possible

(/5)

13. **Orientation:** Ask for the year, month, exact date and day of the week followed by the name of this place and the city

(/6)

Add one point for individuals with 12 years or less of formal education

Appendix C: 6 Item Cognitive Impairment Test (6CIT)

Question	Score Range	Weighting	Weighted Score
What year is it?	0-1	x 4 correct = 0 incorrect = 4	
What month is it	0-1	x 3 correct = 0 incorrect = 3	
Give the memory phrase eg. (John/Smith/42/West Street/Carlow)			
About what time is it?	0-1	As above	
Count back from 20-1	0-2	x 2 correct = 0 1 error = 2 2 errors = 4	
Say months in reverse	0-2	As above	
Repeat the memory phrase	0-5	x 2 correct = 0 1 error = 2 2 errors = 4	
Total Score	0-28		

Appendix D: Charlson Comorbidity Index (CCI)

Condition	Weight
AIDS 6	6
Cerebrovascular disease 1	1
COPD 1	1
CCF 1	1
Connective tissue disease 1	1
Dementia 1	1
Hemiplegia 2	2
Leukaemia 2	2
Malignant lymphoma 2	2
MI 1	1
Peripheral vascular disease 1	1
Peptic ulcer disease 1	1
Malignant solid tumour 2	2
Metastatic solid tumour 6	6
Diabetes mellitus 1	1
Diabetes mellitus with end organ failure 2	2
Mild liver disease1	1
Moderate - severe liver disease 3	3
Moderate - severe renal disease 2	2

Appendix E: Confusion Assessment Method (CAM)

Consider the diagnosis of delirium if 1 and 2 AND either 3a or 3b are positive:

1. Acute Onset and Fluctuating Course

Is there evidence of an acute change in mental status from the patient's baseline?

Did the (abnormal) behaviour fluctuate during the day (tend to come and go, or increase and decrease in severity)?

2. Inattention

Did the patient have difficulty focusing attention (e.g. being easily distractible) or have difficulty keeping track of what was being said?

3a. Disorganized Thinking

Was the patient's thinking disorganized or incoherent: such as rambling or irrelevant conversation, unclear or illogical flow of ideas or unpredictable switching from subject to subject?

3b. Altered Level of Consciousness

Overall, how would you rate this patient's level of consciousness? (Alert [normal], vigilant [hyper-alert], lethargic [drowsy, easily aroused], stupor [difficult to arouse], or coma [un-arousable]). Positive for any answer other than "alert".

Appendix F: 4 Item Geriatric Depression Scale (GDS-4)

Are you basically satisfied with your life? YES / **NO**

Do you feel your life is empty? **YES** / NO

Are you afraid that something bad is going to happen to you? **YES** / NO

Do you feel happy most of the time? YES / **NO**

1 point for each answer in **BOLD**

SCORE: _____

Score of 2-4 suggestive of depression

Appendix G: The Geriatric Anxiety Inventory Short Form (GAI SF)

Please circle the answers according to how you've felt in the last week

I worry a lot of the time Agree / Disagree

I often feel nervous Agree / Disagree

Little things bother me a lot Agree / Disagree

I think of myself as a worrier Agree / Disagree

My own thoughts often make me anxious Agree / Disagree

SCORE ____

≥ 3 suggestive of GAD

Appendix H: Functional Assessment Staging of Alzheimer's Disease (FAST)

1. No difficulties, either subjectively or objectively
2. Complaints of forgetting location of objects. Subjective word finding difficulties
3. Decreased job function evident to co-workers; difficulty in travelling to new locations. Decreased organisational capacity*
4. Decreased ability to perform complex tasks (eg. planning dinner for guests), handling personal finances (forgetting to pay bills), difficulty marketing, etc
5. Requires assistance in choosing proper clothing to wear for day, season, occasion
6.
 - a) Difficulty putting clothing on properly without assistance
 - b) Unable to bathe properly; eg., difficulty adjusting bath water temperature occasionally or more frequently over the past weeks*
 - c) Inability to handle mechanics of toileting (eg., forgets to flush the toilet, does not wipe properly or properly dispose of toilet tissue) occasionally or more frequently over the past few weeks*
 - d) Urinary incontinence, occasional or more frequent
 - e) Faecal incontinence, occasional or more frequently over the past week
7.
 - a) Ability to speak limited to approximately a half dozen different words or fewer in the course of an average day or in the course of an intensive interview
 - b) Speech ability limited to the use of a single intelligible word in an average day or in the course of an interview
 - c) Ambulatory ability lost (cannot walk without personal assistance)
 - d) Ability to sit up without assistance lost (eg., the individual will fall over if there are no lateral rests on the chair)
 - e) Loss of the ability to smile

*Scored primarily on the basis of information obtained from a knowledgeable informant and/or caregiver

Appendix I: 6 CIT Acceptability Scale

Please circle one answer for each of the following questions:

1. THE MEMORY TEST I COMPLETED WAS EASY

Strongly agree ---- agree ---- don't know ---- disagree ---- strongly disagree

2. THE MEMORY TEST I COMPLETED TOOK A LONG TIME

Strongly agree ---- agree ---- don't know ---- disagree ---- strongly disagree

3. THE MEMORY TEST I COMPLETED MADE ME FEEL UNCOMFORTABLE

Strongly agree ---- agree ---- don't know ---- disagree ---- strongly disagree

4. I WOULD BE HAPPY TO DO THIS MEMORY TEST AGAIN

Strongly agree ---- agree ---- don't know ---- disagree ---- strongly disagree

Appendix J: Final Regression Model

Independent Variable: Cognition

Dependent Variable: Length of stay

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.458 ^a	.210	.063	24.3399
a. Predictors: (Constant), Alcohol, Psych Hx, Admitting Team, University Education, Smoker (Former), Marital Status, MCI, Family Hx Dementia, Lives in Nursing home, Depression score, Smoker (Yes), Lives with family, CCI, Secondary Education, Gender, DEMENTIA, Anxiety score, Age				

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18575.134	22	844.324	1.425	.117 ^b
	Residual	69906.610	118	592.429		
	Total	88481.743	140			
a. Dependent Variable: LOS						
b. Predictors: (Constant), Alcohol, Psych Hx, Admitting Team University education, Smoker (Former), Marital Status, MCI, Family Hx Dementia, Lives in Nursing home, Depression score, Smoker (Yes), Lives with family, CCI, Secondary Education, Gender, DEMENTIA, Anxiety score, Age						

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	21.943	31.710		.692	.490	-40.852	84.738
	Gender	8.756	5.537	.173	1.581	.116	-2.209	19.721
	Age	-.180	.387	-.053	-.465	.643	-.946	.586
	DEMENTIA	15.327	5.947	.269	2.577	.011	3.551	27.103
	MCI	5.104	5.557	.083	.918	.360	-5.900	16.108
	Admitting Team Surgery	-3.304	5.142	-.063	-.642	.522	-13.486	6.879
	Admitting Team Med EI	-4.338	10.543	-.046	-.412	.681	-25.216	16.539
	Admitting Team Medicine	5.560	7.057	.076	.788	.432	-8.413	19.534
	Lives in Nursing home	-13.775	19.513	-.065	-.706	.482	-52.416	24.866
	Lives with family	-14.195	5.976	-.276	-2.375	.019	-26.029	-2.362
	Smoker (Former)	.267	5.577	.004	.048	.962	-10.777	11.311
	Smoker (Yes)	4.551	6.812	.066	.668	.505	-8.940	18.041
	Secondary education	6.818	5.110	.130	1.334	.185	-3.302	16.938
	University education	11.079	8.991	.114	1.232	.220	-6.725	28.884
	Psych Hx	1.936	5.930	.030	.326	.745	-9.807	13.680
	Anxiety score	-.022	1.436	-.002	-.016	.988	-2.867	2.822
	CCI	.960	1.243	.079	.772	.441	-1.502	3.422
	Depression score	.741	2.622	.028	.283	.778	-4.452	5.934
	Married	6.510	7.555	.085	.862	.391	-8.450	21.470

	Single	9.939	6.762	.194	1.470	.144	-3.452	23.329
	Widowed	.152	10.011	.002	.015	.988	-19.673	19.977
	Family Hx Dementia	1.693	5.871	.027	.288	.774	-9.933	13.320
	Alcohol	7.614	6.843	.112	1.113	.268	-5.936	21.165
a. Dependent Variable: LOS								

Bootstrap for Coefficients							
Model		B	Bootstrap ^a				
			Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	21.943	.749 ^b	37.185 ^b	.571 ^b	-48.944 ^b	93.321 ^b
	Gender	8.756	.163 ^b	5.463 ^b	.128 ^b	-1.863 ^b	19.737 ^b
	Age	-.180	-.015 ^b	.462 ^b	.720 ^b	-1.119 ^b	.681 ^b
	DEMENTIA	15.327	-.408 ^b	6.780 ^b	.037 ^b	1.710 ^b	27.864 ^b
	MCI	5.104	.017 ^b	4.106 ^b	.222 ^b	-3.102 ^b	13.271 ^b
	Admitting Team Surgery	-3.304	-.281 ^b	4.737 ^b	.462 ^b	-14.103 ^b	5.585 ^b
	Admitting Team Med EI	-4.338	-.848 ^b	9.599 ^b	.659 ^b	-24.486 ^b	13.315 ^b
	Admitting Team Medicine	5.560	.224 ^b	8.335 ^b	.532 ^b	-9.146 ^b	22.588 ^b
	Lives in Nursing home	-13.775	.091 ^b	26.603 ^b	.643 ^b	-67.243 ^b	31.157 ^b
	Lives with family	-14.195	.179 ^b	6.153 ^b	.025 ^b	-26.137 ^b	-2.523 ^b
	Smoker (Former)	.267	.089 ^b	4.874 ^b	.960 ^b	-9.636 ^b	9.959 ^b
	Smoker (Yes)	4.551	.274 ^b	8.795 ^b	.626 ^b	-12.716 ^b	21.474 ^b
	Secondary education	6.818	-.521 ^b	5.555 ^b	.246 ^b	-5.544 ^b	17.428 ^b
	University education	11.079	.372 ^b	12.182 ^b	.376 ^b	-10.148 ^b	37.875 ^b
	Psych Hx	1.936	.970 ^b	6.885 ^b	.784 ^b	-9.685 ^b	16.754 ^b
	Anxiety score	-.022	-.015 ^b	1.672 ^b	.983 ^b	-3.278 ^b	3.260 ^b
	CCI	.960	.100 ^b	1.263 ^b	.467 ^b	-1.486 ^b	3.725 ^b
	Depression score	.741	-.193 ^b	2.651 ^b	.778 ^b	-4.324 ^b	6.166 ^b

	Married	6.510	.741 ^b	9.024 ^b	.468 ^b	-9.262 ^b	25.451 ^b
	Single	9.939	.337 ^b	5.794 ^b	.097 ^b	-1.388 ^b	22.235 ^b
	Widowed	.152	-.036 ^b	11.846 ^b	.992 ^b	-24.278 ^b	23.873 ^b
	Family Hx Dementia	1.693	.206 ^b	7.086 ^b	.811 ^b	-11.959 ^b	15.677 ^b
	Alcohol	7.614	.328 ^b	7.346 ^b	.302 ^b	-6.016 ^b	23.875 ^b
a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples							
b. Based on 873 samples							

Appendix K: Power Calculation to Detect the Prevalence of Dementia in the Acute Hospital Setting

Daniel's Formula³²⁵

$$n = \frac{Z^2 P (1-P)}{d^2} = 316$$

where n = sample size

Z = statistic for level of confidence

For level of confidence of 95%, Z = 1.96³⁷¹

P = expected prevalence

For the purpose of this study, expected prevalence was estimated by calculating the mean of prevalences of dementia in acute settings as determined by prospective cohort studies published since 2000 (see Chapter 1, Table 4) = 29% (0.29 in proportion of 1)

d = precision

According to Naing et al³⁷¹, a precision of 5% is appropriate if the prevalence is expected to be between 10% and 90% (0.05 in proportion of 1)

Appendix L: End of Life Care Standards

DISCUSSIONS AROUND EOLC IN SJH		
Clear documented evidence of discussion	Yes	No
Patient involved	Yes	No
Has the goal of care been defined (eg:comfort)	Yes	No
Have the ceilings of care been established (see guide)	Yes	No
Has the patients preferred place of care been assessed	Yes	No
Has the patients preferred place of death been explored	Yes	No
Have practical issues been addressed (eg: will)	Yes	No
Have the patients spiritual needs been explored	Yes	No
Formal Family meeting to discuss above	Yes	No
Resuscitation status documented	Yes	No

DISCHARGE DOCUMENTATION FROM SJH TO HL		
Cognitive status	Yes	No
EOLC plan	Yes	No
Resus status	Yes	No

DISCUSSIONS AROUND EOLC IN HL		
Clear documented evidence of discussion	Yes	No
Patient involved	Yes	No
Has the goal of care been defined (eg:comfort)	Yes	No
Have the ceilings of care been established (see guide)	Yes	No
Has the patients preferred place of care been assessed	Yes	No
Has the patients preferred place of death been explored	Yes	No
Have practical issues been addressed (eg: will)	Yes	No
Have the patients spiritual needs been explored	Yes	No
Formal Family meeting to discuss above	Yes	No
Resuscitation status documented	Yes	No

DISCHARGE DOCUMENTATION FROM HL TO NURSING HOME		
Cognitive status	Yes	No
EOLC plan	Yes	No
Resus status	Yes	No